A MULTI-COMPONENT TEXT-BASED BEHAVIOUR CHANGE COMMUNICATION INTERVENTION TO ENHANCE HIV/AIDS RISK REDUCTION AMONG LONG-DISTANCE TRUCKERS IN KENYA

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A Multi-Component Text-Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-Distance Truckers in Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

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DEDICATION

To my daughter Nadia Munee and my mother Josephine Mueni.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ARRM	AIDS Risk Reduction Model
ART	Anti-Retroviral Therapy
BCC	Behaviour Change Communication
CPD	Concept of Positive Defiance
DALYs	Disability Adjusted Life Years
DHRS	Denver HIV Risk score
DOI	Diffusion of Innovation Theory
FGD	Focus Group Discussion
FSWs	Female Sex Workers
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
IMB	Information, Motivation Behavioural Skills Model
IOM	International Organization of Migration
IRDO	Impact Research and Development Organisation
KI	Key Informant
KII	Key Informant Interviews
LDTs	Long-Distance Truckers
MOH	Ministry of Health
MSMs	Men who have Sex with Men
NASCOP	National AIDS and STIs Control Programme
NCH	Northern Corridor Highway
NCTTCA	Northern Corridor Transit and Transport Coordination Authority
NGO	Non-Governmental Organization
PEP	Post-exposure Prophylaxis
PrEP	Pre-exposure Prophylaxis
RCT	Randomized Control Trial
RRAPS	Risk Reduction Assessment, Planning, and Support
SCT	Social Cognitive Theory
SMS	Short Message Service

STIs	Sexually Transmitted Infections
TPB	Theory of Planned Behaviour
TTM	Trans-theoretical Model
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNHCR	United Nations High Commissioner for Refugees
US	United States
VCT	Voluntary Counselling and Testing
WHO	World Health Organization

DEFINITION OF OPERATIONAL TERMS

Behaviour Change	Behaviour change is a dynamic process that involves shifting from risky health behaviours to adopting, maintaining, and sustaining new behaviours that promote the health and well-being of individuals.
Behaviour Change Communication	The strategic application of communication approaches and tools to support, promote, and sustain positive health behaviours among individuals, guided by existing theories and models of behavior change.
Behaviour Change Intervention	An intervention that seeks to enable individuals to adopt and maintain positive health behaviours.
Casual Sexual Partner	A sexual partner with whom an individual has no long-lasting ties and is meeting for the first time with no intention of maintaining the relationship.
Combination Prevention	The holistic approach in HIV/AIDS risk reduction which incorporates biomedical, structural, and behavioural interventions.
DALYS	Disability Adjusted Life Years (DALYS) is the measure of the time an individual spends living with a disability and the time lost due to premature death.
Hard-to-reach Population	A population disadvantaged by the nature of their career, geographical barriers, or socio-cultural/economic disparities in accessing key health interventions like HIV/AIDS prevention.
HIV/AIDS Risk	The vulnerability to contracting an HIV infection or the progression to AIDS for those who are HIV positive.
HIV/AIDS Risk Reduction	Eliminating or lowering the odds of contracting HIV infection and decelerating the progression of HIV to AIDS among the HIV positive through targeted interventions.

HIV/AIDS Risk Reduction Practices/Behaviours	Behaviours or practices that contribute to eliminating or lowering the odds of contracting HIV, and decelerating the progression from HIV to AIDS.
HIV/AIDS Risk Reduction Services	Health services that may be biomedical or structural and are intended to facilitate the reduction of HIV/AIDS risk among individuals in the community.
Key-Population	Specific groups of the community that are disproportionately affected by the HIV/AIDS burden due to certain underlying socio-cultural/economic factors compared to the general population.
Long-distance Trucker	Drivers of heavy trucks and their assistants who transport goods within and across international borders, relatively covering distances of above 400 Kilometers daily on the road, and may spend more than a day away from their usual residence.
Most at Risk Population	Groups of the community that are more vulnerable to contracting HIV and other STIs compared to the general population.
Regular Sexual Partner	A sexual partner whom an individual frequents for sexual interactions.
Sexual Risk Behavior	Any sexual behavior that elevates the risk of contracting HIV and other STIs among individuals, and may include lack of or poor condom use, multiple sex partners, illicit drug and substance use before or during sexual intercourse, among many others.
Sexual Interaction	The act of making penetrative or non-penetrative sexual acts between two or more people through their genitalia, oral, or anal.

ABSTRACT

Chronic neglect from mainstream HIV risk reduction services and risky sexual networks often expose Long-distance truckers (LDTs) to a high risk of HIV. As such, LDTs are routinely eligible for behaviour change communication (BCC) interventions on HIV/AIDS risk reduction. However, LDTs' access to such interventions is mostly constrained by their constantly disruptive schedules. Thus, the study aimed to develop, validate, implement, and evaluate a multi-component text-based BCC intervention on HIV/AIDS risk reduction for LDTs. This was a concurrent triangulation mixed-methods study with a quantitative arm entailing a non-equivalent quasi-experimental design and a qualitative arm. The study was organized into baseline, intervention, and post-intervention phases. Initially, the LDTs were systematically sampled and then recruited into either the control (Namanga site) or the intervention arm (Busia site). Each study arm comprised 189 LDTs. At baseline, a pre-test was done to assess the baseline HIV/AIDS risk levels. Eighteen in-depth interviews and nine key informant interviews were used to collect qualitative data. Qualitative data were analyzed using a hybrid deductive-inductive approach with the QDA Miner software. Descriptive statistics and ordinal logistic regression were generated in R for the quantitative data. In phase two, an intervention informed by baseline findings was designed and validated by a team of 24 experts through an e-Delphi exercise. A two-proportion Z-test and a Cochran-Armitage test were used to compare the proportions of HIV/AIDS risk levels in both study arms. A Cramer's V test was also used to calculate the intervention's effect size. Overall, above 80% of the LDTs were at moderate (30-39%) to high-risk (≥40%) of HIV at baseline. The predictors of the HIV/AIDS risk levels were age (aPOR=0.96; p=0.01), college/university level of education (aPOR=0.09; p=0.02), days spent away from a spouse/regular partner (aPOR=1.06; p<0.0001), monthly salaries of 15,000-30000 KSH (aPOR=0.26; p=0.007) and >30,000 KSH (aPOR=0.25; p=0.004). The barriers to HIV/AIDS risk reduction were mainly health system-related factors. Existing BCC strategies on HIV/AIDS risk reduction were media-based, healthcare worker-driven, peer-educator-driven, outreach-based, and NGO-driven. A total of 57 multi-component BCC items were rated by 24 experts in two rounds of an e-Delphi exercise. Subsequently, the BCC items were shared with participants in the intervention arm through a cloud-based text messaging platform (TD_Educator) for six months. Post-intervention, statistically significant ($\chi 2=72.25$, df =1, p<0.001) higher proportions (50.62%) of low HIV/AIDS risk levels were observed in the intervention arm (Busia), an indication of a shift from high to lower risk levels following the BCC intervention, unlike the control arm ($\chi 2=0.84$, d.f=2, p=0.657). Overall, the BCC intervention had a moderate effect (Cramér's V = 0.3, χ^2 = 28.214, d.f. = 2, p < 0.001) on HIV/AIDS risk reduction. In conclusion, the multi-component text-based BCC intervention is considered an effective tool for enhancing HIV/AIDS risk reduction among LDTs. Thus, regular updates will be needed in the future, as the evidence for the intervention is expected to grow and evolve further.

CHAPTER ONE

INTRODUCTION

1.1 Background

Worldwide, the rate of new Human Immunodeficiency Virus (HIV) infections and Acquired Immune Deficiency Syndrome (AIDS) related deaths has markedly declined since 2010, according to the Joint United Nations Programme on HIV/AIDS (UNAIDS, 2025). This outcome is mainly driven by the upscaling of risk-reduction services such as Pre-Exposure Prophylaxis (PrEP) and anti-retroviral therapy (ART). Nevertheless, the UNAIDS highlights that 1.3 million new HIV infections occurred globally in 2024, far beyond the expected 370,000 (UNAIDS, 2024, 2025). As such, the current decline in new HIV infections may not be sufficient to end AIDS as a public health threat by 2030 (UNAIDS, 2025).

Briefly, UNAIDS asserts that the alarming rate of new infections is partly due to uneven progress in the global HIV response across different populations. It is understood that certain key populations often experience chronic neglect from HIV risk reduction programmes despite their high risk compared to the general population (UNAIDS, 2024). One such population is long-distance truckers (LDTs). Indeed, evidence points to a disproportionately high burden of HIV, which stands at 3.86% globally and 14.34% in sub-Saharan Africa (SSA) among LDTs (Mutie et al., 2024).

In SSA, the clients of female sex workers (FSWs), who are mainly the LDTs along the major highways, accounted for 26% of all new HIV infections in the year 2021 (UNAIDS, 2022). Moreover, sex work between the LDTs and the FSWs in most sub-Saharan African countries is criminalized, discriminated against, stigmatized, and unwelcome (Makhakhe et al., 2022). Thus, the steady access to HIV/AIDS risk reduction services among LDTs and their sex partners is frequently disrupted. Unlike other key population groups, evidence on HIV/AIDS risk reduction interventions among the LDTs in Kenya and other sub-Saharan African countries is limited.

The LDTs are not only a key population group but also hard to reach with HIV/AIDS risk reduction services. This is due to their risky sexual networks coupled with limited access to HIV/AIDS risk reduction services while en route (Botão et al., 2016; Ijeoma et al., 2018; Mutie et al., 2021a). Even with a widespread knowledge of HIV/AIDS risk behaviours, the LDTs continue to exhibit high-risk sexual behaviours likely to exacerbate the transmission of HIV and other STIs (García et al., 2017; Ijeoma et al., 2018). Indeed, risky sexual behaviours have been recently linked to a high HIV prevalence of 15.4% among the LDTs, compared to 7.8% in the general population in the region (Botão et al., 2016). Moreover, the LDTs' constant mobility, long and exhausting working hours, as well as tight schedules, leave them with little or no time to access HIV/AIDS risk reduction services like HIV testing, STI screening and treatment, access to pre-exposure prophylaxis (PrEP), and post-exposure prophylaxis (PEP), further elevating their risk of HIV (Cassels et al., 2017; Gachohi et al., 2020; Mutie et al., 2021). Therefore, to reduce risky sexual behaviours and increase uptake of HIV/AIDS risk reduction services among the LDTs, behaviour change interventions are needed. The ultimate goal is to combat new HIV infections, which are currently on the rise in Kenya.

While some studies demonstrate that LDTs possess sound knowledge and positive attitudes toward HIV/AIDS risk reduction, others have documented the opposite (García et al., 2017; Ijeoma et al., 2018). In Kenya, a randomized controlled trial among LDTs using the Northern Corridor highway (NCH) identified several misconceptions, negative attitudes, and poor knowledge of certain aspects of HIV/AIDS risk reduction (Mantell et al., 2022). It was identified that LDTs didn't understand that HIV antibodies could be detected orally through oral HIV testing (Mantell et al., 2022). Moreover, the study revealed that LDTs thought that provider-administered blood-based HIV testing had a longer turnaround time as compared to oral HIV testing (Mantell et al., 2022). Mistrust in the healthcare providers and the belief that the sharps used in blood-based HIV testing may be used in more than one person, hence increasing the risk of HIV infection, emerged from the study (Mantell et al., 2022). Consequently, the uptake of HIV testing among the LDTs using the NCH has been relatively low. This is evidenced by only 4.9% of LDTs who were able to

access the recommended subsequent HIV testing in 2021 (Mutie et al., 2021b), and a mean of 1.6 years since the last HIV test in 2022 (Mantell et al., 2022). Poor uptake of HIV testing decelerates detection of new HIV infections among the LDTs, which further propagates transmissions within their sexual networks along the NCH, and to their communities of origin, as well as poor prognosis for those who are infected. Therefore, behaviour change interventions are needed to correct the above misconceptions and negative attitudes to enhance the uptake of HIV testing among LDTs using the NCH in Kenya.

There are substantial recommendations for consistent behaviour change interventions delivered through mobile phone platforms to hard-to-reach mobile populations, such as the LDTs (Cassels et al., 2017; Firchow & Mac Ginty, 2020; Michalopoulos et al., 2018). This is so because such populations can't be easily reached with the static biomedical and structural HIV/AIDS risk reduction interventions (Cassels et al., 2017; Michalopoulos et al., 2018). However, due to an overburdened and underfunded healthcare system, the adoption of consistent behaviour change interventions for HIV/AIDS risk reduction among the LDTs, in most sub-Saharan African countries, including Kenya, has been suboptimal. More recently, mobile phone-based text messaging education has been recommended to correct existing misconceptions, misunderstandings, and negative attitudes toward HIV/AIDS risk reduction among LDTs using the NCH in Kenya (Mantell et al., 2022).

In the context of HIV/AIDS risk reduction among LDTs, behaviour change entails sexual partner reduction, enhanced use of condoms during sexual intercourse, avoidance of illicit drugs and substances during or before sexual intercourse, and delay of sexual intercourse (Vasconcelos et al., 2018). Additionally, behaviour change can be reflected in enhanced uptake of biomedical services like HIV testing, STI treatment, PrEP, and PEP use among many others. Behaviour change interventions complement the biomedical and structural approaches in HIV/AIDS risk reduction (Vasconcelos et al., 2018). This aligns with the UNAIDS recommendation for combination prevention in HIV/AIDS prevention (UNAIDS, 2022). Combination prevention advocates for a holistic approach to adopting biomedical, structural, and behavioural interventions to

control HIV/AIDS (Makhakhe et al., 2022; UNAIDS, 2022). However, despite the UNAIDS recommendations on combination prevention, much emphasis on HIV/AIDS risk reduction is directed to biomedical and structural interventions, somewhat isolating behavioural interventions in most developing countries.

Behaviour change communication (BCC) is the strategic application of communication approaches and tools to support, promote, and sustain positive health behaviours among individuals, guided by existing behaviour change theories and models (Nancy & Dongre, 2021). The BCC interventions have been widely applied across various health disciplines like nutrition, malaria control, and HIV/AIDS prevention (Awantang et al., 2018; Ayalew & Belachew, 2021; Boulay et al., 2014; Saaka et al., 2021). Moreover, BCC interventions form an integral component of HIV/AIDS risk reduction programs (UNAIDS, 2022). Indeed, BCC interventions complement the UNAIDS recommendation for combination prevention in HIV/AIDS prevention (UNAIDS, 2022).

1.2 Problem Statement

In Kenya, along the NCH, the LDTs are known to exhibit sexual networks characterized by risky sexual behaviours (Kelvin et al., 2021; Mutie et al., 2021a; Romo et al., 2019). Furthermore, the LDTs constitute the majority of FSWs' clients along the NCH, Kenya (Mutie et al., 2021a). Here, the FSWs and other sex workers accounted for 15% of all new HIV infections in the year 2021 (UNAIDS, 2022). The clients of sex workers, who include the LDTs, accounted for 26% of all new HIV infections in the year 2021 (UNAIDS, 2022). Thus, LDTs are categorized as a key population group. However, more up-to-date evidence on the actual risk levels of HIV/AIDS among LDTs along the NCH, Kenya, is missing. Consequently, healthcare stakeholders have found it difficult to efficiently allocate the limited HIV preventive resources targeted for LDTs along the NCH, Kenya.

Depending on their citizenship, LDTs' eligibility for HIV/AIDS risk reduction interventions differs across different geographic borders (Mantell et al., 2022). This has further complicated their steady access to HIV/AIDS risk reduction services.

Furthermore, the limited time to attend clinic appointments among the LDTs makes it hard to reach them with consistent behaviour change messages on HIV/AIDS risk reduction (Mutie et al., 2021b). Indeed, addressing the HIV/AIDS healthcare needs of the mobile populations through mobile phone platforms is recommended since it increases their accessibility to diverse behaviour change messages and is cost-effective (Mantell et al., 2022; Michalopoulos et al., 2018). However, the opportunity to deliver behaviour change messages through mobile phone platforms among the LDTs along the NCH in Kenya is underutilized. Thus, it is not clearly understood how such interventions can be utilized in the Kenyan setting to enhance HIV/AIDS risk reduction among the LDTs.

Poor knowledge, negative attitudes, and misconceptions about certain aspects of HIV/AIDS risk reduction, like HIV testing, have been revealed among LDTs using the NCH in Kenya (Mantell et al., 2022). This has led to a low uptake of subsequent HIV testing of 4.9% (Mutie et al., 2021b) and an average of 1.6 years since the last HIV test among the LDTs using the NCH, in Kenya (Mantell et al., 2022). Consequently, new HIV infections among the LDTs are not diagnosed early enough, resulting in continued infections within their sexual networks. Moreover, late diagnosis of HIV due to poor uptake of HIV testing delays the initiation of those who are HIV positive into anti-retroviral (ART) care, and thus, there is a poor prognosis for AIDS.

While mobile phone-based BCC interventions have been widely recommended for hard-to-reach populations like LDTs, there is little or no evidence of their use in Kenya. This is so despite the overwhelming evidence of prevalent risky sexual behaviours that can be addressed through BCC interventions among the LDTs operating along the NCH, Kenya. Nevertheless, integrating a comprehensive BCC intervention into routine healthcare service delivery can be time-consuming and require additional resources in developing countries like Kenya (Eliezer Wangulu, 2008; UNHCR, 2010). Indeed, to cope with limited resources and a considerable disease burden, healthcare stakeholders focus on biomedical and structural interventions, somewhat isolating the BCC interventions in HIV/AIDS risk reduction.

Consequently, it is not well understood how well BCC interventions can be utilized to combat new HIV infections in resource-limited settings like Kenya.

1.3 Justification

The study targets the LDTs who are part of the larger key population groups, accounting for 70% of all new HIV infections in the year 2021 (UNAIDS, 2022). Just like their primary sexual counterparts (FSWs) on major highways like the NCH, LDTs exhibit high-risk sexual behaviours that are known to propagate HIV/AIDS risk among them (Makhakhe et al., 2017; Mutie et al., 2021a). However, not much attention in the form of HIV/AIDS research has been given to the LDTs, compared to other key population groups. Thus, to reduce the rate of new HIV infections, the LDTs should be targeted with more behaviour change interventions. It is understood that behaviour change interventions among the LDTs have the potential to induce appropriate sexual behaviours among them and their sexual partners (Lau & Tsui, 2012). Moreover, the study will generate an in-depth understanding of the specific risky sexual behaviours and risk factors that contribute to HIV/AIDS risk among LDTs. This may guide community health workers and non-governmental organizations (NGOs) on how to design interventions that address risky sexual behaviours in a more effective and targeted manner. Such interventions could include the development of educational materials and campaigns that focus on HIV prevention strategies such as condom use, HIV testing, and safe-sex practices among the LDTs and their sexual partners.

Along the NCH, the constant mobility and hard-to-reach nature of the LDTs limit their access to biomedical and structural HIV/AIDS risk reduction services, which are, in most cases, static (Botão et al., 2016; Dobra et al., 2017; Mutie et al., 2021b). Moreover, the limited time to attend clinic appointments among the LDTs makes it hard to reach them with consistent behaviour change messages on HIV/AIDS risk reduction (Mutie et al., 2021b). Furthermore, addressing the HIV/AIDS healthcare needs of the mobile populations through mobile phone platforms is recommended since it increases their accessibility to diverse behaviour change messages (Michalopoulos et al., 2018). Therefore, the current BCC intervention will enable reaching the LDTs with more behaviour change messages on HIV/AIDS risk

reduction. Indeed, a BCC intervention would consume less time, be less intrusive, and offer a confidential environment for HIV/AIDS risk reduction among the LDTs (Gurman et al., 2012; Lau & Tsui, 2012).

In most developing countries, including Kenya, much emphasis is given to biomedical and structural approaches to HIV/AIDS prevention, somewhat isolating the behavioural aspect due to limited resources (Makhakhe et al., 2022; UNAIDS, 2022). Thus, the current BCC intervention on HIV/AIDS risk reduction will generate an in-depth understanding of how the BCC interventions can be applied in resource-limited settings. This will inform policy development and advocacy efforts aimed at reducing HIV transmission among LDTs through the use of BCC interventions in Kenya and the developing world. Moreover, the findings could be used to advocate for increased funding for HIV prevention programs targeting LDTs or for the development of policies that encourage trucking companies to promote safe sex practices among their employees.

This study seeks to improve knowledge, attitudes, perceptions, and practices in various aspects of HIV/AIDS risk reduction among LDTs. Of particular concern is PrEP, which is yet to be fully embraced among the LDTs, despite its proven effectiveness in reducing the risk of contracting HIV infection (Makhakhe et al., 2022). Also, the study will play a role in correcting HIV/AIDS misconceptions that may exist among the LDTs, as evidenced in previous studies (Singh & Joshi, 2012).

The study coincides with the UNAIDS's call for an enhanced global response to HIV/AIDS prevention (UNAIDS, 2022, 2024, 2025). This was after the 90-90-90 targets were missed by 2020 (UNAIDS, 2022). The 90-90-90 targets aimed at ensuring that 90% of all people knew their HIV status, 90% of those who knew their HIV status were on ART treatment and care, and 90% of those on treatment and care were virally suppressed (UNAIDS, 2022). Thus, the study will contribute to attaining the new 95-95-95 UNAIDS targets by 2025 and ending AIDS by 2030. The 95-95-95 targets aim at ensuring that 95% of all people in the population know their HIV status, 95% of those who know their HIV status are initiated and maintained in ART care and treatment, and 95% of those on ART care achieve viral suppression (UNAIDS, 2022).

This will go a long way in improving the general productivity of the trucking industry in Kenya and other East African countries.

1.4 Research Questions

The research questions were;

1. What are the risk levels of HIV/AIDS among long-distance truckers in Kenya?
2. What are the predictors of HIV/AIDS risk levels among long-distance truckers in Kenya?
3. What are the barriers to HIV/AIDS risk reduction among long-distance truckers in Kenya?
4. What are the existing behaviour change communication strategies targeting the long-distance truckers to promote HIV/AIDS risk reduction in Kenya?
5. What is the suitable content for a tailored behaviour change communication intervention tool for HIV/AIDS risk reduction among the long-distance truckers in Kenya?
6. What is the effect of a behaviour change communication intervention on HIV/AIDS risk reduction among the long-distance truckers in Kenya?

1.5 Objectives

1.5.1 General Objective

To determine the effect of a multi-component text-based behaviour change communication intervention in enhancing HIV/AIDS risk reduction among long-distance truckers in Kenya.

1.5.2 Specific Objectives

The study aimed to achieve the following specific objectives, categorized into three phases of the study;

Phase One: Baseline Study

1. To assess the risk levels of HIV/AIDS among long-distance truckers in Kenya.
2. To establish predictors of HIV/AIDS risk levels among long-distance truckers in Kenya.
3. To explore barriers to HIV/AIDS risk reduction among long-distance truckers in Kenya.
4. To explore the existing behaviour change communication strategies targeting long-distance truckers to promote HIV/AIDS risk reduction in Kenya.

Phase Two: Intervention

5. To develop a tailored behaviour change communication intervention tool for HIV/AIDS risk reduction among the long-distance truckers in Kenya.

Phase Three: Evaluation

6. To evaluate the effect of the behaviour change communication on HIV/AIDS risk reduction among the long-distance truckers in Kenya.

1.6 Hypotheses

H_0: There are no statistically significant risk predictors of HIV/AIDS among the long-distance truckers in Kenya.

H_1: There are statistically significant risk predictors of HIV/AIDS among the long-distance truckers in Kenya.

H_0: A behaviour change communication intervention has no significant effect on HIV/AIDS risk reduction among the long-distance truckers in Kenya.

H_1: A behaviour change communication intervention has a significant effect on HIV/AIDS risk reduction among the long-distance truckers in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a synthesis of literature on various aspects of HIV/AIDS, with a key focus on LDTs. The chapter gives a general overview of HIV/AIDS, HIV/AIDS risk levels, and the prevalence of HIV among LDTs. The chapter further delves into highlighting barriers associated with HIV/AIDS risk reduction among LDTs. The BCC interventions were looked into, as well as their effects on HIV/AIDS risk reduction. Relevant literature from the aforementioned thematic areas was placed into the context of its contribution to better understand the research problem at hand.

More importantly, where possible, the literature was unravelled from global, regional, and local perspectives. This enabled the researcher to locate the research problem's magnitude and gaps from a wider perspective, narrowing down to the local perspective. Literature materials were primarily sourced from PubMed, PubMed Central (PMC), Cumulated Index to Nursing and Allied Health Literature (CINAHL), ProQuest Central, and Global Index Medicus. Generally, the search terms included: Population (long-distance truckers OR truck drivers OR long-haul drivers OR long-distance truck drivers) AND Condition/Outcome (HIV, HIV/AIDS, STIs, high-risk sexual behaviours) AND Context (all empirical and non-empirical evidence from global, regional, and national levels). Finally, the chapter concludes with a summary of the gaps identified in the literature review.

2.2 A General Overview of HIV/AIDS

Globally, it was estimated that 38 million people were living with HIV by the year 2021, with the number increasing to 39 million in the year 2022 (UNAIDS, 2022, 2023). Sub-Saharan Africa's Eastern and South regions are the most affected (UNAIDS, 2022, 2023). The two regions constituted 54% (20.6 million) and 53.3% (20.8 million) of all people living with HIV globally by the year 2021 and 2022, respectively (UNAIDS, 2022). Notably, the Eastern and South African regions have

recorded a 61% and 58% decline in all new HIV infections and HIV-related deaths, respectively, since 2010. The significant gains in reducing new HIV infections and related deaths can be attributed to the recent breakthrough milestones made in the HIV/AIDS world. Some notable milestones include the introduction of PrEP in 2015, the test and treat policy, cutting-edge ART regimens, oral HIV self-testing, and many more (UNAIDS, 2022).

The burden of HIV/AIDS is highest in sub-Saharan Africa (Wu et al., 2021). In sub-Saharan Africa, evidence shows that South Africa has the highest disability-adjusted life years (DALYs) attributable to HIV, between 7.68 and 9.54 million, almost a quarter of the global 47.63 million cumulative DALYs (Wu et al., 2021). In Kenya, documented evidence indicates that DALYs attributable to HIV stand at 2.89 million, being the highest among all other diseases (Muthuri & Kirigia, 2020). Expectedly, the key population groups, including LDTs, may have the highest DALYs, as evidenced by the high prevalence of HIV among them compared to the general population.

While significant gains have been made in the fight against HIV/AIDS so far, reports indicate that specific key targets have been missed. Initially, the goal was to attain the 90-90-90 targets by 2020 (UNAIDS, 2022). These targets aimed at ensuring that 90% of all people knew their HIV status, 90% of those who knew their HIV status were on ART treatment and care, and 90% of those on treatment and care were virally suppressed (UNAIDS, 2022). However, the 90-90-90 targets were not achieved (UNAIDS, 2022). In 2021, new targets (95-95-95) were put in place (UNAIDS, 2022). These new targets recommend that 95% of all people use HIV combination prevention to reduce new HIV infections, inequalities, and deaths linked to AIDS and ensure a consolidated global response to end AIDS by 2030 (UNAIDS, 2022). The combination of prevention incorporates the biomedical, structural, and behavioural approaches to HIV/AIDS prevention (Makhakhe et al., 2022; UNAIDS, 2022).

In the latest UNAIDS report, it has emerged that the progress in HIV/AIDS control is currently decelerating in many parts of the world. Furthermore, the significant gains made in HIV/AIDS prevention may be stalled or, in the worst scenario, reversed. Several factors have been identified as critical threats likely to derail the HIV/AIDS

gains. These include the recent global COVID-19 pandemic, underfunding in HIV, and critical challenges emanating from the key population groups (UNAIDS, 2022).

Domestic and international funding for HIV/AIDS has significantly declined over the last 10 years (UNAIDS, 2022). For instance, US funding for HIV has decreased by 57% (UNAIDS, 2022). In the past year (2021), international HIV/AIDS resources declined by 6% compared to the year 2010 (UNAIDS, 2022). In middle and low-income countries, the funding gap in HIV/AIDS is 3.5 billion US dollars and is estimated to grow to 8 billion US dollars by the year 2025 (UNAIDS, 2022). It is estimated that the resources made for HIV/AIDS in middle and low-income countries have fallen by 55% (UNAIDS, 2022). Only 42% of HIV/AIDS funding goes to HIV/AIDS prevention programs compared to 72%, which goes to treatment and care in middle and low-income countries (UNAIDS, 2022). The complexities around HIV/AIDS funding have further worsened the limited resource base in most sub-Saharan countries, including Kenya. As a result, much focus is given to biomedical and structural approaches, leaving the behaviour change interventions in HIV control with little or no resources. This has led to poor adoption of comprehensive BCC interventions, for the key population groups including the LDTs. This is contrary to the UNAIDS recommendations for combination prevention in control of HIV/AIDS. Thus, with the behavioural approach in HIV/AIDS control lagging behind, it's not certain that the UNAIDS targets will be met.

The greatest threat to derailing global HIV/AIDS control comes from key population groups, including the LDTs. In 2021, key population groups accounted for less than 5% of the global population (UNAIDS, 2022). Surprisingly, 70% of all new HIV infections came from key population groups in the same year (UNAIDS, 2022). It is estimated that the key population groups had a 30 times higher risk of HIV infection compared to the general population in 2021 (UNAIDS, 2022). In most sub-Saharan African countries, including Kenya, LDTs constitute the largest FSWs' clients on major highways (Ferguson & Morris, 2007). Here, the FSWs and other sex workers accounted for 15 % of all new HIV infections in the year 2021 (UNAIDS, 2022). The clients of the sex workers, who include the LDTs, accounted for 26% of all new HIV

infections in the year 2021 (UNAIDS, 2022). From the above, it's clear that the LDTs are centrally positioned within the highest risk profile of HIV/AIDS (UNAIDS, 2022). Thus, to accelerate the global efforts of ending AIDS by 2030, the LDTs require comprehensive behaviour change interventions. This aligns with the UNAIDS recommendations for combination prevention in HIV/AIDS, especially for key population groups.

The context in which sex work occurs between LDTs and FSWs in sub-Saharan Africa may play a role in how HIV is spread between these two groups and the general population. In most sub-Saharan African countries, sex work is not only criminalized but also widely marred with punitive laws and policies (Makhakhe et al., 2022; UNAIDS, 2022). Here, the FSWs are stigmatized, discriminated against, marginalized, and faced with a lot of socio-economic inequalities and disparities (Makhakhe et al., 2022; UNAIDS, 2022). As a result, the FSWs shun mainstream public healthcare services and are not reached with adequate HIV/AIDS preventive services (Makhakhe et al., 2022). Furthermore, there is a low or lack of involvement of FSWs and LDTs in planning and designing their HIV/AIDS interventions in most sub-Saharan countries (Makhakhe et al., 2022). Notably, the LDTs constitute the largest of the FSW's client base on major highways in Sub-Saharan Africa (Ferguson & Morris, 2007; Mutie et al., 2021a). Thus, the context in which sex work occurs between LDTs and FSWs, compounded with their HIV/AIDS high-risk profile, poses a huge challenge in attaining the UNAIDS targets in the region. It is important to note that much research has focused on FSWs, tending to isolate LDTs, particularly in the NCH, Kenya. This warrants more research, especially on LDTs, to match up their body of HIV/AIDS evidence with that of FSWs.

2.3 The Burden of HIV among Long-Distance Truckers

Globally, LDTs endure a high prevalence of HIV compared to the general population. However, studies have shown that this can widely vary from one region to another and from one country to another. While the HIV prevalence levels differ by region, evidence shows that the burden is highest in sub-Saharan Africa.

In the Asia-Pacific region, prevalence levels as high as 19% (Jindal et al., 2008), 15.97% (Manjunath et al., 2002), and 15.22% (Gawande et al., 2000) have been reported among LDTs in India. Moreover, other studies in the Asia and Pacific region have reported prevalence rates of 0.33% in Indonesia (Mustikawati et al., 2009), 0.16% in China (Li et al., 2010), and 0% in Bangladesh (Gibney et al., 2001). These findings demonstrate high HIV prevalence rates in the LDTs population compared to the estimated 1% prevalence rates in the general population in the region (UNAIDS, 2023). However, it is important to note that the above evidence on HIV prevalence rates is not up to date. Furthermore, this evidence is limited to a few Asian and Pacific countries. Therefore, HIV prevalence levels may not reflect the situation in other countries, for which evidence is unavailable. Thus, further research is recommended to provide up-to-date evidence on HIV prevalence in this region. This evidence compels targeted HIV/AIDS risk reduction interventions for LDTs in the Asia-Pacific region if the war against the pandemic is to be won.

In the Eastern Europe and Central Asia region, a study established HIV prevalence rates of 1.54% among LDTs (Botros et al., 2009). Elsewhere, in the Middle East and North Africa, two studies have established HIV prevalence rates of 0.33% (Karimi et al., 2021) and 0% (Jabbari et al., 2010) in Iran among LDTs. In Latin America and the Caribbean, HIV prevalence rates of 1.33% have been identified in Brazil (Lacerda et al., 1997), 0.09% in Peru (García et al., 2017), and 0.27% in Brazil (Pinho et al., 2011) among LDTs. Lastly, two studies have established HIV prevalence rates of 0.16% (Valway et al., 2009) and 0% (Bachmann et al., 2018) in Western, Central Europe, and North America regions. Notably, the HIV prevalence rates identified in the regions mentioned in this section are lower than those in Asia and the Pacific. This may imply a lower burden of HIV among LDTs in the above regions. However, the prevalence levels reported here indicate the presence of HIV within the LDTs' population in the regions. Therefore, for the global war against HIV/AIDS to be won, a certain level of risk reduction interventions is needed.

The highest prevalence rates of HIV among LDTs have so far been reported in sub-Saharan Africa. Prevalence rates as high as 54.19% have been reported among LDTs

in South Africa (Ramjee & Gouws, 2002). Other countries where high prevalence rates of HIV among LDTs have been reported include Uganda, 35.29% (Carswell et al., 1989), Burkina Faso, 18.64% (Lankoande et al., 1998), Cameroon, 16.28% (Mosoko et al., 2007), Mozambique, 15.41% (Botão et al., 2016), Ethiopia, 13.03% (Mehret et al., 1990), and Nigeria, 10% (Azuonwu et al., 2011). The HIV prevalence rates highlighted here indicate a higher burden of HIV among LDTs in sub-Saharan Africa, compared to an estimated prevalence of 3% in the general population in the region. This is compelling evidence for the extensive HIV/AIDS risk reduction interventions needed in the LDTs population in this region. Furthermore, more up-to-date evidence on HIV risk levels is needed among the LDTs in this region. This will help in the formulation of targeted interventions that will help to address the high HIV prevalence in the region.

Just like other sub-Saharan African countries, studies have identified high HIV prevalence rates among LDTs in Kenya. Prevalence rates of as high as 26.49% (Bwayo et al., 1994), 18.13% (Bwayo et al., 1991), 17.8% (Rakwar et al., 1999), and 5.76% (Lavreys et al., 1999) have been identified among LDTs in Kenya. While these prevalence rates are significantly higher than those of the general population, it is important to acknowledge that the studies cited here date back two decades. More recent or up-to-date evidence regarding HIV prevalence levels among LDTs in Kenya is either limited or not available. This may mean a stalled body of evidence as far as HIV/AIDS research among LDTs is concerned. Moreover, this leaves LDTs more exposed to HIV vulnerabilities since HIV/AIDS risk reduction approaches that primarily target high-risk populations are not well exploited. Thus, more research is needed to understand current HIV risk levels among LDTs in Kenya, especially those using the NCH. This will guide the formulation of the effective and tailored HIV/AIDS risk reduction interventions targeted for the LDTs.

2.4 The Risk Levels of HIV/AIDS among Long-Distance Truckers

Long-distance truckers endure higher risk levels of HIV, among other STIs, compared with the general population. From a global perspective, there is sufficient evidence that LDTs endure a high risk of HIV infection. In a large-scale National cross-sectional

survey conducted in India, it was identified that the risk of HIV infection among LDTs was 12 times higher compared to the general population (Pandey et al., 2008). Likewise, other studies conducted in Northern India (Jindal et al., 2008), Central India (Gawande et al., 2000), South India (Dude et al., 2009), and India West Bengal (Biswas et al., 2020) had similar findings, though not specific on the magnitude of the HIV/AIDS risk levels compared to the general population. Elsewhere, in Indonesia, a national cross-sectional survey revealed high-risk levels of HIV/AIDS among a sample of 599 LDTs (Mustikawati et al., 2009). The high-risk levels are an indication that targeted HIV/AIDS risk reduction is needed among the LDTs. Nevertheless, other studies have identified risk levels of HIV/AIDS that are the same as those of the general population in Peru (García et al., 2017), or even lower than the general population in Iran (Jabbari et al., 2010; Karimi et al., 2021), China (Chen et al., 2006; Li et al., 2010), the USA (Bachmann et al., 2018), Bangladesh (Gibney et al., 2001), and Brazil (Pinho et al., 2011).

Similar trends to those in other global settings have also been witnessed in sub-Saharan Africa regarding HIV/AIDS risk levels among LDTs. Research by Delany-Moretlwe et al. (2014) in South Africa identified that the risk of HIV/AIDS was 3 times higher than that of the general population. Studies done in Mozambique (Botão et al., 2016), Nigeria (Azuonwu et al., 2011), Cameroon (AIDS Analysis Africa, 1994; Mosoko et al., 2007), Burkina Faso (Lankoande et al., 1998), Uganda (Carswell et al., 1989), and Ethiopia (Mehret et al., 1990) identified higher risk levels of HIV/AIDS compared to the general population. However, these studies did not specify the magnitude of the risk levels of HIV/AIDS among the LDTs. On the contrary, a study by Adjei et al. (2016), identified lower risk levels of HIV/AIDS among LDTs in Ghana. Thus, there is compelling evidence of high-risk levels of HIV/AIDS among LDTs in sub-Saharan Africa. This is an indication that HIV/AIDS risk reduction interventions are needed among the LDTs in this region.

According to studies conducted in various stopovers along the NCH, Kenya, it was revealed that the LDTs' risk of HIV/AIDS was higher than in the general population (Bwayo et al., 1991, 1994; Lavreys et al., 1999; Mbugua et al., 1995; Rakwar et al.,

1999). While these studies reveal high-risk levels of HIV/AIDS among LDTs, more up-to-date evidence on the same is lacking. Thus, the current risk levels of HIV/AIDS among LDTs are not clearly understood. Consequently, HIV/AIDS risk reduction interventions that are guided by the current risk levels may equally be lacking or sub-optimal. Such a scenario may fuel a silent wave of HIV transmissions within the LDTs population and their other close sexual contacts, like FSWs and their spouses or regular sexual partners back in their communities. Therefore, this highlights the necessity for up-to-date information on HIV/AIDS risk levels among LDTs, especially those who operate along the NCH, Kenya. This can be pivotal in guiding the formulation of targeted and more effective HIV/AIDS risk reduction interventions for the population.

2.5 Predictors of HIV/AIDS Risk Levels among Long-Distance Truckers

Studies have identified various predictors of HIV/AIDS risk among LDTs. Protective factors to the risk of HIV/AIDS among LDTs include; being married (Delany-Moretlwe et al., 2014; Dude et al., 2009; Pandey et al., 2008, 2012), being circumcised (Botros et al., 2009; Delany-Moretlwe et al., 2014; Lavreys et al., 1999; Rakwar et al., 1999), work experience exceeding eleven years (Pandey et al., 2012), spending less than one week on transit (Delany-Moretlwe et al., 2014), and ability to abstain from sex while on transit (Diallo et al., 2011). The factors that enhance the risk of HIV/AIDS among the LDTs include being unmarried (Botros et al., 2009; Delany-Moretlwe et al., 2014; Dude et al., 2009; Pandey et al., 2012), alcohol and substance use (Diallo et al., 2011; Jindal et al., 2008), lack of or low exposure to HIV prevention interventions (Pandey et al., 2008), previous history or current diagnosis with STIs (Bwayo et al., 1994; Manjunath et al., 2002), frequent sexual interactions and unprotected sex with FSWs (Bwayo et al., 1994; Delany-Moretlwe et al., 2014), never having been tested for HIV (Pandey et al., 2008) and multiple sex partners (Jindal et al., 2008). These risk factors are critical in guiding the formulation of an HIV/AIDS risk reduction intervention targeting LDTs. More importantly, current evidence on the risk levels of HIV/AIDS and their correlates is needed. This will influence certain aspects of HIV/AIDS risk reduction interventions, like the educational component that promotes low-risk behaviours and positive outcomes in risk reduction among LDTs.

2.6 Barriers to HIV/AIDS Risk Reduction among Long-Distance Truckers

The barriers to HIV/AIDS risk reduction are the factors that inhibit the prevention of new HIV infections, as well as accelerate the progression of HIV to AIDS. Globally, multiple sexual partnerships have been shown to facilitate the acceleration of HIV transmissions within sexual networks. In Bangladesh, a cross-sectional study identified that LDTs had an average of two to four sexual partners in the previous year and three months, respectively, preceding the time of data collection (Gibney et al., 2003). Similar findings were identified in a study done in India, where 12.8% of the LDTs reported that they had engaged at least five sexual partners in the previous three months (Singh & Joshi, 2012). In Pakistan, 76% of the LDTs involved in a cross-sectional study reported having had multiple sexual partners (Ishtiaq et al., 2017).

In sub-Saharan Africa, similar findings on multiple sexual partnerships among LDTs have also been recorded. An estimated 61.4% of LDTs had engaged more than four sexual partners, according to a study done in Mozambique (Botão et al., 2016). In Nigeria, LDTs reporting multiple sexual partnerships were more likely to exhibit risky sexual behaviours (Lawal & Olley, 2017), whereas 38.6% of a similar population had multiple sexual partners (Adeoti et al., 2021). Indeed, multiple sexual partners among LDTs lead to the establishment of sexual networks marred with high HIV and STI prevalence and risky sexual behaviours (Apostolopoulos et al., 2011; Doherty et al., 2005). The abundance of FSWs in almost all highway stopovers makes it easy for LDTs to have multiple sexual partners at any given time of need. Thus, there is a plentiful opportunity for LDTs to engage sexual partners of varying risky sexual behaviours from different geographical locations. Consequently, it becomes very easy for LDTs to contract HIV from their multiple sexual partners, which they eventually spread to their spouses and the general population. This further complicates the efforts in HIV prevention, since control of new HIV infections is rendered impossible. Nonetheless, this presents an opportunity to offer BCC interventions to the LDTs so that they can adopt reduced sexual partners.

The nature of the trucking career among LDTs may pose difficulties in the smooth access to HIV/AIDS risk reduction services while on transit. The trucking industry is

marred with delays in transit, insecurity, and sometimes mechanical breakdowns in remote places where access to HIV/AIDS risk reduction services is almost impossible (Makhakhe et al., 2017; Morris & Ferguson, 2007; Mutie et al., 2021a). At other times, LDTs make stopovers at odd hours when health facilities are closed and unable to offer them comprehensive HIV/AIDS risk reduction services (Botão et al., 2016). These unique challenges have made LDTs emerge as a hard-to-reach population (Pachauri et al., 2022). Consequently, targeted interventions are needed to eliminate or reduce the obstacles so that HIV/AIDS risk reduction can be achieved among the LDTs.

Different types of sexual partners pose varying risks of HIV/AIDS among LDTs. For instance, condom use rates are known to be higher among LDTs and their casual sexual partners as compared to their regular sexual partners (Gibney et al., 2003; Singh & Joshi, 2012). Familiarity and the build-up of trust over time between the LDTs and their regular sexual partners are known to orchestrate the reduced rates of condom use. In Bangladesh, increased condom use among LDTs was strongly linked to casual sex partners (Gibney et al., 2003). Similar outcomes were recorded among LDTs in India, with 83.9% of them reporting condom use with casual sex partners (Singh & Joshi, 2012). It is important to note that the low condom use rates between LDTs and their regular partners do not exonerate them from the risk of transmitting HIV and STIs among each other. This positions the LDTs who engage regular sexual partners at the helm of HIV/AIDS risk. Thus, targeted interventions should be focused on this particular group. In sub-Saharan Africa, regularity of sexual partnerships has been linked to reduced perception of HIV risk between LDTs and their regular sexual partners (Kohli et al., 2017).

Furthermore, condom use among regular sexual partners has been shown to breed mistrust and suspicion that one of the partners may be having secret affairs outside the current relationship (Michalopoulos et al., 2018). As a result, LDTs engaging regular sexual partners have been shown to adopt unsafe sexual behaviours like inconsistent condom use with their regular sexual partners (Kohli et al., 2017). This elevates the risk of HIV infection between the two groups. This is so because either the LDTs or the regular sexual partners may also be in other active sexual networks marred with a

high prevalence of STI and HIV. In some other cases, the two groups may not be aware of each other's HIV status. This suggests the need to enhance awareness of safe sexual practices with an emphasis on consistent condom use in all types of sexual partners among the LDTs.

A study done in South Africa identified that sexual interactions between LDTs and FSWs were marred by competitiveness and sometimes violence (Makhakhe et al., 2017). Female sex workers revealed that they were forced to fight with their counterparts to win the attention of wealthy-looking LDTs (Makhakhe et al., 2017). In such instances, the FSWs went to the extent of abandoning condom use to lure the LDTs, who were reluctant to observe safe sexual practices (Makhakhe et al., 2017). The FSWs judged the health and wellness of the LDTs by their physical appearance, after which they would succumb to their demands for unprotected sexual interactions (Makhakhe et al., 2017). This was so only on the condition that the LDTs would pay more than the market cost of paid sex (Makhakhe et al., 2017). This type of unhealthy competition for LDTs from the FSWs poses a huge risk of disseminating HIV and other STIs in a given population. In this case, socioeconomic disparities are partly to blame, as evidenced by the competitiveness of the FSWs to win wealthy-looking LDTs for extra pay. Given that FSWs are also known to face socioeconomic disparities in other parts of sub-Saharan Africa, similar trends of competitiveness in sexual interactions may be expected. These distinct findings suggest the need for socio-economic empowerment among the FSWs, so that they may not compromise safe sexual practices for financial gains. Aggressive BCC interventions are needed to enhance knowledge and awareness among LDTs on the need to adopt safe sexual practices at all times.

The absence of spouses in the lives of LDTs when they are in transit leaves them with minimal options for sources of sex. When the LDTs are detached from their families and community-specific social norms, they find themselves less restrained from rampantly engaging FSWs for commercial sex (Dobra et al., 2017; Makhakhe et al., 2017). Given that the FSWs are known to have risky sexual behaviours, the LDTs' risk of contracting HIV and STIs is increased.

Consistent condom use is critical in the protection against sexually transmitted diseases, including HIV and STIs. Evidence is available that LDTs do not consistently use condoms in their sexual interactions (Apostolopoulos et al., 2011; Gibney et al., 2003; Maarefvand et al., 2016). Gibney et al. (2003) revealed that only 31% of LDTs involved in a study in Bangladesh consistently used condoms during their sexual interactions. In Iran, about 61.4% of LDTs involved in a cross-sectional study did not use condoms in their last sexual intercourse. While LDTs reported that condoms were always available in all truck stops along the highway in the U.S., they did not consistently use them. This is perhaps a suggestion that the availability of condoms may not always guarantee consistency in their use. This points to the possibility of other factors that may influence condom use.

The smooth access to condoms and sex lubricants among LDTs, especially in sub-Saharan Africa, is frequently disrupted (Botão et al., 2016; Matovu & Ssebadduka, 2012; Mutie et al., 2021a). A cross-sectional study done in Uganda found that socio-economic factors hindered condom use among LDTs and their sexual partners (Matovu & Ssebadduka, 2012). It was identified that poverty among FWSs made it easy for them to give in to the demands of unprotected sexual intercourse from LDTs so that they could earn a living (Matovu & Ssebadduka, 2012). This was so even when it was clear to the FSWs that they were propagating their risk of contracting HIV and STIs (Matovu & Ssebadduka, 2012). Beliefs that condoms were less pleasurable during sexual intercourse between LDTs and their sexual partners emerged as a key barrier to safe sexual interactions (Matovu & Ssebadduka, 2012). This study reveals that underlying socio-economic factors can influence condom use patterns in the developing world. There is a need to empower FSWs economically so that they can hold a high position to bargain for safe sexual interactions with their sexual partners. The false beliefs about condom use should also be demystified through enhanced community awareness campaigns. Unlike the findings from the above studies, low rates of condom use (34.8 %) have been identified among LDTs in Togo (Yaya et al., 2016). Conclusively, the LDTs may find themselves lacking condoms in a time of need. In such circumstances, the LDTs are unable to protect themselves from HIV and

other STIs from their sexual partners. Thus, healthcare providers should ensure condoms are always available at truck stops along major highways.

The constant mobility and hard-to-reach nature of the LDTs may essentially limit their access to biomedical and structural HIV/AIDS preventive services, which are, in most cases, static (Botão et al., 2016; Dobra et al., 2017; Mutie et al., 2021b). Moreover, depending on their citizenship, LDTs' eligibility for HIV/AIDS preventive services may differ across different geographic borders (Mantell et al., 2022). Where there is poor access to HIV/AIDS preventive services like HIV testing, PrEP, PEP, and ART care, the efforts in HIV/AIDS risk reduction are rendered obsolete. Equally important, evidence shows that HIV/AIDS preventive services are not always available to the LDTs (Botão et al., 2016; Lalla-Edward et al., 2017). This is so because the LDTs traverse different regions where access to HIV/AIDS prevention is not always guaranteed (Botão et al., 2016; Lalla-Edward et al., 2017).

Poor access to and adherence to ART hasten the progression of HIV to AIDS among individuals. Also, given the exceedingly strenuous work schedules among LDTs, it may be difficult for those who are HIV positive always to take their ART regimen as required. Thus, support through mobile phone reminders can help improve ART adherence among HIV-positive LDTs.

HIV-related stigma occurs when individuals view those who are HIV positive as ‘the others’, and that they are not at risk of contracting the infection. Stigma may also be self-centered. In this case, an individual would shun HIV preventive services like HIV testing in fear that they would test HIV positive. Stigma among LDTs has been linked to risky sexual behaviours (Romo et al., 2019). Thus, behaviour change messages are needed to dispel HIV-related stigma among the LDTs.

Poor knowledge, negative attitude, and poor risk perception of HIV among the LDTs not only make them reluctant to seek HIV/AIDS preventive services but also increase their indulgence in risky sexual behaviours (García et al., 2017; Ijeoma et al., 2018; Matovu & Ssebadduka, 2013). For instance, it was established that LDTs believed mosquito bites, sharing of meals, and shaking hands were means of HIV transmission

(Singh & Joshi, 2012). About 97.5% and 95.6% of LDTs involved in a study in India knew of HIV/AIDs and condom use as the appropriate means of transmission. However, the same LDTs still exhibited unsafe sexual practices (Singh & Joshi, 2012). Ishtiaq et al. (2017) identified that 76% of LDTs understood multiple sexual partnerships as a risk factor for HIV. While 93.4% of LDTs in Peru knew about STIs, they couldn't recognise associated signs and symptoms (García et al., 2017). Notably, LDTs still have unsafe sexual practices, despite a clear indication that they are knowledgeable about HIV and associated means of transmission.

In sub-Saharan Africa, several studies have been conducted to elicit knowledge, attitudes, and practices related to HIV/AIDS risk reduction among LDTs. A study done in Uganda established that 97% of LDTs possessed a good knowledge of condom use as an HIV risk reduction method (Matovu & Ssebadduka, 2013). About 82% of the LDTs had a favourable attitude toward condom use (Matovu & Ssebadduka, 2013). Wrong knowledge on HIV prevention, like seeking the intercession of a traditional healer and praying to God after potential exposure to HIV, emerged from a study done in Nigeria (Ijeoma et al., 2018). The need to enhance knowledge and dispel false beliefs about HIV prevention was recommended (Ijeoma et al., 2018). Understanding the benefits of circumcision was linked to the high uptake of HIV testing among LDTs in Zambia (Mutale et al., 2018). The knowledge of someone who was sick or had died of HIV was linked to low uptake of HIV testing (Mutale et al., 2018). The fear of HIV testing perhaps signals the LDTs' perception of the severity associated with HIV, should one be diagnosed positive (Mutale et al., 2018). The study recommended behaviour change intervention with messages packaged to enhance knowledge and attitudes related to HIV/AIDS (Mutale et al., 2018). Lawal & Olley (2017) assert that for HIV/AIDS risk reduction to be achieved, LDTs should perceive themselves as vulnerable to HIV and possess favourable attitudes towards condom use. In southwest Nigeria, about 68.1% of LDTs acknowledged that they were at risk of HIV (Atilola et al., 2010). In the same study, 86.9% of LDTs knew the importance of knowing their HIV status (Atilola et al., 2010). However, 55.3% of the same LDTs still had unsafe sexual practices like having multiple sexual partners, contrary to their knowledge that it posed a risk of HIV infection (Atilola et al., 2010). About 19.5% portrayed a negative

attitude to HIV by verbalizing that they would commit suicide if they were diagnosed positive (Atilola et al., 2010). From the above, it's clear that even with relatively good knowledge of HIV/AIDS, LDTs still exhibit risky sexual behaviours. It would be expected that good knowledge of HIV/AIDS would translate to safe sexual behaviours among the LDTs. Evidently, more BCC interventions are needed to induce safe sexual behaviours among the LDTs.

Alcohol and substance use, especially when done before or during sexual interactions, is known to propagate unsafe sexual practices among the LDTs (Botão et al., 2016; Gibney et al., 2003; Malta et al., 2006; Matovu & Ssebadduka, 2013; McCree et al., 2010). This is so because when one is intoxicated with alcohol or other substances during sexual interactions, their self-efficacy in maintaining safe sexual practices is reduced. Thus, the risk of contracting HIV is elevated. In Brazil, the use of alcohol and amphetamine-like substances was linked to unsafe sexual practices (Malta et al., 2006). Substance abuse was linked to inconsistent condom use, which in turn facilitated STIs/HIV transmission among LDTs and their sexual partners in New Mexico (McCree et al., 2010). In Meerut, India, LDTs who used psychoactive substances were found to be 4.06 times more likely to exhibit unsafe sexual practices than those who did not (Pundhir et al., 2021a).

There is evidence that LDTs in sub-Saharan Africa are at greater risk of contracting HIV and other STIs because of alcohol and substance abuse, similar to other parts of the world. In Uganda, alcohol use has been linked to inconsistent condom use (Matovu & Ssebadduka, 2012). An estimated 22.5% of LDTs reported having used alcohol during their last sexual interaction in Tanzania (Vara et al., 2020). Botão et al. (2016) in their cross-sectional study identified that 33.3% and 1.9% of LDTs had used alcohol and hard drugs (marijuana and cocaine), respectively, in Mozambique. Alcohol and substance use, especially when taken before or during sexual interactions, may impair an individual's ability to make sound decisions on safe sexual practices. For instance, one may fail to use condoms properly or not use them at all during sexual intercourse. In the LDTs community, alcohol and substance use come at a time when they stop after a long journey to have a rest in one of the designated stopovers along the highway

(Gysels et al., 2001). For the LDTs to have a restful night, they procure commercial sex mostly from casual FSWs, accompanied by alcohol drinking and substance abuse (Gysels et al., 2001). In such a scenario, their risk of contracting HIV and other STIs is increased. The studies highlighted here uniformly assert that alcohol and substance use influences unsafe sexual practices among LDTs, and consequently an inflated risk to HIV. Thus, there is a need for enhanced sensitization on alcohol and substance use to mitigate associated sexual risk behaviours among the LDTs.

Sexually transmitted infections and HIV have a synergistic role. Whereas an active infection with an STI increases the risk of contracting HIV, the latter lowers the body's immunity, making it more vulnerable to STIs. On the other hand, the delay of STI treatment increases one's vulnerability to HIV infection during sexual intercourse. Studies have documented that LDTs experience delayed access to STI treatment (Ishtiaq et al., 2017; Matovu & Ssebadduka, 2012; Pandey et al., 2008). Therefore, the LDTs should be properly sensitized to adopt safe sexual practices. Additionally, sexual health education on how to recognize STI symptoms early enough for timely treatment is required among the LDTs.

2.7 Behaviour Change Communication Strategies Targeted for Long-Distance Truckers

Behaviour change communication strategies are a collection of efforts mostly initiated by governmental or non-governmental agencies aiming at promoting HIV/AIDS risk reduction in populations that are at risk. There have been several programs implemented in different parts of the world with the primary objective of reducing the risk of HIV/AIDS among LDTs. In India, the Avahan program was a government-initiated BCC strategy targeting LDTs (Pandey et al., 2011). Here, the program used peer educators, increased media exposure along highways, and satellite clinical services at stopovers, mostly frequented by LDTs as the media for behaviour change communication (Pandey et al., 2011). Using an integrated behavioural and biological assessment (IBBA) approach, the program aimed at increasing LDTs' exposure to HIV prevention services, enhancing condom use, and reducing the incidence of STIs, including HIV (Pandey et al., 2011). It was established that LDTs who were

intensively exposed to the Avahan BCC program were 2.7 times more likely to use condoms consistently with FSWs than those who had less intensive exposure (Pandey et al., 2011). On the contrary, LDTs who had less intensive exposure to the Avahan program did not show any significant improvement in HIV risk reduction practices (Pandey et al., 2011). While the program demonstrated a high potential in reducing the risk of HIV among the LDTs, it was recommended that exposure to the BCC strategies needed to be intensive enough for them to be effective (Pandey et al., 2011).

In Hong Kong, China, a study recruited LDTs into a control arm (receiving three pamphlets with HIV preventive information) and an intervention arm (receiving 30-45 minutes of BCC interviewing and counselling) (Lau & Tsui, 2012). Baseline risk levels for HIV (history of an STD, number of sexual partners, risky sexual behaviours, and relevant risk perceptions) were assessed for both control and intervention arms (Lau & Tsui, 2012). The BCC strategy was accountable for improved knowledge on HIV and consistency in condom use among the participant LDTs (Lau & Tsui, 2012). These findings indicate that the BCC strategy employed here had the potential to reduce the risk of HIV among the LDTs. However, the study asserts that the BCC strategy would have had better HIV/AIDS risk reduction outcomes if the follow-up duration had been longer.

Elsewhere, in India, a study set out to examine the effect of a three-component BCC strategy on consistency in condom use (Juneja et al., 2013). The BCC strategy comprised exposure to project-run clinics, media, and interpersonal communication (Juneja et al., 2013). It emerged that exposure to mid-media and project-run clinics increased condom use by 26% (Juneja et al., 2013). On the southern border of Mexico, a study used LDTs peer educators and a two-way radio to exchange information through the air among other LDTs on HIV prevention (Bronfman et al., 2002). The radio conversations triggered deep conversations on various HIV prevention domains like the use of condoms and the reduction in the number of sexual partners (Bronfman et al., 2002). The conversation highlighted existing discrepancies in knowledge on HIV among the LDTs, calling for a long-term intervention to instill the correct HIV risk reduction (Bronfman et al., 2002).

A study employing a mixed methods design in Malawi was done to elicit the effects of a BCC intervention on condom use among LDTs and their sexual partners (Walden et al., 1999). It emerged that condom use among LDTs and their casual partners increased by 90.3% as a result of the intervention (Walden et al., 1999). Nonetheless, there were no significant changes in condom use between the LDTs and their regular sexual partners (Walden et al., 1999).

In Morocco, a 5-year intervention was implemented by a community-based organization to enhance HIV prevention in places frequented mainly by LDTs (Himmich et al., 2015). Community health providers were trained on how to educate LDTs who were both at risk and infected with HIV on safe sexual behaviours and demand creation for HIV and Syphilis voluntary testing and referral services (Himmich et al., 2015). The sexual behaviours of participants in LDTs and HIV testing improved significantly following the implementation of the BCC strategy (Himmich et al., 2015). In Tanzania, a peer-led BCC strategy accounted for an increased condom use from 56% to 74% among LDTs (Laukamm-Josten et al., 2000).

More recently, in Kenya SMS SMS-based BCC strategies to promote HIV risk reduction among LDTs have been conducted along the NCH (George et al., 2018; Kelvin et al., 2017, 2019; Strauss et al., 2018). In one study, LDTs received SMSs about the availability of oral self-testing kits provided by the North Star Alliance NGO in Kenya (Kelvin et al., 2019). It was established that announcing the availability of oral HIV testing kits improved HIV testing significantly among LDTs in the intervention arm (Kelvin et al., 2019). In a similar study from the same project, LDTs revealed that the cost of HIV testing was a key preference in the choice of HIV testing among them (Strauss et al., 2018). Thus, there is a need for tailored HIV testing services with consideration of the cost preferences among LDTs (Strauss et al., 2018).

Additionally, a cost analysis study on the type of HIV testing among LDTs in Kenya established that HIV-self-testing was costlier than routine healthcare provider-administered finger-prick testing (George et al., 2018). This was attributed to the high cost of the oral HIV self-testing kits. Consequently, cheaper and affordable oral HIV self-testing kits were recommended (George et al., 2018). Conclusively, the Kenyan

studies highlighted here focused primarily on HIV testing, somewhat leaving out other aspects of HIV risk reduction like reduction in the number of sex partners, ART use, STI screening and treatment, and safe sexual behaviours. Thus, a more holistic BCC intervention to promote HIV/AIDS risk reduction is needed.

2.8 Developing and Implementing a Behaviour Change Communication Intervention

2.8.1 Components of a Behaviour Change Communication Intervention

Behaviour change is a multilevel process that involves shifting from risky health behaviours to adopting and maintaining new behaviours that promote the health and well-being of individuals (UNHCR, 2010). It takes varying durations to change behaviour in different individuals and communities (UNHCR, 2010). Behaviour change may be influenced by either internal or external factors (Fink et al., 2021). Internal factors include personal emotions, intentions, knowledge, perceived consequences, and self-efficacy (Fink et al., 2021). External factors include socio-economic status (level of income, education, employment), cultural norms, policies, and access to health services and technology (Fink et al., 2021). Different populations require specific targeted messages to achieve behaviour change. In the context of HIV/AIDS, behaviour change aims at modifying risky behaviours that elevate the risk of infection (Coates et al., 2008; Vasconcelos et al., 2018). Indeed, behaviour change strategies highly complement biomedical and structural measures in the fight against HIV/AIDS (Coates et al., 2008; Vasconcelos et al., 2018). For an effective HIV/AIDS risk reduction to be achieved, behaviour change should address sexual partner reduction, enhanced use of condoms during sexual intercourse, avoidance of drugs and substances during or before sexual intercourse, delay of sexual intercourse, enhanced uptake of STI treatment, and PrEP use among many other factors (Coates et al., 2008; Family Health International, 2002; Vasconcelos et al., 2018). Behaviour change interventions should therefore influence knowledge, attitudes, perceptions, and practices related to HIV/AIDS among the target population (Albarracin & Durantini, 2010; Family Health International, 2002).

Behaviour change communication is an intervention that involves community members in identifying existing problems, determining their needs, and developing potential solutions by developing tailored messages and strategies to promote and sustain positive health outcomes (Family Health International, 2002; Nancy & Dongre, 2021). The BCC messages are created with the target population's specific needs in mind (Family Health International, 2002; Nancy & Dongre, 2021). Appropriate communication channels are required to deliver behaviour-change messages to the target population (Family Health International, 2002; Nancy & Dongre, 2021). The BCC interventions form a critical component of HIV/AIDS risk reduction programs (Family Health International, 2002). The fundamental roles of a BCC intervention include increasing knowledge, reducing stigma, creating demand, and promoting attitudes toward HIV/AIDS risk reduction, among many more (Family Health International, 2002).

A BCC intervention aims to achieve several objectives within the target population (Family Health International, 2002). Different populations experience varying risks of HIV/AIDS. In particular, the LDTs are faced with risky sexual behaviours, harsh working conditions, and limited access to HIV/AIDS preventive services (Makhakhe et al., 2017). A BCC intervention should, therefore, promote safe sexual practices among the LDTs, such as a reduced number of sexual partners, delay of sexual intercourse, enhanced condom use, abstaining from substance use during sexual intercourse, and many more (Family Health International, 2002). Moreover, a BCC intervention should also create demand for health services like the use of PrEP, PEP, and uptake of STI and HIV testing (Family Health International, 2002). The overall goal would be to enhance knowledge and encourage a change in negative attitudes and perceptions toward HIV/AIDS (Family Health International, 2002).

A BCC intervention requires an appropriate channel for its delivery to the target population (Family Health International, 2002; UNHCR, 2010). When developing a BCC intervention, it is important to identify the channel that would most suit the target population (Family Health International, 2002). The channel of choice should be affordable, accessible, and cost-effective, and uphold the cultural values of the target

population (Family Health International, 2002). BCC channels include mass media platforms such as television and radio, one-on-one interactions such as counselling and peer educators, print media such as newspapers, brochures, and magazines, flip charts, and digital media such as mobile phone SMSs (Family Health International, 2002; UNHCR, 2010).

The existing literature suggests that adopting BCC interventions has been suboptimal, especially in developing countries (Durosinmi-Etti et al., 2021; Eliezer Wangulu, 2008; Family Health International, 2002). Integrating a comprehensive BCC intervention in routine healthcare service delivery has proven costly and time-consuming in most developing countries (Eliezer Wangulu, 2008; Family Health International, 2002). This is because a BCC intervention would require extra human and financial resources, which are limited in the developing world (Eliezer Wangulu, 2008; Family Health International, 2002). Healthcare settings in developing countries are often overburdened with disease and face limited healthcare resources, which explains the low adoption of BCC interventions (Eliezer Wangulu, 2008; Family Health International, 2002).

Other factors that challenge the smooth implementation of a BCC intervention include political interference, geographical obstacles, cultural diversities, and language barriers (Eliezer Wangulu, 2008; Family Health International, 2002). Political interference occurs when politicians or other influential figures in society manipulate BCC implementing partners to adopt procedures that may not be viable or to direct how resources will be used (Eliezer Wangulu, 2008; Family Health International, 2002). In some instances, long distances and poor geographical terrain may make it hard to reach certain communities with BCC interventions (Eliezer Wangulu, 2008; Family Health International, 2002). Sustainability issues arise when communities cannot sustain certain BCC interventions without the assistance of the implementing partner (Eliezer Wangulu, 2008; Family Health International, 2002). This happens when the program's implementation period ends and the communities lack the technical and financial capacity to carry forward the BCC intervention (Eliezer Wangulu, 2008; Family Health International, 2002). The language barrier and cultural

diversity may also complicate the efficiency and acceptability of a BCC program (Eliezer Wangulu, 2008; Family Health International, 2002).

Before implementing a BCC intervention, various prerequisites should be in place (Durosinmi-Etti et al., 2021). These include resources (financial and human), the BCC messages, implementing partners (healthcare stakeholders and non-governmental organizations), a pretesting exercise, the target population, and the channels of delivering the BCC intervention (Durosinmi-Etti et al., 2021; Family Health International, 2002; Nancy & Dongre, 2021). Different populations have unique needs and challenges, which should be factored into the BCC intervention by tailoring messages (Durosinmi-Etti et al., 2021; Eliezer Wangulu, 2008; Family Health International, 2002). The needs and challenges are always evolving, and so information should also evolve to address current affairs (Durosinmi-Etti et al., 2021; Eliezer Wangulu, 2008; Family Health International, 2002). Implementing partners facilitate the integration of BCC interventions into existing healthcare service delivery programs (Family Health International, 2002).

2.8.2 Developing and Validating HIV/AIDS Risk Reduction Messages

Risk reduction messages on HIV/AIDS are evidence-based facts made to guide HIV prevention (UNAIDS, 2023, 2024). Since the body of evidence on HIV/AIDS prevention is constantly evolving, more up-to-date information is adopted, replacing the existing one. For instance, PrEP and U=U (undetectable viral load = untransmissible HIV infection) are among the most recent risk reduction strategies that the UNAIDS is strongly advocating for (UNAIDS, 2024). Therefore, the most recent guidelines and experts should be consulted when developing HIV/AIDS risk-reduction messages (Goldenberg et al., 2015). As such, evidence suggests involving intervention consumers in the development of risk reduction messages (de Assunção Gaia et al., 2023; Dunn Navarra et al., 2024; Goldenberg et al., 2015). That way, the researcher can overcome the disconnect that may occur when the consumers of the intervention are not involved, most likely leading to unacceptability and poor outcomes of the HIV/AIDS risk reduction messages.

As part of the development process for the risk reduction messages, validation is required to gauge their suitability for the target population. Previous studies have involved several experts with relevant experience in the area of interest (de Assunção Gaia et al., 2023; Dunn Navarra et al., 2024; Goldenberg et al., 2015). This helps gather experts' views, perceptions, and suggestions on improving the intervention messages before they are rolled out to the target population (Shinners et al., 2021). Previously, experts were invited to physical meetings to offer their views on validating the interventions (Shinners et al., 2021). However, with the recent emergence of electronic-based technology, researchers prefer using e-Delphi techniques to gather expert views during validation (Shinners et al., 2021). Initially, the researcher selects and invites experts through electronic mail or mobile phone text-based platforms (Shinners et al., 2021). Those who accept the invitation proceed to rate several components of the intervention. It is recommended that the agreement levels from all experts should be above 75% for a given item of the intervention messages to be adopted (Munos et al., 2018). Suppose the recommended threshold is met in the first round of the Delphi validation exercise. The validation exercises conclude with the adoption of any suggestions offered during the process. However, if the recommended threshold is not met, more rounds of the e-Delphi technique are done until it is achieved (Munos et al., 2018). Often, the e-Delphi validation exercise involves more than one round, as evidenced in the existing literature (de Assunção Gaia et al., 2023; Goldenberg et al., 2015; Munos et al., 2018; Shinners et al., 2021). Eventually, once the e-Delphi exercise is over, the intervention messages are implemented on the target population.

2.9 Effects of Behaviour Change Communication on HIV/AIDS Risk Reduction

An effective BCC intervention should be able to enhance knowledge, attitudes, and perceptions toward HIV/AIDS risk reduction (Family Health International, 2002; UNHCR, 2010). Further, an effective BCC intervention should create a demand for health services like HIV testing, STI treatment, and utilization of PrEP and PEP among LDTs (Family Health International, 2002; UNHCR, 2010). Other potentials of an effective BCC intervention include reduced stigma, enhanced skills on condom use

and negotiation for safe sexual practices with sexual partners, as well as self-efficacy among LDTs to execute the changed behaviour with ease (Family Health International, 2002; UNHCR, 2010). The ultimate goal is to reduce the risk levels of HIV/AIDS in the target population.

In Hong Kong, LDTs exposed to a BCC intervention had advanced knowledge of HIV with low rates of STIs and increased satisfaction with VCT services (Lau & Tsui, 2012). In another similar RCT study in Hong Kong, LDTs demonstrated better knowledge of HIV risk reduction. They were less likely to report STIs at a 9-week follow-up than at baseline (Lau et al., 2010). A short follow-up duration and self-reporting of sexual behaviours leading to social desirability bias were highlighted as likely to have limited the effectiveness of the BCC intervention (Lau et al., 2010). A study done in Central America identified that 52% of the participants exposed to a BCC intervention through a mass media campaign had increased condom use by 1.8 times and were 1.5 times more likely to disclose their HIV status (Vu et al., 2015). The ease of disclosing HIV status is perhaps a reflection of reduced self-stigma and a shift toward a positive attitude about HIV. Reduced stigma and positive attitudes toward HIV may improve health-seeking behaviour and enhance adherence among those who are infected with HIV. A systematic review established that condom use increased by 81%, whereas unprotected sexual intercourse was reduced by a range of 27 to 43% following BCC intervention on HIV/AIDS risk reduction (Herbst et al., 2007). In India, a BCC intervention dubbed *'kavach'* recruited 2066 and 2085 LDTs in two phases (Sharma et al., 2015). The outcome was an increased condom use from 4,430 to 6,876 per 1000 LDTs (Sharma et al., 2015). Moreover, the acceptability of the HIV preventive services increased from 13.8% to 50.6% (Sharma et al., 2015). However, while the BCC intervention significantly improved the effectiveness of HIV preventive services, it did not resolve all access-related issues (Sharma et al., 2015). Thus, the need to overcome demand and supply barriers to improve access to HIV preventive services alongside BCC interventions was highlighted (Sharma et al., 2015). In India, a BCC intervention based on the information, motivation, behavioural skills model was implemented (Cornman et al., 2007). The intervention aimed at promoting safe sexual behaviours, positive attitudes, and knowledge on HIV/AIDS

risk reduction among LDTs (Cornman et al., 2007). Those exposed to intervention had improved positive attitudes and enhanced safe efficacy towards condom use with their marital partners (Cornman et al., 2007). However, the intervention did not significantly affect motivation and behavioural skills among LDTs and their non-marital partners (Cornman et al., 2007). Loss to follow-up and self-reporting on sexual behaviours were highlighted as likely to have limited the effectiveness of BCC intervention (Cornman et al., 2007).

In sub-Saharan Africa, some BCC interventions have recorded overwhelming effects in HIV/AIDS risk reduction, while in other instances, the interventions didn't have any effect. In Malawi, there was a significant increase in HIV/AIDS knowledge in a BCC intervention group, compared to the control group (James et al., 2006). In the same study, no significant changes were established in sexual practices after a follow-up period of six months (James et al., 2006). A peer-led BCC intervention was attributed to a 93.3% increase in condom use among LDTs and their casual sexual partners (Walden et al., 1999). There was a reduced level of HIV risk behaviours following a BCC intervention in South Africa (Peltzer et al., 2012). However, the same study did not identify any association between exposure to the BCC intervention and a reduced number of sexual partners (Peltzer et al., 2012). Since the study relied on self-reporting, the extent to which the intervention measured exposure effects could not be ascertained (Peltzer et al., 2012). Low-Beer & Stoneburner, (2003) established a 21 to 9.8% decline in HIV prevalence in Uganda, attributable to BCC interventions.

In Nairobi, Kenya, a cross-sectional study sought to determine the effect of varying levels of exposure to a BCC intervention on FSWs (Prakash et al., 2018). The study revealed that intensive exposure to the BCC intervention was linked to a 1.57 times increase in condom use, a 3.37 times increase in seeking STI treatment, and a 1.63 times increase in the ability to negotiate safe sex between the FSWs and their clients (Prakash et al., 2018). It was recommended that interventions targeting most at-risk populations should be intensive enough to elicit the best practices that can optimize HIV/AIDS risk reduction (Prakash et al., 2018). The lack of a control group in the study was associated with difficulties in interpreting the study's findings (Prakash et

al., 2018). Since the study was cross-sectional, causal inference from the findings was not possible (Prakash et al., 2018). A BCC intervention coupled with a PrEP adherence campaign was not effective in reducing sexual risk behaviours, enhancing condom use, and reducing the incidence of STIs (Mehta et al., 2021). While there was a considerable decline in self-reported risky sexual behaviours, the incidence of STIs did not decline, perhaps a reflection of social desirability bias from the study (Mehta et al., 2021). A study conducted in Western Kenya found that failure to align BCC interventions with the local community's culture and preferences was likely to render them ineffective (Ogoye-Ndegwa, 2005). The study recommended caution when choosing a BCC intervention channel (Ogoye-Ndegwa, 2005). Some elements that can increase a BCC channel's effectiveness comprise sustainability, acceptance, and its compatibility to the target audience (Ogoye-Ndegwa, 2005).

2.10 Theoretical Framework

The design of a BCC intervention should be guided by existing theories and models of behaviour change (Nancy & Dongre, 2021; UNHCR, 2010). While several theories and models of behaviour change exist, each has both strengths and weaknesses (Nancy & Dongre, 2021). For instance, the health belief model (HBM) is applicable at the individual level but fails to account for the roles of environmental, economic, and social norms in behaviour change (Family Health International, 1996; Nancy & Dongre, 2021). Like HBM, the theory of planned behaviour (TPB) does not consider economic and environmental factors in influencing behaviour change (Nancy & Dongre, 2021). While the trans-theoretical model (TTM) explains behaviour change as occurring in six stages, it does not clarify the duration estimates for each stage (Nancy & Dongre, 2021). The social cognitive theory (SCT) is applied at the interpersonal level, whereas the diffusion of innovation theory (DOI) is applied at a community level. Therefore, the SCT and DOI theories may not be suitable for studying behaviour change at the individual level, which is beyond the scope of this study. While the AIDS risk reduction model (ARRM) has been widely used to guide HIV/AIDS reduction interventions, it fails to consider the role of external contributors like sexual partners in an individual’s risk of HIV (Family Health International, 1996).

The information, motivation, and behavioural skills (IMB) model is highly recommended for BCC interventions on HIV/AIDS risk reduction (Wang et al., 2020). This is because the theory has information sharing as its pre-requisite construct, which is an element of communication (Wang et al., 2020). Information sharing triggers motivation to change risky HIV/AIDS behaviours (Fisher et al., 2002; Fisher & Fisher, 1992). Individuals who are informed and motivated to change their risky behaviours will eventually gain the behavioural skills to practice and sustain HIV/AIDS risk reduction (Fisher et al., 2002; Fisher & Fisher, 1992). Thus, the IMB model provides a comprehensive guide to understanding behaviour change and is deemed generalizable in formulating a BCC intervention for HIV/AIDS risk reduction (Fisher et al., 2002; Fisher & Fisher, 1992). In keeping with the aforementioned strengths, the IMB model is deemed suitable for guiding the theoretical framework for this study. Indeed, BCC interventions based on the IMB model have been implemented elsewhere in India with positive outcomes on HIV/AIDS risk reduction among LDTs (Bryan et al., 2000; Cornman et al., 2007).

2.10.1 Information-Motivation-Behavioural Skills Model (IMB)

The IMB model is anchored on three key constructs: information, motivation, and behavioural skills (Fisher et al., 2002; Fisher & Fisher, 1992). The model postulates a causal effect relationship between the three constructs (Fisher et al., 2002; Fisher & Fisher, 1992). While the IMB model is highly generalizable, it recommends that information should be specific and tailored to suit the unique needs of the target population (Fisher et al., 2002; Fisher & Fisher, 1992).

The IMB model acknowledges information as a prerequisite determinant of HIV/AIDS risk reduction (Fisher et al., 2002; Fisher & Fisher, 1992). Information, in this case, entails facts on the means of HIV/AIDS transmission and preventive measures (Fisher et al., 2002; Fisher & Fisher, 1992). In the current study, tailored behaviour change messages will be communicated to the LDTs via short message service (SMS). The information component will entail up-to-date facts on HIV/AIDS risk reduction behaviours and practices like sexual partner reduction, delay of sex, enhanced use of condoms, avoidance of substance use during or before the sexual act, enhanced use of

PrEP (pre-exposure prophylaxis) and PEP (post-exposure prophylaxis), ART (anti-retroviral) care, and STI treatment, among many others. Assessing information through knowledge of various aspects of HIV/AIDS risk reduction will be a component of the first objective of the study.

Motivation is the second determinant of the IMB model (Fisher et al., 2002; Fisher & Fisher, 1992). The IMB model suggests that a person who is well informed on the means of HIV transmission and prevention is likely to be motivated to change high-risk behaviours (Fisher et al., 2002; Fisher & Fisher, 1992). Motivation may be personal or social (Fisher et al., 2002; Fisher & Fisher, 1992). Personal motivation is the individual attitudes and perceptions towards HIV preventive behaviours (Fisher et al., 2002; Fisher & Fisher, 1992). Social motivation refers to how individuals perceive support from their social networks for practising preventive behaviours (Fisher et al., 2002; Fisher & Fisher, 1992). In the current study, the motivation component was delivered by encouraging positive attitudes toward HIV risk reduction behaviours and practices and by instilling positive perceptions of HIV/AIDS risk reduction behaviours and practices. Moreover, the motivation construct will entail highlighting the need for social support mechanisms like peer-driven HIV/AIDS risk reduction from the LDTs. The motivation construct will be part of the first objective of the study, which seeks to compare risk levels of HIV/AIDS among LDTs at baseline and post-intervention.

Behavioural skills constitute the last determinant of the IMB model (Fisher et al., 2002; Fisher & Fisher, 1992). The IMB model postulates that a well-informed and motivated individual will exhibit enhanced behavioural skills and perform HIV/AIDS risk-reduction practices effectively (Fisher et al., 2002; Fisher & Fisher, 1992). The behavioural skills component will entail enhancing self-efficacy on risk reduction behaviours and practices, referral for further HIV/AIDS risk reduction services and linkages, demand creation for PrEP, PEP, STI screening and treatment, and HIV testing among LDTs. The behavioural skills component will be assessed from the LDTs' practices on various aspects of HIV/AIDS risk reduction as part of objective one in the current study.

The IMB model makes the following assumptions (Fisher & Fisher, 1992).

1. Information and motivation trigger behavioural skills that result in HIV/AIDS risk reduction.
2. Information and motivation are independent determinants of the IMB model.
3. The strength of some factors in the IMB model varies across populations, and the constructs should be tailored to the unique needs of each population.
4. Well-informed people will exhibit good knowledge and positive attitudes towards HIV/AIDS risk reduction behaviours.

An illustration of the study's theoretical framework (the IMB model) is shown in Figure 2.1.

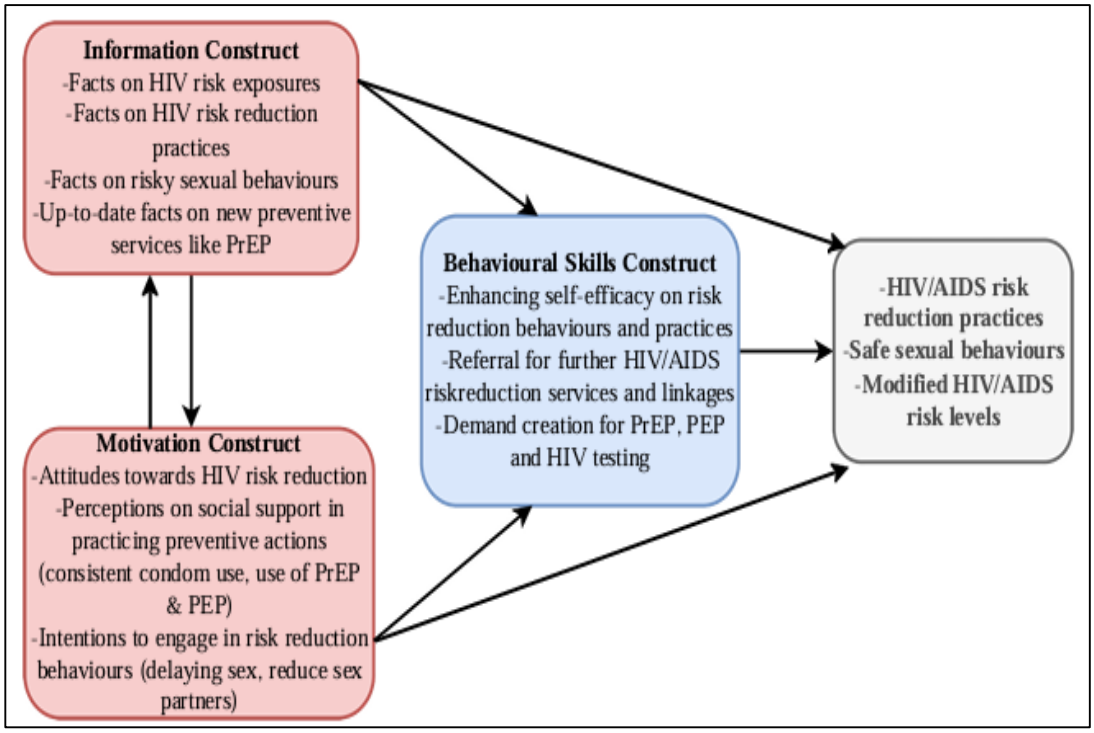

Figure 2.1: Information Motivation Behavioral Skills Model (Fisher & Fisher, 1992)

2.11 Conceptual Framework

There is a variety of factors that influence behaviour change on HIV/AIDS risk reduction among LDTs. These factors are categorized into the background, intervention, and outcome variables. Background factors are the underlying variables

such as socio-demographic, socio-economic, and existing HIV/AIDS risk reduction (PrEP, PEP, STI screening and treatment, and HIV testing) among the LDTs. Proximal to the study outcome is the study intervention (exposure to BCC messages delivered through mobile phone SMSs). The BCC messages were be based on various HIV/AIDS risk reduction themes like safe sexual practices, access to and utilization of PrEP and PEP, HIV testing, STI screening and treatment, and access to ART care for those who are infected with HIV, among others. It is envisaged that the BCC intervention will enhance HIV/AIDS risk reduction knowledge, attitudes, and practices, as well as safe sexual behaviours among the LDTs. Figure 2.2 depicts the conceptual framework of the current study.

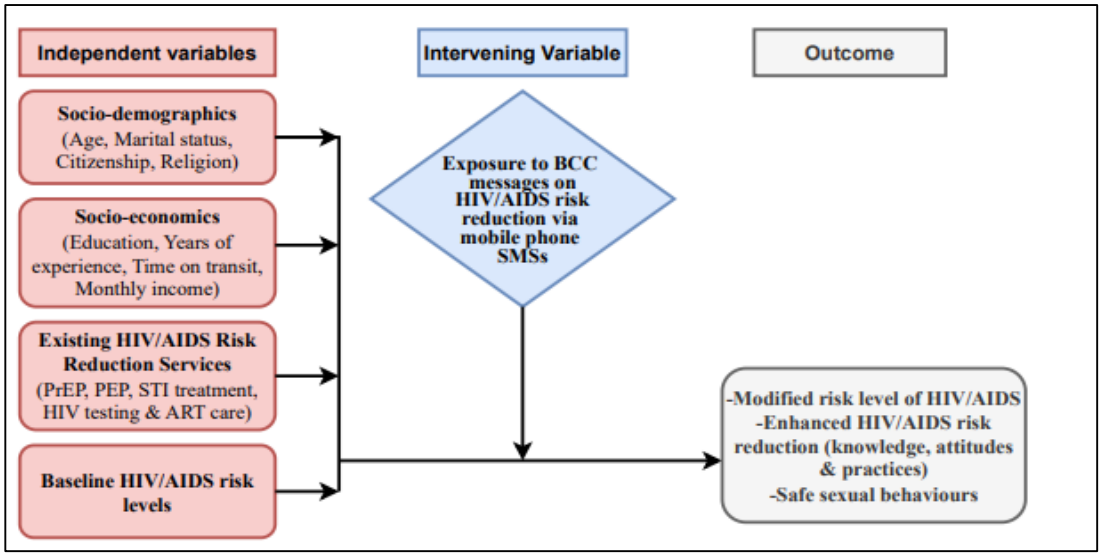

Figure 2.2: Conceptual Framework Depicting the Interconnection between Independent Variables and the Intervening Variable towards the Study's Outcome (HIV/AIDS Risk Reduction).

Source: Author

2.12 Gaps Identified

From the review of the literature, it is evident that even with widespread knowledge of sources of HIV/AIDS risk among LDTs, their actions speak the contrary, as evidenced by their risky sexual behaviours. It is not clear why the LDTs would continue to exhibit

risky sexual behaviours, opposite to their knowledge that the same behavior increases their HIV/AIDS risk. Surprisingly, there are few or no studies that have looked into behaviour change towards HIV/AIDS risk reduction among LDTs on the Northern Corridor highway, in Kenya.

While critical milestones have been made in the HIV/AIDS risk reduction, like the introduction of PrEP in 2015 for people at risk of HIV, evidence of the same among the LDTs in many sub-Saharan countries, including Kenya, is scanty. It is unclear whether the limited evidence is due to a lack of knowledge and awareness of PrEP use or to a lack of documentation of the current situation on the ground.

Even when the BCC interventions have been widely recommended for HIV/AIDS risk reduction for the hard-to-reach populations, there is limited evidence of their adoption among the LDTs in Kenya. Thus, further research is needed to understand how well BCC interventions can be utilized to achieve HIV/AIDS risk reduction among LDTs in Kenya.

Even when certain studies looked into the effectiveness of BCC interventions in HIV/AIDS risk reduction, their methodology wasn't up to the recommended standards of experimental design. Other studies lacked clarity in their control of confounding. Certain flaws that may render experimental studies less effective, such as small sample sizes, short follow-up durations, and the lack of formative assessments, were also identified.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Design

The study adopted a concurrent triangulation mixed methods design (Creswell & Clark, 2010). A concurrent triangulation mixed-methods design uses qualitative and quantitative methods in data collection and analysis within the same phase of the study (Creswell & Clark, 2010). The quantitative and qualitative findings are integrated to yield a strong body of evidence (Creswell & Clark, 2010). In the current study, both quantitative and qualitative data were collected concurrently in the first phase. Thereafter, the quantitative and qualitative findings were triangulated to inform the development of a tailored BCC intervention tool for HIV/AIDS risk reduction among the LDTs. The quantitative arm of the study used a pretest-posttest nonequivalent quasi-experimental design approach (Chiang et al., 2015; Jhangiani et al., 2020).

In a pretest-posttest quasi-experimental design, the intervention group receives a pre-test, is followed up with an intervention or treatment, and finally a post-test (Chiang et al., 2015; Jhangiani et al., 2020). On the other hand, the control group is given a pre-test, does not receive an intervention or treatment over a period similar to that of the intervention group, and finally receives a post-test (Chiang et al., 2015; Jhangiani et al., 2020). Here, the fundamental analogy is whether the intervention group improves in the outcome of interest and whether their improvement is significantly greater than that of the control group (Chiang et al., 2015; Jhangiani et al., 2020). As such, findings from the qualitative arm at baseline are used to complement those from the quantitative arm, providing a firm basis for the development of the study intervention (Mutie et al., 2025; Mutie et al., 2025).

3.2 Study Setting

The study was conducted in both Busia and Namanga, Kenya. Busia and Namanga towns are key terminal entry and exit points of the NCH from the interior of Kenya to the Kenya/Uganda and Tanzania international borders, respectively (Fitzmaurice &

Hartmann, 2013; NCTTCA, 2017). Namanga town serves as the major entry and exit point for LDTs ferrying goods to and from Kenya and other countries in the region, such as Tanzania, Burundi, and Zambia (Fitzmaurice & Hartmann, 2013; NCTTCA, 2017). LDTs often face long waits for border clearance (Fitzmaurice & Hartmann, 2013; NCTTCA, 2017). When LDTs spend longer than expected at such border points, they have the opportunity to interact and access the abundant services of commercial FSWs from Kenya and Tanzania (Odek et al., 2014). Thus, Namanga town is a key sexual network hotspot primarily for LDTs and FSWs (Odek et al., 2014). Such sexual network hotspots are characterized by risky sexual behaviours which fuel the spread of HIV and other STIs across diverse communities (Mutie et al., 2023).

On the other hand, it is through Busia town that most LDTs ferrying goods and services from within and outside Kenya (Uganda, Rwanda, South Sudan, Ethiopia, and DRC) enter and exit (Fitzmaurice & Hartmann, 2013; NCTTCA, 2017). Due to long queues of trucks awaiting clearance, LDTs frequently spend longer than expected in the town (Mutie et al., 2023). As a result, the LDTs are forced to seek accommodation services as well as commercial sex from FSWs who are abundant within the town (Mutie et al., 2023). More recently, evidence has shown that Busia town serves as a sexual network hotspot between LDTs and FSWs (Mutie et al., 2023). Here, commercial sex between LDTs and FSWs is considerably higher compared to other major stopovers along the NCH (Mutie et al., 2023). Moreover, a significant number of FSWs who offer commercial sex to the LDTs in Busia town are illegal migrants who shun the locally available health facilities because they lack the necessary identification documents required to access HIV/AIDS preventive services (IOM, 2013). As a result, exposure rates to HIV are higher among the LDTs and FSWs. This is evidenced by the fact that Busia leads with over 6% HIV prevalence, compared to an average of 4% in other major stopovers along the NCH, Kenya (Waruru et al., 2021). It is in keeping with the above reasons that the two towns were purposively chosen as the study sites, as shown in Figure 3.1.

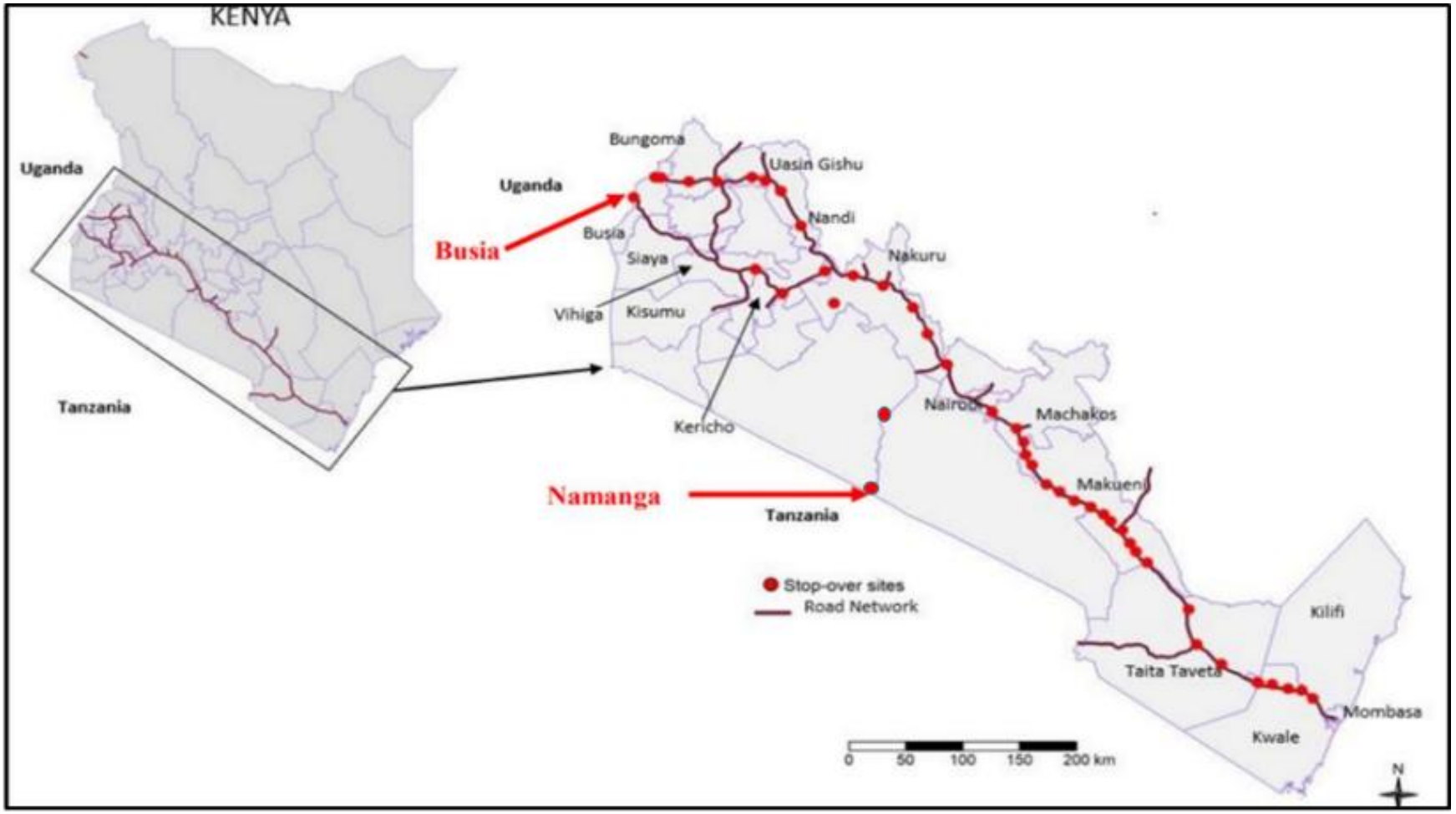

Figure 3.1: A Map of The Northern Corridor Highway, Showing The Study Sites of Busia And Namanga. (Mutie Et Al., 2023)

3.3 Study Population

The study population comprised LDTs who use the NCH and exit or enter Kenya through the Busia and Namanga towns at the Kenya/Uganda & Kenya/Tanzania international border points. The study targeted LDTs operating along the NCH in Kenya. Moreover, the study involved healthcare providers who provide HIV/AIDS risk reduction services to the LDTs at the Busia and Namanga border points.

3.3.1 Inclusion Criteria

The inclusion of the LDTs in the study was based on their ability to read SMSs in English or Swahili on their mobile phones and on their possession of a mobile phone with which to access the SMSs. The healthcare providers who offered HIV/AIDs risk reduction services to the LDTs within Busia and Namanga towns were also included in the study.

3.3.2 Exclusion Criteria

The study excluded LDTs under 18 years of age, drivers of other vehicles not covering long distances, and truckers not involved in long-distance trucking. The drivers of vehicles covering short distances were excluded because they may not have been experiencing the diverse vulnerabilities to HIV/AIDS that come with covering long distances across different geographical stopovers along the NCH, Kenya. Other healthcare workers who were not directly involved in offering HIV/AIDS preventive services to LDTs, like cashiers, receptionists, and health record officers, were excluded.

3.4 Sample Size Determination

Since LDTs were recruited into either intervention or control groups, for comparison purposes during the pre-test and post-test, the sample size calculation formula for two proportions was deemed appropriate (Wang & Chow, 2007). The formula for sample size calculation to estimate the intervention effect difference between two proportions, as suggested by Wang & Chow (2007), is tabulated below.

$$\boldsymbol{n = \frac{[(Z_{a/2} + Z_{\beta})^2 \times (P_1 (1 - P_1) + P_2 (1 - P_2)]}{(P_1 - P_2)^2}}$$

Where:

n = the sample size in either the intervention or control group, which is assumed to be equal.

$Z_{a/2}$ = the desired level of statistical significance, for a confidence level of 95%, 5% level of significance ($\alpha = 0.05$) = 1.96

Z_{β} = the desired power which is 80% ($\beta = 0.20$) = 0.84

P_1 = the expected proportion of LDTs with reduced HIV/AIDS risk in the control group, based on findings of a previous study among LDTs who had attained selected HIV/AIDS risk reduction practices on the NCH, Kenya (Mutie et al., 2021b), = 4.9% = 0.049

P_2 = the expected proportion of LDTs with reduced HIV/AIDS risk in the intervention group at post-test projected to be 15% = 0.15

P_1-P_2 = the expected effect size (expected difference) in HIV/AIDS risk reduction following the BCC intervention among the LDTs in the control group and those in the intervention arm, set at (0.049-0.15) = 0.102 = 10%

Therefore;

$$\boldsymbol{n = \frac{[(1.96 + 0.84)^2 \times (0.049 (1 - 0.049) + 0.15(1 - 0.15)]}{(0.049 - 0.15)^2}}$$

n=135 LDTs for each group (intervention and control).

To minimize bias in the findings of an interventional study and maintain validity, a loss to follow-up of more than 20% should be factored into the sample size calculation (Dettori, 2011). Given the unique, hard-to-reach nature of the LDTs, it was envisaged

that a higher number than expected in the general population might be lost to follow-up. Thus, a higher-than-expected minimum (20%) loss to follow-up of 40% was considered, resulting in an adjustment of 54 in each group (135). Indeed, a higher loss-to-follow-up adjustment is understood to yield a higher response rate among volatile populations such as LDTs (Dettori, 2011; Fewtrell et al., 2008). As a result, the intervention group constituted 189 LDTs, as well as the control group, at baseline. Thus, the total sample of LDTs involved in the study will be 378.

3.5 Sampling Technique

3.5.1 Systematic Sampling

A systematic sampling technique was used. Systematic sampling is a probability sampling technique that involves randomly selecting participants at predetermined intervals (e.g., the *kth* term) (Boswell & Cannon, 2023). To determine the sampling interval, the researcher must first establish the desired sample size (n) and the study population (N) (Boswell & Cannon, 2023). The *kth* interval is calculated by dividing the size of the study population by the sample size as given below;

$$\boldsymbol{kth} = \frac{N}{n} = \frac{Population\ size}{Sample\ size}$$

While approaching the Busia and Namanga borders, LDTs usually wait in a queue for clearance at the border customs clearing point, which informed the choice of the sampling method. At the Busia border, it is estimated that 500 LDTs are served daily (Kenya News Agency (KNA), 2022). The data collection exercise for the baseline study intervention group lasted for about 16 days. This was in consideration of two data enumerators who were required to collect data from 12 LDTs daily (six each) and the intervention group sample size of 189. Therefore, multiplying the data collection period (16 days) by the daily number of LDTs (500) who used the Kenya-Busia border clearing unit yielded an estimated study population of 8,000. However, since data collection was conducted during the day, the daily population of 8000 was divided by 2, leaving only 4000 who could be reached during the day.

As a result, the (*kth* interval) was calculated by dividing the study population size (4,000) by the sample size of the study (189) as shown below;

$$\boldsymbol{kth} = \frac{N}{n} = \frac{4{,}000\ (Population\ size)}{189\ (Sample\ size)} = 21$$

Thus, the sampling interval was 21 for the Busia border intervention group. The first participant was selected at random using a simple random lottery within the first sampling interval. The start point was the 5th participant randomly selected from the first sampling frame. The random selection of the first participant was done daily at the start of every data collection exercise. The subsequent participants were selected by adding the sampling interval to the random figure (5) generated by the initial lottery technique. This was repeated until the daily sampling size of 12 and the study sample size of 189 were achieved. Where the 21st participant did not meet the inclusion criteria or was unwilling to participate, a replacement was made with the next eligible one.

Since the Namanga border was used to recruit LDTs for the control arm, a systematic sampling approach was used, though slightly different from that at Busia (intervention site) due to the varying numbers of LDTs served at the two border points (Fitzmaurice & Hartmann, 2013). About 250 LDTs are estimated to be served at the Namanga border point daily (Fitzmaurice & Hartmann, 2013). Therefore, the baseline study's control group data collection lasted about 16 days. This was in consideration of two data enumerators who were required to collect data from 12 LDTs daily (six each) and the sample size of 189 in the control group. Thus, multiplying the data collection period (16 days) by the daily number of LDTs (250) who used the Namanga border clearing unit yielded an estimated study population of 4,000. Since data collection was conducted during the day, the daily study population of 4000 was divided by 2 to include an estimated 2000 LDTs that could be reached that day.

Therefore, the (*kth* interval) was calculated by dividing the study population size (4,000) by the sample size of the study (189) as shown below;

$$\boldsymbol{kth} = \frac{N}{n} = \frac{2{,}000\ (Population\ size)}{189\ (Sample\ size)} = 11$$

Thus, the sampling interval for the Namanga (control site) will be 11. Recruitment of the first participant was based on simple random sampling (3rd participant), from within the first sampling interval 11. As highlighted above, an approach similar to that of the intervention group was used to determine the selection interval of the subsequent participants.

3.5.2 Sampling Procedure for Key Informant Interviews

Just like other key population groups, LDTs have peer educators tasked with sensitizing and creating HIV/AIDS risk reduction awareness among them. Mostly, the peer educators are recruited by an existing non-governmental organization (NGO) based health facility like the Impact Research and Development Organisation (IRDO) and North Star Alliance, which specifically targets the LDTs with HIV/AIDS preventive services in both Busia and Namanga towns, respectively (IRDO, 2024; Kelvin et al., 2019). The peer educators were recruited based on their experience in the trucking industry and active involvement in HIV/AIDS risk reduction. Therefore, key informants (KIs) were purposively sampled from the existing LDT peer educators' list available at NGO-based health facilities such as the IRDO and North Star Alliance. In addition, healthcare providers who exclusively provide HIV/AIDS preventive services to the LDTs in health facilities based in Busia and Namanga towns were recruited as KIs. The choice of peer educators and healthcare providers as KIs was based on the understanding that they were well-versed with the barriers to HIV/AIDS risk reduction, as well as the existing level of BCC strategies targeted for the LDTs. It was envisaged that 10 to 15 key informant interviews (KIIs) would be conducted, based on existing evidence suggesting that saturation could be reached at this point (Muellmann et al., 2021). However, by the time the ninth KII was conducted, the researcher noted that the saturation point had already been reached.

3.5.3 Sampling Procedure for In-Depth Interviews

The in-depth interviewees were purposively sampled from the LDTs registering high-risk scores on the level of HIV/AIDS in the baseline study for the Busia intervention

and Namanga control sites. It was estimated that 20-30 in-depth interviews would be conducted, but saturation was reached by the 18th ID (Vasileiou et al., 2018).

3.6 Study Variables

3.6.1 Independent Variables

The independent variables included socio-demographic factors (age, marital status, citizenship, and religion), socioeconomic factors (education level, experience duration as truck drivers, average time spent on transit, hours spent on rest, days spent on off duty in a week, monthly income, and mileage allowance), existing HIV/AIDS risk reduction services (PrEP, PEP, HIV testing, availability of condoms and sex lubricants, ART care, and STI treatment).

3.6.2 Intervening Variable

The intervening variable was the exposure to BCC messages on HIV/AIDS risk reduction.

3.6.3 Dependent/Outcome Variable

It was envisaged that the study would enhance HIV/AIDS risk reduction knowledge, attitudes, practices, and safe sexual behaviours among long-distance truckers. Thus, the ultimate outcome was enhanced HIV/AIDS risk reduction as evidenced by risk levels post-intervention compared to baseline.

3.7 Study Procedures

3.7.1 Phase One (Baseline Study)

The first phase of the study was a baseline study. This phase enabled the elicitation of the risk levels of HIV/AIDS, barriers to HIV/AIDS risk reduction, and existing BCC strategies to promote HIV/AIDS risk reduction among the LDTs. Both the control and intervention groups from the Namanga and Busia sites participated in the baseline study. The findings in phase one were used to inform the development of a BCC

intervention in phase two to promote HIV/AIDS risk reduction among LDTs using the NCH.

3.7.2 Phase Two (Development, Validation, and Implementation of The BCC Intervention)

The development and validation of the BCC intervention was informed by three stages as outlined below;

Phase 1: Formative Research

As part of a larger ongoing study, formative research was conducted to collect qualitative feedback on preferred intervention content and delivery modes from LDTs and healthcare providers. Moreover, a systematic review and meta-analysis were conducted to collate global evidence on HIV/AIDS risk-reduction interventions targeting LDTs as part of the formative research (Mutie et al., 2024; Mutie et al., 2024). The findings from the formative research would later inform the number of items across various categories of the HIV/AIDS risk reduction, as well as a mobile phone platform, given the tight work schedules and the constant mobility nature of LDTs.

Phase 2: Developing the Intervention

The researcher assembled several guidelines and training manuals on various HIV/AIDS risk reduction themes to formulate targeted text-based items for the LDTs. The guidelines included PrEP, post-exposure (PEP), HIV testing, antiretroviral therapy (ART) treatment and care, sexually transmitted infection (STI) screening and treatment, and the Kenya National Key Population manual (CDC, 2025; MOH, 2022; NASCOP, 2014; WHO, 2025). Key facts and updates were extracted and packaged into short targeted BCC messages for LDTs (originally drafted in English) (Mutie et al., 2025a).

The BCC messages covered various HIV/AIDS risk-reduction themes. The themes included consistency in condom use, reduced number of sexual partners, the type of sexual partners, uptake of PrEP and PEP, enhanced uptake of HIV testing, STI

screening and treatment, and initiation and adherence to ART care. A total of 57 BCC messages were formulated. The original 57 SMSs in English were also translated into Swahili and archived on an online platform (TD_Educator). Subsequently, seven items were developed on PrEP, six on HIV testing, 12 on ART treatment and care, 15 on PrEP, seven on PEP, and lastly, 10 on STI screening and treatment, making a total of 57. A Swahili version of the 57 items was created using standard translation tools.

Phase 3: Content Validation

The third phase involved validating the 56 items initially developed and adding a new item through an e-Delphi exercise. Initially, an electronic (e)-Delphi exercise was used to enlist feedback about the suitability and validity of the BCC intervention messages from various sexual health and key population experts. These experts were drawn from the Ministry of Health, Kenya (MOH-K), local and international universities, research institutions, and certain NGOs that offer HIV/AIDS risk-reduction services to LDTs, such as the North Star Alliance and IRDO. Based on the recommended sample size of 20-30, a multidisciplinary pool of 35 multinational experts was purposively sampled and invited to participate in the validation exercise (Manyara et al., 2024). An electronic invitation link containing the consent form (Appendix VIII) and the intervention messages was sent to the experts via a Google Form link. Here, only 24 experts accepted to participate. The experts were requested to interrogate and critique the suitability of the BCC messages. The researcher then implemented the suggested amendments as guided by the experts before initiating the intervention.

Two rounds of an e-Delphi validation exercise were done. A consensus of above 75% was adopted for individual items (BCC messages) (Barrios et al., 2021). Where an item scored 75% or below agreement levels, it was amended as recommended and taken to round two of the e-Delphi exercise. Further, to assess interrater reliability at each round of the e-Delphi technique, a Fleiss' Kappa (K) statistic was computed (Zapf et al., 2016). Here, a Fleiss' K of <0.00 indicated poor agreement, 0.00-0.20 slight agreement, 0.21-0.40 fair agreement, 0.41-60 moderate agreement, 0.61-0.80 substantial agreement, and 0.81-1.0 perfect agreement. The criterion (that all items must have achieved a percentage agreement of at least 75%) for closing the e-Delphi

in round 2 was applied (Barrios et al., 2021). A summary of the three intervention development phases is given in Figure 3.2. Moreover, a model of the HIV/AIDS risk reduction BCC intervention is given in Figure 3.3.

Validated BCC messages were shared among LDTs in the intervention arm through their mobile phones. Initially, the researcher registered an online text messaging platform called TD_Educator (meaning trucker driver educator) with a cloud Bulk SMS company called Text.SMS (Text.SMS, 2025) (**Appendix XVI**). The text messaging platform (TD_Educator) was also formally registered with the Government of Kenya and given an authorization certificate to share the BCC SMSs with the LDTs (**Appendix XVII**). The Bulk SMS platform (TD_Educator) enabled archiving and scheduling BCC SMSs for later sending. The TD_Educator was configured to send scheduled messages on Mondays, Wednesdays, and Fridays each week. Given the varying lengths of the SMSs and the total number (57 unique messages), the messages were shared for at least 24 weeks. One SMS (English Version) was sent at 7 a.m., and the other (Swahili version) at 5 p.m., on the three selected days of the week. The weekly messages were sent only once, without being repeated later. This timing was based on the qualitative feedback gathered from LDTs at baseline, indicating that this was the best time for them to read and comprehend the BCC SMSs uninterrupted amid their busy schedules.

The participants were then followed up for six months. Thereafter, the participants were subjected to a post-test to determine the effects of the intervention on HIV/AIDS risk reduction. All BCC messages will be compiled into a single document and shared with LDTs who had not received the intervention in the control group.

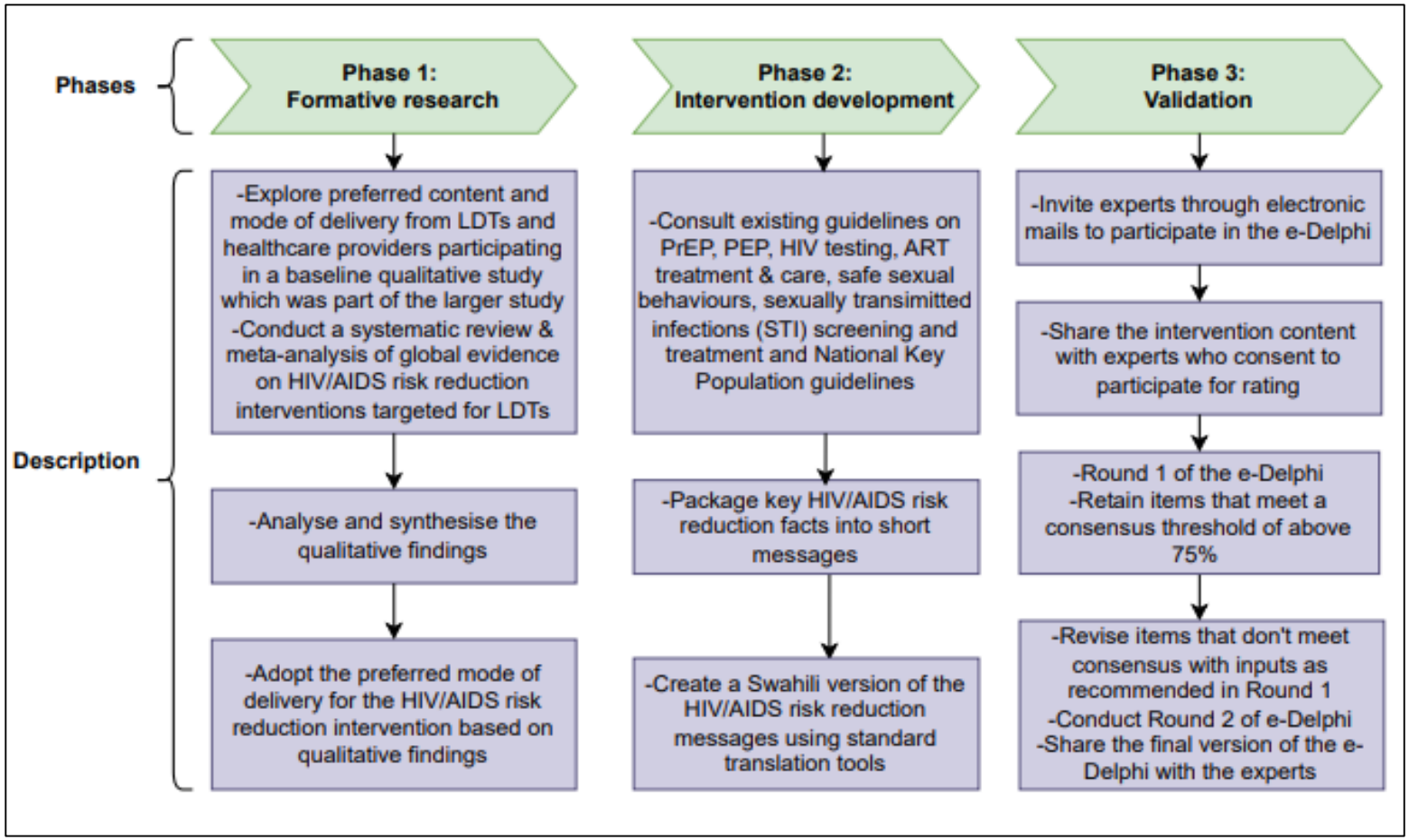

Figure 3.2: A Summary of the Phases Involved In The Development And Validation of The BCC Intervention Tool

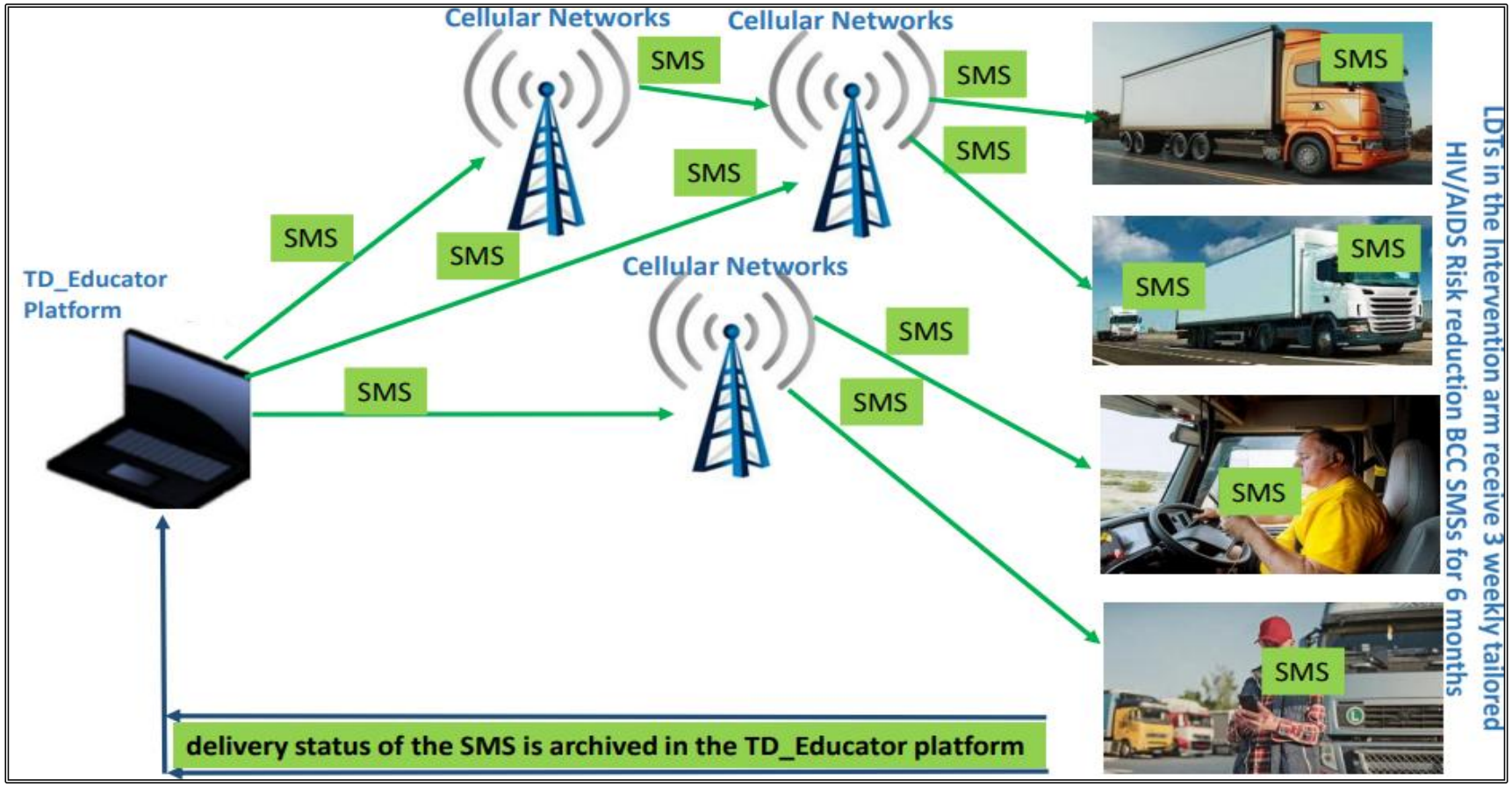

Figure 3.3: A Model HIV/AIDS Risk Reduction BCC Intervention for the LDTs

3.7.3 Phase Three (Evaluation)

A post-test on the HIV/AIDS risk levels was delivered to both study arms of at the end of six months (Mutie et al., 2025b). A comparison was done between the pre-test and the post-test to identify whether the BCC intervention was effective in enhancing HIV/AIDS risk reduction, and to what extent. An illustration of the study phases and their components is given in Figure 3.4.

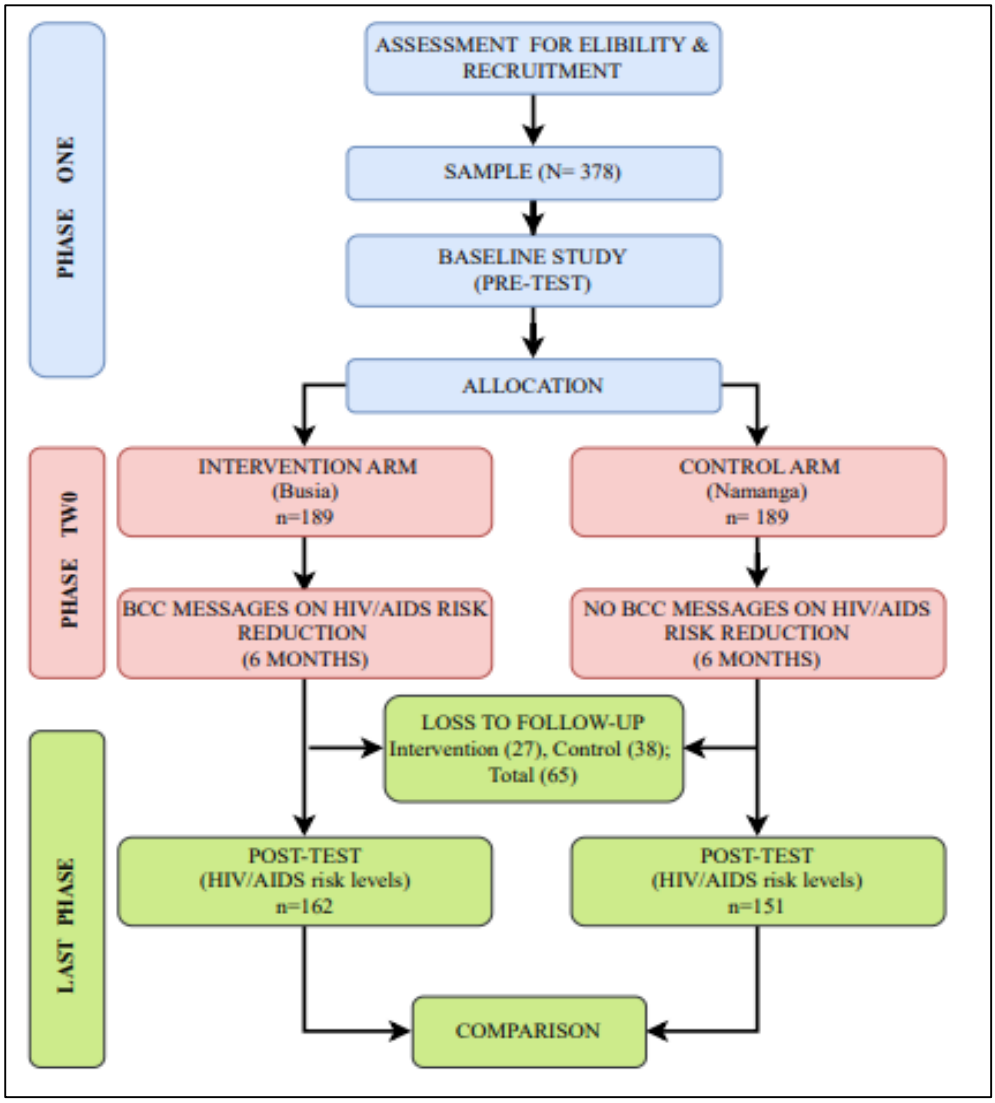

Figure 3.4: A Flow Chart Showing the Three Study Phases

3.8 Data Collection Tools

The current study adopted three data collection tools. The tools included a structured interviewer-administered questionnaire, a key informant interview (KII) guide, and an In-depth interview (IDI) guide.

3.8.1 Key Informant Interview Guide

A KII guide was used to gather qualitative data on the existing BCC strategies targeted for LDTs towards HIV/AIDS risk reduction among LDTs' peer educators and healthcare workers tasked with offering HIV/AIDS preventive services to the LDTs. Moreover, a KII guide was utilized to gather qualitative information on barriers to HIV/AIDS risk reduction among LDTs.

3.8.2 In-Depth Interview Guide

Just as with the KII guide, an in-depth interview (IDI) guide was used to gather additional qualitative data on barriers to HIV/AIDS risk reduction among the LDTs and on the existing level of BCC strategies targeted at LDTs' peer educators and healthcare workers who provide HIV/AIDS preventive services to the LDTs.

3.8.3 Questionnaire

A structured, interviewer-administered questionnaire was used to collect quantitative data during the pre-test and post-test of the study. The questionnaire was formulated following existing guidelines (Choi & Pak, 2005; Oppenheim, 2000; Oppenheim & Oppenheim, 1992). At the pre-test level, the questionnaire entailed the following thematic areas; socio-demographic factors, socio-economic factors, and an HIV/AIDS risk assessment tool that comprises knowledge, attitudes, practices on HIV/AIDS risk reduction (HIV testing, PrEP and PEP use, history of STI, STI screening and treatment, linkage and adherence to ART care) and sexual behaviour characteristics (condom use, number of sexual partners,

alcohol and substance use during or before sexual interaction, type of sexual partners). The HIV/AIDS risk assessment tool was adapted from the Risk Reduction Assessment, Planning and Support (RRAPS) manual toolkit and the Denver HIV Risk score (DHRS) tool (Family Health International 360, 2017; Haukoos, 2016). The RRAPS and DHRS tools provide an opportunity to assess HIV risk among individuals based on current behaviours, creating an avenue for a risk-reduction intervention to promote healthier behaviours (Family Health International 360, 2017; Haukoos, 2016). The DHRS tool has been tested and validated elsewhere and shown to accurately categorise patients into risk groups (Falasinnu et al., 2015; Haukoos et al., 2015). At the post-test level, the questionnaire will only comprise the HIV/AIDS risk assessment tool to assess changes in HIV/AIDS risk levels following implementation of the BCC intervention among LDTs. Since the above tools are open source, with only proper acknowledgement required for their reuse, a license was not needed.

3.9 Validation of the HIV/AIDS Risk Assessment Tool

The risk assessment tool was subjected to validation by a panel of experts from MOH, health-based NGOs, and various research institutions. Here, 15 experts were invited through their email addresses and asked to rate the suitability of the questionnaire for testing the risk levels of HIV/AIDS among LDTs by either agreeing or disagreeing on specific items of the tool. However, only 8 of the invited experts agreed to participate in the validation exercise. In section one (knowledge assessment on HIV/AIDS risk reduction) of the tool, most questionnaire items achieved agreement levels above the recommended 0.7, except for items 13 (there is only one type of HIV testing) and 25 (you should take PrEP for your entire life). The two items were removed based on the recommendation of half of the experts (4) that they were redundant. Therefore, 35 items of the original 37 items in section one of the tool were retained. In section two (sexual risk behaviour, drug and substance use history) of the tool, all of the 11 items attained agreement levels of above 0.75, except for item number 5 (in the instances you had sex with your sex partners, did you use condoms during sexual interactions), which had an

agreement level of 0.6 below the recommended 0.7. The experts suggested rephrasing the specified item to make it sound clearer. This is because condom use may not always apply to all types of sexual partners, like spouses or regular partners. Therefore, the item was revised as follows (How frequently do you use condoms during sexual interactions). In the last section of the tool (HIV/AIDS reduction practices), all 15 items achieved agreement levels above 0.75, surpassing the recommended 0.7, except for a few suggestions to rephrase. Generally, agreement levels of 0.84 were achieved across the three sections of the tool in round 1 of the validation exercise. Therefore, round two was deemed unnecessary. The characteristics of the experts constituting the validation panel are given in Table 3.1. More importantly, the percentage agreement levels in Round 1 of the validation exercise are presented in Table 3.2.

3.9.1 Feedback on Validation of the Risk Assessment Tool from Experts

In addition to agreeing or disagreeing with the suitability of the questionnaires, qualitative feedback from the experts was also welcome. Expert number 2 suggested including skip patterns so participants may not have to complete certain items of the risk assessment tool.

> "…..*Skip patterns are needed, especially if a truck driver does not answer as you anticipated. For instance, in HIV testing, there should be a skip pattern from Q1 that asks whether a person would like to test, why they haven't tested, or where they would prefer to test. More importantly, where they would like to receive information on testing*."…Expert no.2.

Expert number 2 also suggested the following regarding the tool; however, these suggestions were retained for the qualitative part of the study, as they were not relevant to the assessment of HIV/AIDS risk.

> "…..*Now that there are PrEP options, assessing preferences would be worthwhile. For those living with HIV, how long have they been taking treatment, which regimen, and what frequency of clinic visits? Are they under any differentiated*

model of care? For those who have used PrEP or PEP and have not completed, what would be their reasons for non-completion? Most importantly, this is a study where a communication intervention is to be tested. However, I have not seen any questions about communication or the medium… Just curious to understand if these will be in another questionnaire?"....Expert no. 2.

Expert number one had a suggestion for clarification on item 10 regarding whether the sharps included a needle prick.

"*…This risk assessment questionnaire looks good. My comment is more of a semantics one. Question 10, you say "prick for a sharp." Did you mean prick from a sharp needle?"*...Expert no. 3.

Expert number 1 suggested that condoms may not be suitable for all sexual partners, except the casual or irregular ones, and therefore the need to rephrase the item, which initially read (in the instances you had sex with your sex partners, did you use condoms during sexual interactions).

"*….the item needs to be made clearer, I don't expect a truck driver who only has his wife as the only sexual partner to use always condoms"*...Expert no. 1.

Table 3.1: Characteristics of the Risk Assessment Tool Validation Panel

Expert	Training	Degree	Work Position	Years of experience
1	Nursing	Masters (MSCN)	University Lecturer (Chuka University, Kenya)	8
2	Public Health	PhD (Public Health)	Senior Researcher (The Aurum Institute South Africa)	14
3	Health Promotion	PhD (Health Promotion)	Senior Lecturer (University of Durban, South Africa)	10
4	Nursing	Masters (MPH)	Program Officer, MOH, Kenya	7
5	Nursing	Masters (MPH)	Research Officer, KEMRI Welcome Trust	8
6	Biomedical Sciences	Masters (MPH)/Doctoral Fellow	Doctoral Fellow University of Glasgow	9
7	Clinical Medicine/Public Health	BSC. Public Health	Senior Program Officer, ICRH-Kenya	13
8	Nursing	MPH/Doctoral Fellow	Researcher, Institute of Human Development, Agha Khan University	8

Table 3.2: Round 1 of the Delphi Validation of the Risk Assessment Tool

Category of the HIV/AIDS Risk Assessment Items	No. of Items	No. of Experts	Percentage of Agreement
Knowledge assessment on HIV/AIDS risk reduction	37	8	87.84%
Sexual behaviour, drug injection, recreational/non-medicinal/illicit drug use, and substance use risk assessment	12	8	75%
HIV/AIDS risk reduction practices	15	8	81.67%
			Overall=83.98%

3.10 Pre-Testing of Data Collection Tools

A pre-test of the data collection tools was conducted in Mlolongo, a town in Machakos. The choice of this town was because LDTs prefer it as a major stopover for their transit clearance bureaucracies, rest, and commercial sex from sex workers who are abundantly available there (Mutie et al., 2021a). The pre-testing exercise aimed to identify flaws likely to limit the suitability of the data collection tools, enabling the researcher to make appropriate corrections. The three data collection tools, the structured interviewer-administered questionnaire, the KI guide, and the IDI guide, were pre-tested. Based on the recommended sample size, 30 participants were involved in the pretest of the study's main questionnaire (Perneger et al., 2015). One KII and IDI guide was pre-tested for the qualitative data collection tools.

3.10.1 Validity

Validity is the extent to which a data collection tool or method accurately measures a specific concept in a study (Ahmed & Ishtiaq, 2021). It indicates how sound the entire research process is (design, measurement, and analysis) (Heale & Twycross, 2015). There are two broad categories of validity: internal and external (Heale & Twycross, 2015).

Internal validity refers to the study population and to how the study was conducted, from the study design through data collection and analysis (Andrade, 2018; Heale & Twycross, 2015). It ensures the absence of bias and confounding and acts as a pre-requisite for external validity (Andrade, 2018; Heale & Twycross, 2015). To ensure internal validity, the study was designed using scientific approaches that have been applied and proven valid in previous studies. Moreover, the data collection tools were designed to reflect all the study objectives and questions. The formulation of the data collection tools was based on existing guidelines on questionnaire development (Choi & Pak, 2005; Oppenheim, 2000; Oppenheim & Oppenheim, 1992). Moreover, the tools were developed from existing tools tested and validated elsewhere (Falasinnu et al., 2015; Family Health

International 360, 2017; Haukoos, 2016; Haukoos et al., 2015). The pre-testing survey results were analyzed to ensure the contents of the data collection tools were clear and capable of producing the intended output before the actual implementation of the data collection exercise. Further, questionnaires were assigned unique numbers during data collection to avoid duplicate entries and were checked for completeness. Data cleaning and double-checking of questionnaires were done during data entry. As part of the analysis, an ordinal logistic regression was performed to address confounding in the predictors of HIV/AIDS risk levels. As mentioned earlier, a validation exercise involving experts from MOH and select key population organisations that address HIV prevention among LDTs was conducted. To ensure that HIV/AIDS risk reduction was an outcome of the BCC intervention, both the intervention and control arms of the study were subjected to a pre-test and post-test exercise.

External validity is the extent to which the study findings are generalizable to the target population (Andrade, 2018; Heale & Twycross, 2015). To ensure external validity, the eligibility criteria ensured that all study participants had an equal opportunity to participate in the current study. Moreover, random sampling (systematic sampling) was employed to ensure the study sample was representative of the study population. In addition, the domains of the study questionnaire and intervention tool were tailored to the specific traits and experiences of LDTs to ensure the generalizability of the study findings to similar populations.

3.10.2 Reliability

Reliability is the extent to which a specific measure consistently or repeatedly gives the same outcome or results (Ahmed & Ishtiaq, 2021; Heale & Twycross, 2015). The data collection tool is deemed reliable if it yields the same results across a variety of subjects under similar circumstances (Ahmed & Ishtiaq, 2021). Research assistants underwent training before the data collection exercise to familiarize them with the study instruments and the appropriate protocols. The flow of the wording in the data collection tools was

carefully monitored during the pre-testing exercise to identify areas where participants may have had difficulty providing responses. The data collection tools were designed to capture all the content necessary to achieve the study objectives. The researcher oversaw the data collection exercise, through active participation in the data collection as well as supervising the research assistants. At the beginning and end of every data collection exercise the researcher checked for completeness of the data collection tools and received updates of any new challenges that needed to be addressed. This esnured that quality and rigor was maintained in the entire data collection process, all to analysis.

The reliability of the study's questionnaire was determined through Cronbach's alpha test (Zach, 2021). This was done by analyzing the results of the pre-test HIV/AIDS risk assessment tool using R statistical software. The reliability coefficient of Cronbach's alpha ranges between 0 and 1 (Zach, 2021). A Cronbach's alpha score of 0.7 and above is deemed acceptable (Zach, 2021). Thus, where the particular items of the HIV risk assessment tool (knowledge, risk reduction practices, risky sexual behaviours, and substance use/illicit drug use) had a Cronbach's alpha of above 0.7, it was deemed acceptable to measure the respective variables in the study (Table 3.2).

Table 3.3: Reliability Analysis of the HIV Risk Assessment Items

HIV Risk Assessment Items	Number of Items	Cronbach's α	Comments
HIV risk reduction knowledge	35	0.872	Good
Risk sexual behaviors, illicit drug/substance use	11	0.704	Acceptable
HIV risk reduction practices	15	0.839	Good

3.11 Data Collection

3.11.1 Qualitative Data Collection Procedures

The KIs were purposively drawn from among the LDTs' peer educators and healthcare providers who exclusively offer HIV/AIDS preventive services to the LDTs. It was understood that the LDTs' peer educators and healthcare providers were well versed with the barriers and existing BCC strategies for HIV/AIDS risk reduction among the LDTs. Prior arrangements were made for a suitable site for the interview, based on the KIs' preferences. A consent form was provided to the KIs, detailing the protocol and assuring them of confidentiality and that the process would be voluntary. The KIIs were conducted in either English or Swahili, depending on the language the KIs best understood. The researcher was accompanied by at least one research assistant during the KIIs. While the research took participants through the KI guide, the research assistant was tasked with taking shorthand notes and audio recordings. The KIIs lasted approximately 30 to 45 minutes. The KIIs concluded once a point of saturation was reached (no further new information emerged from the interviews). Initially, it was estimated that 10 to 15 KIIs were to be conducted. However, by the time the ninth KII was conducted, the researcher had established that saturation had already been achieved, and therefore there was no need for further KIIs.

In-depth interviews (IDIs) are among the methods used in qualitative data collection (Boyce & Neale, 2006). This method is used in place of focus group discussions (FGDs) when the study population is hard to reach (Boyce & Neale, 2006). Given the hard-to-reach nature and constant mobility of the LDTs, it was almost impossible to mobilize them for an FGD (Botão et al., 2016). Thus, the IDIs were deemed suitable to generate an in-depth understanding of LDTs' experiences with barriers to HIV/AIDS risk reduction and their existing level of BCC uptake during their trucking career. The language of choice for the IDIs was English or Swahili, depending on the interviewee's preferred language. At least 20-30 IDIs are recommended to achieve thematic saturation in a standard

qualitative study (Vasileiou et al., 2018). Thematic saturation is the point at which no new concepts emerge from the IDIs (Vasileiou et al., 2018). Therefore, the current study initially estimated that 20 to 30 IDIs were to be conducted. However, by the time the researcher had conducted the 18th IDI, saturation was deemed to have been attained. The participants of the IDIs were purposively sampled from among the LDTs registering high HIV risk scores from the main questionnaire. An appropriate venue for the IDIs was sought according to the interviewees' preferences. The interviewees were taken through the study protocol and made aware that the process was voluntary and that their identities were to be kept confidential. Approximately, the IDIs lasted between 30 minutes and one hour. While the researcher took brief notes, the interview was audiotaped for record-keeping. The interviewees were allowed to give their in-depth thoughts and experiences on barriers and existing levels of BCC uptake on HIV/AIDS risk reduction among the LDTs. This enabled the researcher to gain in-depth perspectives relating to the barriers encountered in HIV/AIDS risk reduction among the LDTs.

3.11.2 Quantitative Data Collection Procedures

The researcher (principal investigator) and three research assistants conducted the data collection. The research assistants had background training in nursing or public health. Before the data collection exercise, the research assistants underwent a two-day training on the data collection tools and the necessary study protocols.

The LDTs were assessed for eligibility as they approached the international border points at Busia and Namanga by the researcher and research assistants. Those who met the inclusion criteria were given a consent form to familiarize themselves with the study's contents and protocol. Informed consent was sought from the LDTs before the interviews commenced. Due to the hard-to-reach nature of the LDTs, the questionnaires were interviewer-administered, thus enabling a high response rate. Understandably, self-administered questionnaires may have been difficult to trace, given that the LDTs are constantly on the move over long distances.

The information collected entailed socio-demographic and socio-economic factors, knowledge, HIV/AIDS risk reduction practices like the uptake of PrEP and PEP, uptake of HIV testing, history of STIs, and screening and treatment of STIs. Moreover, sexual behaviour patterns (condom and sex lubricant use, number of sexual partners, type of sexual partners, alcohol and substance use during or before sexual interactions) were sought.

3.12 Data Management and Analysis

3.12.1 Qualitative Data Management and Analysis

Qualitative data analysis on barriers to HIV/AIDs risk reduction, and existing BCC strategies, followed a mixed inductive and deductive analysis approach. Here, while some themes were identified in advance, others were derived during the analysis. This approach sought to organize and describe the qualitative data into themes and sub-themes (Braun & Clarke, 2006). This form of analysis is recommended as it enables the researcher to interpret the deeper details of information patterns embedded in the data, ensuring that all details of the themes and sub-themes are exhaustively captured (Braun & Clarke, 2006). The mixed inductive and deductive analysis approach also enables the researcher to identify themes that reflect the objectives or questions of the current study (Braun & Clarke, 2006). Thus, the analysis followed six steps, namely data familiarization, generating child and parent codes, clustering the child and parent codes to generate themes and sub-themes, reviewing the themes and sub-themes, defining and naming the themes and sub-themes, and reporting (Braun & Clarke, 2006).

The researcher, assisted by one research assistant, transcribed and translated the audio-recorded data verbatim. A transcript was generated for each KII and IDI. All transcripts were exported into the QDA-Miner statistical software version 2024.0.5 for coding (Provalis Research, 2024). Coding identifies unique features in data segments that lead to meaningful groups (Braun & Clarke, 2006). The coding process delineates the researcher

from existing theoretical approaches and their own preconceptions that may occur during data collection (Braun & Clarke, 2006). Thus, the process is primarily data-driven (Braun & Clarke, 2006).

Therefore, child codes were developed by going through the transcript and identifying items related to each research question. After the child codes were generated, the researcher categorized them into their respective research questions. The categorization involved screening the child codes for similarities and differences. Subsequently, the child codes were retrieved and saved in an MS Excel sheet in preparation for clustering to generate parent codes. Child codes that appeared to be closely related were clustered and merged into parent codes in the QDA Miner software. From the parent codes, themes and sub-themes were generated.

Thereafter, the researcher retrieved an MS Excel sheet from the QDA-Miner software comprising the initial child codes, parent codes (themes and sub-themes), number of mentions for each theme, and number of cases (participants with respect to the themes). A sample of the transcripts was shared with a second coder to verify the codes, themes, and sub-themes that the researcher had initially generated. Triangulation of the qualitative findings from both the KIIs and IDIs was done (Braun & Clarke, 2006). The aim was to complement and compensate for weaknesses that may be specific to either data collection method. Here, a comparison of findings from KIIs and IDIs was done to compare and contrast outcomes on barriers and existing BCC strategies on HIV/AIDS risk reduction among the LDTs.

The essence of each theme and its embedded narrative were captured in text. This was done to ensure the information fits within the broader perspective of the research question. The subthemes that gave structure to the main themes were also captured. Moreover, summary tables and word cloud diagrams were used to present the qualitative data.

3.12.2 Quantitative Data Management and Analysis

The researcher reviewed the baseline and post-intervention questionnaires to check for completeness and ensure they were assigned unique serial numbers to avoid duplicate entries. This was followed by creating datasets in MS Excel® for data entry, cleaning, and coding. Subsequently, the datasets were exported to the R statistical software version 4.4.1 for analysis (R Core Team, 2018).

The baseline data were used to generate descriptive statistics on; socio-demographic, socioeconomic factors, and risk levels of HIV/AIDS among LDTs based on knowledge, practices on HIV/AIDS risk reduction (HIV testing, PrEP and PEP use, history of STI, STI screening and treatment, linkage and adherence to ART care) and sexual behaviour characteristics (condom use, number of sexual partners, alcohol and substance use during or before sexual interaction, type of sexual partners).

Initially, individual sample data for all variables in the main dataset were checked for normality using the Shapiro-Wilk test for normal distribution (Mishra et al., 2019). Based on the null hypothesis that the sample data were normally distributed, a p-value of above 0.05 was an indication that the sample data for specific variables were normally distributed, whereas a p-value of 0.05 and below indicated that the data were not normally distributed. For continuous numeric variables with normally distributed data, the mean and standard deviation were computed as the descriptive statistics. On the other hand, for continuous numeric variables that were not normally distributed, the median and interquartile range (IQR) were computed. For categorical variables, summaries were made and corresponding percentages computed.

Thereafter, the researcher performed a comparative analysis of all socio-demographic and socio-economic factors for both Intervention (Busia) and Control (Namanga) sites. This was so to establish whether there were any significant differences between the two sites at baseline. To compare the normally distributed continuous numeric variables at baseline,

the independent t-test (a parametric test) was performed. Using the independent t-test function in R statistical software, the test returned a (t) value, degree of freedom (d.f), and a p-value. For continuous numeric variables that were not normally distributed, the Wilcoxon test (a nonparametric test) was used to assess whether there was a difference between the two study groups at baseline. Using the wilcox.test function in R, the test returned a Wilcoxon rank sum (W) and a p-value. For the categorical variables, Pearson's chi-square test was used to test for differences between the two study groups. Using Pearson's Chi-square test function in R statistical software, a ($\chi 2$) value, degrees of freedom (d.f), and a p-value were returned. Where a p-value was less than 0.05, a statistically significant difference between the two sets of variables in the two study groups was deemed present in all of the above tests. Additionally, when more than 25% of the cells in a categorical variable had counts less than 5, a Fisher's exact test in R was used. The test returned a p-value below 0.05, indicating a statistically significant difference in the observed counts.

Overall risk scores of HIV/AIDS were generated from the domains of knowledge, HIV/AIDS risk reduction practices, and sexual behaviour characteristics. This was per the guidelines of the RRAPS HIV risk assessment manual toolkit and Denver HIV risk assessment tool (Family Health International 360, 2017; Haukoos, 2016). For the knowledge domain, the scores were reverse-coded. This is because the absence of HIV/AIDS risk reduction knowledge enhances vulnerability to HIV infection, whereas its presence has a protective effect. Thus, incorrect scores were scored one (1) to show the presence of some risk, whereas the correct scores were scored a zero (0) as an indication of reduced risk. Knowledge of HIV/AIDS risk reduction was tested on questions framed around the following items, namely condom use, number of sexual partners, alcohol and substance use, HIV testing, PrEP use, PEP use, history of STI, screening and treatment of STIs, linkage and adherence to ART care. A participant responded with a 'True' or 'False' and scored (incorrect = 1) or (correct = 0).

Similar to the knowledge domain, the HIV/AIDS risk reduction practices were reverse-coded. A participant was prompted with a Yes/No question about whether they performed selected HIV/AIDS risk-reduction practices. Where a participant didn't perform the respective risk reduction practice, a score of one (1) was given to show the presence of some risk, whereas a score of zero (0) was given when the participant performed the respective HIV/AIDS risk reduction practice to show reduced risk. The HIV/AIDS risk reduction practices were based on the following items condom use (consistent condom use=0, inconsistent condom use=1), HIV testing within three months (tested for HIV=0, not tested for HIV=1), PrEP use when on an ongoing risk of HIV infection (uses PrEP =0, does not use PrEP=1), PEP use after a potential exposure to HIV within three days (used PEP =0, never used PEP=1), history of STI while on trucking career (no history of STI=0, history of STI=1), screened and treated for STI within seven days after onset of symptoms (screened and treated for STI=0, not screened neither treated for STI=1), linkage to care and adherent to ART care for those who are HIV positive (linked and adherent to ART=0, not linked or not adherent to ART care=1).

Unlike the knowledge and HIV/AIDS risk reduction domains, the sexual behaviour characteristics domain was not reverse-coded. This is because the presence of a risky sexual behaviour is an indication of some risk of HIV/AIDS. In contrast, the absence of risky sexual behaviour is an indication of reduced risk. Thus guided by the RRAPS and DHRS risk assessment tools, sexual behaviour characteristics were measured as follows; number of sexual partners (one or no sexual partner = 0, more than one sexual partner = 1), alcohol and substance use during or before sexual interaction (no alcohol and substance use = 0, uses alcohol and other substances = 1), and frequency of sexual interactions (delays sexual interactions while on transit =0, engages in multiple sexual interactions while on transit= 1).

Eventually, a composite score was generated from the above three domains to give an overall risk level of HIV/AIDS among the LDTs. The risk levels of HIV/AIDs were categorised into low, moderate, and high risk based on the overall scores from a particular

participant based on the Denver HIV risk assessment scoring (Falasinnu et al., 2015; Haukoos, 2016, 2016). These scores have been tested and validated elsewhere and shown to accurately categorise patients into correct risk groups (Falasinnu et al., 2015; Haukoos et al., 2015). According to the DHRS tool, risk scores of below 30% indicate a low risk of HIV, risk scores of 30-39 indicate a moderate risk of HIV, and risk scores of 40 and above indicate a high risk of HIV infection (Falasinnu et al., 2015; Haukoos, 2016; Haukoos et al., 2015). The risk scores were dummy coded as follows: low risk=0, moderate risk=1, and high risk=2 for analysis.

A comparative analysis was conducted to determine whether differences existed in the baseline risk scores. More specifically, to test for differences across similar proportions (like low risk in Busia and Namanga), the two-proportion z-test was used. Using the two-proportion z test function in R, the test returned a ($\chi 2$) value, degrees of freedom (d.f), and a p-value. This is so because the z-statistic is an equivalent of the chi-square statistic, with the p-values for both tests being equal in this case, hence why running the two-proportion z-test in R returns a ($\chi 2$) value. Thereafter, the researcher compared whether there were any statistically significant differences across all risk levels (Low, Moderate, and High) in both study groups. This was done using Pearson's Chi-square test function in R. The test returned a ($\chi 2$) value, d.f, and a p-value. In all of the above test scenarios, a p-value of 0.05 or lower indicated a statistically significant difference in the specific risk levels between the two study groups, and vice versa. Further, a clearer perspective of the risk level differences across the two study sites was visualized using grouped bar plots embedded with error bars in the R statistical software. The error bars were created using 95% confidence intervals (CI) of the specific risk level proportions. The upper upper tail of the error bar was based on the upper CI, and vice versa. The bar plots were grouped by study site, with risk levels on the x-axis and proportions of LDTs within each risk level on the y-axis. Where error bars overlapped in the various bar plots, a statistically significant difference was deemed absent at the respective risk levels, and vice versa.

An ordinal logistic regression analysis using the R statistical software was used to determine the factors associated with the risk levels of HIV/AIDs among the LDTs (R Core Team, 2018). A univariable ordinal logistic regression model was performed as a precursor to the multivariable ordinal logistic regression model to identify independent variables associated with HIV/AIDS risk levels. The strength of the association between independent and dependent variables was determined using the Proportional Odds Ratio (pOR). At the univariable logistic regression level of analysis, the level of significance was set at P<0.05. Here, the independent variables with p-values less than 0.1 (p<0.1) entered the multivariable ordinal logistic regression at the level of analysis. At first, to fit an ordinal logistic regression model, the (MASS) package library in R statistical software was loaded. Using the polr (proportional odds logistic regression) function an ordinal logistic regression model was fit as follows; where ***logit (P(Y ≤ j)) = βj0 + β1x1 + ….. + βpxp*; where P(Y ≤ j)** represented the cumulative probability of the response variable (HIV risk scores) falling in or below category **j** (low, moderate or high), ***βj0*** was the threshold parameter for category **j** (low= <30%, moderate (30-39%) and high (≥40%) and ***β1, β2, …, βp*** were the coefficients associated with the predictor variables ***X1, X2, …, Xp*** (age, marital status,…religion). The polr function estimated the coefficients (***β*** (beta) values), which were later exponentiated to get pORs. Therefore, the univariable ordinal logistic regression model was fit as follows ***(model <- polr (response (risk of HIV among LDTs) ~ predictor1 (age), data = (dataset name)).***

Using a stepwise backward elimination method, a multivariable ordinal logistic regression model was performed to establish factors associated with the risk levels of HIV/AIDS. Initially, an exhaustive model containing all independent/predictor variables (those that depicted significance at univariable ordinal logistic regression analysis) was established. The variable with the highest p-value was subsequently eliminated from the model. This iterative process was continued until the stopping criterion [p<0.05] was reached and the model was selected as final. The independent variables with p<0.05 were deemed significant predictors of the respective outcomes/dependent variables. The final multivariable ordinal logistic regression model also enabled controlling for confounding

among variables that were significant at the univariable level of analysis. The multivariable ordinal logistic regression model in R was fit as follows: ***(model <- polr (outcome (risk of HIV among LDTs) ~ predictor1 (age) + predictor2 (religion)……+ predictor4 (religion), data = (name of dataset)).***

To test the hypothesis that there are no statistically significant predictors of HIV/AIDS risk levels among long-distance truckers operating along the Northern Corridor highway, the ordinal logistic regression analysis was used. The null hypothesis would be rejected if at least one predictor variable had a p-value < 0.05 in the multivariable logistic regression analysis. In a scenario where none of the predictor variables had a p-value < 0.05 in the multivariable logistic regression analysis, the researcher would fail to reject the null hypothesis.

In order to gauge the effectiveness of the BCC intervention on HIV/AIDS risk reduction among LDTs, several tests were conducted. First, the researcher used a two-proportion Z-test to compare the proportion of HIV/AIDS risk scores in control and intervention groups at baseline and post-intervention. The two-proportion Z-test returned a $\chi 2$ value, d.f and a p-value. Here, a p-value of less than 0.05 ($p<0.05$) indicated a statistically significant difference in risk scores across and within the control and intervention groups. Additionally, a chi-square test of independence was used to assess statistically significant differences in the overall risk scores (all combined) between the control and intervention groups. The chi-square test of independence returned a $\chi 2$ value, d.f and a p-value. A p-value of less than 0.05 ($p<0.05$) indicated a statistically significant difference in the overall risk scores between the groups.

Further, the researcher performed the Cochran-Armitage test for trend in proportions to examine trends in HIV/AIDS risk levels (low, moderate, high) across the intervention and control groups post-intervention (Neuhäuser & Hothorn, 1999). The purpose of this test was to detect any shift or linear trend in proportions of HIV/AIDS risk from low risk to high risk levels, and vice versa. Ideally, the Cochran-Armitage trend test would enable a

better understanding of the effect of the BCC intervention on HIV/AIDS risk reduction among LDTs post-intervention. The test returned a Z value and a p-value. A positive Z value would indicate a positive association between the exposure to the BCC intervention and HIV/AIDS risk reduction, and vice versa. A p-value of less than 0.05 indicates statistical significance for the outcome. The Cochran-Armitage results were visualized using a Mosaic plot from the (ggplot2) and (dplyr) packages in the R statistical software.

To test the null hypothesis that the BCC intervention had no statistically significant effect on HIV/AIDS risk reduction among LDTs, the Cramer's V test for effect size calculation of the Chi-square test for independence was used (Kim, 2017). Essentially, the Cramér's V test is used to calculate effect size for ordinal outcomes expressed as proportions, as in the current study. The test returned a $\chi 2$ value, d.f, a p-value, and a Cramer's V value. A Cramer's V of 0 shows no association, ≥ 0.1 small effect, ≥ 0.3 moderate effect, and ≥ 0.5 strong effect. If the test returned a Cramér's V value>0 and a p-value <0.05, the researcher would reject the null hypothesis. However, if a Cramer's V value of zero was returned with a p-value of above 0.05, then the researcher would fail to reject the null hypothesis. A summary of the data analysis and management plan is given in Table 3.4.

Table 3.4: Data Management And Analysis For The Study

Objective	Data	Analyses	Output
Objective 1&2	HIV/AIDS risk levels among LDTs were generated from knowledge on HIV/AIDS risk reduction, sexual behaviours, illicit drug use, and injection history, and HIV/AIDS risk reduction practices. Socio-demographic & socio-economic factors (age, marital status, citizenship, religion, years of experience, monthly salary, education, duration spent on transit, days spent on off-duty per week).	Descriptive statistics (median & frequency distributions) on risk levels of HIV/AIDS (low, moderate, and high risk) and inferential statistics (ordinal logistic regression analysis to establish factors associated with HIV/AIDS risk levels (low, moderate, and high risk) among LDTs), using R statistical software.	Ordinal risk levels of HIV/AIDS (low, moderate, and high risk). Predictors of the HIV/AIDS risk levels among LDTs.
Objective 3	Qualitative data on barriers to HIV/AIDS risk reduction among LDTs collected through KIIs and IDIs.	Mixed inductive and deductive analysis to generate themes and sub-themes on barriers to HIV/AIDS risk reduction.	Barriers to HIV/AIDS risk reduction among LDTs.
Objective 4	Qualitative data on existing BCC strategies on HIV/AIDS risk reduction targeted for LDTs along the NCH, Kenya, collected through KIIs and IDIs.	Mixed inductive and content analysis to generate themes and sub-themes on existing BCC strategies on HIV/AIDS risk reduction targeted for LDTs.	Level of existing BCC strategies on HIV/AIDS risk reduction.
Objective 5	Qualitative feedback from experts on the suitability of the BCC intervention content.	Agreements and Consensus levels from the different experts on the suitability of the BCC content.	Consensus on the most suitable BCC content after several rounds of item rating from the panel of experts.
Objective 6	HIV/AIDS risk levels before and after intervention between and within the control and intervention arms of the study.	A two-proportion Z-test and Chi-Square test of independence to compare HIV/AIDS risk scores within and between control and intervention groups. Cochran-Armitage test for trend in proportions of the risk scores and Cramer's V for effect size of the BCC intervention.	Effect of the BCC intervention on HIV/AIDS risk reduction.

3.13 Ethical Considerations

Ethical approval for the study was sought and approved by the ethical review committee of Jomo Kenyatta University of Agriculture and Technology (JKUAT) (**Ref: JKU/ISERC/02317/1256**) (**Appendix X**). Further, a permit was sought and granted by the National Commission for Science, Technology and Innovation (NACOSTI) (**Ref: NACOSTI/P/24/33837**) (**Appendix XI**). Authorization to conduct the study was granted from JKUAT and the County administrative and health offices of Busia and Kajiado counties (**Refs: JKU/2/125/037; JKU/2/11/HSN411-0005/2023; ADM 15/27 Vol.1/151 & KJD/CC/ADM/45 VOL.V (4)**) (**Appendixes XII, XIII, XIV & XV**). Written informed consent was sought from the study participants before the start of every interview (**Appendix I**). Further, the informed consent details the risks and benefits of the study, voluntary participation, and the participants' right to withdraw from the study at will without any form of coercion. Confidentiality was maintained by observing the anonymity of all study participants during data collection, archiving, and analysis. To ensure privacy, a secure location was agreed upon between the researcher or data enumerator and the eligible participant (LDT) before the interview began.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the study findings based on the six objectives detailed in Chapter One. The chapter begins with the socio-demographic and socio-economic characteristics of study participants from both control (Namanga) and intervention (Busia) sites/arms at baseline. This is followed by a comparative analysis of the socio-demographic and socio-economic characteristics to determine whether any statistically significant differences exist between the two study arms. Subsequently, both quantitative and qualitative findings from the baseline study are presented. The quantitative findings are on HIV/AIDS risk levels established at the baseline study.

On the other hand, the qualitative findings detail the barriers and existing BCC strategies on HIV/AIDS risk reduction as established at baseline. Thereafter, the results of the development and validation of the BCC intervention are presented. Lastly, the chapter concludes with the findings of the end-line (post-intervention) survey on HIV/AIDS risk levels among LDTs from both study arms and a hypothesis testing to establish the effect of the BCC intervention in enhancing HIV/AIDS risk reduction among LDTs.

4.2 Socio-Demographic Characteristics of Participants from Both Study Arms at Baseline

At baseline, a total of 378 LDTs from both study sites/arms (189 for each arm) were recruited. The mean age and standard deviation (SD) of LDTs from the control arm (Namanga) were 33.58 (±8.48) years, and for the intervention arm (Busia), 41.13 (±9.00) years. Across both study arms, the mean age and standard deviation were 37.35 (±9.51) years. In the control (Namanga) arm, slightly more than half of the participants were Tanzanians (99; 52.38%), followed by Kenyans (77; 40.74%), and the least represented

were LDTs of Malawian citizenship (1; 0.53%). A vast majority of participants in the intervention arm were LDTs of Kenyan origin 161 (85.19%), followed by Ugandans 15 (7.94%) and the least being from DRC 1 (0.53%). Almost two-thirds of LDTs from both study arms had attained a secondary level of education: Namanga 123 (65.08%), Busia 114 (60.32%), and both study arms combined 237 (62.70%), and the least having no formal education. A detailed summary of the socio-demographic characteristics of study participants is given in Table 4.1.

Table 4.1: Socio-Demographic Characteristics of Study Participants at Baseline

Variable	**Category**	**Control arm (Namanga)**		**Intervention arm (Busia)**		**Combined (Both arms)**	
		N=189	**%**	**N=189**	**%**	**N=378**	**%**
Age		*M*±*SD* = 33.58±8.48		*M*±*SD* =41.13±9.00		*M*±*SD* = 37.35±9.51	
Citizenship	Kenyan	77	40.74	161	85.19	238	62.96
	Tanzanian	99	52.38	4	2.11	103	27.25
	Ugandan	5	2.65	15	7.94	20	5.29
	Zambian	3	1.59	0	0	3	0.79
	Rwandese	0	0	5	2.64	5	1.32
	Burundian	2	1.05	3	1.59	5	1.32
	DRC	2	1.05	1	0.53	3	0.79
	Malawian	1	0.53	0	0	1	0.26
Marital status	Married	109	57.67	165	87.30	274	72.49
	Single	67	35.45	16	8.47	83	21.96
	Divorced	2	1.06	3	1.59	5	1.32
	Widowed	0	0	4	2.12	4	1.06
	Cohabiting	11	5.82	1	0.53	12	3.17
Religion	Christian	142	75.13	158	83.60	300	79.37
	Muslim	47	24.87	31	16.40	78	20.63
Education	No formal education	0	0	8	4.23	8	2.12
	Primary	34	17.98	43	22.75	77	20.37
	Secondary	123	65.08	114	60.32	237	62.70
	Vocational	23	12.17	16	8.47	39	10.32
	College/university	9	4.76	8	4.23	17	4.50

4.3 Socio-Economic Characteristics of Study Participants from Both Sites at Baseline

A majority of LDTs indicated that they were given some mileage allowance while in transit from both study arms: Namanga 143 (75.66%), Busia 146 (77.25%), and all sites combined 289 (76.46%). The median (Mdn) and interquartile range (IQR) for the duration of the experience (in years) among LDTs from the Namanga site were 7 (4-11), from Busia 12 (7-20), and from all sites combined 9 (5-15). The median time spent on transit by LDTs was relatively uniform in both study arms: Namanga 12 (12-15) hours, Busia 12 (9-15) hours, and both study sites combined 12 (10-15) hours. The LDTs at the Namanga site spent a shorter median duration of 2 (2-5) hours at rest, compared to 4 (2-7) hours for LDTs from Busia and 4 (2-6) hours when combining both sites. The LDTs in Busia spent a slightly longer mean (SD) duration away from their families/spouses, 24.20 (± 21.22) hours, compared to those from the Namanga site, who spent 20.43 (± 13.09) hours, and 22.31 (± 17.71) hours on combining all sites. The mean (SD) number of days spent off duty among LDTs was 1.39 (± 0.87) days for the Namanga site, 1.44 (± 1.14) days for the Busia site, and 1.42 (± 1.01) days for all sites combined. The mean (SD) salary for LDTs from all sites was 33014.81 (± 10430.54) Kenya shillings. A summary of the socio-economic characteristics of study participants from both study arms is given in Table 4.2.

Table 4.2: Socio-Economic Characteristics of Study Participants at Baseline

Variable	Category	Control arm (Namanga)		Intervention arm (Busia)		Combined (Both arms)	
		N=189	**%**	**N=189**	**%**	**N=378**	**%**
Transit mileage allowance	No	2	1.06	1	0.53	3	0.79
	Sometimes	44	23.28	42	22.22	86	22.75
	Always	143	75.66	146	77.25	289	76.46
Duration of experience in years		Mdn (IQR)= 7 (4-11)		Mdn (IQR)=12 (7-20)		Mdn (IQR)= 9 (5-15)	
Hours on transit		Mdn (IQR)= 12 (12-15)		Mdn (IQR)= 12 (9-15)		Mdn (IQR)= 12 (10-15)	
Hours on rest		Mdn (IQR)= 2 (2-5)		Mdn (IQR)= 4 (2-7)		Mdn (IQR)= 4 (2-6)	
Days away from spouse/partner		*M*±*SD* = 20.43 ± 13.09		*M*±*SD* = 24.20 ± 21.22		*M*±*SD* = 22.31 ± 17.71	
Days off duty in a week		*M*±*SD* = 1.39 ± 0.87		*M*±*SD* = 1.44 ± 1.14		*M*±*SD* = 1.42 ± 1.01	
Monthly salary		*M*±*SD* = 32962.96 ± 11953.53		*M*±*SD* = 33066.67 ± 8676.319		*M*±*SD* = 33014.81 ± 10430.54	

4.4 A Comparative Analysis of Socio-Demographic and Socio-Economic Characteristics of Study Participants at Baseline

There was no statistically significant difference in most independent variables across the two study sites, except for age, citizenship, years of experience, hours spent on transit, hours spent on rest, and days spent away from family/spouse. For age, there was a statistically significant difference between Namanga and Busia sites, as indicated by the independent t-test ($t = -8.40$; $d.f = 376$; $p<0.0001$). A p-value of <0.0001 suggested that the distribution of citizenship significantly varied between the two study sites. Based on a Wilcoxon rank test, there was a statistically significant difference among LDTs from both sites in regards to their duration of experience in years ($W = 10314$; $p<0.0001$), hours spent on transit ($W = 21807$; $p=0.001$), hours spent on rest ($W = 12428$; $p<0.0001$). An independent t-test also showed a statistically significant difference in days spent off duty in a week ($t = -2.07$; $d.f = 376$; $p=0.038$), Table 4.3.

Table 4.3: A Comparative Analysis Of Socio-Demographic And Socio-Economic Characteristics of Study Participants From Both Study Sites at Baseline

Variable	Category	Control arm (Namanga)		Intervention arm (Busia)		Combined (Both arms)		T-test, Fisher's Exact, Pearson's chi-square test, or Wilcoxon test	p-value
		N=189	%	N=189	%	N=378	%		
Age		*M*±*SD* = 33.58±8.48		*M*±*SD* =41.13±9.00		*M*±*SD* = 37.35±9.51		t = -8.40, df = 376	**<0.001**
Citizenship	Kenyan	77	40.74	161	85.19	238	62.96	Fisher's exact	**< 0.001**
	Tanzanian	99	52.38	4	2.11	103	27.25		
	Ugandan	5	2.65	15	7.94	20	5.29		
	Zambian	3	1.59	0	0	3	0.79		
	Rwandese	0	0	5	2.64	5	1.32		
	Burundian	2	1.05	3	1.59	5	1.32		
	DRC	2	1.05	1	0.53	3	0.79		
	Malawian	1	0.53	0	0	1	0.26		
Marital status	Married	109	57.67	165	87.30	274	72.49	$\chi2$= 3.43 , df = 12	0.991
	Single	67	35.45	16	8.47	83	21.96		
	Divorced	2	1.06	3	1.59	5	1.32		
	Widowed	0	0	4	2.12	4	1.06		
	Cohabiting	11	5.82	1	0.53	12	3.17		
Religion	Christian	142	75.13	158	83.60	300	79.37	$\chi2$= 1.61, df = 1	0.204
	Muslim	47	24.87	31	16.40	78	20.63		
Education	No formal education	0	0	8	4.23	8	2.12	$\chi2$= 15.38, df =12	0.221
	Primary	34	17.98	43	22.75	77	20.37		
	Secondary	123	65.08	114	60.32	237	62.70		
	Vocational	23	12.17	16	8.47	39	10.32		
	College/university	9	4.76	8	4.23	17	4.50		
Duration of experience in years		Mdn (IQR)= 7 (4-11)		Mdn (IQR)=12 (7-20)		Mdn (IQR)= 9 (5-15)		W = 10314	**<0.001**

Variable	Category	Control arm (Namanga)		Intervention arm (Busia)		Combined (Both arms)		T-test, Fisher's Exact, Pearson's chi-square test, or Wilcoxon test	p-value
		N=189	%	N=189	%	N=378	%		
Hours on transit		Mdn (IQR)= 12 (12-15)		Mdn (IQR)= 12 (9-15)		Mdn (IQR)= 12 (10-15)		W = 21807	**0.001**
Hours on rest		Mdn (IQR)= 2 (2-5)		Mdn (IQR)= 4 (2-7)		Mdn (IQR)= 4 (2-6)		W = 12428	**<0.001**
Days away from spouse/partner		*M*±*SD* = 20.43 ± 13.09		*M*±*SD* = 24.20 ± 21.22		*M*±*SD* = 22.31 ± 17.71		t = -2.07, df = 376	**0.038**
Days off duty in a week		*M*±*SD* = 1.39 ± 0.87		*M*±*SD* = 1.44 ± 1.14		*M*±*SD* = 1.42 ± 1.01		t = -0.50, df = 376	0.611
Monthly salary		*M*±*SD* = 32962.96 ± 11953.53		*M*±*SD* = 33066.67 ± 8676.319		*M*±*SD* = 33014.81 ± 10430.54		t = -0.096, df = 376	0.923
Transit mileage allowance	No	2	1.06	1	0.53	3	0.79	$\chi 2$= 2.47, df = 4	0.649
	Sometimes	44	23.28	42	22.22	86	22.75		
	Always	143	75.66	146	77.25	289	76.46		

4.5 Risk Levels of HIV/AIDS among Long-Distance Truckers at Baseline

The proportion of LDTs at low-risk levels (<30%) of HIV/AIDS in the Namanga site was 49 (25.93%), almost twice that of LDTs in the same risk category from Busia site 21 (11.11%). At both sites, about half of the LDTs had moderate risk levels (30-39%), though slightly higher in Busia 106 (56.09%) than in Namanga 96 (50.79%). The LDTs at high-risk levels (≥40%) in Busia were higher, 62 (32.80%), compared to those of the same risk category in Namanga 44 (23.28 %). Generally, on combining both study sites, slightly above half of the LDTs were at moderate HIV/AIDS risk levels 202 (53.44%), followed by those at high-risk levels 106 (28.04%), and lastly, those at low-risk level 70 (18.52%).

When performing a two-proportion z-test, it emerged that there was only a statistically significant difference in the proportion of LDTs at low-risk levels between the two sites. At the Namanga site, the proportion of LDTs at low-risk levels was significantly lower than those in the same category at the Busia site ($\chi2=12.78$; df=1; p=0.0004). There was no statistically significant difference in the proportion of LDTs at high-risk levels between the two study sites ($\chi2=3.78$; d.f=1; p=0.051), and the same was true for the moderate risk level ($\chi2=0.86$; d.f=1; p=0.353). Overall, there was no statistically significant difference in the proportion of LDTs in all risk levels ($\chi2=1.68$; d.f = 4; p=0.793), as shown in Table 4.4.

Table 4.4: Risk Levels of HIV/AIDS among LDTs In Both Study Sites at Baseline

Risk Level	Category	Namanga		Busia		Combined (Both arms)		Two proportion Z test	p-value	Pearson's Chi-square test	p-value
		N=189	%	N=189	%	N=378	%				
Low	<30%	49	25.93	21	11.11	70	18.52	$\chi2$=12.78, df=1	**0.004**		
Moderate	30-39%	96	50.79	106	56.09	202	53.44	$\chi2$=0.86, df=1	0.353		
High	≥40%	44	23.28	62	32.80	106	28.04	$\chi2$=3.78, df=1	0.051	$\chi2$=1.68, df = 4	0.793

Moreover, bar plots embedded with error bars were used to establish risk differences in the proportions of LDTs within individual study sites. In Figure 4.1, the presence of overlapping error bars at low and high risk levels at the Namanga site indicates a lack of a statistically significant difference in the proportions of LDTs across those two risk categories. Similarly, there is no overlap between the moderate-risk error bar and those for low- and high-risk levels at the Namanga site. This indicates that the proportion of LDTs at moderate risk was statistically significant compared to the proportions at low and high risk. For the Busia site, there was no overlap of the error bars at either risk level. This indicates that there were statistically significant differences in the proportions of LDTs across all risk categories at the Busia site (Figure 4.1). To compare the risk levels across the two study sites, the lack of overlap in the low-risk level error bars indicates a statistically significant difference in those risk levels (Figure 4.1). The overlap of error bars at the high- and moderate-risk levels for both sites indicates a lack of a statistically significant difference in the proportions of LDTs in those risk categories (Figure 4.1).

Generally, Figure 4.2 shows overlapping error bars at low and high risk levels across all sites combined, but not at moderate risk. This indicates that there were no statistically significant differences in the proportions of LDTs at low- and high-risk levels across both study sites. However, there was a statistically significant difference in LDTs between moderate-risk and low- and high-risk levels across all study sites combined (Figure 4.2).

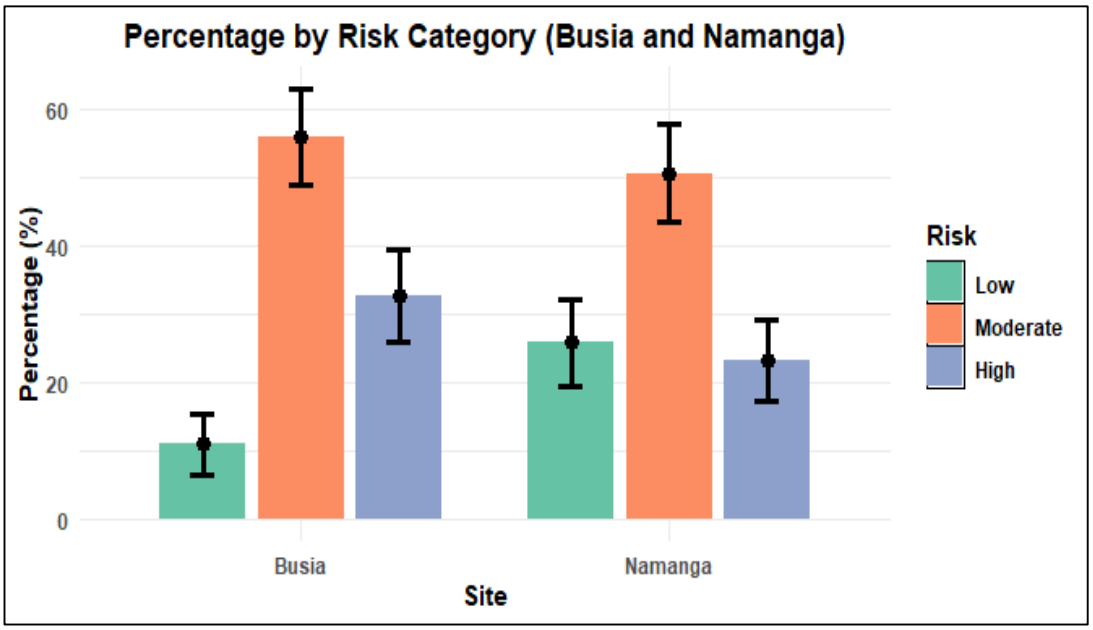

Figure 4.1: Bar Plots and Error Bars Showing the Risk Categories and their Differences Within Individual and Across the Study Sites

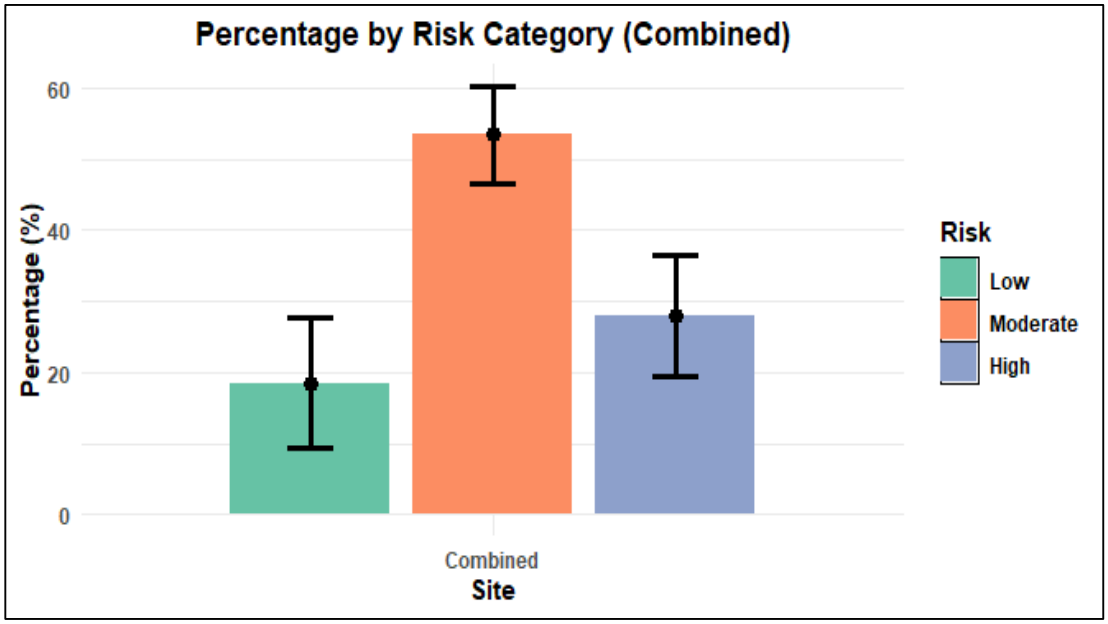

Figure 4.2: Bar Plots and Error Bars Showing the Risk Categories and their Differences an all Study Sites Combined

4.6 Predictors of the HIV/AIDS Risk Levels among Study Participants from all Study Sites

To determine predictors of the HIV/AIDS risk levels among LDTs, a univariable and multivariable ordinal logistic regression analysis was performed. Initially, a univariable ordinal logistic regression analysis was performed. The significance level was set at $P<0.05$. In univariable ordinal logistic regression analysis, variables had to meet a threshold of 0.1 ($P<0.1$) to enter the multivariable ordinal logistic regression levels of analysis. A proportional odds ratio was used to estimate the strength of the association between the predictor and the response variables.

4.6.1 Univariable Ordinal Logistic Regression Analysis for Predictors of HIV/AIDS Risk Levels among LDTs from all Sites

The following variables were significant at the univariable ordinal logistic regression level of analysis: age, religion, education level, days spent away from a spouse or regular partner, and monthly income, as shown in Table 4.5.

4.6.2 Multivariable Ordinal Logistic Regression Analysis for Predictors of HIV/AIDS Risk Levels among LDTs from All Sites

At the multivariable ordinal logistic regression level of analysis, the following variables emerged as statistically significant predictors of the risk of HIV/AIDs among the LDTs: age, level of education, days spent away from spouse/partner, and monthly salary. For every one-year increase in age among the LDTs, the odds of being at a risk level of at least 30% [combining moderate risk level (30-39%) and high-risk level (≥40%)] versus [low-risk level (<30%)] decreased by 0.97 times. In regards to education, LDTs who had attained a university/college level of education had the odds of being at a risk level of at least 30% [combining moderate risk level (30-39%) and high-risk level (≥40%)] versus [low-risk level (<30%)], reduced by 0.09 times compared to those who had no formal education, $p=0.02$. For every one day spent in transit, away from the spouse/partner, the odds of being at a risk level of at least 30% [combining moderate risk level (30-39%) and high-risk level (≥40%)] versus [low-risk

level (<30%)], increased by 1.06 times, p<0.0001. For LDTs who earned a monthly salary of 15000-30000 KSH, the odds of being at a risk level of at least 30% [combining moderate risk level (30-39%), and high risk level (≥40%)] versus [low risk level (<30%)], reduced by 0.26 times compared to those earned below 15000KSH, p=0.007. In terms of monthly salary, LDTs who earned above >30000 KSH, their odds of being at a risk level of at least 30% [combining moderate risk level (30-39%) and high-risk level (≥40%)] versus [low-risk level (<30%)], reduced by 0.25 times compared to those who earned below 15000KSH, p=0.004, Table 4.6.

4.6.3 Hypothesis Testing

Step 1: Stating the Null and Alternative Hypotheses

H_0: There are no statistically significant predictors of HIV/AIDS risk levels among long-distance truckers in Kenya.

H_1: There are statistically significant predictors of HIV/AIDS risk levels among long-distance truckers in Kenya.

Step 2: Computing the Test Statistic

The test statistic is an ordinal logistic regression, as in Tables 4.5 and 4.6.

Step 3: Determining the P-Values

To establish the existence of predictors to HIV/AIDS risk levels, at least one of the predictor variables should have a p-value <0.05 at the multivariable logistic regression analysis. Here, age, education level, days spent away from a spouse/partner, and monthly salary had p-values <0.05 as shown in Table 4.6.

Step 4: Decision Rule

Reject the H_0 if $p<0.05$; Fail to reject the H_0 if $p\geq0.05$.

Step 5: Conclusion

Based on the multivariable ordinal logistic regression results in Table 4.6, the null hypothesis that there are no statistically significant predictors of HIV/AIDS risk levels among long-distance truckers in Kenya was rejected. In this case, age, education level, days spent away from a spouse/partner, and monthly salary are predictors of HIV/AIDS risk levels among LDTs.

Table 4.5: Univariable Ordinal Logistic Regression of Predictors of HIV/AIDS Risk Level among LDTs In All Sites (Namanga And Busia) Combined

Variable	Category	*β*	95% CI of *β*	uPOR	95% CI of uPOR	P-value
Age		-0.03	-0.02,0.05	0.97	0.95-0.99	**0.012**
Citizenship	Kenyan	*Ref.*	-	*Ref.*	-	-
	Tanzanian	-0.03	-0.48-0.41	0.97	0.62-1.51	0.889
	Ugandan	-0.39	-1.27-0.48	0.67	0.28-1.62	0.377
	Zambian	0.60	-1.50-2.80	1.82	0.22-16.44	0.566
	Rwandese	1.12	-0.74-3.20	3.05	0.48-24.46	0.241
	Burundian	2.11	0.09-5.12	8.27	1.09-167.27	0.067
	Democratic Republic of Congo (DRC)	1.73	-0.50-4.79	5.64	0.60-120.24	0.153
	Malawian	-0.25	-3.82-3.32	0.78	0.02-27.61	0.882
Marital status	Married	*Ref.*	-	*Ref.*	-	-
	Single	0.34	-0.13-0.81	1.41	0.88-2.26	0.154
	Divorced	-0.82	-2.63-0.96	0.44	0.07-2.62	0.359
	Widowed	-0.20	-2.16-1.75	0.81	0.12-5.73	0.833
	Cohabiting	0.05	-1.11-1.21	1.05	0.33-3.35	0.931
Religion	Christian	*Ref.*	-	*Ref.*	-	-
	Muslim	0.31	-0.17-0.80	1.37	0.85-2.22	0.201
Education	**No formal education**	*Ref.*	-	*Ref.*	-	-
	Primary	-1.49	-3.47-0.07	0.22	0.03-1.07	**0.082**
	Secondary	-1.95	-3.90 - -0.43	0.14	0.02 – 0.65	**0.02**
	Vocational	-2.54	-4.57--0.91	0.08	0.01-0.40	**0.004**
	College/university	-3.15	-5.26--1.40	0.04	0.01-0.25	**0.001**
Years of experience		-0.004	-0.03-0.02	0.997	0.97-1.02	0.741
Hours on transit		0.01	-0.04-0.07	1.01	0.96-1.07	0.59
Hours on rest		0.02	-0.03-0.08	1.02	0.97-1.08	0.393
Days away from spouse/partner		0.06	0.05-0.08	1.06	1.05-1.08	**<0.001**

Variable	Category	*β*	95% CI of *β*	uPOR	95% CI of uPOR	P-value
Days off duty in a week		-0.03	-0.23-0.17	0.97	0.79-1.18	0.77
Monthly salary	**<15000 KSH**	*Ref.*	-	*Ref.*	-	-
	15000-30000 KSH	-1.94	-2.88 - -1.09	0.14	0.06-0.34	**<0.0001**
	>30000 KSH	-2.18	-3.09 - -1.35	0.11	0.05-0.26	**<0.0001**
Transit mileage allowance	No	*Ref.*	-	*Ref.*	-	-
	Sometimes	-0.52	-3.71 -2.17	0.59	0.025 -8.72	0.703
	Always	-1.27	-4.45-1.39	0.28	0.01- 4.02	0.344

Table 4.6: Multivariable Ordinal Logistic Regression of Predictors of HIV/AIDS Risk Level among LDTs In All Sites (Namanga And Busia) Combined

Variable	Category	*β*	95% CI of *β*	aPOR	95% CI of aPOR	P-value
Age		-0.03	-0.05 - -0.01	0.96	0.95-0.99	**0.01**
Education	**No formal education**	*Ref.*		*Ref.*		
	Primary	-1.09	-3.16-0.66	0.34	0.04- 1.93	0.24
	Secondary	-1.12	-3.16-0.58	0.34	0.04-1.79	0.22
	Vocational	-1.69	-3.81-0.19	0.18	0.02-1.13	0.08
	College/university	-2.40	-4.60-0.47	0.09	0.01-0.62	**0.02**
Days away from spouse/partner		0.06	0.04-0.07	1.06	1.04-1.08	**<0.0001**
Monthly salary	**<15000 KSH**	*Ref.*		*Ref.*		
	15000-30000 KSH	-1.33	-2.34- -0.40	0.26	0.10- 0.67	**0.007**
	>30000 KSH	-1.39	-2.38- -0.46	0.25	0.09- 0.63	**0.004**

4.7 Barriers to HIV/AIDS Risk Reduction among Long-Distance Truckers

The qualitative arm of the study comprised nine key informants and 18 in-depth interviewees. Most of the key informants 4 (44.44%) were aged between 25 to 34 years. A majority of the key informants were female (5 (55.56%)) and were from Busia site 8 (88.89%), Table 4.7. For the in-depth interviews, half of them were aged 35-44 years. Slightly above half of the in-depth interviewees were from Busia 10 (55.56%), whereas the majority 15 (83.33%) of them were truck drivers, Table 4.8.

Table 4.7: Socio-Demographic and Socio-Economic Characteristics of Key Informants

Variable	Category	N=9 (%)
Age in years	18-24	1 (11.11)
	25-34	4 (44.44)
	35-44	2 (22.22)
	Above 44	2 (22.22)
Gender	Male	4 (44.44)
	Female	5 (55.56)
Study Site	Busia	8 (88.89)
	Namanga	1 (11.11)
Profession	Nurse	3 (33.33)
	Pharmacist	1 (11.11)
	Peer-educator	1 (11.11)
	Community mobilizer	2 (22.22)
	Trucker's Association Leader	2 (22.22)
Years of Experience	1-4	2 (22.22)
	5-9	3 (33.33)
	Above 9	3 (33.33)

Table 4.8: Socio-Demographic and Socio-Economic Characteristics of In-Depth Interviewees

Variable	Category	N=18 (%)
Age in years	18-24	4 (22.22)
	25-34	3 (16.67)
	35-44	9 (50)
	Above 44	2 (11.11)
Study Site	Busia	10 (55.56)
	Namanga	8 (44.44)
Profession	Truck Driver	15 (83.33)
	Assistant trucker	3 (16.67)
Years of experience	1-4	1 (5.56)
	5-9	8 (44.44)
	Above 9	9 (50)

The themes on barriers on HIV/AIDS risk reduction were health system barriers, long-distance trucking career-related barriers, biomedical barriers, and individual barriers. Moreover, sub-themes were also generated. Participants were also asked to recommend possible ways to mitigate the barriers.

4.7.1 Theme 1: Health System Barriers and Suggested Solutions

The health system barriers had the following sub-themes: hospital-based barriers, lack of targeted health facilities for LDTs, high cost of health services, and structural barriers. A summary of the themes, sub-themes, codes, and illustrative text is given in Table 4.9. The most mentioned themes were health system barriers (48 mentions), followed by trucking career-related barriers and individual barriers (38 mentions each). The frequency of themes and qualitative responses is visualized in Figures 4.3 and 4.4.

Table 4.9: Summary of Barriers To HIV/AIDS Risk Reduction Among LDTs In Both Namanga And Busia Study Sites

Theme	Sub-theme	Codes	Illustrative Quote
Health system barriers	Distance of health facilities from transit highways/stopovers	Distance	*"…not so many of them (health facilities) are situated near the highway such that you can quickly rush, get the HIV preventive services you want, and come back." (IDI015)*
		Far away	
	Health facility operation hours	Closed at night	*"Again, the private health facilities are closed at night, and that is the time we have time to attend such services like health checkups. So when we find them closed, we have no other option." (IDI18)*
		Not open	
	Hospital waiting time	Slow	*"The attendants were friendly but slow. I had to wait for longer than I expected for me to get all the services. I would have preferred if they did it quicker…." (IDI07)*
		Wait for long	
	Lack of health facilities targeted for LDTs	No hospital/health facility	*"I have not found any hospital or health facility that is handling truck drivers' health concerns along this route." (IDI16)*
	Cost of healthcare services	Expensive	*"…some of those private facilities are very expensive and we don't have so much money with us. You know this job doesn't pay very well…." (IDI8)*
		Not affordable	
	Inadequate staffing of healthcare workers	Few	*"…peer educators and community mobilizers are also very few and cannot handle the huge workload you see here. So the issue of inadequate staffing is a serious challenge...." (KI008)*
		Shortage of staff	
	Inadequate infrastructure	Small space	*"…look at our facility there, the space is too small.. Yes, we are giving STI treatment, but imagine there are no laboratories for screening the actual STI…." (KI008)*
		No laboratory	
	Over-the-counter medication	Chemist	*"…we just go to the chemist and say what we are feeling and then we are given some drugs". (IDI01)*
	Stocks outs and unavailability of drugs	Out of supplies	*"Sometimes, we run out of supplies. The county sometimes delays with supplies. Actually, without the NGOs, we would be highly affected. About PrEP, some truckers are using them, but they may run out of them." (KI002)*
		No drugs	
Trucking career-related barriers	Tight work schedules and delays	No time	*"Most of the time I am very busy trying to compete against time so that I can deliver my cargo in time. I can say I only go to the hospital when I feel sick..." (IDI07)*

Theme	Sub-theme	Codes	Illustrative Quote
		Strict deadlines	
	Insecurity along transit routes	Theft	*"There is a huge challenge of insecurity along the way, there are places where you can't even stop, you have to keep on driving….in such a situation how I can even access any type of health services..." (IDI02)*
		Valuable goods	
Individual-level barriers	Lack of awareness/knowledge	Don't know	*"..Remember, we also don't have the IEC materials to share with these truckers…most of them don't even know about the event-driven PrEP. And remember, the PrEP is very helpful. We are giving those who know about it a whole tin of PrEP so that they can use them when in need."(KI002)*
		Not aware	
	Language barrier	Can't understand Swahili/English	*"…as you have seen with one of my clients, he is a Burundian, and it's his first time here in Kenya. He doesn't understand English and Swahili. He doesn't even understand what we mean when we tell him about HIV testing and PrEP, and we also don't know his home language." (KI006)*
		Can't communicate	
	Stigma	Shame	*"..Even though he expressed willingness to take the PrEP with him after educating him about it, he resisted the drugs when he saw they were packed in a container like that of ARVs. He said, 'No but why do the PrEP drugs look like this? No, I won't have them, I am okay without them; I don't want them, even my fellow truck drivers will start to think I am sick and I am using ARVs." (KI006)*
		Fear of being seen as HIV positive	
	Unsafe sexual interactions with FSWs	No condom	*"A sex worker will offer the services you need based on the amount of money you have. They can even be willing to allow you to have sex with them without condom protection as long as you offer something extra above the normal charges. And you know that can be risky? (IDI03*
		Risky	
	Hard to convince LDTs	Rushed away	*"…You see that driver over there, I just talked to him, and he rushed away, he says that he had left his cabin door unclosed, but it's not true, you can even see it is closed, so it is the services he didn't want." (KI007)*
		Don't want services	

Figure 4.3: A Word Cloud Visualizing the Frequency of Themes for Barriers to HIV/AIDS Risk Reduction among LDTs

Figure 4.4: A Word Cloud Visualizing the Frequency of Qualitative Responses for Barriers to HIV/AIDS Risk Reduction among LDTs

I. Distance of Health Facilities from Transit Highways/Stopovers

The location of health facilities far away from the main transit corridors used by the LDTs was stated as a barrier to easy access to HIV/AIDs risk reduction services.

Participants felt that the distance to key health facilities along various transit routes made it difficult for them to easily access services in times of need. Given the nature of the goods they ferry from one location to another and the size of their trucks, participants expressed that they found it hard to access such services, especially the mainstream hospitals. About this, one IDI had the following to say;

> "*You know, not so many of the hospitals are situated near the highway such that you can quickly rush, get the HIV preventive services you want, and come back*." *(IDI015)*

Another IDI noted that some HIV preventive services were limited to certain facilities (especially the mainstream health facilities), and not always accessible to them when they are far away in remote areas;

> "*Imagine if I were required to obtain certain HIV preventive services from, let us say, a place far away from here, and then let us say around here there are no such services; do you think I would get them?" (IDI13)*

To address this barrier, one participant had the following recommendation;

> *"If we can have hospitals that are situated along the places we stop and park our trucks to rest, and are open for some hours during the night, like until midnight, this can help us access such services"(IDI01)*

II. Health Facility Operation Hours

Respondents reported that the hours when most health facilities along the transit routes operated didn't align with the times when most LDTs made stopovers and were free to access HIV/AIDS risk reduction services. They stated that most health facilities only operated during the daytime, not at night. They felt that this limited them in accessing key HIV/AIDS risk reduction services, given that it is at early and mid-night hours that

most of the LDTs make a stopover to have a rest and attend to their personal needs, like seeking routine healthcare checkups. Two respondents noted that hospitals remained closed, especially at odd hours, and were likely to miss certain HIV preventive services in times of need;

> *"Look at how most of these hospitals operate; you know most are not always open during the day or night. And you know this is when most of us stop to rest and maybe find time to go to the hospital…"* (IDI01)

> *"At night, most of the health facilities that are close to the highway are closed. Unless you are in a big and busy town like this one, you will not find anywhere to seek the services you want." (IDI16)*

Another respondent felt that some private hospitals had limited time to operate and were not always accessible during the night;

> *"Again, the private health facilities are closed at night, and that is the time we have time to attend services like health checkups. So when we find them closed, we have no other option." (IDI18)*

III. Hospital Waiting Time

Participants also felt that the waiting time, especially in public hospitals, highly inhibited them from going for key HIV/AIDS risk reduction services from such facilities. One participant expressed discouragement from having to spend an entire day queueing for services, only to end up being told that the services he was seeking were not available.

> *"There (in public hospitals), you know, the lines are long. Sometimes, you may have to spend a day just waiting to be treated, and lastly, when the doctor sees you, they tell you the hospital has no medicine, so they give you a prescription to buy the drugs from the pharmacy. So I will not waste time going there; I will look for a pharmacy, go and explain myself, get drugs in less than five minutes, and continue with my transit journey." (IDI15)*

Another respondent had an experience with slow healthcare providers contrary to his expectations;

> *"The attendants were friendly but slow. I had to wait for longer than I expected for me to get all the services. I would have preferred if they did it quicker..." (IDI07)*

IV. Lack of Health Facilities Targeted for LDTs

Participants lamented the lack of healthcare facilities specifically targeted for LDTs along the transit routes or even at some of the international border points as a key barrier to accessing HIV/AIDS risk reduction services. One IDI felt that having to seek healthcare services in facilities that didn't consider the unique trucking career needs was a key impediment to accessing the required services;

> *"When we lack hospitals that are for our needs, and we are to seek services in the mainstream hospitals, we may not always feel that we are being served well, you know, we must keep in a hurry" (IDI10)*

Another IDI had an experience of entirely not getting any hospitals along specific transit routes;

> *"As you can see, I am taking this cargo to South Sudan. It is a very long destination; reaching it will take three weeks. And you know along the way there are no hospitals, let alone those addressing our healthcare needs as LDTs, especially when you get to the south-Sudan side" (IDI02)*

Another IDI shared a slightly different assertion that HIV/AIDS risk reduction services for LDTs were only available at a cost in certain cross-border points and not in between the transit corridors;

> *"The only other place I can say these services are available in the cross-border to Tanzania and Zambia at a place called Tunduma. But there you are required to pay for them; they are not for free." (IDI18)*

Similarly, the lack of health facilities targeted for LDTs was echoed by a key informant;

> *"Mainly, this unit is supported by the National government. We have tried to push for a health unit for truck drivers but it has not been successful. The lack of a health unit specifically targeted for truck drivers means we can't offer HIV risk reduction services to them." (KI009)*

One key informant recommended the establishment of a healthcare facility targeted for LDTs at the Namanga border point, where such a facility was missing;

> *"I would say first we get a health unit for truck drivers somewhere here at Border Customs, which can provide HIV prevention services for them. You know, even the way it is, there is no privacy. Even if we started providing HIV prevention services, there is no safe space where truck drivers can open up about their experiences and even get tested for HIV and get PrEP and PEP. The way HIV preventive services are provided, a safe space is needed. Then they can access the HIV prevention services with some privacy, which would enhance confidentiality among them." (KI009)*

V. Cost of Healthcare Services

Participants expressed that the high cost of healthcare services, especially in private health facilities, was likely to inhibit them from accessing HIV/AIDS risk reduction services from such facilities. One participant had the following to say;

> *"We get them mostly from private facilities. Now the problem is that some of those private facilities are very expensive and we don't have so much money with us. You know this job doesn't pay well, and we are also not given a good mileage allowance; it's just a little money." (IDI8)*

A key informant expressed a closely similar challenge. One key informant stated that due to limited resources, they were not able to sustain an adequate number of peer educators for the outreach services;

"We have high attrition of peer educators because they feel demotivated. For example, now only 10 are paid a monthly stipend. And you know the organization can't accommodate more peer educators due to inadequate resources. We also have a problem with inadequate pay for our workers. They get very little. Again, the pay for the clinicians is not good." (KI008)

Another key informant highlighted that some NGO-based health facilities that used to provide LDTs' targeted services had since ceased to exist due to a lack of donor funding;

"We had an NGO called North Star Alliance. They used to be in a blue container over there, but they are no longer around. You know, recently, NGOs have been affected by budget cuts by major donors like USAID. So I think they were affected by that in one way or another, though not so sure, but I know they are no longer in operation." (KI009)

In addition, some participants highlighted the challenge of inadequate funds to meet healthcare expenses while in transit, such as delayed salaries, lack of transit allowance enough to meet medical costs, and lack of health insurance coverage. One participant lamented, as stated below;

"Another challenge we face is delayed salaries. I have depleted all the mileage allowance I had been given at the start of the transit journey. It's tough; thank God I am healthy and not on any medications. Imagine if I were using some drugs for a chronic illness. How would I use them on an empty stomach? Remember, employers don't provide us with health insurance coverage. If I fell sick in this situation, trust me, I couldn't afford any health services?" (IDI003)

To address the barrier, one participant recommended the following;

"I wish we had a union for truck drivers. It would help us solve salary delays and help us afford treatment services. Lastly, as I have told you, there is the issue of health insurance. If all trucking companies can be instructed to provide

health insurance covers to their truck drivers, then we could access any form of health service, including HIV prevention, without any challenge…" (IDI03

VI. Inadequate Staffing of Healthcare Workers

Inadequate staffing was stated as a key barrier to HIV/AIDS risk reduction among the LDTs. One of the key informants had the following to say;

> *"Again, the outreach workers, like peer educators and community mobilizers, are also very few and cannot handle the huge workload you see here. The issue of inadequate staffing is a serious challenge here. When the truck drivers come and see that there are few clinicians, especially during the outreaches, they do not come for the services. They feel discouraged and go on their journey because they don't have much time to waste. Only a few clinicians are hired during the outreaches, which is why there is the issue of understaffing." (KI008)*

Another key informant expressed the lack of a counterpart to stand by when one of them was on leave, which left them overburdened and unable to deliver HIV/AIDS prevention services effectively in such situations;

> *"We are only two of us here, so staff shortage is an issue; that way, we can't even operate at night. Imagine if one of us is on leave, the one left behind finds it hard to even provide services efficiently throughout the week because there is no relief." (KI002)*

To address this barrier, one key informant highlighted the need for more support from peer educators;

> *"Yes, if we can get more stakeholders coming in, then they can support more peer educators who are very important in spreading the risk reduction messages among the truck drivers." (KI004)*

VII. Inadequate Infrastructure

Inadequate space in some of the healthcare facilities and a lack of essential facilities like laboratories for STI screening were mentioned as a barrier to HIV/AIDS risk reduction. One key informant highlighted the problem of inadequate space as follows;

> *"We have a small space; just see the size of the port health unit; it's so small, and for us to give HIV risk reduction services, we would need a larger space. Unlike the Busia customs border site, no designated health unit that specifically targets truck drivers here." (KI009)*

Besides the inadequate space, another key informant also highlighted the lack of laboratories for STI screening;

> *"Like, if you look at our facility there, the space is too small, and we don't even have labs. Yes, we are giving STI treatment, but imagine there are no laboratories for screening the actual STI. So, we need a fully equipped laboratory with STI screening equipment to be sure of what we are treating." (KI008)*

VIII. Over-The-Counter Medication

It was mentioned that on some occasions, participants sought over-the-counter medication by avoiding the routine screening and diagnosis for accurate treatment. This is what one participant had to say;

> *"When I talk to my friends who have had such a problem (STI infection), they tell me they go to the shops selling drugs (pharmacy). They explain their signs and symptoms, and they are given treatment. Leave alone the STIs, even when we have other health problems, you know, like I have a fever, or I have a headache, we go the pharmacies you can see around the highway and explain ourselves, and then you are given medication, and you feel better." (IDI15)*

Ix. Stockouts and Unavailability of Drugs

On the issue of medications, frequent stockouts and unavailability of drugs were expressed as a barrier to HIV/AIDS risk reduction. One key informant expressed a problem with the shortage of STIs and PrEP drugs;

> *"Sometimes, we run out of supplies. The county sometimes delays with supplies. Actually, without the NGOs, we would be highly affected. Some dispensaries and health centers run for long without supplies like STI treatment drugs...About PrEP, some truckers are using it, but they may run out of the drugs sometimes." (KI002)*

Another key informant highlighted a shortage of oral HIV test kits;

> *"We have had a problem with oral HIV test kits; they have been out of stock for a long time, and they just brought more the other day." (KI008)*

Another key informant mentioned that they didn't provide PrEP and PEP for LDTs in their facility as part of the HIV risk reduction services, except for condoms, which they also ran out of stock sometimes;

> *"Here we don't do HIV testing, we don't give PrEP and PEP, just some condoms, and we are not always stocked with them." (KI009)*

4.7.3 Theme 2: Long-Distance Trucking Career-Related Barriers

The long-distance trucking-related barriers had the following sub-themes: tight work schedules, timing and delays at various spots when in transit, insecurity and extortion from highway police traffic, and unfavorable policies.

I. Tight Work Schedules, Timing, And Delays

The problem of being delayed along transit routes, especially at international border points awaiting clearance, operating under strictly tight work schedules, and the timing of transit journeys were widely cited as key barriers to HIV/AIDS risk reduction

among LDTs. One participant felt that strict deadlines left him with little or no time for risk reduction services due to exhaustion;

> *"We have stringent deadlines. And when you don't meet those deadlines, you will have problems with your employer. The only time we have is in the evenings when we park to rest, and you know we are exhausted. Like me, I rest in my cabin. Driving long distances is not easy, and you will get exhausted at the end of the day." (IDI16)*

Another participant had a problem with unforeseen delays owing to bureaucratic reasons, especially at international border points;

> *"The other big problem is the delays we sometimes experience at the international border points, like here. Sometimes, you can stay here waiting when your papers are not in order. And sometimes some of these places don't even have health facilities. So getting any form of health services becomes very hard." (IDI02)*

Further, the key informants had more to add to the issue of delays, timing, and tight work schedules. One key informant had an experience with LDTs who missed their drug refill owing to delays in foreign countries or even sometimes due to long queues;

> *"Sometimes the truckers will get delayed in other countries. So, they may miss their drug supplies like ART or PrEP for some days. When there are long queues, like sometimes the queues go all the way to Bumala, you will find that a trucker who wanted to have their refill at a particular time will come and find that we have closed. And this is due to the delay. Sometimes the queues will last for two days, and you know we are not operating at night. So some will still miss the refill or even fail to find us in the odd hours." (KI002)*

Another key informant expressed that the constant mobility and the strict work deadlines unique to LDTs' trucking career were key barriers to accessing HIV risk reduction services;

"The main barrier, I think, is the nature of the trucking career. You know these guys are constantly in transit, and they don't even have enough time to rest and access health services. They have stringent deadlines to meet. I see them rushing to compete against time and get cleared to move on. They will tell you they have only one day to deliver the goods to their destination. So tell me when such a person will find time to access the HIV risk reduction health services." (KI009)

II. Unfavorable Long-Distance Trucking Policies

Participants lamented that the existence of punitive or the lack of policies that addressed their unique needs as LDTs highly affected their ability to access HIV/AIDS risk reduction services. For instance, some participants felt that the lack of a policy that compels employers to recruit truck assistants made it hard to leave their trucks unsupervised to attend to HIV risk reduction services like getting PrEP, PEP, STI screening and treatment, and HIV testing. One IDI expressed the following on the issue of lack of truck assistants;

"One challenge I see among truck drivers is loneliness. At least my company has given me an assistant, but that is not the case in most other companies. You need someone to help you, but you can't find them. When you want to go to get a health service, you will not because you cannot leave the truck and the loaded goods unsupervised." (IDI08)

Another IDI stated the following on the issue of the wealthy political class failing to institute policies that compelled the recruitment of truck assistants;

"You know these trucks belong to the wealthy people, some of whom are the politicians and are in a position to make policies that force the truck companies to employ a truck driver and a truck assistant. But they will not do that; they want to save more by not employing many people in the companies. So they will not make such policies to avoid extra expenditures on salaries, and when we raise these concerns, no one wants to listen to us." (IDI15)

Participants also stated that when in foreign countries, they had limited eligibility to access HIV risk reduction services. This was orchestrated by the lack of policies that made it easy for them to do so. One of the participants had this to say;

> *"You know, like for me, who is not Kenyan, I don't mostly go to the Kenyan hospitals when I am here in Kenya. I fear being asked many questions. But you see, when we are here at the customs border point, that facility over there gives us most of the HIV preventive services we may need". (IDI11)*

Participants also lamented that trucking career policies did not allow traveling with their regular partners or wives. This made it hard for them to meet their sexual needs when away on transit. Consequently, to meet their sexual needs, they had to look for FSWs or casual sex workers who are abundantly available along transit stopovers. This is what one participant had to say;

> *"As you travel in these trucks, you must be insured in case of an accident. And, they can't insure your wife. If an accident happens, they won't compensate her. Again, with the technology nowadays, they have CCTV cameras installed here, and if you try to have someone unauthorized here, they will dismiss you immediately." (IDI03)*

Another participant felt that political interference made it hard to have policies that eased access to HIV/AIDS risk reduction services;

> *"Most of the issues affecting us, truck drivers, are politicized. That is why we are suffering. For instance, politicians meddle with most of the issues affecting us. After all, they also own most of these trucking companies. They don't want any policies that will better our working conditions, fearing they could have to spend extra money." (IDI17)*

III. Insecurity along transit routes

Long-distance truckers ferry valuable goods across diverse transport corridors. This was mentioned as a primary factor that attracted insecurity along transit routes and stopovers. Participants lamented that it was hard to leave their trucks unsupervised to

attend HIV risk reduction services during their routine transit journey. One participant highlighted certain places where it was impossible to access HIV preventive services due to insecurity reasons;

> *"There is a huge challenge of insecurity along the way, like places where you can't even stop, you have to keep driving. Should you try to stop, they will steal everything in the truck, and they can also harm you. So, tell me now, in such a situation, how I can even access any health services even if I was severely sick, let alone the HIV preventive services." (IDI02)*

A key informant shared a similar sentiment;

> *"Another problem is insecurity. Truck drivers face a lot of insecurity on the way. When they leave their trucks to seek health services, thieves come and steal their goods, so for that reason, most truck drivers avoid leaving their trucks to come and get these services" (KI008)*

Another IDI had a unique experience with female sex workers who, besides offering transactional sex, had ill intentions of robbing LDTs when drunk;

> *"Nowadays, the highway girls will approach you on this route. You will think they are coming for those other services (transactional sex), as they will offer you something to take, like a drink. What you don't know is that they have added some drugs to the drink; when you get drunk, you sleep, and you wake up two days later. The other day, one truck driver was approached and given some water to drink. Then, the lady had a syndicate of buglers waiting somewhere for her signal. When the truck driver slept, she stole from him, and they broke and left with some valuables in the cargo. Luckily, other truck drivers saw it in time and alerted the police, and the driver was taken to the hospital, and the truck and valuables were secured in a nearby police station." (IDI14)*

Another participant expressed that truck breakdowns in remote places far from towns exposed them to attacks from bandits;

"Just imagine the other day I was past a place called 'Mbui Nzau,' and I realized that the bearing balls of one of the rear wheels had heated up and broken down due to too much heat caused by the load, just as I was alighting the truck, two men emerged from the darkness in the bush. One had a sharp sword; they wanted to steal the goods. Safe for me, I had a catapult. I chased both of them, and they had to leave me alone. Imagine such situations on the highway. Can you even leave the truck alone and go for the HIV preventive services you are talking about?" (IDI10)

4.7.3 Theme 3: Individual-Level Barriers

Several individual barriers likely to inhibit HIV/AIDS risk reduction were highlighted. These include lack of awareness/knowledge on existing preventive services/strategies, lack of condom use, stigma, language barrier to foreign truckers, unwilling/hard to convince truckers, and female sex workers.

I. Lack of Awareness/Knowledge

It was expressed that the shortage of IEC materials had made it hard to establish a platform through which healthcare providers would share up-to-date HIV risk reduction services like PrEP to LDTs;

"We don't have the IEC materials to share with these truckers. So, I know most don't even know about the event-driven PrEP. And remember, the PrEP is very helpful; we are giving those who know about it a whole tin of the drugs so they can use it when needed."(KI002)

Another key informant stated LDTs couldn't trace healthcare facilities made to provide HIV risk reduction services to them, and thus underutilizing it;

"Previously, we didn't have signage here showing the location of this facility, and truckers couldn't identify it. There were some obstacles; some customs Management Didn't Want The Signage Here, But Now It Has Been Solved."(KI003)

II. Hard to Convince LDTS

It was also mentioned that some LDTs were hard to convince for them to utilize the HIV/AIDS risk reduction services available. This is what some participants had to say;

> *"We must convince the truck drivers, but it is not easy. Others will tell you they are coming, but are on the line for clearance there. Like you see that driver over there, I just talked to him, and he rushed away; he says that he had left his cabin door open, but it's not true. You can see it is closed, so it is the services he didn't want." (KI007)*

III. Language Barrier

Language barrier was highlighted as a key impediment to access to HIV/AIDS risk reduction services, especially for LDTs from outside the country. It was stated that such LDTs could not understand either English or Swahili, and thus it was difficult for them to be offered available services. A key informant had this to say;

> *"We have the language barrier issue, as you have seen with one of my clients. He is a Burundian, and it's his first time here in Kenya; he doesn't understand English or Swahili, so it's challenging to communicate with him. He doesn't even understand what we mean when we tell him about HIV testing and PrEP, and we also don't know his home language." (KI006)*

IV. Stigma

Participants lamented that some LDTs declined to carry condoms when offered them, claiming that they would be labeled as unfaithful. Also, the packaging of PrEP was said to make LDTs resist using them, claiming that they looked like ARVs, and people would say that they are HIV positive. In particular, one key informant expressed the following on condom stigma;

> *"As we approach them, we also give them condoms. But you know others will resist picking them when we give them the condoms; they say they don't want to carry those things, they fear. It's like they have a stigma on them. They will tell you I don't want to be seen carrying those condoms. They will say, When*

someone sees me with these condoms, they think I am having many female sex partners along the way" (KI005)

Another key informant had an experience with a LDT who declined to carry PrEP because the drugs were packaged like other ART drugs for the HIV positive;

"Even though he expressed willingness to take the PrEP with him after educating him about it, he resisted when he noticed they were packed in a container like that of ARVs. He said, 'No, but why do the PrEP drugs look like this? No, I won't have them; I am okay without them. This will bring problems at home with my wife. She will think that I am using ARVs. He went further to say, 'If they were packed like normal drugs, I would have taken them, but this way, no, I don't want them; even my fellow truck drivers will start to think I am sick and I am using ARVs." (KI006)

V. Unsafe Sexual Interactions with Female Sex Workers

It was also mentioned that some FSWs were willing to compromise safe sex for some extra charges above the normal rates, elevating the risk of contracting HIV. A participant had this to say;

"A sex worker will offer the services you need based on the amount of money you have. They can even be willing to allow you to have sex with them without condom protection as long as you offer something extra above what the normal charges. And you know that can be risky? You may end up contracting some illnesses like HIV." (IDI03)

To avoid the challenge of having to seek sexual services from FSWs, a participant suggested the need to be allowed to travel with their spouses;

"If we could be allowed to travel with our spouses, then this issue of female sex workers would not be a problem for us." (IDI03)

4.8 Existing BCC Strategies Targeting the LDTs to Promote HIV/AIDS Risk Reduction

A total of five themes emerged from the qualitative data on BCC strategies to promote HIV/AIDS risk reduction for LDTs. These include media-based BCC strategies, healthcare worker-driven BCC strategies, peer-educator-driven BCC strategies, outreach-based BCC strategies, and NGO-driven BCC strategies. A summary of the themes, sub-themes, codes, and illustrative text is given in Table 4.10. The most prominent theme based on the number of mentions was media-based BCC strategies, with 15 mentions, followed by NGO-driven BCC strategies at six mentions and lastly, educator-driven strategies at 2 mentions. The frequency of themes is visualized in Figure 4.5 and 4.6.

Table 4.10: Summary of BCC Strategies on HIV/AIDS Risk Reduction Targeting LDTs In Busia and Namanga Sites

Theme	Sub-theme	Codes	Illustrative Quote
Media-based BCC strategies	Broadcast media-based BCC strategies	Radio	*"The only communication on behaviour change I have heard was on radio programs, and this is about condom use messages and having faithful partners, and you know this was not even specifically for truck drivers but the general population." (IDI05)*
	Print media-based BCC strategies	Posters Pamphlets IEC materials	*"The only place where I have been approached and given some small pamphlets on HIV prevention mechanisms like condom use is in the Tunduma border of Zambia and Tanzania, but within Kenya and Tanzania, not really." (IDI14)*
	Modern technology/media-based BCC strategies	Flash-disk Text-messages	*".. previously, an NGO called 'Terres de Homes' provided flash disks with messages on HIV prevention for truck drivers so that they can play the HIV risk reduction messages while in transit. But they just provided 15, which is very inadequate for all the truck drivers..." (KI008)*
Healthcare-worker-driven BCC strategies		Clinicians Nurses	*"The clinicians and nurses at the border post sometimes conduct what we call 'moonlight' HIV testing, especially when the truckers are many, the CASCO organizes for a moonlight, and they are tested and given messages, and those who are diagnosed with HIV are initiated on treatment and care, whereas those on ARTs can do their refills…." (KI001)*
Peer-educator-led BCC strategies		Peer-educators	*"Like, they are supporting us in conducting an outreach here this week. They have trained over 60 peer educators, and they will attend this outreach and others in the future. That is why these peer educators are here. They are the ones who are educating the truck drivers on the updates of PrEP and PEP." (KI004)*
Outreach based BCC strategies		Outreach Community mobilization	*"Sometimes we organize outreaches for HIV preventive services, but still you will find that LDTs don't access them." (KI004)*
Non-governmental organization driven BCC strategies		NGOs IRDO North-Star Alliance	*"We have an NGO called IRDO, at least it supports us in various ways like for the outreaches they give us the equipment needed for HIV prevention services… they compensate in terms of enumeration, and also provide drugs and condoms. (KI004)*

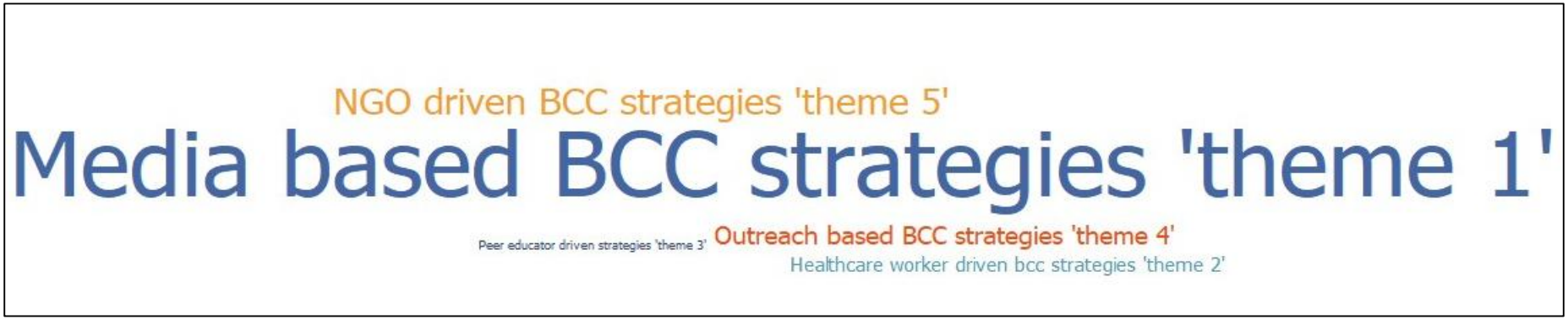

Figure 4.5: A Word Cloud Visualizing The Frequency of Themes For BCC Strategies On HIV/AIDS Risk Reduction Targeting LDTs

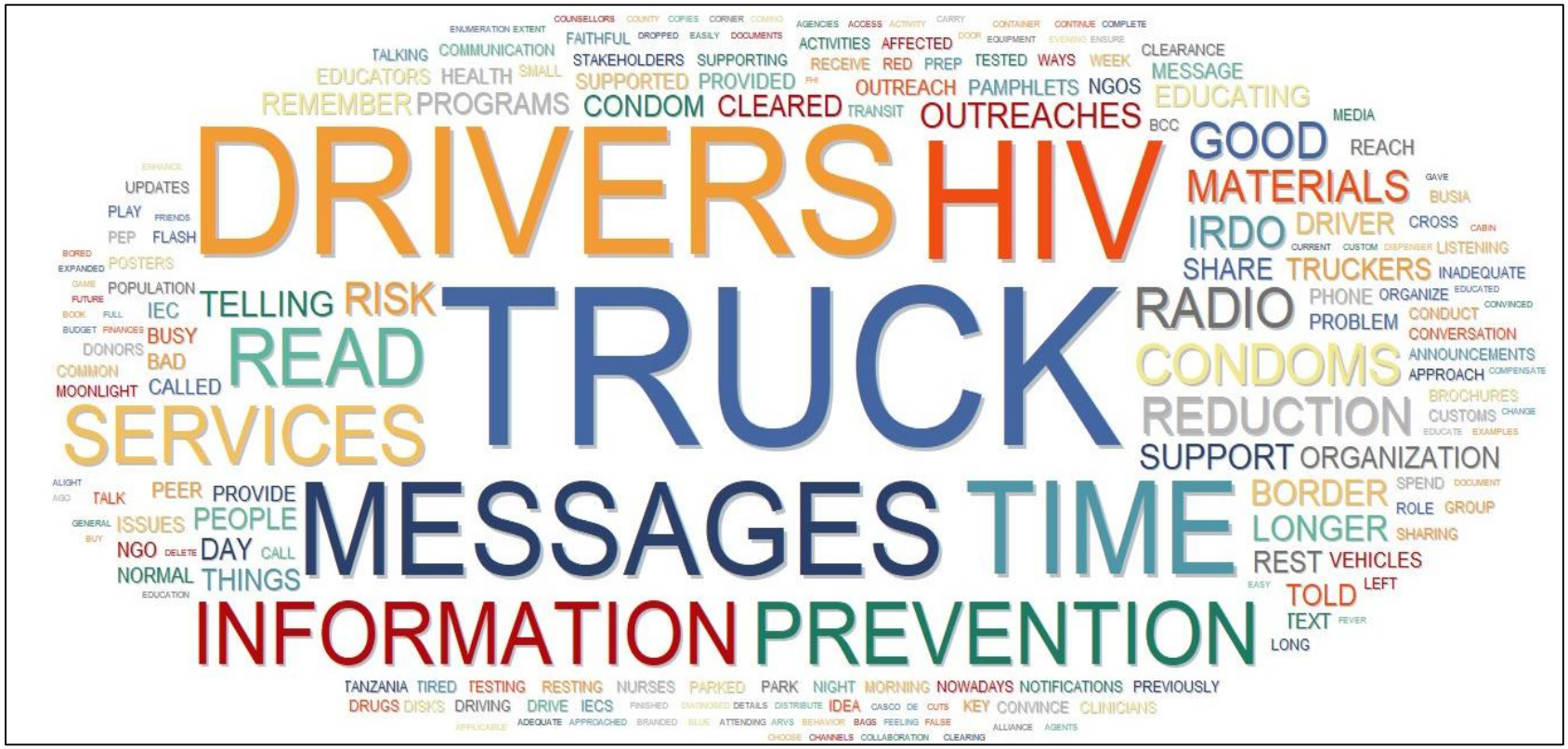

Figure 4.6: A Word Cloud Visualizing the Frequency of Qualitative Responses for BCC Strategies on HIV/AIDS Risk Reduction among LDTs

4.8.1 Theme 1: Media-Based BCC Strategies

I. Broadcast Media-Based BCC Strategies

Participants cited radio as the most common broadcast media through which they had previously received BCC messages. This is what they had to say;

> *"It is just the normal radio programs for everyone. And you know nowadays it is not very common because many people know about these things of HIV." (IDI18)*

> *"The only communication on behaviour change I have heard was on radio programs, and this is about condom use messages and having faithful partners, and you know this was not even specifically for truck drivers but the general population." (IDI05)*

To enhance the media-based BCC strategies, one key informant recommended the following;

> *"...I call upon stakeholders so that they can come and support us. Also, the media can play a role in educating truck drivers on HIV risk reduction and current updates. For example, you see the truck drivers spend a good time listening to the radio as they drive, so that way they can be reached with key HIV risk reduction messages." (KI009)*

Ii. Print Media-Based BCC Strategies

Several participants also shared that they had received BCC messages on HIV/AIDS risk reduction printed in the form of posters, pamphlets, and information, education, and communication (IEC) materials. Two participants disclosed that they had been issued with some pamphlets on HIV prevention, though not certain from which organization;

> *"Honestly, I don't think there is much. For instance, when I want some drugs, I mostly buy them. But there have been times when we met some people along*

the way; I think they were from an organization, and they gave us condoms and some papers with good information about HIV prevention. But I don't remember their name" (IDI01)

"The only place where I have been approached and given some small pamphlets on HIV prevention mechanisms like condom use is in Tunduma on the border of Zambia and Tanzania, but with Kenya and Tanzania, not really." (IDI14)

Another participant disclosed that they had posters around the facility for LDTs to read on HIV risk reduction;

"If you have looked at our walls, we have a few posters there, but these truckers don't have time to read them…." (KI002)

A key informant shared that they only received a few IEC materials, though not enough to share with the LDTs;

"We only get these IEC materials when we go for training, and you know we are only given copies that are enough for us, so we are not even left with any to give to the truckers." (KI003)

In addition to the IEC materials, another participant shared that they had been issued branded driver accessories with messages on HIV risk reduction;

"We used to have BCC materials like IEC materials, but they are no longer available. Donors had only given a few previously. That organization also provided us with bags and reflector jackets branded with HIV prevention information, but only 15 of them, so we couldn't give these BCC materials to many truck drivers. I wish they could provide many of them so that we can distribute to more truck drivers." (KI008)

When asked how the print BCC strategies could be enhanced, one participant recommended the following;

"By printing many of those pamphlets, I think many truck drivers can be given them to read." (IDI14)

Iii. Modern Technology/Media-Based BCC Strategies

Participants also stated that they had received certain aspects of BCC messages through modern technology/media devices like flash disks. This is what they had to say;

".. previously, an NGO called 'Terres de Homes' provided flash disks with messages on HIV prevention for truck drivers so that they can play the HIV risk reduction messages while in transit. But they just provided 15, which is very inadequate for all the truck drivers, given their huge population. So if there were more materials, we could enhance the HIV risk reduction messages to reach more drivers." (KI008)

"You know, as you can see, these clearing agents have our phone numbers, sometimes, they will give them to certain agencies, and they send us text messages telling us to use condoms and other examples of HIV prevention messages. But the problem is that many truck drivers delete them without reading what is there." (IDI12)

When asked to recommend what they would recommend concerning modern technology BCC strategies, one participant stated the following;

"…when a text message is incoming on the phone, they will hear or see a notification and read. Yes, so I think that way they can be informed, and they will read and understand what you were telling them. You see, no one ignores text message notifications. They will read, even if they don't complete the whole message, they will have read it to some extent anyway." (KI005)

On the timing of the text messages as a modern BCC strategy, one participant recommended the following;

"I think the best time to read messages is when we are resting and not very busy with our activities. You know it's good to read when you are relaxed. That is the time we find it easy to read the messages. Otherwise, we may receive many other notifications during the day, and when we open the phone to see new messages later, we may not have time to read all of them." (IDI06)

Another participant felt that if more flash disks were made available, then more LDTs could be reached with the audio-recorded risk reduction BCC messages;

"I recommend the provision of similar items like more flash disks, IEC materials, placards, and brochures on HIV prevention among the truck drivers." (KI008)

4.8.2 Theme 2: Healthcare Worker-Driven BCC Strategies

The key informants expressed the role they played in disseminating BCC messages and HIV/AIDS risk reduction among LDTs. Some of their key roles included educating LDTs on condom use, providing condoms during routine HIV testing and STI screening, organizing and participating in 'moonlight' HIV prevention outreaches, and providing medication refills for PrEP and ARTs. This is what some of the key informants had to say;

"Generally, we ensure they (LDTs) get condoms (as you can see, there is a dispenser around the corner there full of condoms); we also share with them health messages, and other key services, not just on HIV prevention, but also other non-serious illnesses." (KI004)

"The clinicians and nurses at the border post sometimes conduct what we call 'moonlight' testing, especially when there are many truckers. The County Aids Coordinator (CASCO) organizes the moonlight testing, and they are tested and given messages. Those who are diagnosed with HIV are initiated on treatment and care, whereas those on ART care can do their refills. They don't need to alight their vehicles." (KI001)

4.8.3 Theme 3: Peer-Educator-Led BCC Strategies

Participants felt that peer educators were central in disseminating BCC messages among LDTs. This was so, especially at the Busia border customs health facility for LDTs. On the contrary, no peer educators were at the Namanga border point. This is what one participant had to say;

> *"Like, they are supporting us in conducting an outreach here this week. They have trained over 60 peer educators, and they will be attending this outreach and others in the past and future. That is why these peer educators are here. They are the ones who are educating the truck drivers on the updates on PrEP and PEP." (KI004)*

A peer educator expressed that they were tasked with the primary responsibility of educating truckers on various HIV/AIDS risk reduction aspects, with emphasis on the most current ones, such as PrEP, though facing limitations in working hours;

> *"Our main responsibility is that of sharing HIV/AIDS risk reduction messages with the truckers, especially when they are waiting for clearance at the customs point. We are currently encouraged to emphasize some of the latest and most effective prevention approaches, like PrEP. However, we do this mostly during the daytime due to a lack of adequate remuneration to work in the odd hours." (KI003)*

4.8.4 Theme 4: Outreach-Based BCC Strategies

Participants highlighted that they had outreaches conducted periodically to reach more LDTs with BCC messages and HIV/AIDS risk reduction services, especially at the Busia border point. Participants stated the following;

> *"My role is that of a mobilizer. I am tasked with talking to the truck drivers when they are around here in Busia so that they can come for our services. Yes, there are a number of us. So whenever a truck stops for clearance here at customs, I talk to the truck driver. I told him that we have some health services*

like HIV testing, condoms, PrEP, and PEP. And then, if they are convinced, they can choose to come. We also do this during outreaches. We normally have outreaches, but we will have one this week. During those activities, we convince truck drivers around here to come and receive our services. We guide them to our HTC counselors, clinicians, and nurses, and then they are given the services they need…" (KI005)

"Sometimes we organize outreaches for HIV preventive services, but still you will find that they (LDTs) don't access them." (KI004)

4.8.5 Theme 5: Non-Governmental Organization-Driven BCC Strategies

Non-governmental organizations were mentioned as key facilitators of BCC strategies targeting LDTs. Participants stated that most of the HIV/AIDS risk reduction services at the Busia border point were mainly supported by NGOs;

"We have an NGO called Impact Research and Development Organization (IRDO), at least it supports us in various ways, like the outreaches they give us the equipment needed for HIV prevention services….but remember IRDO is also supported by the Red Cross organization (Two organizations in collaboration). Yeah, during the outreach, the IRDO compensates in terms of enumeration and also provides drugs and condoms. (KI004)

However, one participant mentioned that one NGO had since ceased to operate at the Namanga border point leaving LDTs with no healthcare facility to address their needs;

"Some years ago, we had an NGO called North Star Alliance. They used to be in a blue container on the other side, but they are no longer around. You know, recently, NGOs have been affected by budget cuts from major donors like USAID. So I think they were affected by that somehow, but I'm not so sure. But I know they are no longer in operation. You know, there are issues with finances and a lack of support from other stakeholders. You know these issues of HIV prevention are mostly supported by NGOs, and here we had only one, and it has since gone. I no longer see them." (KI009)

4.9 Development and Validation of the BCC Intervention Tool for HIV/AIDS Risk Reduction among Long-Distance Truckers

4.9.1 Characteristics of the Panel of Experts Who Participated in the E-Delphi Exercise

A total of 24 experts took part in rounds 1 and 2 of the e-Delphi technique. Most participants were of Kenyan citizenship, 21 (88%), except for one Ugandan and two South Africans. Most of the experts were of female gender 16 (66.67%), were aged between 31-40 years 18 (75%), had a background in Nursing 15 (62.5%), and had a work experience of between 5-10 years 15 (62.5%). Half of the experts worked at various HIV/AIDS service delivery units at the Ministry of Health. A detailed summary of the experts' characteristics is given in Table 4.11.

Table 4.11: Characteristics of the Panel of Experts Involved in Round 1 And 2 of the E-Delphi Exercise

Variable	Category	N=24	Percentage (%)
Age	25-30 years	5	20.83
	31-40 years	18	75
	>40 years	1	4.17
Gender	Male	8	33.33
	Female	16	66.67
Citizenship	Kenyan	21	87.5
	Ugandan	1	4.17
	South-African	2	8.33
Speciality	Nursing	15	62.5
	Medicine	1	4.17
	Clinical Medicine	3	12.5
	Public Health	4	16.67
	Biomedical Labolatory	1	4.17
Highest level of education	Diploma	4	16.67
	Degree	3	12.5
	Master's degree	12	50
	Doctoral fellow	2	8.33
	PhD	1	4.17
	Post-doctoral fellow	2	8.33
Current Employment	MOH	12	50
	Research Institute	8	33.33
	University Lecturer	2	8.33
	Non-Governemnetal Organisation	2	8.33
Years of experience	< 5 years	3	12.5
	5-10 years	15	62.5
	>10 years	6	25

4.9.2 Round 1 of the E-Delphi Exercise

A total of 56 BCC messages were rated by 24 experts in round 1. The BCC messages were spread across various HIV/AIDs risk reduction themes. The themes included sexual behaviours (condom use, sexual partner reduction, and alcohol/substance use), HIV testing, PrEP, PEP, ART care, and STIs. Almost a quarter of the BCC messages were on PrEP, 14(25%), and the least were on HIV testing, 6(10.71%). The BCC messages on HIV testing had the highest level of consensus at 98.61%, followed by STIs at 98.33% and PrEP coming last at 89.58%. In all sections of the BCC messages, at least one item did not meet the set criteria of above 75% consensus, except for HIV testing and STIs. Out of the 56 messages, 6 had a consensus of 75% and below, meaning substantial changes and a second round of validation were needed. Almost all of the other 50 BCC messages were retained in content, except for a few minor grammatical changes. Based on experts' recommendations, an extra item on PrEP was developed and taken for validation in round 2, together with the initial six that had not met the set consensus in round 1. Overall, the consensus was 93.82% in round 1. Furthermore, a Fleiss K' of 0.41, p=0.001 was computed, indicating moderate agreement among the experts in round 1. A summary of the e-Delphi outcome of round 1 is given in Table 4.12.

Table 4.12: Round 1 of the E-Delphi Exercise

Section	No. of Raters	No. of Items	No. of Items >75	No. of Items ≤75	Percentage Agreement (%)	Fleiss' Kappa Statistic
Sexual Behaviours (condom use, sexual partner reduction, and alcohol/substance use)	24	7	6	1	89.88	Items=56; Raters=24; Fleiss' K=0.41; p=0.001
HIV Testing	24	6	6	0	98.61	
Anti-retroviral Treatment (ART) and Care	24	12	11	1	94.79	
Pre-exposure prophylaxis	24	14	11	3	89.58	
Post-exposure prophylaxis	24	7	6	1	94.05	
Sexually Transmitted Infections	24	10	10	0	98.33	
Total	24	56	50	6	93.82	

Supplemental Expert Recommendations in Round 1

Besides rating the individual items, some experts offered their qualitative inputs, which they thought would enhance the validity of the BCC messages. The experts had the following to say;

> *"I don't find this item well structured and clear. "Item no.6; We can reduce the risk of contracting HIV and other STIs by minimizing the number of times we have sexual intercourse as much as possible." I would suggest you add some extra information because the risk is not entirely on the number of times we have sexual intercourse, but on whether you are using condom protection. Someone who has unprotected sexual intercourse just once with an infected person will most likely contract HIV, compared to someone who has protected sex a hundred times using condom protection." (Expert no. 3; Researcher & Lecturer)*

The above item was negatively rated (disagreed) by 15 other experts out of the 24 in round 1, reflecting a critical flaw that needed a major adjustment. In response, the researcher revised this item as follows: "Item no. 6: Did you know that we can reduce the risk of contracting HIV and other STIs by always using condom protection during sexual interaction and reducing our sex partners as much as possible to at most one, at a particular period."

Another expert had the following to say;

> *"When you say "Item no. 16; Those are on ART treatment and care should get their refill from any healthcare facility offering the service early before their drugs run out of stock." I find it confusing. First, the sentence is not clear and lacks a pronoun. Also, this may construe the idea that any other facility can offer ART services when we know not all facilities can do so." (Expert no. 12; NGO (IRDO) based clinician)*

The item highlighted above was also negatively rated by six other experts, hence a significant revision was enacted to read as follows; "Item no. 16: Those who are on

ante-retroviral therapy (ART) treatment and care are advised to get their medication refills from authorized healthcare facilities that offer the ART care and treatment services early before their drugs run out of stock."

For PrEP, several expert opinions reflected the sentiments given by the following experts;

> *"I am not so sure if you used the latest PrEP guidelines when preparing the PrEP-specific messages. Today, there is a distinct way in which men and women take PrEP. Men use event-driven PrEP, which is not for 28 days as it used to be for everyone. Consult the latest guidelines from MOH and get the right messages to avoid misleading your participants." (Expert no. 9; MOH, clinician).*

While the researcher formulated the PrEP messages based on pre-existing guidelines, he was made aware of the most current and updated ones. Therefore, after keenly consulting the latest guidelines, the PrEP items were fully revised, and an extra one was added. The new items were as follows; "Item no. 31; Did you know that an 'event' (sexual act) driven Pre-exposure prophylaxis (ED-PrEP) (where oral PrEP is to be used when an isolated sexual act is anticipated) is recommended for Men who can plan for sex at least two hours in advance or who can delay sex for at least 2 hours? Therefore, you should take the event-driven PrEP two hours before having sexual intercourse with a partner whose HIV status is unknown to you. Newly added item: For Men whose occurrence of sex cannot be predicted and for those whose potential exposures to HIV are more frequent than 2 times per week, such that ED-PrEP would be taken so frequently, then they are advised to change to daily oral PrEP. Item no 32: Did you know that for event-driven Pre-exposure prophylaxis (PrEP), which is suitable for men, you are advised to take two pills between 2 and 24 hours in advance of anticipated sex, then a third pill 24 hours after the first two pills and a fourth pill 48 hours after the first two pills, that is; 2-1-1. Item no. 34: Did you know that before initiation into PrEP, clients with renal and liver disease should receive further clinical and laboratory tests to determine the renal/liver function and extent of disease, if there is any?"

An expert also questioned the correctness of the PEP message, stating that the drug was recommended to be taken for 30 days by stating the following;

> *Check the BCC message of PEP; it is not 30 days, but 28 days. The item is not correct as it is and needs to be revised. (Expert no. 15; MOH, Nurse)*

Based on the experts' opinions, the above items were validated using the e-Delphi technique in round 2.

4.9.3 Round 2 of the E-Delphi Exercise

Round 2 consisted of 7 BCC messages shared with the 24 experts for rating, based on the recommendations of Round 1. All of the BCC messages attained a 100% consensus except for 3, which were 95.8%. Overall, a consensus of 98.21% was achieved in round 2, indicating that a consensus was reached and a third round was unnecessary. Also, a Fleiss' K of 0.62 (p=0.005) was obtained, indicating substantial interrater agreement. A summary of the outcomes of the round 2 e-Delphi exercise is given in Table 4.13

Table 4.13: Round 2 of the E-Delphi Exercise

Section	No. of Raters	No. of Items	No. of Items >75%	No. of Items ≤75%	Percentage Agreement (%)	Fleiss Kappa Statistic
Sexual Behaviours (condom use, sexual partner reduction, and alcohol/substance use)	24	1	1	0	95.83	Items=7; Raters=24; Fleiss' K=0.62; p=0.005
HIV Testing	24	0	N/A	N/A	N/A	
Anti-retroviral Treatment (ART) and Care	24	1	1	0	95.83	
Pre-exposure prophylaxis	24	4 (1 new item added)	4	0	98.96	
Post-exposure prophylaxis	24	1	1	0	100	
Sexually Transmitted Infections	24	0	N/A	N/A	N/A	
Total	24	7	7	0	98.21	

4.9.4 Validated Multi-Component BCC Messages for HIV/AIDS Risk Reduction

A list of the validated multi-componet BCC messages on HIV/AIDS risk reduction targeted for the LDTs is given in the following section. A Swahili version of the same is given in Appendix IX.

Sexual Behaviours (Condom Use, Sexual Partner Reduction, and Substance Use)

1. Condoms provide protection from HIV and other STIs, so remember to use them during sexual intercourse with your partner.
2. You can access condoms for free from healthcare facilities, or at a cost from chemists, pharmacies, and shops. While in Busia, you can access them at the Truck drivers' Health Unit, located at the Busia cross-border customs point, for free.
3. Only use one condom at a time per a sexual act.
4. Negotiate for condom use with your partner to ensure compliance from all parties.

5. Sticking to one faithful sexual partner is an important way to reduce your risk of contracting HIV and other STIs.
6. Did you know that we can reduce the risk of contracting HIV and other STIs by always using condom protection during sexual interaction and reducing our sex partners as much as possible to at most one, at a particular period of time?
7. Having sexual intercourse under the influence of alcohol or other substances and illicit drugs increases our risk of contracting HIV and other STIs.

HIV Testing

8. People at risk of contracting HIV should get tested for HIV at least after every three months to know their HIV status.
9. HIV testing is commonly available in two ways: provider-administered blood-based HIV testing and oral HIV self-testing.
10. You can access provider-administered blood-based HIV testing in public, NGO based and private health facilities.
11. Did you know you can do Oral HIV testing on your own, by following simple pictorial guidelines provided on the oral HIV testing kit?
12. Did you know you can access Oral self HIV testing kits at a cost from many chemists and pharmacies, and for free from most healthcare facilities?
13. You are advised to seek further HIV tests and guidance from a healthcare provider should you turn HIV positive after self-testing with an Oral HIV testing kit. In Busia, you can access services at the truck drivers' Health Unit, located at the Busia cross-border customs point, for free.

Anti-retroviral Treatment (ART) and Care

14. If someone tests HIV positive, he/she is advised to be initiated into anti-retroviral treatment (ART) and care the soonest possible.
15. Those who are HIV positive and on ART treatment and care are advised to be adherent as guided by the healthcare provider.
16. Those who are on ante-retroviral therapy (ART) treatment and care are advised to get their medication refills from authorized healthcare facilities that offer the ART care and treatment services early before their drugs run out of stock.

17. Those who are HIV positive and on treatment are advised to undergo viral load tests in specific intervals as guided by their healthcare providers.
18. Viral load tests help evaluate the adherence levels of the person receiving ART care and treatment.
19. If someone is virally suppressed, it means they have been adherent to ART treatment and care for a given duration of time.
20. People who are virally suppressed have little or no chance of infecting their HIV negative sexual partners.
21. People who are using ART treatment and care may experience some side effects like nausea, vomiting, and kidney problems, among others.
22. People on ART who experience side effects from their treatment are advised to seek the intervention of a healthcare provider.
23. Proper adherence to ART care slows the progression from HIV to AIDS.
24. Proper adherence to ART care helps prevent opportunistic infections.
25. Most ART services are available in public and NGO-based healthcare facilities. In Busia, these services are available at the truck drivers' Health Unit, located at the Busia cross-border customs point, for free.

Pre-Exposure Prophylaxis

26. Pre-exposure prophylaxis (PrEP) is a more recent anti-retroviral drug used to prevent people at risk of HIV from contracting the infection.
27. Pre-exposure prophylaxis is used before a foreseeable risk of exposure to HIV, hence its name.
28. Before initiation to PrEP, one should be tested for HIV.
29. Only people who are HIV negative can use PrEP.
30. When on PrEP one should get tested for HIV regularly to be sure they are HIV negative while using the drug.
31. Did you know that an 'event' (sexual act) driven Pre-exposure prophylaxis (ED-PrEP) (where oral PrEP is to be used when an isolated sexual act is anticipated) is recommended for Men who can plan for sex at least two hours in advance or who can delay sex for at least 2 hours? Therefore, you should take the event

driven PrEP two hours before having sexual intercourse with a partner whose HIV status is unknown to you.

32. For Men whose occurrence of sex cannot be predicted and for those whose potential exposures to HIV are more frequent than 2 times per week, such that ED-PrEP would be taken so frequently, then they are advised to change to daily oral PrEP.
33. Did you know that for event-driven Pre-exposure prophylaxis (PrEP), which is suitable for men, you are advised to take two pills between 2 and 24 hours in advance of anticipated sex; then, a third pill 24 hours after the first two pills and a fourth pill 48 hours after the first two pills, that is; 2-1-1.
34. People using PrEP may experience some short-term side effects like nausea, vomiting, and weight loss, among others.
35. Did you know that before initiation into PrEP, clients with renal and liver disease should receive further clinical and laboratory tests to determine the renal/liver function and extent of disease, if any?
36. PrEP is not a replacement for other HIV preventive methods like condoms.
37. When on PrEP, one should continue to use condoms.
38. One cannot continue taking PrEP when they turn HIV positive.
39. PrEP can only protect you from HIV and not any other sexually transmitted infections.
40. You can access PrEP free of charge at most public and NGO-based healthcare facilities.

Post-Exposure Prophylaxis

41. Post-exposure prophylaxis is an anti-retroviral drug used to protect one from contracting HIV after a potential exposure.
42. PEP is not the same as PrEP.
43. One should be tested for HIV before initiation to PEP.
44. You can only use PEP if you are HIV negative.
45. Did you know that PEP should always be offered as soon as possible, preferably within 72 hours, after an exposure, and is used for 28 days (you are

given PEP medication for all 28 days of treatment at the first visit if tested HIV negative).

46. People using PEP may experience some short-term side effects like nausea, vomiting, and weight loss, among others.
47. You can access PEP at most public and NGO-based healthcare facilities for free. While in Busia, you can access PEP at the truck drivers' Health Unit at the Busia cross-border customs point for free.

Sexually Transmitted Infections

48. A sexually transmitted infection is one that is contracted from unprotected sexual intercourse with someone who is already infected.
49. A burning sensation, irritation and penile discharge are the most common signs and symptoms of a sexually transmitted infection.
50. One may still have a sexually transmitted infection even without any signs and symptoms.
51. Sexually transmitted infections increase the risk of contracting HIV.
52. Over-the-counter medications are discouraged in treating sexually transmitted infections because they may miss treating the accurate infections.
53. One should be screened and diagnosed for a sexually transmitted infection by a healthcare provider in order to receive the right treatment for the correct sexually transmitted infection.
54. Sexual partners of people infected with sexually transmitted infections should also be screened and treated if they are diagnosed with the same sexually transmitted infection (STI) or any other form of STI.
55. One should complete the sexually transmitted infections treatment as guided, even when the signs and symptoms are no longer present.
56. You should avoid having sex when you have an active sexually transmitted infection to avoid contracting other infections, which may complicate the healing process.
57. You can access sexually transmitted infections' screening, diagnosis, and treatment in most public, NGO based, and private healthcare facilities. While

in Busia, you can access these services at the truck drivers' Health Unit, located at the Busia cross-border customs point, for free.

4.10 Outputs of the Mobile Phone-Based Text Messaging (TD_Educator) Platform

Overall, 18,364 SMSs were shared from the TD_Educator platform to the 189 LDTs in the intervention group over 24 weeks (six months), from June to December 2024. Half (9,182) of the SMSs were in English, and the rest were in Swahili. Of the total SMSs shared from the TD_Educator platform, 2,275 were not successfully delivered to the end-user recipient. The reason for this could possibly be because the recipients' phone numbers ceased to be operational, a lack of network range in the location of the end use at the time of sending the SMSs, or the end users had opted out of the TD_Educator platform (given that the platform allowed for opting out). A summary of the BCC SMSs from the TD_Educator platform is given in Table 4.14.

Table 4.14: Summary of the BCC SMSs Shared From the TD_Education Platform

Total No. of SMSs Send from TD_Educator platform to Recipients	Total No. of SMSs delivered to end user recipient	Total No. of SMSs send but not delivered to end user recipient
18,364	16,089	2,275 Reasons:- -Phone number out of service -End user recipient opted out of the TD_Educator messaging service -End user was out of mobile network range

4.11 Loss to Follow Up and Response Rate Post-Intervention

Overall, 65 (17.2%) LDTs were lost to follow-up in both study arms. The loss to loss up was highest in the control group at 38 (20.1%) and lowest in the intervention arm

at 27 (14.3%). Therefore, post-intervention, the response rate was 82.8% for both study arms combined, 79.9% in the control group, and 85.7% in the intervention group.

4.12 Effect of the Behaviour Change Communication Intervention on HIV/AIDS Risk Reduction among the Long-Distance Truckers

4.12.1 A Comparison of the HIV/AIDS Risk Levels at Baseline and Post-Intervention

There were no statistically significant ($\chi2=0.84$, d.f=2, $p=0.657$) differences in the risk levels of HIV/AIDS among LDTs in the control group (Namanga) at baseline and post-intervention. In contrast, on comparing the HIV/AIDS risk levels for the intervention group (Busia), statistically significant ($\chi2=67.07$, d.f = 2, $p<0.001$) differences were observed between baseline and post-intervention. Specifically, a statistically significant increase ($\chi2=72.25$, d.f =1, $p<0.001$) in the proportion of Low HIV/AIDS risk levels (50.62%) was observed post-intervention compared to baseline, where the Low risk level was 11.11%. Conversely, the proportions of Moderate and High risk levels were significantly lower in post-intervention compared to baseline, indicating a shift from high to lower HIV/AIDS risk levels following the BCC intervention. Similarly, comparing the overall risk levels across both study sites, a statistically significant difference ($\chi2=29.50$, d.f=2, $p<0.001$) was observed, with a shift from high to lower risk levels. A summary of the risk levels in the control group (comparing baseline and after six months follow-up), intervention group (comparing baseline and post-intervention), and all sites combined (comparing baseline and post-intervention) is given in Table 4.15. To get a clearer glimpse of the shift in the risk levels, the above results are also visualized using bar and error bar plots in Figures 4.7 and 4.8.

Table 4.15: A Comparison of the Risk Levels of HIV/AIDS among LDTs in Control and Intervention Groups at Baseline and Post-Intervention

Risk level	Intervention (Busia)				Control (Namanga)			
	Baseline N (%)	**Post-intervention N (%)**	**Two proportion Z test (χ2, df, p-value)**	**Pearson's Chi-square test (χ2, df, p-value)**	**Baseline N (%)**	**Post-intervention N (%)**	**Two proportion Z test (χ2, df, p-value)**	**Pearson's Chi-square test (χ2, df, p-value)**
Low (<30%)	21 (11.11)	82 (50.62)	72.25, 1, **<0.001**	67.07, 2, **<0.001**	49 (25.93)	33 (21.85)	0.76, 1, 0.383	0.84, 2, 0.657
Moderate (30-39%)	106 (56.09)	57 (35.19)	29.46, 1, **<0.001**		96 (50.79)	79 (52.32)	0.08, 1, 0.779	
High (≥40%)	62 (32.80)	23 (14.20)	35.79, 1, **<0.001**		44 (23.28)	39 (25.83)	0.30, 1, 0.587	

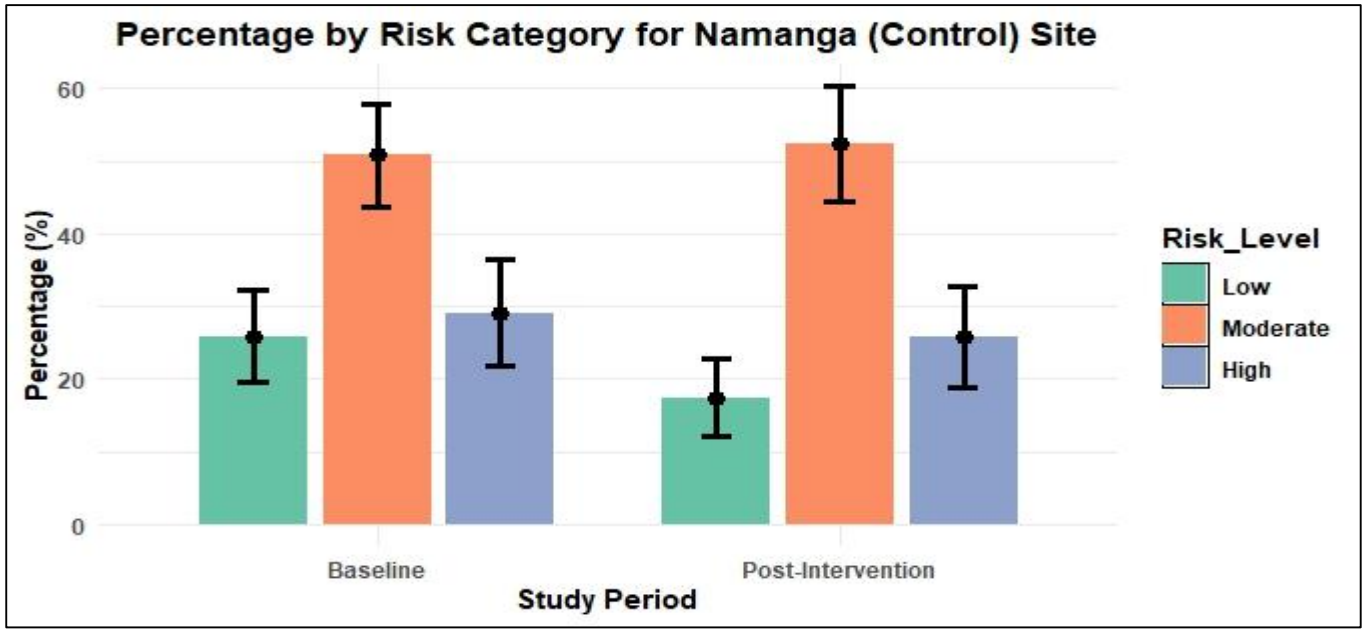

Figure 4.7: Bar Plots and Error Bars Showing the Risk Levels of HIV/AIDS among LDTs in Control Group (Namanga) at Baseline and After Six Months Follow-up

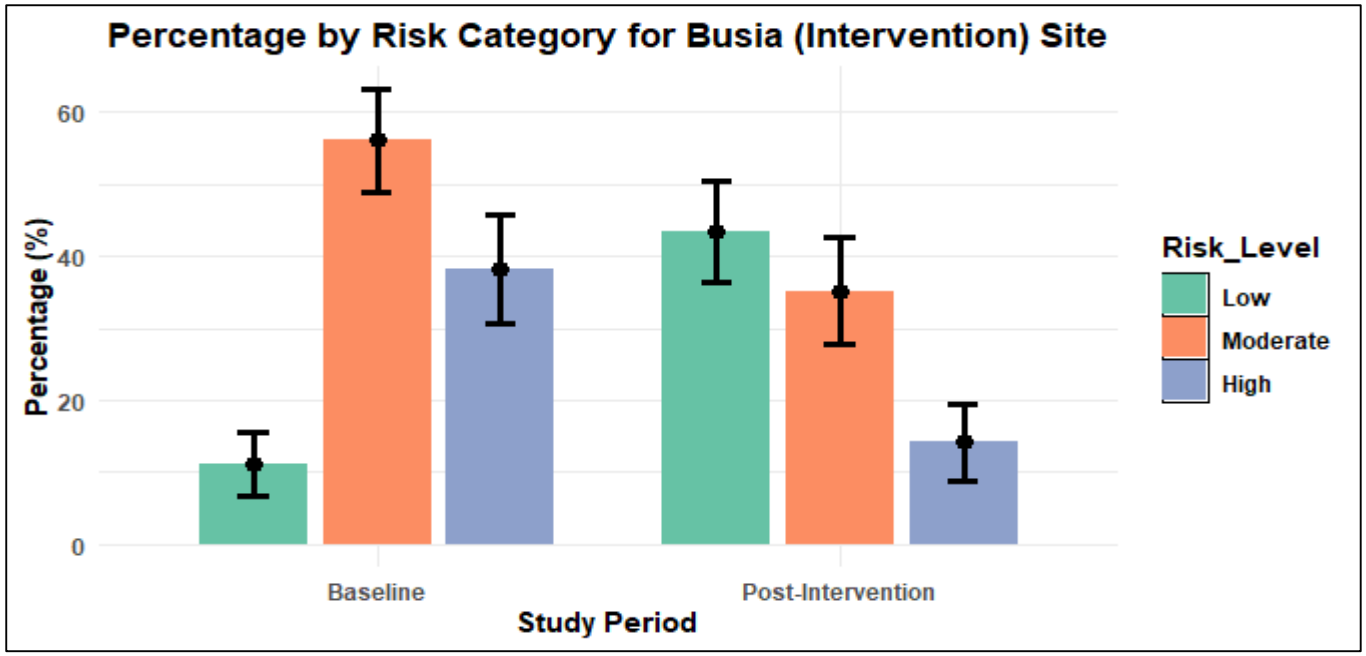

Figure 4.8: Bar Plots and Error Bars Showing the Risk Levels Of HIV/AIDS among LDTs in Intervention Group (Busia) at Baseline and Post-Intervention

4.12.2 Cochran Armitage (CA) Trend Test for Proportions in HIV/AIDS Risk Levels

The Cochran-Armitage trend test examining the trend in HIV/AIDS risk levels (low, moderate, high) across the intervention and control groups post-intervention revealed a statistically significant decreasing trend in HIV/AIDS risk levels in the intervention group compared to the control group ($Z = 4.87$, $p < 0.001$). Specifically, in the control group, 33 (21.85%) participants were at low risk, 79 (52.32%) at moderate risk, and 39 (25.83%) at high risk. In contrast, in the intervention group, a greater proportion of participants were classified as low risk (82, 50.62%), with 57 (35.19%) at moderate risk and 23 (14.20%) at high risk. These findings suggest that the intervention was effective in reducing HIV/AIDS risk levels. A summary of the Cochran Armitage trend test in proportions is given in Table 4.16 and visualized in Figure 4.9 below.

Table 4.16: A Summary of the Cochran Armitage Trend Test For Proportions of HIV/AIDS Risk Levels among LDTs

Study site	Low (<30%)	Moderate (30-39%)	High (≥40%)	CA trend test (Z)	p-value
Control (Namanga)	33 (21.85%)	79 (52.32%)	39 (25.83%)	4.87	**<0.001**
Intervention (Busia)	82 (50.62%)	57 (35.19%)	23 (14.20%)		

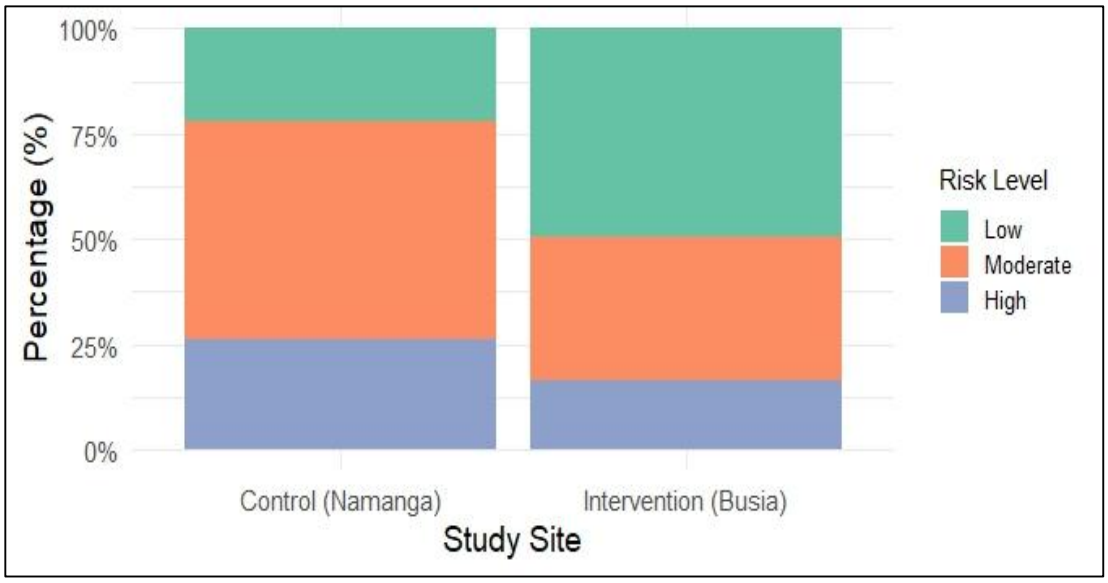

Figure 4.9: A Mosaic Plot Visualizing the Effect of the BCC Intervention Based on the Cochran Armitage Test of Proportions in HIV/AIDS Risk Levels among LDTs

4.12.3 Effect Size of the BCC Intervention on HIV/AIDS Risk Reduction among LDTs

To quantify the effect of the intervention on risk reduction, the Cramér's V results showed a moderate effect of the intervention on HIV/AIDS risk reduction, with Cramér's V = 0.3, indicating a meaningful change in risk levels post-intervention. Moreover, the chi-square test results showed a highly significant association between the intervention and changes in risk levels ($\chi^2 = 28.214$, d.f = 2, $p < 0.001$), supporting the effectiveness of the intervention, Table 4.17.

Table 4.17: A Summary of the BCC Intervention Cramer's V Effect Size on HIV/AIDS Risk Reduction among LDTs

Period	χ^2 (d.f)	p-value	Effect Size (Cramér's V)
Baseline	-	-	-
Post-Intervention	28.214 (2)	<0.001	0.3002

4.12.4 Hypothesis Testing

Step 1: Stating the Null and Alternative Hypotheses

H0: A behaviour change communication intervention has no significant effect on HIV/AIDS risk reduction among long-distance truckers in Kenya.

H1: A behaviour change communication intervention has a significant effect on HIV/AIDS risk reduction among long-distance truckers in Kenya.

Step 2: Computing the Test Statistic

To test the null hypothesis, the Cramér's V test was used to calculate the effect size for ordinal outcomes expressed as proportions, as in the current study. The effect size was computed as indicated in Table 4.17 above.

Step 3: Determining the Effect Sizes and P-Values

A Cramer's V of 0 shows no association (no effect of the BCC intervention on HIV/AIDS risk reduction), ≥ 0.1 small effect, ≥ 0.3 moderate effect, and ≥ 0.5 strong effect. The effect sizes should yield a p-value < 0.05 to indicate that the outcome is statistically significant.

Step 4: Decision Rule

Reject the null hypothesis if the test returns a Cramér's V value above 0, and a p-value <0.05. Fail to reject the null hypothesis if a Cramér's V value of zero is returned with a p-value <0.05.

Step 5: Conclusion

Based on the test results in Table 4.18 (Cramér's V = 0.3, $\chi^2 = 28.214$, d.f. = 2, $p < 0.001$), the effect size of 0.3 indicates a moderate effect of the BCC intervention on HIV/AIDS risk reduction among the LDTs in the intervention group (Busia). Therefore, the null hypothesis that a behaviour change communication intervention

has no significant effect on HIV/AIDS risk reduction among long-distance truckers in Kenya was rejected.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the results presented in the previous section. The results are interpreted, and their implications on community health nursing practice and research elucidated. Moreover, the discussion locates the current study findings within the broader literature on HIV/AIDS among LDTs and other key population groups. A brief highlight of the socio-demographic and socio-economic characteristics of the study participants is presented. The subsequent sections are organized according to the study objectives.

5.2 Socio-Demographic and Socio-Economic Characteristics of Study Participants at Baseline

The mean age of study participants from both intervention and control sites was 37.35 years, comparable to recent studies involving LDTs in Kenya (Kelvin et al., 2018; Mutie et al., 2021a; Romo et al., 2019). The study population was dominated by LDTs of Kenyan (238; 62.96%) and Tanzanian (103; 27.25%) origin. This implies that LDTs from Kenya and Tanzania dominate the trucking industry in Kenya, perhaps reflecting the two countries' strategic roles in regional trade. The LDTs from the intervention site (Busia) spent a slightly longer time, 24.20 (± 21.22) hours, away from their families/spouses than those from the control site (Namanga), who spent 20.43 (± 13.09) hours. This may be explained by the fact that the Busia route involves transiting across more international boundaries, like Uganda, South Sudan, Rwanda, and DRC, than the Namanga route, which mainly involves Tanzania, Burundi, and Zambia. Transiting across multiple international boundaries may lead to prolonged delays due to varying border clearance bureaucracies across countries, according to existing evidence (Gachohi et al., 2020; Mutie et al., 2023). Evidence shows that LDTs who travel longer routes are likely to spend more time resting due to fatigue and exposure

to other trucking career-related stressors (Apostolopoulos et al., 2010; Gysels et al., 2001; Romo et al., 2019).

There was no statistically significant difference in most participants' socio-demographic and socio-economic characteristics at baseline, except for age, years of experience, hours spent on transit, hours spent on rest, and days spent away from family/spouse. The age of LDTs transiting through the intervention site was significantly higher, 41.13 (±9.00) years, compared to those from the control site, 33.58 (±8.48) years. Two schools of thought may partly explain this scenario. First, the two routes (Busia and Namanga) comprised LDTs of distinct countries of origin. On one hand, labour policies may be flexible enough to allow for the rapid advancement of young LDTs in the trucking industry.

On the other hand, age-restrictive labour policies would favor LDTs of advanced age in the trucking career. The second school of thought is that trucking companies operating through the Busia route may have been less willing to employ young, less experienced assistant truckers to navigate the challenging multi-national route from Kenya to DRC, compared to the Namanga route. Indeed, this argument is corroborated by the finding that LDTs from the Busia site had a statistically significant longer experience duration than those from the Namanga site. Studies have concluded that older LDTs may be more valued for their trucking services due to their experience, mental sobriety, and ability to safely deliver services and goods compared to their younger counterparts (Newnam et al., 2020; Pritchard et al., 2023; van Vreden et al., 2022).

Lastly, it is important to note that participants from the two study sites were of diverse nationalities. Here, the Namanga site was dominated by LDTs from Tanzania, whereas those of Kenyan origin dominated the Busia Site. Likely, this trend may partly influence the HIV/AIDS risk levels identified in this study. This is because HIV prevalence levels, associated risk behaviours, and clinical management strategies differ slightly across countries in the region (Leung et al., 2024).

5.3 Risk Levels of HIV/AIDS among Long-Distance Truckers at Baseline

The findings indicate that the risk of HIV/AIDS was slightly higher in the intervention arm as compared to the control site at baseline, though not statistically significant. Several factors may be attributed to the varying HIV/AIDS risk levels in the two study sites. First, it is understood that the intervention site is located along the main Northern corridor route, which is characterized by multiple sexual network locations of high-risk sexual activity between LDTs and FSWs (Mutie et al., 2023). Indeed, such high-risk sexual networks have been attributed to high HIV/AIDS risk levels in the U.S. (Apostolopoulos et al., 2011). Other factors attributable to the high HIV/AIDS risk levels, as evidenced elsewhere, may include inadequate access to HIV/AIDS risk reduction services along the transit routes and an abundance of casual sex workers who may not always observe safe sexual practices along this route (Makhakhe et al., 2017; Mantell et al., 2022; Mutie et al., 2021a). Also, LDTs transiting through multiple nations may have limited eligibility for HIV/AIDS risk reduction services due to varying multinational policies on the same (Mantell et al., 2022). Therefore, the findings call for heightened community health interventions to enhance HIV/AIDS risk reduction among vulnerable LDTs.

Altogether, the variation in HIV/AIDS risk levels between the intervention and the control arm wasn't of a statistically significant margin. This means that the Namanga site may be experiencing closely similar high-risk levels of HIV/AIDS among LDTs. Whereas the literature highlighting the sexual networks along this route is scanty, it may be argued that the nature of HIV/AIDS levels witnessed here is a result of inadequate access to health facilities offering HIV/AIDS risk reduction services to the LDTs. Indeed, the current study's qualitative findings affirm that few or no targeted health facilities for LDTs exist along this route. Evidence has pointed to a lack of tailored HIV prevention services as likely to fuel high-risk levels of HIV among LDTs along this route (Kohli et al., 2017). Other factors attributable to this outcome include the abundance of FSWs, especially at the border points, alcohol consumption, and lack of perceived risk of HIV infection among LDTs along this route (Kohli et al., 2017). Certainly, the lack of HIV prevention interventions has been attributed to potentially

high-risk levels of HIV/AIDS among LDTs in India (Chanda et al., 2020). Thus, LDTs from this route are equally in need of targeted HIV prevention interventions, owing to their substantial risk levels as identified in this study.

On combining both study arms, the findings show that only a paltry 18.52% of the LDTs were in low-risk levels of HIV/AIDS. This implies that a majority of LDTs are at substantial risk of HIV/AIDS from both study arms. These findings are consistent with outcomes from other studies conducted in Iran, India, Mexico, the U.S, Nigeria, and Bangladesh showing that LDTs are at elevated risk of HIV/AIDS compared to the general population (Adeoti et al., 2021; Maarefvand et al., 2016; Pundhir et al., 2021b). A recent systematic review and meta-analysis has shown that the global prevalence of HIV among LDTs is 3.86%, almost six times that of the general population (Mutie, Otieno, Mwangi, et al., 2024). On the contrary, LDTs are at a lower risk of HIV/AIDS compared to other populations elsewhere (Bachmann et al., 2018; Jabbari et al., 2010; Li et al., 2010; Pinho et al., 2011).

It is worth noting that the HIV/AIDS risk levels identified in this study are not actual HIV infections among the LDTs involved. Nevertheless, these outcomes are based on the DHRS tool for HIV risk assessment used in this study (Haukoos et al., 2015, 2021). The DHRS tool has been proven reliable in accurately identifying undiagnosed HIV-infected people, enabling successful linkage to care and treatment (Haukoos et al., 2015, 2021). Indeed, this approach has previously enabled targeted HIV screening, which is cost-effective on scarce HIV preventive resources (Haukoos et al., 2021). Therefore, whereas these findings do not identify the HIV positives at a glance, they can guide key healthcare stakeholders in identifying LDTs who would need further diagnostic tests and perhaps linkage into care and treatment. Given the constant mobility of LDTs, which has been implicated in the spread of HIV across the region, the current study findings would go a long way in preventing further transmissions to other populations who frequently come into contact with them, not forgetting their spouse (Bahemuka et al., 2023; Camlin & Charlebois, 2019).

5.4 Predictors of the HIV/AIDS Risk Levels among Long-Distance Truckers

The study identified age as one of the predictors of HIV/AIDS risk among LDTs. Here, the risk of HIV/AIDS decreased as the age of LDTs increased. This may partly be explained by the fact that, as men age, their sexual drive tends to decline (Steckenrider, 2023). Thus, with reduced sexual activity, the exposure rates to risky sexual interactions also tend to go down. Expectedly, with reduced sexual interactions, older LDTs would find themselves at reduced HIV/AIDS risk levels, given the understanding that HIV infections predominantly occur through heterosexual interactions (Steckenrider, 2023). Indeed, a lower frequency of sexual interactions among older LDTs, as compared to their younger counterparts, has been reported in a previous study involving a closely similar population (Mutie et al., 2021a). The findings are consistent with those reported in another study conducted in Kenya, which found that the risk of HIV/AIDS is lower among older LDTs compared to their younger counterparts (Rakwar et al., 1999). The findings call for enhanced HIV/AIDS prevention interventions targeted at younger LDTs in the region.

It was established that the risk of HIV/AIDS was lower among LDTs who had attained a University/College level of education compared to those who had a Primary level of education. Here, it would be correctly argued that advanced educational status is a protective factor against the risk of HIV/AIDS. Indeed, this school of thought is cemented by existing literature (Pettifor et al., 2008). Understandably, as one ascends the ladder of education, chances are they will gain more information on diverse ways of HIV/AIDS prevention and thus reduce risk. Similar findings have been reported among LDTs from Mozambique (Botão et al., 2016). This outcome highlights the need for advancing HIV/AIDS risk reduction interventions among LDTs with lower levels of education.

Spending longer durations away from a spouse or regular sexual partner was established as a significant predictor of HIV/AIDS risk. Sex is classified as a need for sexually active people (Liu et al., 2016). Understandably, LDTs frequently travel distances far away from their regular partners or spouses (Makhakhe et al., 2017). Their stopover locations are mainly characterized by an abundance of FSWs whose

risk of HIV is high (Mutie et al., 2023). In such situations, LDTs' options for their sexual needs are narrowed down to the FSWs (Makhakhe et al., 2017; Matovu & Ssebadduka, 2012). Indeed, evidence shows that LDTs constitute most of FSWs' clientele along major transit routes (Makhakhe et al., 2017; Mutie et al., 2023). Thus, prolonged durations of LDTs on transit create more opportunities for their sexual interaction with FSWs. The result is elevated HIV/AIDS risk levels. The findings are similar to those of other studies conducted in India, South Africa, Mozambique, and Guinea that established a dose-response relationship regarding duration spent on transit and HIV/AIDS risk among LDTs (Botão et al., 2016; Delany-Moretlwe et al., 2014; Diallo et al., 2011; Pandey et al., 2008; Singh & Joshi, 2012). On the contrary, a study conducted in Iran established no link between spending longer durations on transit and HIV/AIDS risk among LDTs (Maarefvand et al., 2016).

Earning a salary of 15,000-30000 KSH and above 30000 KSH was protective for HIV/AIDS risk among LDTs in this study. Higher income levels have been associated with decreased HIV/AIDS risk (Leung Soo et al., 2023). However, evidence suggests that high income levels may mean high sexual risk-taking and, thus, high HIV/AIDS risk (Andrus et al., 2021). Nonetheless, high income levels would possibly mean that the LDTs can easily afford HIV/AIDS risk reduction services and thus lower risk levels. Therefore, there is a need to create more sensitization among trucking companies on the need for enhanced LDTs' wages so that they can easily afford HIV/AIDS risk reduction services when in transit.

5.5 Barriers to HIV/AIDS Risk Reduction among Long-Distance Truckers

The participants in this study highlighted several pertinent issues that they felt were key barriers to HIV/AIDS risk reduction among LDTs using the Northern Corridor highway. These factors fall into themes ranging from the health system and trucking career to individual barriers. Some themes are common to the general population, whereas others are unique to the LDTs' trucking career.

In regard to health system barriers, participants stated that distance to health facilities, hospital operation hours, lack of or insufficient targeted healthcare facilities,

inadequate staff, and inadequate space/infrastructure are the main factors that largely inhibit smooth access to HIV/AIDS risk reduction services among LDTs. Generally, limited access to essential healthcare services, including HIV/AIDS risk reduction services among LDTs, is often attributed to their constant mobility when in transit (Lalla-Edward et al., 2016). Due to changing socio-economic dynamics and the emergence of new trading blocs in the region, new highways far from traditional healthcare facilities have arisen (de Vries et al., 2013). Indeed, other studies have concluded that the location of healthcare facilities far away from highways may adversely affect LDTs' access to healthcare services (Lalla-Edward et al., 2016, 2017, 2019). To address this problem, several NGOs have made efforts to locate targeted healthcare facilities closer to highways to facilitate access to LDTs (de Vries et al., 2013). However, as alluded to by the participants in the current study, only a handful of targeted healthcare facilities for LDTs' HIV/AIDS risk reduction exist along the Northern Corridor highway. More precisely, targeting healthcare services for LDTs may mean ensuring that hospital operating hours align with LDTs' time of rest, building healthcare facilities at major highway stopovers, and at international border points where LDTs spend considerable time awaiting clearance or routine maintenance for their trucks (Lalla-Edward et al., 2016). The findings also demonstrate the need for healthcare providers to be flexible, such that their hospital operating hours accommodates LDTs' unusual timing for seeking HIV/AIDS risk reduction services in late hours of the night. Consistent to this study, a recent study involving LDTs from Kenya and other East African countries has established similar health system barriers (Mantell et al., 2022). Closely similar findings have been documented in studies conducted in Mozambique, Togo, Tanzania, and South Africa (Botão et al., 2016; Kohli et al., 2017; Lalla-Edward et al., 2017; Yaya et al., 2016). From a global perspective, studies have equally documented health system barriers as likely to adversely affect LDTs' access to HIV/AIDS risk reduction services (Apostolopoulos et al., 2010; Chanda et al., 2020; Solomon et al., 2004; van Vreden et al., 2022). For policymakers, the health barriers highlighted here should be a wake-up call to advocate for more HIV/AIDS risk reduction services along the Northern Corridor highway, not only for LDTs but also for their close sexual network counterparts like FSWs.

Tight work schedules, delays, and unfavorable long-distance trucking policies were the key factors specific to trucking career-related barriers to HIV/AIDS risk reduction. Notably, LDTs in East Africa, as in other global settings, primarily transport valuable goods for import or export. As such, LDTs find themselves working under very strict schedules with high demands to meet set deadlines; failure to do so may result in penalties such as salary cuts or even dismissal from their jobs. Therefore, for their job security, LDTs hardly find time to access routine HIV/AIDS risk reduction services like HIV testing (Adeoti et al., 2021; Kelvin et al., 2019; Kelvin & Akasreku, 2020; Mantell et al., 2022). This study documented delays along transit routes due to mechanical breakdowns and complex bureaucratic clearance systems at international borders, findings similar to those of other studies (Gachohi et al., 2020; Kohli et al., 2017). In Zambia, LDTs claimed that owing to strict and tight work schedules, they couldn't access their routine health check-ups, including HIV screening (Michalopoulos et al., 2016).

Moreover, participants alluded to the lack of policies that favor LDTs, like being allowed to travel with regular sexual partners and varying eligibility for HIV/AIDS risk reduction from foreign countries. In such a scenario, LDTs would resort to having multiple sexual partners along the highways to meet their sexual needs, further elevating their risk of HIV infection as documented in other studies (Makhakhe et al., 2017; Matovu & Ssebadduka, 2013; Mutie et al., 2023; Podhisita et al., 1996). Equally important, evidence has shown that LDTs may miss clinic appointments for ART refill or routine HIV/AIDS screening when they find themselves in foreign countries where they have limited eligibility to access healthcare services from local facilities (Mantell et al., 2022). Nonetheless, the emergence of NGO-based health facilities, such as IRDO and North Star Alliance, specifically targeting LDTs, has somewhat alleviated this problem in the region, though to a limited extent (IRDO, 2024; Kelvin et al., 2019; Kelvin & Akasreku, 2020).

Self-diagnosis, self-medication with over-the-counter drugs, and frequent stockouts were the factors around the individual barriers theme. It is important to note that these factors are not unique to LDTs but may cut across a wider range of other populations,

especially in resource-limited settings. Therefore, these findings suggest the need for healthcare stakeholders to sensitize LDTs against self-diagnosis and self-medication practices, especially with STI infections. By doing so, LDTs should always be guided to seek screening for their illnesses from qualified healthcare personnel stationed in healthcare facilities with the right equipment to ensure accurate diagnosis and treatment. Consistent with the findings from this study, LDTs in Pakistan have previously reported difficulties accessing timely STI screening and, in turn, resorting to self-diagnosis and medication (Ishtiaq et al., 2017). A study done in Kenya established that LDTs had the potential to seek the right screening and treatment if offered a comprehensive package of HIV/AIDS risk reduction services (Kelvin et al., 2019). Another study targeting LDTs in Kenya also concluded that offering free HIV/AIDS risk reduction services at highway wellness centers was likely to improve their uptake. Therefore, key healthcare stakeholders have an important role to play in reducing self-medication and over-the-counter drugs among LDTs in this setting. As alluded by the participants in this study, inadequate or frequent stockout of STI drugs, ARTs, and risk reduction commodities like condoms and HIV test kits is a problem not so strange among LDTs as reported from studies done in Mozambique, the U.S, South Africa, and Pakistan (Botão et al., 2016; Ishtiaq et al., 2017; Lalla-Edward et al., 2017; Ramjee & Gouws, 2002).

In regard to individual barriers, participants highlighted a lack of knowledge or being unaware of the existence of HIV/AIDS prevention practices like PrEP, seeking the services of FSWs, stigma, and lack of personal health insurance cover as the key impediments to risk reduction among LDTs. Poor knowledge and poor risk perception of HIV among the LDTs have been shown to make LDTs reluctant to seek HIV/AIDS risk reduction services, as well as making them indulge in risky sexual behaviours (García et al., 2017; Ijeoma et al., 2018; Matovu & Ssebadduka, 2013). For instance, an estimated 97.5% and 95.6% of LDTs involved in a study in India knew of HIV/AIDs and condom use as the appropriate means of transmission. However, the same LDTs still exhibited unsafe sexual practices (Singh & Joshi, 2012). While 93.4% of LDTs involved in a study in Peru knew about STIs, they couldn't recognize associated signs and symptoms (García et al., 2017).

Notably, LDTs still have unsafe sexual practices despite a clear indication that they are knowledgeable about HIV and associated means of transmission. Equally important, poor PrEP knowledge has led to sub-optimal uptake among most at-risk populations, such as FSWs in South Africa (Makhakhe et al., 2022). The abundance of FSWs readily available for LDTs along transit routes has been widely cited as a key driver of STI and HIV transmission (Gysels et al., 2001; Makhakhe et al., 2017; Matovu & Ssebadduka, 2012; Mutie et al., 2021a, 2023; Ramjee & Gouws, 2002). Strangely, when the LDTs are detached from their families and community-specific social norms, they find themselves less restrained from rampantly engaging FSWs for commercial sex (Dobra et al., 2017; Makhakhe et al., 2017). The findings demonstrating stigma against PrEP due to its packaging, as with ARVs, are similar to those of a study in South Africa, where FSWs declined to use PrEP for similar reasons (Makhakhe et al., 2022). In Kenya, HIV/AIDS-related stigma among LDTs has been linked to their indulgence in risky sexual behaviours (Romo et al., 2019). As highlighted in this study, lack of healthcare insurance has been reported as a barrier to HIV/AIDS risk reduction among LDTs in New Mexico (McCree et al., 2010).

5.6 Behaviour Change Communication Strategies Targeting Long-Distance Truckers to Promote HIV/AIDS Risk Reduction

The study established various existing BCC strategies targeting LDTs along the Northern Corridor highway. The BCC strategies were media-based, healthcare worker-driven, peer educator-led, outreach-based, or NGO driven. While a few of these strategies were not unique to LDTs, most of them were tailored to address various aspects of HIV/AIDS risk reduction among them.

Participants highlighted Media-based BCC strategies most among the themes in this category. Here, sub-themes included broadcast media-based BCC strategies, print media-based BCC strategies, and modern technology/media-based BCC strategies. Broadcast media-based BCC strategies are predominantly channelled through radio or television. In this study, participants disclosed having received certain messages advocating for HIV preventive practices like condom use through the radio when in transit. While messages shared through radio channels can reach a wide audience, it

may not be easy to tailor them to specific groups, given the diverse audience. The LDTs in this study disclosed that, whereas they benefited from such messages, they were not the primary target audience. This suggests the need for healthcare stakeholders to look for ways in which they can develop mini radio programmes that target LDTs with HIV/AIDS risk reduction. At Mexico's Southern Border, a BCC strategy provided two-way radios to exchange information in the air among other LDTs on HIV prevention (Bronfman et al., 2002). Here, the radio conversations triggered deep conversations on various HIV prevention domains like the use of condoms and the reduction in the number of sexual partners. As a result, the program highlighted existing discrepancies in the knowledge of HIV among the LDTs, calling for a long-term intervention to instil the correct HIV risk reduction (Bronfman et al., 2002). This reveals the potential that such programmes possess in enhancing HIV/AIDS risk reduction among LDTs. Print media-based BCC strategies like the use of IEC materials, pamphlets, and other documented materials have been widely used to enhance HIV/AIDS risk reduction among LDTs in Mexico, Brazil, Morocco, Kenya, and Nigeria (Bronfman et al., 2002; Chinaglia et al., 2007; Himmich et al., 2015; Jackson et al., 1997; Olugbenga-Bello et al., 2011). Equally important, as mentioned in this study, modern technology, such as text-based messages, has been widely adopted and has been shown to successfully enhance LDTs' HIV/AIDS risk reduction in Kenya, Zimbabwe, Mozambique, and South Africa (Govender et al., 2019; Kelvin et al., 2019). Contrary to text-based BCC strategies highlighted here, a study in India utilized phone calls to enhance HIV/AIDS risk reduction among LDTs (Snyder et al., 2012). This suggests the need to embrace technology based platforms like text-based interventions in enhancing HIV/AIDS risk reduction given that almost every one including LDTs owns a phone in modern day world.

The second most prominent theme in this category was NGO-driven BCC strategies. Given the unique nature of the Long-distance trucking career, LDTs are mostly underserved by the mainstream healthcare facilities (Botão et al., 2016; Ijeoma et al., 2018; Lalla-Edward et al., 2016; Solomon et al., 2004). To bridge this gap, NGO-driven health facilities have been established at major stopover locations and international border points along the main LDTs' transit corridors (IRDO, 2024;

Kelvin et al., 2018, 2019; Kelvin & Akasreku, 2020). The NGO-driven programmes are mostly donor-funded and offer a range of HIV/AIDS risk-reduction services, including HIV testing, PrEP and PEP, ART care and follow-up, among others (Kelvin et al., 2018, 2019; Kelvin & Akasreku, 2020; Romo et al., 2019). For instance, North Star Alliance is in major highway corridors in South Africa, Zimbabwe, Zambia, Tanzania, and Kenya (Lalla-Edward et al., 2016). However, even with the presence of these NGOs, LDTs continue to face limited access to HIV/AIDS risk reduction, especially in recent years when donor funding has been significantly downsized from key funders like USAID (UNAIDS, 2023, 2024). Indeed, one of the key informants disclosed that a health unit for LDTs operated by North Star Alliance in Namanga had since been closed down owing to a lack of funding. Here, we note the central role the NGO-driven health facilities play in enhancing HIV/AIDS risk reduction in vulnerable populations like LDTs. Therefore, there is a need for governmental organizations like UNAIDS to advocate for more funding for these NGOs so that they can continue executing their HIV/AIDS prevention without facing financial obstacles.

Participants mentioned that outreach-driven BCC strategies were very instrumental in carrying forward HIV/AIDS risk reduction services for LDTs. It was stated that outreaches were often organized to align with LDTs' schedules, especially when they were able to access them efficiently. For instance, two key informants mentioned that they carried out what was dubbed '*moonlight*' HIV testing days. Here, the word '*moonlight*' connotes nighttime hours when such outreaches were held. This is perhaps an indication of efforts to align HIV/AIDS risk reduction services with LDTs' work schedules. Similarly, outreach programs have been used to disseminate HIV/AIDS risk-reduction services in India, Morocco, and Brazil (Chinaglia et al., 2007; Himmich et al., 2015; Juneja et al., 2013; Pandey et al., 2011).

It is worth noting the role of healthcare workers in HIV/AIDS risk reduction among LDTs. Indeed, participants recognized the important roles that healthcare workers, such as nurses, clinicians, pharmacists, and counsellors, play. These roles ranged from mobilization, STI screening and treatment, initiation to PrEP and PEP, HIV testing, to ART linkage and care. Other studies have similarly documented the role of healthcare

workers in HIV/AIDS prevention among LDTs (Chinaglia et al., 2007; Lau & Tsui, 2012; Pandey et al., 2011; Snyder et al., 2012).

The discussion of BCC strategies targeted for LDTs cannot be concluded without mentioning peer educators. Participants in this study highlighted the role peer educators play in enhancing HIV/AIDS risk reduction among LDTs. Peer educators are LDTs who are given some basic health training, mostly by NGOs, to spread risk reduction messages and other non-technical services like condom distribution to their peers. The peer educator approach has been used widely to enhance HIV/AIDS prevention among LDTs in Tanzania, India, and Malawi (Juneja et al., 2013; Laukamm-Josten et al., 2000; Pandey et al., 2011; Rao et al., 2013; Walden, 1999). The findings suggest the need to embrace LDTs as peer educators to champion other BCC prevention strategies, as they are more acceptable to their peers.

5.7 Development and Validation of the BCC Intervention Tool for Long-Distance Truckers

Generally, 57 items on HIV/AIDS risk reduction were rated, achieving consensus at or above the set threshold of 75%. Additionally, the expert qualitative input was critical in enhancing the content of the risk-reduction text messages. This outcome indicates that the intervention's content is valid based on expert judgment. Furthermore, this is evidence that the intervention package was relevant in addressing key HIV/AIDS risk reduction areas to the target population. Notably, the intervention aligns with the recent UNAIDS call to reach vulnerable and hard-to-reach populations with more current, up-to-date risk-reduction messages (UNAIDS, 2024). The goal is to promote optimal uptake of HIV/AIDS risk reduction services such as PrEP among LDTs

The choice of an electronic platform for the e-Delphi exercise is understood to enhance efficiency. The rapid growth of internet use among healthcare professionals in recent years is understood to have popularised electronic platforms for information sharing, such as emails (Shinners et al., 2021). As a result, this approach may have enhanced the exercise's efficiency while enabling multidimensional input from experts with

diverse backgrounds. Indeed, the validation exercise attracted 24 multinational experts with distinct backgrounds in various health disciplines. Agreeably, this is a considerable level of multi-disciplinary inclusivity of experts. Evidence shows that multi-disciplinary inclusivity is critical in e-Delphi exercises (Shinners et al., 2021; Somefun et al., 2024). Arguably, this level of inclusivity shows that the issues addressed in the intervention are of priority importance in promoting HIV/AIDS risk reduction among LDTs. As such, the intervention can be adopted to enhance HIV/AIDS risk reduction across diverse populations of LDTs in the region.

The experts held varied consensus levels across different categories of the HIV/AIDS risk reduction items. For instance, the highest consensus levels were on HIV testing items at 98.61% and the lowest on PrEP items at 89.58% in round one. Understandably, the phase at which peers acquire current updates on HIV/AIDS risk reduction may vary, depending on one's level of education and profession, among many other factors. It can be argued that evidence on HIV testing may not be rapidly evolving as compared to the more recent PrEP (WHO, 2025). Since the introduction of PrEP, more updates have emerged. This assertion is corroborated by the opinions of specific experts, who advised the researcher to consult more current guidelines on PrEP. Agreeably, while the researcher had used the pre-existing guidelines when developing the formative text messages, more updates were already in place barely two months before the validation exercise began. As a result, experts may achieve considerably lower consensus levels in the more rapidly evolving areas, such as PrEP, than in HIV testing (Somefun et al., 2024; Wan Mohamad Darani et al., 2024). Also, given this outcome, we opine on the need for regular updates to this intervention, as the evidence is expected to grow and evolve further (Somefun et al., 2024). Equally important, similar updates are also needed for healthcare providers to keep them in touch with the current evidence on HIV/AIDS risk reduction.

The experts found it convincing to have more HIV/AIDS risk reduction items in certain areas, such as PrEP. The use of PrEP in the prevention of HIV infections is a fairly new area. While this approach has proven success rates of almost 100%, much about it remains unknown among vulnerable populations such as LDTs (Makhakhe et al., 2022; Mantell et al., 2022). Therefore, the researcher developed most of the PrEP

items under the assumption that LDTs had no pre-existing knowledge in that area. Indeed, one expert recommended adding an extra item to the PrEP category, highlighting the emphasis placed on those items.

The experts' agreement on packaging the intervention as a short message service (SMS) delivered via mobile phone platforms underscores its relevance as the most suitable mode of delivery for hard-to-reach LDTs (Mantell et al., 2022; Michalopoulos et al., 2018). The choice of the mobile platform was also informed by feedback from LDTs during the formative qualitative phase of a larger study, indicating it as their preferred mode of delivery. Mobile phone platforms have proven efficient in remotely reaching hard-to-reach populations such as LDTs with HIV/AIDS risk reduction messages (Conserve et al., 2017; Mantell et al., 2022). Furthermore, mobile phone platforms are known to enhance confidentiality and privacy on HIV/AIDS risk reduction messages among hard-to-reach populations while at the same time creating demand for existing services such as PrEP, PEP, and HIV testing, among many others. Eventually, these efforts will contribute to the collective UNAIDS goal of ending new HIV infections and AIDS by 2030.

5.8 Effect of the Behaviour Change Communication Intervention on HIV/AIDS Risk Reduction among the Long-Distance Truckers

A novel mobile phone text-based BCC intervention anchored on the information, motivational, and behavioural skills (IMB) model was implemented, aiming to enhance HIV/AIDS risk reduction among LDTs in Kenya. Overall, the findings reveal that the intervention significantly lowered HIV/AIDS risk levels in the intervention group ($\chi2=67.07$, d.f = 2, $p<0.001$) over the 24 weeks (six months) follow up, compared to the control group ($\chi2=0.84$, d.f=2, $p=0.657$), albeit with a moderate effect (Cramer's $V=0.3$, $\chi^2 = 28.214$, d.f = 2, $p < 0.001$). As such, the findings reaffirm mobile phone-based BCC interventions as a promising platform through which hard-to-reach populations such as LDTs can be remotely reached with positive HIV/AIDS risk reduction outcomes (Govender et al., 2019; Kelvin et al., 2019).

The significant reduction in HIV/AIDS risk levels in the intervention group is a suggestion that the text-based BCC intervention influenced behaviour change over time. Arguably, it is likely that the regular exposure to the BCC text messages prompted the LDTs in the intervention group to practice safer sexual behaviour, such as sexual partner reduction and enhanced condom use. Furthermore, regular exposure to the BCC messages may have played a role in removing stigma barriers associated with the uptake of HIV risk reduction services like HIV testing, thus creating an enabling environment for LDTs to go for such services, consistent with a closely similar study done in South Africa (Govender et al., 2019). Thus, the findings add weight to the recent UNAIDS call for enhanced technology-based interventions to reach more hard-to-reach populations such as LDTs (UNAIDS, 2024).

More precisely, the intervention's success can partly be attributed to its foundation in the IMB model, which emphasizes the interplay among information, motivation, and behavioural skills. By delivering up-to-date, targeted, and structured SMSs, the intervention addressed information/knowledge gaps, reinforced motivation for safer practices like consistent condom use, and enhanced behavioural skills necessary for risk reduction, like PrEP use, HIV testing, and sexual partner reduction, thus enhancing HIV/AIDS risk reduction post-intervention. These findings align with another study that demonstrated the effectiveness of an IMB-anchored intervention in promoting HIV/AIDS risk reduction outcomes like enhanced condom use among LDTs in India (Cornman et al., 2007). However, another study anchored on the same IMB model did not affect the intervention outcomes owing to high loss-to-follow-up rates (Schneider et al., 2009). Understandably, high-to-loss follow-up may affect the internal validity of interventional studies and render them ineffective (Dettori, 2011; Fewtrell et al., 2008). However, while the current study was expected to have a considerable loss to follow-up, it was still within (17.2%) the allowable minimum of 20% (Dettori, 2011; Fewtrell et al., 2008). Therefore, it is believed that the loss to follow-up reported here didn’t adversely affect the study’s internal validity.

The moderate effect size (Cramer’s V=0.3) identified in this study highlights a meaningful, albeit not large, effect of the BCC intervention on enhancing HIV/AIDS risk reduction among LDTs in the intervention group. This outcome is expected in a

real-world scenario where multiple other contextual factors may affect behaviour change interventions. Several factors are likely to explain the intervention's moderate effect in this study. First, given the extremely busy schedules of the LDTs, they may have received the text messages variedly owing to network changes, exhaustion, or even a lack of time to go through them. Second, the TD_Educator messaging, like other text-messaging platforms, had character limits, making it challenging to have the SMSs comprehensive enough, especially in certain areas fairly new to LDTs, like PrEP. Consistently, a study by Kelvin et al. (2019) leveraging text reminders to enhance HIV testing faced a similar challenge: limited characters in their SMSs, which affected its overall effect. Approaches integrating text messaging and elaborative video-supported animations for HIV/AIDS risk reduction have been recommended (Kelvin et al., 2019). Moreover, other interventions targeting LDTs have failed to register a significant effect on reducing sexual behaviours (Govender et al., 2019). Briefly, while the intervention by Governder et al. (2019) improved HIV testing, it didn't have any effect on risky sexual behaviour reduction among the LDTs, mainly due to inconsistencies in sampling and failure to aggregate outcomes from those of other populations involved, such as FSWs.

Additionally, barriers unique to LDTs' trucking career, such as tight work schedules, high-risk sexual networks, and limited access to HIV/AIDS risk reduction services, may have moderated the overall effectiveness of the intervention (Kohli et al., 2017; Makhakhe et al., 2017; Matovu & Ssebadduka, 2013). Closely similar to the current study, the study by Kelvin et al. (2019) achieved a proximally moderate effect size of 2.7 on one of the HIV/AIDS risk reduction domains (HIV testing). However, the study by Governder et al. (2019) had a small effect size of 1.71 on the same HIV/AIDS risk reduction domain of HIV testing.

5.9 Study Limitations

Several limitations should be considered when interpreting the current study's findings. First, the risk of contamination is high in educational interventions (Howe et al., 2007; Keogh-Brown et al., 2007). Here, contamination occurs when the intervention intended for the treatment group is also received by some control group members

(Howe et al., 2007). Geographical, socio-economic, and professional factors are understood to be key facilitators of contamination (Howe et al., 2007). Ultimately, contamination may reduce the magnitude of the study's estimated effect, rendering the intervention non-statistically significant (Howe et al., 2007). Therefore, given the socio-economic characteristics and nature of the trucking career, which enable geographical overlap among the LDTs, there is a likelihood of contamination by the BCC intervention in this study. As such, the researcher allocated geographically diverse control (Namanga) and intervention (Busia) arms to minimise contamination. Given the geographical diversity of the two NCH routes through Namanga and Busia, it was envisaged that the likelihood of interaction between LDTs across the two study arms was very low. Thus, the chances of contamination were low. Moreover, LDTs in the intervention group were sensitized against sharing the contents of the BCC intervention with others. Besides, single blinding was used to mask the LDTs in the treatment group from being aware that they were the only ones receiving the intervention and not their counterparts in the control group.

The study's two-site design may have led to information specific to other sites being missed, especially in the qualitative arm. It is also likely that information gathered from other personnel who interact with LDTs at different levels, such as at the employer level, was missed. However, given the UNAIDS call for heightened HIV/AIDS research on most at-risk populations such as LDTs, the current findings on the existing barriers are instrumental in informing targeted interventions.

The reliance on self-reporting may have introduced social desirability bias, thus affecting the risk scores reported here. Nonetheless, this was mitigated by creating risk scores from an interplay of behavioural skills and knowledge outcomes. Given the longitudinal study, recall bias may also have affected the risk scores. To mitigate recall bias, the post-intervention evaluation was conducted soon after the intervention, when participants were still aware of the intervention's contents and practices. Lastly, the current study didn’t have a comprehensive linkage mechanism for the LDTs to a wider range of targeted facilities offering HIV/AIDS risk reduction services, owing to the limited nature of such facilities along the NCH. However, the LDTs were strongly

encouraged to seek such services in the available facilities, such as the Busia International border point health unit.

Lastly, given the constantly evolving evidence on specific aspects of HIV prevention, such as PrEP, the validity of the intervention tool may weaken over time, needing extensive revisions in the future.

5.10 Conclusions

- Only a paltry 18.52% of LDTs involved in this study at baseline were at low-risk levels of HIV/AIDS. Therefore, it is accurate to conclude that a significant proportion (above 80%) of LDTs in Kenya are at substantial HIV/AIDS risk levels. There are no statistically significant differences in the risk levels of HIV/AIDS between the LDTs from Namanga and Busia in Kenya. Therefore, LDTs from both study sites are equally in need of enhanced HIV/AIDS risk reduction interventions.
- Age, spending longer durations on transit, education level (college/university), and income (15000-30000 K.Shs and 30000 K.Shs and above) are predictors of HIV/AIDS risk levels among LDTs in Kenya.
- Despite LDTs in Kenya being a hard-to-reach and most-at-risk group, they are still faced with a wide range of barriers to HIV/AIDS risk reduction. The barriers range from the health system and career-related trucking to biomedical and individual factors. Therefore, there is a need to create more targeted interventions to eliminate the barriers to HIV/AIDS risk reduction among the LDTs.
- A variety of BCC strategies exist to enhance HIV/AIDS risk reduction among LDTs in Kenya. These include media-based, healthcare worker-driven, NGO-driven, peer educator-based, and outreach-based BCC strategies. It is worth noting that most of these BCC strategies may be limited to specific locations, such as international border crossings and major highway rest areas. Consequently, not all LDTs in Kenya may have encountered or benefited from these BCC strategies during their trucking

careers. Therefore, it is necessary to enhance these BCC strategies to reach as many LDTs as possible.

- Given the multidimensional inputs from the interdisciplinary panel of experts, the intervention is considered a valid tool in enhancing HIV/AIDS risk reduction among LDTs.
- The current study underscores the potential of mobile phone text-based BCC interventions as an effective tool in enhancing HIV/AIDS risk reduction among LDTs. By leveraging the IMB model, such BCC interventions can enhance knowledge, motivation, and behavioural skills, ultimately enhancing HIV/AIDS risk reduction outcomes like PrEP use, safe sexual behaviours, and HIV testing among the hard-to-reach and vulnerable LDTs.

5.11 Recommendations

5.11.1 Recommendations for Policy and Practice

1. The study recommends that key stakeholders involved in providing targeted HIV/AIDS risk reduction services (for example, NGOs like North Star Alliance and the Ministry of Health, both at the National level and from the Counties where LDTs transit through other countries) should enhance these services to increase access for LDTs. Given that LDTs from both sites face similar HIV/AIDS risk levels, there is a need to institute similar HIV/AIDS risk reduction services in both routes.
2. There is a need for healthcare providers, such as nurses, clinicians, and HTC counselors, to develop and tailor BCC messages based on age and education level. In this case, young LDTs may benefit more from technology and interactive approaches than older LDTs, who may prefer traditional print media or face-to-face interactions.
3. To eliminate the barriers established in this study, the study recommends that health policymakers at the Ministry of Health and the national government should advocate for policies that encourage bringing healthcare services closer to LDTs at highways, international border points, and major stopover points.

These policies should set the hospital operating hours to align with LDTs' schedules, especially when they find time to rest at odd hours of the night. Healthcare providers like nurses, counsellors, and clinicians who offer routine healthcare services to LDTs should enhance sensitization on available new methods of HIV prevention, like PrEP. This would enhance knowledge and reduce the stigma associated with PrEP, as established by the study participants.

4. Trucking companies, the Ministry of Health, and healthcare providers like nurses should work together and leverage mobile phone technology to pass HIV/AIDS risk reduction services to a wider population of LDTs. This can also be done by creating mobile applications and websites that host HIV/AIDS risk reduction messages for LDTs.
5. Government agencies at national and regional levels, like NASCOP and UNAIDS, should advocate for policies that prioritize HIV prevention among LDTs, allocate resources, create supportive work environments, and sustain funding for NGO-driven healthcare facilities like IRDO and North Star Alliance.
6. Healthcare stakeholders like nurses, community mobilizers, and clinicians should expand the 'moonlight' HIV testing outreaches to accommodate LDTs' irregular schedules and ensure they are available at key transit hubs and major international border points.
7. The study recommends that nurses, clinicians, and other key stakeholders involved in HIV/AIDS risk reduction intervention implementation among LDTs (e.g, IRDO, MOH, and North Star Alliance) should ensure regular updates of the intervention, as the relevant evidence is expected to grow and evolve further in the future.
8. Nurses, clinicians, HTC counselors, peer educators, and other relevant stakeholders directly involved in the provision of HIV/AIDS risk reduction services to LDTs should implement a multi-modal BCC approach that incorporates the current TD_Educator text-messaging and elaborative short video animations to overcome the character limitations and enhance comprehensiveness in fairly new topics such as PrEP.

9. Key stakeholders targeting HIV/AIDS risk reduction for LDTs should develop partnerships with trucking companies to broaden the referral systems for services such as PrEP and HIV testing for LDTs. Besides, the stakeholders should also advocate for workplace policies with the trucking companies to encourage HIV prevention for LDTs in their workplaces.

5.11.2 Recommendations for Further Research

1. There is a need for a study to explore the role of modern technology in overcoming the HIV/AIDS risk reduction barriers highlighted in this study.
2. A study is recommended to examine the role of national and regional policies and legal barriers, such as discrimination and employment laws, that may inhibit LDTs from accessing HIV/AIDS risk reduction in foreign countries.
3. The study recommends investigating the sustainability of NGO-driven BCC strategies, as it has been established that their services cease when they face budget cuts.
4. Future studies should investigate the effect of integrating the mobile phone text-based BCC intervention with other digital platforms, such as mobile apps that allow the sharing of animated short videos to enhance engagement and overcome the character limitations of the current TD_Educator platform.

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APPENDICES

Appendix I: Informed Consent & Consent Form for Study Participants

Part A: Information about the study and Informed Consent

Study Title

A Multi-Component Text Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-distance Truckers in Kenya.

Introduction

Good morning/afternoon/evening, I am Cyrus Mutie Paul, a postgraduate student in the College of Health Sciences, School of Nursing, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya (**Admission: HSN411-0005/2023**). I am currently pursuing a PhD in Community Health Nursing at the University. I am conducting a research study to determine the effect of a multi-component text-based behaviour change communication on HIV/AIDS risk reduction among long-distance truckers.

Purpose

The study will generate an in-depth understanding of how better BCC interventions can be applied among LDTs in the developing world. This will inform the key stakeholders in HIV/AIDS programs on improving and enhancing the current policies surrounding BCC interventions for the LDTs and the larger key population groups. It is envisaged that the BCC intervention will play a role in reducing the risk levels of HIV infections which are currently on the rise in Kenya among the LDTs and their sexual partners, through demand creation for biomedical and structural HIV/AIDS preventive services.

Procedure

This interview is estimated to take between 45 minutes to one hour. I will ask you a variety of questions revolving around sexual risk behaviours, knowledge, and practices related to HIV/AIDS risk reduction. You may also be asked to share your views individually or amidst a group on facilitators, barriers, needs, and level of behaviour change communication on HIV/AIDS risk reduction. Permission to audio-tape the interview may be sought where necessary. You are free to interject and seek clarification on any questions that are unclear to you. You have the right to withdraw from the interview at any time.

Discomforts/Risks

The study does not pose any potential risks that would require compensation. Some questions may be uncomfortable to answer, especially the ones that seek your past sexual experiences with your partners. All information gathered from this interview is exclusively for research purposes. Questionnaires and any audio-recorded information will be stored in secure cabinets and on computers, with passwords accessible only to the researcher and the supervisors. All questionnaires will be destroyed by burning after data entry and cleaning are complete.

Benefits

While there are no monetary benefits from this study, your participation will equip you with knowledge key to HIV/AIDS risk reduction between you and your sexual partners. Indeed, the study contributes to improving truckers' general health and well-being, thereby increasing productivity in the trucking industry.

Confidentiality

Your participation in this interview will strictly be kept anonymous and confidential, meaning that your name or any other identifying information won’t be collected.

Part B: Consent Form

A form will be read to you to certify that I have informed you about the study and everything pertaining to it. I will ask you to sign the form, but it will not be attached to the questionnaire to maintain confidentiality and anonymity.

I (Name of study participant: _____) have been taken through the necessary information on the study titled '**A Multi-Component Text Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-distance Truckers in Kenya,**' which will be guided by the researcher and the research assistants.

I understand that I have been requested by (Name of Interviewer_____) to take part in an interview seeking my opinions, experiences, and perspectives on sexual behaviours, knowledge, attitudes, and practices on HIV/AIDS risk reduction.

I understand that during this interview, I will be asked questions about my sexual behaviours, practices on HIV/AIDS risk reduction, facilitators, barriers, needs, and level of behavior change communication while on transit along the Northern Corridor highway and that my responses will be recorded in a questionnaire form. My participation in this study will be kept anonymous and confidential throughout the study.

I am aware that there may be questions during the interview that make me uncomfortable, and that there are no monetary benefits from participating in the study. However, through my participation, I hope to help investigators and key stakeholders improve behavior change communication on HIV/AIDS risk reduction, not only long-distance truckers, but also other populations at risk of HIV.

I realize that I have the liberty to answer questions at my will. I understand that I am free to withdraw my consent and discontinue my participation in this interview at my will.

Should there be any questions or need for clarification, I understand that I can reach the researcher at;

Phone Number: +254713487574 or Email: paulmutiecyrus@gmail.com

PARTICIPANT'S
SIGNATURE…….DATE……..

RESEARCHER'S
SIGNATURE…….DATE……

Appendix II: Questionnaire (English Version)

INTERVIEW DETAILS			
I appreciate your consent to participate in this study. I will seek your opinions on various aspects of Behavior Change Communication related to HIV/AIDS Risk Reduction among Long-Distance Truckers Operating along the Northern Corridor Highway in Kenya. The interview is estimated to take between 30 to 40 minutes. Please note that your participation is voluntary (i.e., you can withdraw at any time) and that your opinions will be kept confidential. For responses given, tick the adjacent box. Date DD____/ MM____/ YY___ Interviewer unique number:_____ Respondent number :_____(e.g., 001,002).			
No.	**QUESTION**	**RESPONSE**	**CODE**
SECTION A **SOCIO-DEMOGRAPHIC AND SOCIO-ECONOMIC FACTORS**			
QA.1	How old are you in years?	Years…….	
QA.2	What is your citizenship?	☐Kenyan ☐Tanzanian ☐Ugandan ☐Zambian ☐Rwandese ☐Burundian ☐Democratic Republic of Congo ☐Malawian ☐Other specify…	1 2 3 4 5 6 7 8

QA.3	What is your marital status?	☐Married ☐Single ☐Divorced ☐Widowed ☐Cohabiting	1 2 3 4 5
QA.4	What is your religion?	☐Christian ☐Muslim ☐Hindu ☐Other specify…	1 2 3 4
QA.5	What is the highest level of education you last attended?	☐No formal education ☐Primary education ☐Secondary education ☐Vocational training ☐College/University	1 2 3 4 5
QA.6	For how long have you been working as a long-distance trucker?	Years…….	
QA.7	How many hours do you averagely spend on a transit journey daily?	Hours…….	
QA.8	How many hours do you spend on rest while on a transit journey?	Hours……..	
QA.9	Averagely, how long do you spend on transit before going back to your family or home?	Days……	
QA.10	How many days do you spend off duty in a week?	Days……	
QA.11	How much do you earn per month in Kenyan Shillings from your trucking career?	Kenya Shs…..	
QA.12	Are you normally provided with mileage allowances by your employer while on a transit journey?	☐ No ☐ Sometimes ☐ Always	1 2 3

SECTION B

KNOWLEDGE ASSESSMENT ON HIV/AIDS RISK REDUCTION

In this section, we ask you about various aspects of knowledge on HIV/AIDS reduction. You are requested to respond with either true or false, and where you are not sure, indicate do not know.

No.	QUESTION	RESPONSE	RISK SCORE
QB.1	There is a difference between HIV and AIDS.	☐True ☐False ☐Do not know	0 1 1
QB.2	Only people who have sex with many people can contract HIV.	☐True ☐False ☐Do not know	1 0 1
QB.3	Having sexual intercourse under influence of alcohol, drugs and other substances does not increase your risk of contracting HIV and other STIs.	☐True ☐False ☐Do not know	1 0 1
QB.4	Correct and consistent condom use can protect a person from HIV infection and other STIs.	☐True ☐False ☐Do not know	0 1 1
QB.5	Males who are circumcised are more likely to get infected by HIV than those who are uncircumcised.	☐True ☐False ☐Do not know	1 0 1
QB.6	Having only one sexual partner at a time will help reduce your risk of HIV.	☐True ☐False ☐Do not know	0 1 1
QB.7	Knowing one's HIV status can lead to a better quality of life where one makes informed decisions regarding their life.	☐True ☐False ☐Do not know	0 1 1

QB.8	Having sex with a person whose HIV status you do not know will not put you at risk of infection.	☐True ☐False ☐Do not know	1 0 1
QB.9	Only people living with HIV need to use condoms to protect their loved ones.	☐True ☐False ☐Do not know	1 0 1
QB.10	Negotiating for sexual protection (like condom use) before a sexual intercourse enhances protection from HIV and other STIs from sexual partners.	☐True ☐False ☐Do not know	0 1 1
QB.11	Having frequent sexual intercourse increases the chances of contracting HIV and other STIs.	☐True ☐False ☐Do not know	0 1 1
QB.12	HIV testing every three months for people at risk has no role in enhancing HIV/AIDS risk reduction.	☐True ☐False ☐Do not know	1 0 1
QB.13	Oral HIV testing can be done by self and does not need to be provider-initiated.	☐True ☐False ☐Do not know	1 0 1
QB.14	One who tests HIV positive from oral HIV testing should seek further testing from a healthcare provider for confirmation.	☐True ☐False ☐Do not know	0 1 1
QB.15	People who are in an ongoing risk of HIV should use pre-exposure prophylaxis (PrEP) to prevent themselves from contracting HIV.	☐True ☐False ☐Do not know	0 1 1
QB.16	One does not need to be tested and confirmed to be HIV negative before initiation to PrEP.	☐True ☐False ☐Do not know	1 0 1

QB.17	PrEP is recommended for Men who can plan for sex at least two hours in advance or who can delay sex for at least 2 hours with a partner of unknown HIV status.	☐True ☐False ☐Do not know	0 1 1
QB.18	For PrEP to be effective, one should use two pills between 2 and 24 hours in advance of anticipated sexual intercourse, then a third pill 24 hours after the first two pills and a fourth pill 48 hours after the first two pills.	☐True ☐False ☐Do not know	0 1 1
QB.19	PrEP should only be used by people who are HIV negative.	☐True ☐False ☐Do not know	0 1 1
QB.20	Use of PrEP does not replace other HIV preventive measures like condom use.	☐True ☐False ☐Do not know	0 1 1
QB.21	PrEP can protect one from contracting other STIs apart from HIV.	☐True ☐False ☐Do not know	1 0 1
QB.22	You should be tested for HIV regularly while using PrEP.	☐True ☐False ☐Do not know	0 1 1
QB.23	You can continue using PrEP if you turn HIV positive.	☐True ☐False ☐Do not know	1 0 1
QB.24	PrEP is the same as post-exposure prophylaxis (PEP).	☐True ☐False ☐Do not know	1 0 1
QB.25	When exposed to HIV through unprotected sexual intercourse one should use	☐True	0

	post-exposure prophylaxis (PEP) to prevent him/her from contracting the infection.	☐False ☐Do not know	1 1
QB.26	One doesn't need to be tested for HIV before being initiated into PEP.	☐True ☐False ☐Do not know	1 0 1
QB.27	One should use PEP for 28 days after a potential exposure to HIV through unprotected sexual intercourse.	☐True ☐False ☐Do not know	1 0 1
QB.28	One who tests HIV positive should be initiated into treatment (anti-retroviral therapy) and care immediately.	☐True ☐False ☐Do not know	0 1 1
QB.29	A HIV positive individual should remain adherent to ART regimens in the rest of his or her life.	☐True ☐False ☐Do not know	0 1 1
QB.30	A person who is adherent to ART and is virally suppressed cannot infect others with HIV.	☐True ☐False ☐Do not know	0 1 1
QB.31	Having a STI increases the risk of contracting HIV.	☐True ☐False ☐Do not know	0 1 1
QB.32	An irritation or burning sensation during urination, or penile discharge are the major signs and symptoms of a STI in men.	☐True ☐False ☐Do not know	0 1 1
QB.33	One should be screened and diagnosed for an STI in a health facility by a healthcare provider before starting STI treatment.	☐True ☐False ☐Do not know	0 1 1
QB.34	One can stop taking the STI treatment when the signs and symptoms subside.	☐True	1

		☐False ☐Do not know	0 1
QB.35	Sexual partners of people infected with STIs should be referred or initiated for treatment of the same as soon as possible.	☐True ☐False ☐Do not know	0 1 1

SECTION C

SEXUAL BEHAVIOUR, DRUG INJECTION, RECREATIONAL/NON-MEDICINAL/ILLICIT DRUG USE AND SUBSTANCE USE RISK ASSESSMENT

In this section I ask questions pertaining your sexual experiences with your sexual partners, drug injection, illicit drug and substance use while on transit in your trucking career. Remember that your responses are strictly confidential.

No.	**QUESTION**	**RESPONSE**	**RISK SCORE**
QC.1	In the past 3 months have you had sexual intercourse with commercial female sexual partners while in transit?	☐Yes ☐No	1 0
QC.2	In the past 3 months have you had sexual intercourse with men who have sex with men?	☐Yes ☐No	1 0
QC.3	How many sexual partners have you had in the last three months?	☐One or no sexual partner ☐More than one sexual partner	0 1
QC.4	Have you shared the HIV status between you and your sexual partner/s, or had HIV testing together before sexual interactions?	☐Yes ☐No	0 1
QC.5	How frequently do you use condoms during sexual interactions?	☐Consistently (always) ☐Inconsistently (sometimes or never)	0 1
QC.6	How frequently do you negotiate for condom use and other safe sexual practices	☐Always ☐Sometimes/Not at all	0 1

	during sexual interactions with your partners?		
QC.7	In the last 3 months are there instances when you drank alcohol, smoked bhang, or used other recreational/ non-medicinal substances like cocaine during or before sexual intercourse?	☐Yes ☐No ***(If No skip to QD.1)***	1 0
QC.8	In the past 3 months have been you unable to remember what happened the night before after drinking alcohol or any other recreational/non-medicinal drugs?	☐Yes ☐No	1 0
QC.9	In the past 3 months, are there instances when you did not use condoms in sexual intercourse after drinking alcohol or using the recreational/ non-medicinal drugs?	☐Yes ☐No	1 0
QC.10	In the past 3 months are there instances when you were coerced to have sex against your willingness after drinking alcohol or any other recreational/ non-medicinal drugs?	☐Yes ☐No	1 0
QC.11	Are there instances when you inject your recreational/non-medicinal drugs and share injecting sharps or needles with peers or fellow truckers??	☐Yes ☐No	1 0
SECTION D **HIV/AIDS RISK REDUCTION PRACTICES** **In this section, we ask you about various aspects of practices related to HIV/AIDS risk reduction. You are requested to respond with either Yes or No.**			
No.	**QUESTION**	**RESPONSE**	**RISK SCORE**
QD.1	Have you ever been tested for HIV?	☐Yes	0

		☐No ***(If No skip to QD.8)***	1
QD.2	If **Yes to QD.1** above, would you tell me when you were lastly tested for HIV?	☐Within 3 months to 6 months ☐More than 6 months ago	0 1
QD.3	If **HIV positive**, were you initiated on ART treatment and care?	☐Yes ☐No ***(If No, skip to QD.8)***	0 1
QD.4	If **Yes, to QD.3** above, are you still on treatment and care?	☐Yes ☐No	0 1
QD.5	If **Yes, to QD.3 above**, are there times when you ran out of ART drugs or missed clinic appointments owing to reasons related to your trucking career?	☐Yes ☐No	0 1
QD.6	If **Yes, to QD.3 above**, have you ever undergone a viral load test?	☐Yes ☐No	0 1
QD.7	If **Yes, to QD.6 above**, what was the outcome of the viral load test?	☐Virally suppressed ☐Not virally suppressed	0 1
QD.8	Have you been able to use PrEP before at a time when you were in an ongoing risk of HIV infection?	☐Yes ☐No ☐Not applicable ***(If No skip to QD.10)***	0 1
QD.9	If **Yes to QD.8 above,** did you complete the treatment as guided by your healthcare provider?	☐Yes ☐No	0 1
QD.10	Have you been able to use PEP before at a time when you experienced a risk of exposure to HIV like a condom burst or a prick from a sharp used by another	☐Yes ☐No ☐Not applicable	0 1

	person who HIV status was unknown to you?	***(If No skip to QD.12)***	
QD.11	If **Yes to QD.10 above**, did you complete the PEP treatment?	☐Yes ☐No	0 1
QD.12	Have you ever contracted a STI (irritation, burning sensation or penile discharge related to a previous unprotected sexual intercourse) since the time you were employed as a long-distance trucker?	☐Yes ☐No ***(If No, end the interview here)***	1 0
QD.13	If **Yes to QD.12 above**, were you screened and initiated on treated by a healthcare provider?	☐Yes ☐No ***(If No skip to QD.15)***	0 1
QD.14	If **Yes to QD.13 above**, did you complete your treatment as guided by the healthcare provider?	☐Yes ☐No	0 1
QD.15	If **Yes to QD.12 above**, did you refer your sexual partner for the same STI treatment?	☐Yes ☐No	0 1
	COMPOSITE HIV/AIDS RISK SCORE = ( )		
This is the end of our interview. I appreciate your participation and wish you all best in your transit journey and trucking career.			

Appendix III: Questionnaire (Swahili Version)

MAELEZO YA MAHOJIANO			
Tunashukuru kwa idhini yako ya kushiriki katika utafiti huu. Tunaomba kupata maoni yako kuhusu vipengele mbalimbali vya Mawasiliano ya Mabadiliko ya Tabia kuhusu Kupunguza Hatari ya VVU/UKIMWI miongoni mwa Waendesha Lori wa Masafa Mrefu Wanaofanya kazi kwenye Barabara Kuu ya Ukanda wa Kaskazini, Kenya. Mahojiano haya yanakadiriwa kuchukua kati ya dakika 30 hadi 40. Tafadhali kumbuka kuwa ushiriki wako ni wa hiari (ikimaanisha kwamba unaweza kujitoa kwa hiari yako) na kwamba maoni yako yatakuwa siri. Kwa majibu yaliyotolewa, weka alama kwenye kisanduku kilicho karibu. Tarehe DD____/ MM____/ YY___ Nambari ya kipekee ya mwenye kuhoji:_____ Nambari ya kipekee ya mhojiwa :_____(e.g., 001,002).			
No.	**SWALI**	**JIBU**	**KODI**
SEHEMU A **MAHOJIANO YA HALI YA KIBINAFSI, KIUCHUMI NA SOSOLOJIA**			
QA.1	Je una umri wa miaka migapi?	Miaka…….	
QA.2	Je uraia wako ni wa nchi gani?	☐Kenyan ☐Tanzanian ☐Ugandan ☐South-Sudanese ☐Rwandese ☐Burundian ☐Democratic Republic of Congo ☐Ingine eleza…	1 2 3 4 5 6 7 8

QA.3	Je hali yako ya ndoa ni gani?	☐Nimeoa ☐Kabwela ☐Nilihasi ndoa ☐Mjane ☐Mahusiano yasiyo ya kudumu	1 2 3 4 5
QA.4	Je unaabudu dini ya aina gani?	☐Wakristo ☐Waisalumu ☐Wahindu ☐Ingine eleza…	1 2 3 4
QA.5	Je umehitimu kiwango kipi cha upeo kimasomo?	☐Sijapata elimu rasmi ☐Elimu ya msingi ☐Elimu ya Sekondari ☐Chuo anuwai ☐Chuo cha kati/Chuo kikuu	1 2 3 4 5
QA.6	Hadi sasa umefanya kazi kama dereva wa masafu marevu kwa muda gani?	Miaka……	
QA.7	Ni kadri ya masaa magapi huwa unatumia kwenye safari ya masafa marefu kila siku?	Masaa…….	
QA.8	Ni kadri ya masaa magapi huwa unatumia kupumzika unapokua kwenye safari yay a masafa marevu?	Masaa…….	
QA.9	Huwa unachukua kadri ya muda gani kitambo urudi nyumbani ama kunako familia yako?	Siku….	
QA.10	Ni kadri ya siku gapi unatumia kwa mapumziko yako kila wiki?	Siku….	
QA.11	How much do you earn per month in Kenyan Shillings from your trucking career? Mapato yako ni kadri ya shilling gapi za Kenya?	Kenya Shs…..	
QA.12	Je huwa unapewa marupurupu ya kukidhi mahitaji yako unapokua kwenye safari ya masafa marevu?	☐ La ☐ Mara kwa mara	1 2

		☐ Kila wakati	3

SEHEMU B

TATHMINI YA MAARIFA JUU YA KUPUNGUZA HATARI ZA VVU/UKIMWI

Kwa hili sehemu nitakuuliza maswali ya kutadhmini ufahamu wako kuhusu jia mbali mbali ambazo mtu anaweza kuambukizwa virusi vya Ukimwi. Unaombwa kujibu kwa La, Ndio ama Sijui jinsi unavyoelewa.

No.	Swali	Jibu	Kiwango cha Hatari
GB.1	Kuna tofauti kati ya VVU na UKIMWI.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.2	Ni watu wanaofanya mapenzi na watu wengi pekee ndio wanaweza kuambukizwa VVU.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.3	Kufanya ngono chini ya ushawishi wa pombe, madawa ya kulevya na vitu vingine hakuongezi hatari yako ya kuambukizwa VVU na magonjwa mengine ya zinaa.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.4	Utumizi wa mipira ya kinga kila mara unaweza zuia mmoja hasiambukizwe virusi vya ukimwi na magonjwa ya zinaa.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.5	Wanaume waliotahiriwa wana uwezekano mkubwa wa kuambukizwa VVU kuliko wale ambao hawajatahiriwa.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.6	Kuwa na mpenzi mmoja tu kwa wakati mmoja kutasaidia kupunguza hatari yako ya kuambukizwa VVU.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.7	Kujua hali ya mtu ya VVU kunaweza kusababisha hali bora ya maisha ambapo mtu hufanya maamuzi sahihi kuhusu maisha yake.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.8	Kufanya mapenzi na mtu ambaye hali yake ya VVU hujui	☐Ni kweli	1

	hakutakuweka katika hatari ya kuambukizwa.	☐Sio Kweli ☐Sijui	0 1
QB.9	Ni watu wanaoishi na VVU pekee wanaohitaji kutumia kondomu kuwalinda wapendwa wao.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.10	Majadiliano ya kinga dhidi ya virusi na magonjwa ya zinaa kabla ya kushiriki ngono ni kielelezo muhimu cha kuzuia maabukizi.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.11	Kushiriki ngono kwa mara kadha wa kadha huchochea maabukizi ya virusi vya ukimwi na magonjwa ya zinaa.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.12	Upimwaji wa virusi baada ya miezi tatu haina faida yoyote kudhibiti maabukizi ya virusi vya ukimwi?	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.13	Upimaji wa virusi vya ukimwi kwa jia ya kidude cha mdomo hauitaji kuwepo kwa mhudumu wa afya.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.14	Mtu anapogudua ameabukizwa virusi kwa jia ya kipimo cha kudude cha mdomo huitaji uagalizi na vipimo zaidi kutoka kwa mhudumu wa afya.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.15	Watu walio kwenye hatari ya maabukizi ya virusi huitaji kutumia madawa aina ya PrEP kama kinga ya maabukizi.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.16	Mtu haitaji kupimwa virusi vya ukimwi kabla kuanzishwa madawa ya PrEP	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.17	PrEP inapendekezwa kwa Wanaume ambao wanaweza kupanga kujamiiana angalau saa mbili kabla au ambao wanaweza kuchelewesha kujamiiana kwa	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1

	angalau masaa 2 na mwenzi ambaye hajulikani hali ya VVU.		
QB.18	Ili PrEP iwe na ufanisi, mtu anapaswa kutumia tembe mbili kati ya saa 2 na 24 kabla ya kujamiiana kutarajiwa, kisha kidonge cha tatu saa 24 baada ya vidonge viwili vya kwanza na kidonge cha nne saa 48 baada ya vidonge viwili vya kwanza.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.19	Madawa aina ya PrEP yanaweza kutumiwa tu na watu ambao hawajaambukizwa virusi vya ukimwi pekee.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.20	Utumizi wa madawa ya PrEP haufutilii jia zingine za kuzia virusi vya ukimwi.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.21	Madawa aina ya PrEP yanauwezo wa kuzuia maabukizi ya magonjwa mengine ya zinaa isipokua virusi vya ukimwi.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.22	Mtu huitaji kupimwa virusi vya ukimwi mara kadha wa kadha anapoendelea kutumia madawa aina ya prep.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.23	Mtu anaweza kuendelea kutumia madawa aina ya PrEP anadhibitishwa kuabukizwa na virusi vya ukimwi.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.24	Madawa aina ya PrEP ni sawa na yale aina ya PEP.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.25	Mtu anapokadiriwa kuabukizwa virusi vya ukimwi atahitaji kutumia madawa aina ya PEP kumkinga hasipate maabukizi.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.26	Mtu anapoenda kuanzishwa kwa madawa ya PEP haitaji kufanyiwa vipimo vya virusi vya ukimwi.	☐Ni kweli ☐Sio Kweli	1 0

		☐Sijui	1
QB.27	Mtu atahitaji kutumia madawa ya PEP kwa siku 30 pale anapokadiriwa kupata maabukizi ya virusi vya ukimiwi.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QB.28	Mtu anapodhibitishwa kuambukizwa virusi vya ukimwi atahitaji kuanzishiwa kwa madawa ya ART papo kwa hapo.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.29	Mtu akidhitishwa kuabukizwa virusi vya ukimwi atahitaji kutumia madawa ya ART kwa maisha yake yote.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.30	Mtu aliyetumia madawa ya ART mfululizo kwa muda fulani na viwango vyake vya virusi viko chini zaidi ana uwezo hafifu wa kuabukiza wengine virusi vya ukimwi.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.31	Kuwepo na ugonjwa wa zinaa mwilini huchochea maabukizi ya virusi vya ukimwi.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.32	Hali ya kujikuna, uchungu unapokojoa, na kutokwa na usaha ama uchafu kwa jia ya uzazi ni dalili ya maabukizi na magonjwa wa zinaa.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.33	Mtu huitaji maagalizi maalum na kudhitishwa kuabukizwa na ugonjwa wa zinaa na muhudumu wa afya ili kuazishwa kwa madawa yake.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1
QB.34	Mtu anaweza kuacha matumizi ya madawa ya ugonjwa wa zinaa pale dalili za huo ugonjwa zinapofifia ama kupotea.	☐Ni kweli ☐Sio Kweli ☐Sijui	1 0 1
QC.35	Washirika wenzi wa wale waliodhibitishwa kuabukizwa na magonjwa ya zinaa wanahitaji pia kupata matibabu sawia.	☐Ni kweli ☐Sio Kweli ☐Sijui	0 1 1

SEHEMU C

UTATHMINI WA TABIA ZA KIGONO ZINAZOCHOCHEA HATARI YA VIRUSI VYA UKIMWI, UTUMIZI WA MADAWA YA KULEVYA NA POMBE, IKIWEMO TABIA ZA KUJIDUNGA MADAWA YASIYO YA KIMATIBABU KWENYE MISHIPA YA DAMU

Kwa hili sehemeu mahojiano yetu yatalenga ushirika wako wa kigono na wapenzi, hali ya utumizi wa madawa ya kulevya na vileo, ikiwemo madawa ya kujidunga kwenye mishipa ya damu yasiyo ya kimatibabu unapokua kwenye kazi ya uendeshaji masafa marefu. Nitakukumbusa kua maoni yako yatawekwa kwa jia ya usiri.

No.	Swali	Jibu	Kiwango cha Hatari
QC.1	Je, katika kipindi cha miezi 3 iliyopita ulifanya ngono na washirika wa kibiashara wa ngono wa kike ukiwa njiani?	☐Ndio ☐La	1 0
QC.2	Je, katika kipindi cha miezi 3 iliyopita ulifanya tendo la ndoa na wanaume wanaofanya mapenzi na wanaume?	☐Ndio ☐La ***(Kama la ruka hadi QC.6)***	1 0
QC.3	Umekua na kadri ya washirkia wagapi wa ngono kwa miezi tatu iliyopita?	☐Mmoja ama hakuna kabisa ☐Zaidi ya mmoja	0 1
QC.4	Je, mmewahi kushiriki hali yenu ya VVU na mwenzi wako wa ngono, au kupima VVU pamoja kabla ya mwingiliano wa ngono?	☐Ndio ☐La	0 1
QC.5	Ni kadri ya mara gapi unatumia mipira ya kinga?	☐ Kila wakati ☐ Mara kwa mara/Hakuna kabisa	0 1
QC.6	Je, ni mara ngapi unajadiliana kuhusu matumizi ya kondomu na mazoea mengine ya ngono salama wakati wa mwingiliano wa ngono na wenzi wako?	☐Kila wakati ☐Mara kwa mara/Hakuna kabisa	0 1
QC.7	Je, katika miezi 3 iliyopita, kuna matukio wakati ulikunywa pombe, kuvuta bangi, au kutumia vitu vingine vya burudani/zisizo za dawa kama vile kokeini wakati au kabla ya kujamiiana?	☐Ndio ☐La ***(Kama la ruka hadi QD.1)***	1 0

QC.8	Katika miezi 3 iliyopita kuna nyakati umeshindwa kukumbuka kilichotokea usiku uliopita baada ya kunywa pombe au dawa zozote za kuburudisha/zisizo za dawa?	☐Ndio ☐La	1 0
QC.9	Katika kipindi cha miezi 3 iliyopita, kuna matukio ambapo hukutumia kondomu katika kujamiiana baada ya kunywa pombe au kutumia dawa za kuburudisha/zisizo za dawa?	☐Ndio ☐La	1 0
QC.10	Je, katika kipindi cha miezi 3 iliyopita, kuna matukio ambapo ulilazimishwa kufanya ngono bila kupenda kwako baada ya kunywa pombe au dawa zozote za burudani/zisizo za matibabu?	☐Ndio ☐La	1 0
QC.11	Je, kuna matukio unapojidunga dawa zako za kuburudisha/zisizo za dawa na kushiriki sindano au sindano na wenzako au madereva wenzako??	☐Ndio ☐La	1 0

SEHEMU D

MIENENDO YA KUPUGUZA HATARI YA VIRUSI VYA UKIMWI

Kwa hili sehemu, nitakuuliza maswali kadhaa kuhusu mienendo yako inayolenga kupuguza hatari ya virusi vya ukimwi. Unaombwa kujibu kwa La au Ndio, ama majibu yanayofaa kuabatana na mienendo yako.

No.	**Swali**	**Jibu**	**Kiwango cha Hatari**
QD.1	Je umewai pimwa virusi vya ukimwi?	☐Ndio ☐La ***(Kama la ruka hadi QD.8)***	0 1
QD.2	Kama **Ndio kwa QD.1**, ni lini ulipimwa virusi vya ukimwi?	☐Kati ya miezi 3 hadi 6 ☐ Zaidi ya miezi 6 iliyopita	0 1
QD.3	Kama ulidhibitishwa kua na virusi vya ukimwi, ulianzishiwa madawa ya kupunguza makali yake?	☐Ndio ☐La ***(Kama la ruka hadi QD.8)***	0 1
QD.4	Kama **Ndio kwa QD.3** bado unaendelea kutumia madawa?	☐Ndio ☐La	0 1

QD.5	Kama **Ndio, kwa QD.3**, kunazo nyakati unakosa madawa na ufuatilizi kutokana na sababu za kazi yako ya masafi marefu?	☐Ndio ☐La	0 1
QD.6	Kama, **Ndio kwa QD.3**, je umewai fanyiwa maagalizi ya maabara kutathmini kiwango cha virusi mwilini?	☐Ndio ☐La	0 1
QD.7	Kama **Ndio, kwa QD.6**, matokeo yalikua yepi?	☐Virusi vimepungua kwa kiasi kinachohitajika ☐Virusi havijapungua kwa kiwango kinachohitajika	0 1
QD.8	Je, umeweza kutumia PrEP hapo awali wakati ulipokuwa katika hatari inayoendelea ya kuambukizwa VVU?	☐Ndio ☐La	0 1
QD.9	Kama **Ndio kwa QD.8**, je, ulikamilisha matibabu kama ulivyoelekezwa na mtoa huduma wako wa afya?	☐Ndio ☐La ***(Kama la ruka hadi QD.10)***	0 1
QD.10	Je, umeweza kutumia dawa aina ya PEP hapo awali wakati ambapo ulikumbana na hatari ya kuambukizwa VVU kama kupasuka kwa kondomu au kuchomwa na ncha kali iliyotumiwa na mtu mwingine ambaye hajui hali yako ya VVU?	☐Ndio ☐La	0 1
QD.11	Kama Ndiyo kwa QD.10 hapo juu, je, ulikamilisha matibabu?	☐Ndio ☐La	0 1
QD.12	Je, umewahi kuambukizwa magonjwa ya zinaa (kuwashwa, kuungua au kutokwa na uume kutokana na kujamiiana bila kinga) tangu wakati ulipoajiriwa kama dereva wa lori la masafa marefu?	☐Ndio ☐La (Kama hapana, malizia mahojiano hapa)	0 1
QD.13	Kama **Ndio kwa QD.12**, je, ulichunguzwa na kuanza kutibiwa na mtoa huduma ya afya?	☐Ndio ☐La ***(Kama Hapana ruka hadi QD.15)***	0 1

QD.14	Kama **Ndiyo kwa QD.13**, je, ulikamilisha matibabu yako kama ulivyoelekezwa na mtoa huduma ya afya?	☐Ndio ☐La	0 1
QD.15	Kama Ndiyo kwa QD.12 hapo juu, je, ulimrejelea mwenzi wako wa ngono kwa matibabu sawa ya magonjwa ya zinaa?	☐Ndio ☐La	0 1
	ALAMA YA UJUMLA YA HATARI ZA VVU/UKIMWI = ( )		
Huu ndio mwisho wa mahojiano yetu. Ninashukuru ushiriki wako na ninakutakia kila la heri katika safari yako ya usafiri wa umma na taaluma ya uchukuzi wa malori.			

Appendix IV: Key Informant Interview Guide

For Long distance truckers' peer educators and healthcare providers offering HIV/AIDS risk reduction services to LDTs

A. Introduction and Informed Consent

Good morning/afternoon/evening. My name is Cyrus Mutie Paul, a postgraduate student from the College of Health Sciences, School of Nursing, JKUAT, studying for a PhD in Community Health Nursing. I am conducting a study on the **'A Multi-Component Text Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-distance Truckers in Kenya.'**

I would like to begin by thanking you for your consent to participate in this study despite your busy work schedule. Your selection to participate in this study is solely based on your role in providing HIV/AIDS risk reduction services to the LDTs. The opinions and experiences you will share with me will inform health stakeholders and policymakers in improving policies surrounding behaviour change communication strategies on HIV/AIDS risk reduction among the LDTs and their sexual partners.

I would like to inform you that your participation is confidential. The information generated from this interview is solely for research purposes, and won't be shared with other parties besides the researcher and study supervisors. Should you have any questions or need clarification, feel free to ask. Where you feel uncomfortable answering some questions, you are at liberty to request we skip them.

In the meantime, I would like to inform you that I will be taking shorthand notes as we speak, and that the interview session will be audio-recorded so that vital information is not missed. The interview session is estimated to take between 45 minutes to one hour. Do you have any questions so far? May we commence the interview session now?

May I begin by asking you a few questions about yourself (name of healthcare facility you work for or that has recruited you as a LDTs' peer educator, role or cadre, duration

you have worked as a healthcare provider, or peer educator offering HIV/AIDS risk reduction services to the LDTs).

Name of healthcare facility……...

Role/Cadre……..

Duration as a healthcare provider/peer educator……....

B. Barriers to HIV/AIDS risk reduction among LDTs

1. What are the structural/health system barriers hindering HIV/AIDS risk reduction among LDTs?
2. What are the biomedical barriers hindering HIV/AIDS risk reduction among LDTs?
3. What are the behavioural barriers hindering HIV/AIDS risk reduction among LDTs?
4. What would you say are the trucking career-related barriers to HIV/AIDS risk reduction among LDTs?
5. What would you recommend to address the aforementioned barriers?

C. Behaviour change communication strategies for HIV/AIDS risk reduction

Level of existing behaviour change communication strategies on HIV/AIDS risk reduction targeted for LDTs

1. What behavior change communication strategies have you been engaged on in regards to HIV/AIDS reduction among LDTs?
2. How does your organization support behavior change communication on HIV/AIDS risk reduction among LDTs?
3. In your opinion how do the LDTs view or perceive the behavior change communication on HIV/AIDS risk reduction?
4. What are the key challenges surrounding behavior change communication on HIV/AIDS risk reduction among the LDTs?

5. What are your recommendations on behavior change communication on HIV/AIDS risk reduction among the LDTs?

Appendix V: Mwongozo wa Mahojiano ya Mtoa Taarifa Muhimu

Kwa waelimishaji rika wa magari ya masafa marefu na watoa huduma za afya wanaotoa huduma za kupunguza hatari za VVU/UKIMWI kwa madereva wa masafa marefu (LTDs).

A. Utangulizi na Idhini ya Taarifa

Habari za asubuhi/mchana/jioni. Jina langu ni Cyrus Mutie Paul, mwanafunzi wa shahada ya uzamili kutoka Chuo cha Sayansi ya Afya, Shule ya Uuguzi, JKUAT, anayesoma PhD katika Uuguzi wa Afya ya Jamii. Ninafanya utafiti juu ya **'A Multi-Component Text Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-distance Truckers in Kenya.'**

Ningependa kuanza kwa kushukuru idhini yako ya kushiriki katika utafiti huu katikati ya ratiba ya kazi yenye shughuli nyingi. Uteuzi wako wa kushiriki katika utafiti huu unategemea tu jukumu lako katika kutoa huduma za kupunguza hatari za VVU/UKIMWI kwa LDTs. Maoni na uzoefu utakaoshiriki nami utawafahamisha wadau wa afya na watunga sera katika kuboresha sera zinazohusu mikakati ya mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs na washirika wao wa ngono.

Ningependa kukujulisha kuwa ushiriki wako ni wa siri. Maelezo yanayotokana na mahojiano haya ni kwa madhumuni ya utafiti pekee, na hayatashirikiwa na wahusika wengine isipokuwa mtafiti na wasimamizi wa utafiti. Iwapo una maswali au hitaji lolote la ufafanuzi, jisikie huru kuuliza. Pale ambapo hujisikii vizuri kujibu baadhi ya maswali, una uhuru wa kuomba turuke.

Wakati huo huo, ningependa kuwajulisha kwamba nitakuwa nikiandika maelezo mafupi ya mkono tunapozungumza, na kwamba kipindi cha mahojiano kitarekodiwa sauti ili taarifa muhimu zisikose. Kipindi cha mahojiano kinakadiriwa kuchukua kati ya dakika 45 hadi saa moja. Je, una maswali yoyote kufikia sasa? Je, tunaweza kuanza kipindi cha mahojiano sasa?

Naomba nianze kwa kukuuliza baadhi ya maswali machache kukuhusu (jina la kituo cha afya unachofanyia kazi au ambacho kimekuajiri kama mwalimu rika wa LDTs, jukumu au kada, muda ambao umefanya kazi kama mhudumu wa afya, au mwalimu rika anayetoa VVU/ Huduma za kupunguza hatari za UKIMWI kwa LDTs).

Jina la kituo cha afya……...

Jukumu……..

Muda kama mtoa huduma ya afya/mwalimu rika……....

B. Vikwazo vya kupunguza hatari za VVU/UKIMWI

Vikwazo vya kupunguza hatari ya VVU/UKIMWI miongoni mwa LDTs

Ulizia yafuatayo:

1. Je, ni vikwazo gani vya kimuundo/afya vinavyozuia kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?

2. Je, ni vikwazo vipi vya kimatibabu vinavyozuia kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?

3. Je, ni vikwazo vipi vya kitabia vinavyozuia kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?

4. Je, unaweza kusema ni vipi vikwazo vinavyohusiana na uchukuzi wa malori katika kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?

5. Ungependekeza nini kushughulikia vizuizi vilivyotajwa hapo juu?

C. Kiwango cha mawasiliano ya mabadiliko ya tabia juu ya kupunguza hatari za VVU/UKIMWI

Kiwango cha mawasiliano ya mabadiliko ya tabia juu ya kupunguza hatari za VVU/UKIMWI

1. Ni mikakati gani ya mawasiliano ya mabadiliko ya tabia ambayo umejihusisha nayo kuhusiana na kupunguza VVU/UKIMWI miongoni mwa LDTs?
2. Je, shirika lako linasaidia vipi mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?
3. Je, kwa maoni yako LDTs wanaonaje mawasiliano ya kubadilisha tabia kuhusu kupunguza hatari za VVU/UKIMWI?
4. Je, ni changamoto gani kuu zinazozunguka mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?
5. Ni yapi mapendekezo yako kuhusu mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs?

Appendix VI: In-depth Interview Guide

A. Opening, Introduction and Informed Consent

Good morning/afternoon/evening. I would like to open this in-depth interview by welcoming you. My name is Cyrus Mutie Paul, a postgraduate student from the College of Health Sciences, School of Nursing, JKUAT, studying a PhD in Community Health Nursing. I am conducting a study on the **'A Multi-Component Text Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-distance Truckers in Kenya'.**

I would like to begin by thanking you for your consent to participate in this study despite your busy work schedule. The opinions and experiences you will share in this discussion will inform health stakeholders and policy makers in improving on policies surrounding behavior change communication strategies on HIV/AIDS risk reduction among the LDTs and their sexual partners.

I would like to inform you that your participation is confidential, and the information generated from this interview will be used solely for research purposes and will not be shared with any parties other than the researcher and study supervisors. Should you have any questions or need clarification, feel free to ask by politely raising your hand. Where you find it difficult or uncomfortable to answer some questions, please note that you are at liberty to do so and no coercion whatsoever will be made on you to participate.

B. Guiding protocols

1. Your participation in the interview is voluntary, meaning you can withdraw at any time.
2. We can agree to use either English or Swahili, whichever suits you best.
3. Your opinions are all equally important, so don't hesitate to share as much as you can.
4. No right or wrong answers.

In the meantime, I would like to inform you that I will be taking some short-hand notes as we speak, and that the interview will be audio-recorded so that vital information is not missed. The interview is estimated to take between 45 minutes to one hour. Do you have any questions so far? May we commence the interview?

C. Ice breaker

May I request that you begin by introducing yourself in this order; name, age, and duration of experience as a trucker?

D. Barriers to HIV/AIDS risk reduction among LDTs

Barriers to HIV/AIDS risk reduction

1. What health system/ health facility-related factors do you think have been an obstacle towards HIV/AIDS risk reduction among you LDTs?
2. What behaviors would you say are key obstacles towards HIV/AIDS risk reduction among you LDTs?
3. Are there any challenges associated with a trucking career that you think act as obstacles towards HIV/AIDS risk reduction among you LDTs?
4. How best do you think the barriers in HIV/AIDS risk reduction among you LDTs should be addressed?

E. Behaviour change communication on HIV/AIDS risk reduction

Existing Level of behavior change communication strategies on HIV/AIDS risk reduction

1. What do you understand by behavior change communication on HIV/AIDS risk reduction?
2. What are some of the ways you think behavior change communication on HIV/AIDS is facilitated? (Probe for examples like condoms, PrEP, PEP, STI treatment, sexual partner reduction).
3. Who do you think is the appropriate target for behavior change communication on HIV/AIDS reduction?

4. Have you been reached before with information encouraging behavior change towards a lower risk of HIV/AIDS? (Probe for sources of the information, like media, one-on-one counselling, and digital platforms like mobile phones, and the type of information shared).
5. What would you recommend as the best modality of receiving behavior change communication on HIV/AIDS risk reduction?

F. Conclusion

Is there anything else you would like to know or add about behavior change communication for HIV/AIDS risk reduction?

This is the end of our interview. Your participation is highly appreciated.

Thank you.

Appendix VII: Mahojiano ya Kina

A. Ufunguzi, Utangulizi na Idhini ya Taarifa

Habari za asubuhi/mchana/jioni nyote. Ningependa kufungua mjadala huu kwa kukukaribisha. Jina langu ni Cyrus Mutie Paul, mwanafunzi wa shahada ya uzamili kutoka Chuo cha Sayansi ya Afya, Shule ya Uuguzi, JKUAT, anayesoma PhD katika Uuguzi wa Afya ya Jamii. Ninafanya utafiti juu ya **'A Multi-Component Text Based Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-distance Truckers in Kenya'.**

Ningependa kuanza kwa kushukuru idhini yako ya kushiriki katika utafiti huu katikati ya ratiba ya kazi yenye shughuli nyingi. Maoni na uzoefu utakaoshiriki katika mjadala huu utawafahamisha wadau wa afya na watunga sera katika kuboresha sera zinazohusu mikakati ya mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI miongoni mwa LDTs na washirika wao wa ngono.

Ningependa kukuarifu kuwa ushiriki wako ni wa siri na maelezo yanayotolewa kutoka kwa mahojiano haya ni kwa madhumuni ya utafiti pekee, na hayatashirikiwa na wahusika wengine isipokuwa mtafiti na wasimamizi wa utafiti. Iwapo una maswali au hitaji lolote la ufafanuzi, jisikie huru kuuliza kwa kuinua mkono wako kwa heshima. Pale ambapo unaona ni vigumu au huna raha kujibu baadhi ya maswali, tafadhali kumbuka kuwa uko huru kufanya hivyo na hakuna shuruti yoyote itakayofanywa kwako kushiriki.

B. Itifaki elekezi

1. Ushiriki weko katika mjadala huu ni wa hiari, kumaanisha unaweza jiondoa utakapo.
2. Tunaweza kukubali kutumia Kiingereza au Kiswahili, kulingana na jinsi lugha hiyo inavyotufaa sisi sote.
3. Maoni yako ni muhimu sawa, kwa hivo unaweza toa maelezo kwa kina zaidi iwezekanavyo.
4. Hakuna majibu sahihi au yasiyo sahihi.

Wakati huu, ningependa kukajulisha kwamba nitakuwa nikiandika maelezo mafupi ya mkono tunapozungumza, na kwamba majadiliano yatarekodiwa kwa sauti ili taarifa muhimu zisikose. Mahojiano haya yanakadiriwa kuchukua kati ya dakika 45 hadi saa moja. Je, una maswali yoyote kufikia sasa? Je, tunaweza kuanza mjadala?

C. Mapumziko kiasi

Naomba uanze kwa kujitambulisha kwa utaratibu huu; jina, umri, na muda wa uzoefu kama lori?

D. Vikwazo vya kupunguza hatari za VVU/UKIMWI

Vikwazo vya kupunguza hatari za VVU/UKIMWI

1. Ni mambo gani yanayohusiana na mfumo wa afya/kituo cha afya unafikiri yamekuwa kikwazo kwa VVU/UKIMWI miongoni mwenu LDT?
2. Je, ni tabia zipi unazoweza kusema ni vikwazo muhimu katika kupunguza hatari za VVU/UKIMWI miongoni mwenu LDT?
3. Je, kuna changamoto zozote zinazohusiana na kazi ya uchukuzi wa lori ambazo unafikiri ni vikwazo vya kupunguza hatari za VVU/UKIMWI miongoni mwenu LDT?
4. Je, unafikiri vipi vikwazo katika kupunguza hatari ya VVU/UKIMWI miongoni mwenu LDTs vinapaswa kushughulikiwa?

E. Kiwango cha mawasiliano ya mabadiliko ya tabia juu ya kupunguza hatari za VVU/UKIMWI

1. Unaelewa nini kuhusu mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI?

2. Je, ni baadhi ya njia gani unafikiri mawasiliano ya kubadilisha tabia kuhusu VVU/UKIMWI yanawezeshwa? (Chunguza mifano kama, kondomu, PrEP, PEP, matibabu ya magonjwa ya zinaa, kupunguza wapenzi).
3. Je, unadhani ni nani mlengwa mwafaka wa mawasiliano ya mabadiliko ya tabia kuhusu kupunguza VVU/UKIMWI?
4. Je, umewahi kufikiwa na taarifa zinazohimiza mabadiliko ya tabia kuelekea kupunguza hatari ya VVU/UKIMWI? (Chunguza vyanzo vya habari kama vile vyombo vya habari, ushauri nasaha kwa mtu mmoja, na mifumo ya kidijitali kama vile simu za mkononi na aina ya taarifa inayoshirikiwa).
5. Je, ungependa kupendekeza nini kama njia bora ya kupokea mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI?

F. Hitimisho

Je, kuna kitu kingine chochote ambacho ungependa kujua au kuongeza kuhusu mawasiliano ya mabadiliko ya tabia kuhusu kupunguza hatari za VVU/UKIMWI?

Huu ndio mwisho wa mahojiano yetu. Ushiriki wako unathaminiwa sana.

Asante

Appendix VIII: Informed Consent for the E-Delphi Participants

Dear esteemed expert, you are invited to participate in a validation exercise for HIV/AIDS risk-reduction messages targeted at long-distance truck drivers operating along the Northern Corridor Highway in Kenya. This is part of a PhD research project that commenced with a baseline study completed in phase one at both the Busia (intervention site) and Namanga (control site). The baseline study assessed risk levels to HIV/AIDS, risk reduction barriers and existing behaviour change communication strategies targeted for Long-distance truckers. The validated risk-reduction messages will be shared with long-distance truckers at the intervention site as part of a targeted behaviour change communication intervention to enhance HIV/AIDS risk reduction among participants. Here, you are requested to assess the correctness of the messages and offer suggestions of any amendments that would enhance their appropriateness.

Any opinions and suggestions to improve the tool are welcome and can be shared to; paulmutiecyrus@gmail.com. If you agree to participate, please go ahead and fill out the electronic Google form at the link provided. Your support will be highly appreciated.

I (Name_____) agree to take part in the Delphi exercise to offer my expertise, opinions, experiences, and perspectives on the suitability of the various BCC messages listed.

Appendix IX: Jumbe za Afua za Kupunguza Hatari za VVU/UKIMWI

Tabia za Kujamiiana (matumizi ya kondomu, kupunguza washirika wa ngono, na matumizi ya pombe/dawa)

1. Kondomu hutoa kinga dhidi ya VVU na magonjwa mengine ya zinaa, hivyo kumbuka kuzitumia wakati wa kujamiiana na mpenzi wako.
2. Unaweza kupata kondomu bila malipo kutoka kwa vituo vya afya, au kwa bei kutoka maduka ya dawa. Ukiwa Busia unaweza kuzipata katika Kitengo cha Afya cha Madereva wa Malori kilicho katika eneo la forodha la mpakani la Busia bila malipo.
3. Tumia kondomu moja tu kwa wakati mmoja kwa tendo la ngono.
4. Zungumza kuhusu matumizi ya kondomu na mwenzi wako ili kuhakikisha kwamba wahusika wote wanashirikiana kikamilivu.
5. Kushikamana na mpenzi mmoja mwaminifu ni njia muhimu ya kupunguza hatari yako ya kuambukizwa VVU na magonjwa mengine ya zinaa.
6. Je, unajua tunaweza kupunguza hatari ya kuambukizwa VVU na magonjwa mengine ya zinaa kwa kutumia kondomu wakati wa kujamiiana na kupunguza wenzi wetu wa ngono kadiri tuwezavyo hadi angalau mmoja, kwa muda fulani?
7. Kufanya ngono chini ya ushawishi wa pombe au madawa ya kulevya huongeza hatari yetu ya kuambukizwa VVU na magonjwa mengine ya zinaa.

Upimaji wa VVU

8. Watu walio katika hatari ya kuambukizwa VVU wanapaswa kupimwa angalau kila baada ya miezi mitatu ili kujua hali zao za VVU.
9. Upimaji wa VVU kwa kawaida unapatikana kwa njia mbili, mhudumu wa afya anayesimamia upimaji wa damu kwa kuzingatia na upimaji kwa mdomo.
10. Unaweza pata upimaji wa damu unaosimamiwa na mhudumu wa afya kwa kuzingatia VVU katika vituo vya afya vya umma, mashirika yasiyo ya kiserikali na kibinafsi.
11. Je, unajua unaweza kufanya upimaji wa Virusi vya UKIMWI kwa Mdomo peke yako, kwa kufuata miongozo rahisi ya picha iliyotolewa kwenye seti ya kupima VVU kwa mdomo?

12. Je, unajua unaweza kupata vifaa vya kupima VVU kwa njia ya mdomo kwa gharama kutoka kwa maduka ya dawa, na bila malipo kutoka kwa vituo vingi vya afya?
13. Unashauriwa kutafuta vipimo zaidi vya VVU na mwongozo kutoka kwa mhudumu wa afya iwapo utakuwa na VVU baada ya kujipima kwa kutumia kifaa cha Kupima VVU cha Mdomo. Ukiwa Busia unaweza kupata huduma katika kitengo cha Afya cha madereva wa lori kilichopo eneo la forodha la mpakani la Busia bila malipo.

Matibabu ya Kuzuia Virusi vya Ukimwi (ART)

14. Iwapo mtu atagundulika kuwa na VVU, anashauriwa aanzishwe katika matibabu ya kupunguza makali ya VVU (ART) haraka iwezekanavyo.
15. Wale walio na VVU na wanaopata matibabu ya kupunguza makali yake, wanashauriwa kutumia madawa kwa mfululizo bila kukosa, na kufuata maelekezo ya mhuduma ya afya.
16. Wale wako kwenye matibabu ya ART na uangalizi wanapaswa kupata ujazo wao kutoka kwa kituo chochote cha afya kinachotoa huduma hiyo mapema kabla ya dawa zao kuisha.
17. Wale walio na VVU na wanaopata matibabu wanashauriwa kufanyiwa vipimo vya wingi wa virusi kwa muda maalum kama watakavyoelekezwa na wahudumu wao wa afya.
18. Vipimo vya wingi wa virusi husaidia kutathmini viwango vya ufuasi vya mtu anayepokea huduma na matibabu ya ART.
19. Ikiwa mtu amedhitishwa kuwa na idadi ya chini zaidi ya virusi, inamaanisha kuwa amekuwa akifuata matibabu ya ART na utunzaji kwa jia ifaayo.
20. Watu ambao waana idadi ya chini zaidi ya virusi kwa zaidi ya miezi sita wana nafasi ndogo au hawana kabisa ya kuwaambukiza wenzi wao wa ngono wasio na VVU.
21. Watu wanaotumia matibabu na utunzaji wa ART wanaweza kupata athari fulani kama kichefuchefu, kutapika, matatizo ya figo miongoni mwa mengine.

22. Watu ambao wako kwenye uangalizi na matibabu ya ART na wanaopata madhara fulani kutokana na matibabu yao wanashauriwa kutafuta uangalizi wa mhuduma ya afya.
23. Ufuasi sahihi wa huduma ya ART hupunguza ubashiri wa VVU hadi UKIMWI.
24. Kuzingatia ipasavyo utunzaji wa ART husaidia kuzuia magonjwa nyemelezi.
25. Huduma nyingi za ART zinapatikana katika vituo vingi vya afya vya umma na mashirika yasiyo ya kiserikali.

Pre-exposure prophylaxis.

26. Pre-exposure prophylaxis (PrEP) ni dawa ya hivi majuzi zaidi ya kupunguza makali ya VVU inayotumika kuzuia watu walio katika hatari ya kuambukizwa VVU kutokana na kuambukizwa.
27. Pre-exposure prophylaxis hutumiwa kabla ya hatari inayoonekana ya kuambukizwa VVU, kwa hiyo jina lake.
28. Kabla ya kuanza kutumia PrEP, mtu anapaswa kupimwa VVU.
29. Ni watu ambao hawana VVU pekee wanaweza kutumia PrEP.
30. Wakati wa kutumia PrEP mtu anapaswa kupima VVU mara kwa mara ili kuhakikisha kuwa hana VVU anapotumia dawa hiyo.
31. Je, unajua kwamba 'tukio' (tendo la ngono) linaloendeshwa na Pre-exposure prophylaxis (ED-PrEP) (ambapo Oral PrEP itatumika wakati tendo la ngono la pekee linatarajiwa) linapendekezwa kwa Wanaume ambao wanaweza kupanga ngono katika angalau saa mbili kabla au ni nani anayeweza kuchelewesha ngono kwa angalau masaa 2? Kwa hiyo, unapaswa kuchukua PrEP inayoendeshwa na tukio saa mbili kabla ya kujamiiana na mpenzi ambaye hali yake ya VVU haijulikani kwako.
32. Kwa Wanaume ambao tukio la ngono haliwezi kutabiriwa na kwa wale ambao uwezekano wao wa kuambukizwa VVU ni mara kwa mara zaidi ya mara 2 kwa wiki, kama vile ED-PrEP inaweza kuchukuliwa mara kwa mara, basi wanashauriwa kubadili PrEP ya mdomo ya kila siku.
33. Mtu anapaswa kuendelea kutumia PrEP kwa angalau siku 28 baada ya uwezekano wa kuambukizwa VVU ili iwe na ufanisi.

34. Watu wanaotumia PrEP wanaweza kupata madhara ya muda mfupi kama vile kichefuchefu, kutapika, kupungua uzito miongoni mwa mengine.
35. Je, unajua kwamba kabla ya kuanzishwa kwa wagonjwa wa PrEP walio na ugonjwa wa figo na ini wanapaswa kupokea uchunguzi zaidi wa kimaabara na wa kimaabara, ili kubaini utendaji kazi wa figo/ini na kiwango cha ugonjwa iwapo kuna wowote?
36. PrEP si mbadala wa mbinu nyingine za kuzuia VVU kama vile kondomu.
37. Wakati wa kutumia PrEP mtu anapaswa kuendelea kutumia kondomu.
38. Mtu hawezi kuendelea kutumia PrEP anapokuwa na VVU.
39. PrEP inaweza kukukinga tu dhidi ya VVU na si magonjwa mengine ya zinaa.
40. Unaweza kupata PrEP bila malipo katika vituo vingi vya afya vya umma na mashirika yasiyo ya kiserikali.

Post-exposure prophylaxis

41. Post-exposure prophylaxis ni aina ya dawa inayosaidia kumlinda mtu dhidi ya kuambukizwa VVU baada ya kujipata kati hali inayochochea hatari ya kupata maambukizi.
42. PEP si sawa na PrEP.
43. Mtu anapaswa kupimwa VVU kabla ya kuanzishwa kwa PEP.
44. Unaweza kutumia PEP tu ikiwa huna VVU.
45. Je, unajua kwamba PEP inapaswa kutolewa haraka iwezekanavyo, ikiwezekana ndani ya saa 72, baada ya kuambukizwa na inatumiwa kwa siku 28 (unapewa dawa za PEP kwa siku zote 28 za matibabu katika ziara ya kwanza ikiwa huna VVU).
46. Watu wanaotumia PEP wanaweza kupata madhara ya muda mfupi kama vile kichefuchefu, kutapika, kupungua uzito miongoni mwa mengine.
47. Unaweza kupata PEP katika vituo vingi vya afya vya umma na mashirika yasiyo ya kiserikali bila malipo. Ukiwa Busia unaweza kupata PEP katika kitengo cha Afya cha madereva wa lori kilichopo eneo la forodha la mpakani la Busia bila malipo.

Maambukizi ya zinaa

48. Maambukizi ya zinaa ni yale yanayoambukizwa kwa kujamiiana bila kinga na mtu ambaye tayari ameambukizwa.
49. Hisia ya muwasho na kutokwa na usaha kwa jia ya uume ni ishara na dalili za kawaida za maambukizo ya zinaa.
50. Mtu bado anaweza kuwa na maambukizi ya zinaa hata bila dalili zozote.
51. Maambukizi ya zinaa huongeza hatari ya kuambukizwa VVU.
52. Dawa za kujinunulia pasi na maagalizi maalumu sio jia bora inayopendekezwa kutibu magonjwa ya zinaa kwa sababu zinaweza kukosa kutibu magonjwa sahihi.
53. Mtu anapaswa kuchunguzwa na kutambuliwa kwa mtoa huduma ya afya ili kupokea ipasavyo maambukizi sahihi ya zinaa.
54. Wapenzi wa ngono wa watu walioambukizwa magonjwa ya zinaa pia wanapaswa kuchunguzwa na kutibiwa ikiwa watagunduliwa na magonjwa ya zinaa (STI) au aina yoyote ya magonjwa ya zinaa.
55. Mtu anapaswa kukamilisha matibabu ya magonjwa ya zinaa kama anavyoelekezwa hata wakati dalili na dalili hazipo tena.
56. Unapaswa kuepuka kufanya ngono wakati una maambukizi ya zinaa ili kuepuka kuambukizwa magonjwa mengine ambayo yanaweza kutatiza mchakato wa uponyaji.
57. Unaweza kufikia uchunguzi, utambuzi na matibabu ya magonjwa ya zinaa katika vituo vingi vya afya vya umma, mashirika yasiyo ya kiserikali na ya kibinafsi. Ukiwa Busia unaweza kupata huduma hizi katika kitengo cha Afya cha madereva wa lori kilichopo eneo la forodha la Busia bila malipo.

Appendix X: Ethical Approval

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
P.O BOX 62000(00200) NAIROBI, Tel:(067) 58700001-4
(Office of the Deputy Vice Chancellor, Research Production and Extension Division)
JKUAT INSTITUTIONAL SCIENTIFIC AND ETHICS REVIEW COMMITTEE

REF: JKU/2/4/896B Date: 29th February 2024

CYRUS MUTIE PAUL
DEPARTMENT OF NURSING, JKUAT

Dear Mr. Mutie,

RE: A BEHAVIOUR CHANGE COMMUNICATION INTERVENTION TO ENHANCE HIV/AIDS RISKS REDUCTION AMONG LONG-DISTANCE TRUCKERS OPERATING ALONG THE NORTHERN CORRIDOR HIGHWAY, KENYA.

This is to inform you that JKUAT Institutional Scientific and Ethical Review Committee has reviewed and approved your above research proposal. Your application approval number is **JKU/ISERC/02317/1256.** The approval period is **29th February 2024 to 28th February 2025.** This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by JKUAT ISERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to JKUAT ISERC within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to JKUAT ISERC within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to JKUAT ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours Sincerely,

29 FEB 2024

Dr Amos Mbugua
CHAIR, JKUAT ISERC

Appendix XI: Research Licence by NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **501665**

Date of Issue: **09/March/2024**

RESEARCH LICENSE

This is to Certify that Mr.. CYRUS MUTIE of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Busia, Kajiado on the topic: A Behavior Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-Distance Truckers Operating along the Northern Corridor Highway, Kenya for the period ending : 09/March/2025.

License No: **NACOSTI/P/24/33837**

501665

Applicant Identification Number

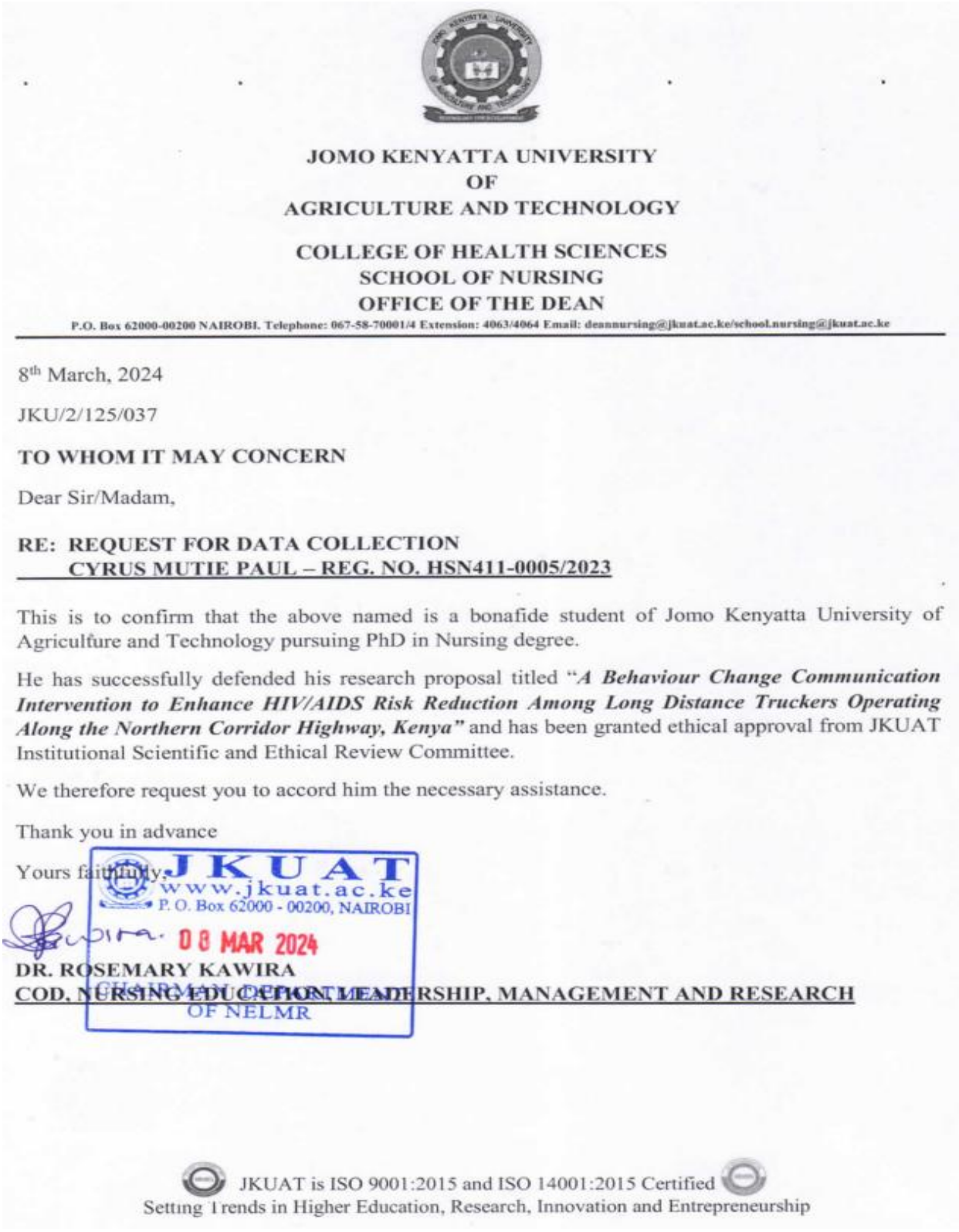
Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix XII: Data Collection Authorization



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING
OFFICE OF THE DEAN

P.O. Box 62000-00200 NAIROBI. Telephone: 067-58-70001/4 Extension: 4063/4064 Email: deannursing@jkuat.ac.ke/school.nursing@jkuat.ac.ke

8th March, 2024

JKU/2/125/037

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: REQUEST FOR DATA COLLECTION
CYRUS MUTIE PAUL – REG. NO. HSN411-0005/2023

This is to confirm that the above named is a bonafide student of Jomo Kenyatta University of Agriculfure and Technology pursuing PhD in Nursing degree.

He has successfully defended his research proposal titled "***A Behaviour Change Communication Intervention to Enhance HIV/AIDS Risk Reduction Among Long Distance Truckers Operating Along the Northern Corridor Highway, Kenya"*** and has been granted ethical approval from JKUAT Institutional Scientific and Ethical Review Committee.

We therefore request you to accord him the necessary assistance.

Thank you in advance

Yours faithfully,

JKUAT
www.jkuat.ac.ke
P. O. Box 62000 - 00200, NAIROBI
08 MAR 2024

DR. ROSEMARY KAWIRA
COD, NURSING EDUCATION, LEADERSHIP, MANAGEMENT AND RESEARCH

CHAIRMAN DEPARTMENT OF NELMR

JKUAT is ISO 9001:2015 and ISO 14001:2015 Certified
Setting Trends in Higher Education, Research, Innovation and Entrepreneurship

Appedix XIII: Research Approval by Board of Post Graduate Studies

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

OFFICE OF THE DIRECTOR, GRADUATE SCHOOL
P.O. BOX 62000, 00200 • NAIROBI •KENYA•TEL: (067)-5870001-4• Email: director@bps.jkuat.ac.ke

REF: **JKU/2/11/HSN411-0005/2023** 8TH APRIL,2024

CYRUS MUTIE PAUL
C/o SON
JKUAT

Dear, Cyrus,

RE: APPROVAL OF RESEARCH PROPOSAL AND APPOINTMENT OF SUPERVISORS

Kindly note that your PhD. research proposal entitled: "BEHAVIOR CHANGE COMMUNICATION INTERVENTION TO ENHANCE HIV/AIDS RISK REDUCTION AMONG LONG-DISTANCE TRUCKERS OPERATING ALONG THE NORTHERN CORRIDOR HIGHWAY, KENYA." has been approved. The following are your approved supervisors:-

1. Dr. Grace Wambura Mbuthia - JKUAT
2. Dr. John Gachohi - JKUAT
3. Dr. Rosemary Kawira Kithuci -JKUAT

Please be advised that you are expected to publish your research outputs in quality and indexed journals.

Yours sincerely,

PROF. FRANCIS K. NJONGE, Ph.D
DIRECTOR, GRADUATE SCHOOL
Copy to: Dean, SON
/cao

Appendix XIV: Data Collection Authorization, Busia County

REPUBLIC OF KENYA

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
State Department for Internal Security and National Administration

Email: ccbusia@gmail.com

COUNTY COMMISSIONER'S OFFICE
BUSIA COUNTY
P.O. BOX 14
BUSIA (K)

When replying please quote

Ref No. ADM 15/27 VOL.I/151

4th April, 2024

All Deputy County Commissioner
BUSIA COUNTY

RE: RESEARCH AUTHORIZATION.

Following research authorization vide Director General National Commission for Science Technology & Innovation (NACOSTI) letter, Ref.No.501665 dated 9th March, 2024 authorizing research for **"A behavior Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long-Distance Truckers Operating along the Northern Corridor Highway, Kenya".**

This is to inform you that **Mr. CYRUS MUTIE** has **been** authorized to carry out research in Busia County for the period ending 9th March, 2025.

Lokuruka M. Aletea
For: County Commissioner
BUSIA COUNTY.

COUNTY COMMISSIONER BUSIA(K)
4 APR 2024
Email:ccbusia@gmail.com
P.O. Box 14-50400,BUSIA(K)

Copy to:

Mr. CYRUS MUTIE

Appendix XV: Data Collection Authorization, Kajiado County

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
COUNTY COMMISSIONER, KAJIADO

Telephone: 0203570295
Fax: 0202064416
Email: kajiadocc2012@gmail.com
When replying please quote

County Commissioner
Kajiado County
P.O. Box 1-01100
KAJIADO

Ref. KJD/CC/ADM/45 VOL. V (4)

24th April, 2024

Cyrus Mutie Paul
Jomo Kenyatta University of Agriculture and Technology
P.O Box 62000 -00200
NAIROBI

RE: RESEARCH AUTHORIZATION- CYRUS MUTIE PAUL

Following the request made on your behalf by National Commission for Science, Technology and Innovation vide letter **Ref. No. NACOSTI/P/24/33837** dated 9th March, 2024.

You are hereby granted authority to carry out research on **"A Behavior Change Communication Intervention to Enhance HIV/AIDS Risk Reduction among Long – Distance Truckers Operating along the Northern Corridor Highway, in Oloililai Sub County in Kajiado County", Kenya:** for the period ending: 9th March, 2025

It is expected that you adhere to research ethics in doing your study.

H.N.KAMAU
FOR: COUNTY COMMISSIONER
KAJIADO COUNTY

CC:

County Director of Education
KAJIADO COUNTY

Deputy County Commissioner
OLOILILLAI SUB COUNTY

CECM-Roads & Transport
KAJIADO COUNTY GOVERNMENT

County Director of Health
KAJIADO COUNTY GOVERNMENT

Appendix XVI: Application for Bulk SMS Sender Platform

TRUCKER EDUCATOR
HEALTH FOR ALL

Loc: Juja, Thika, Kiambu, Kenya
Phone: +254713487574
Email: paulmutiecyrus@gmail.com

ATTN

Mobile Network:

Safaricom Limited

RE: APPLICATION FOR BULK SMS SENDER ID: TD_Educator

We **(TRUCKER EDUCATOR)** of P.O Box [62000, 00622 - JUJA]. Telephone [0713487574] email [paulmutiecyrus@gmail.com] do hereby instruct **Wyzer Technologies Ltd** to register and Set up in your Bulk SMS system an Alpha Numeric Sender I.D **TD_Educator**

We **(TRUCKER EDUCATOR)** understand that the process of registration and set-up may take a max of 2days for Safaricom & Telkom and up to 5days for Airtel **Wyzer Technologies Ltd** liaises with all the Mobile Network Operators.

Your company name
Name: **TRUCKER EDUCATOR**
Designation: **PROPRIETOR**
Date: **11/06/2024**

Appendix XVII: Formal Bulk SMS Sender Authorization Certificate

THE REGISTRATION OF BUSINESS NAMES ACT

(Cap, 499, Section 14)

CERTIFICATE OF REGISTRATION

I hereby **CERTIFY** that, **CYRUS MUTIE PAUL** , carrying on business under the business name of

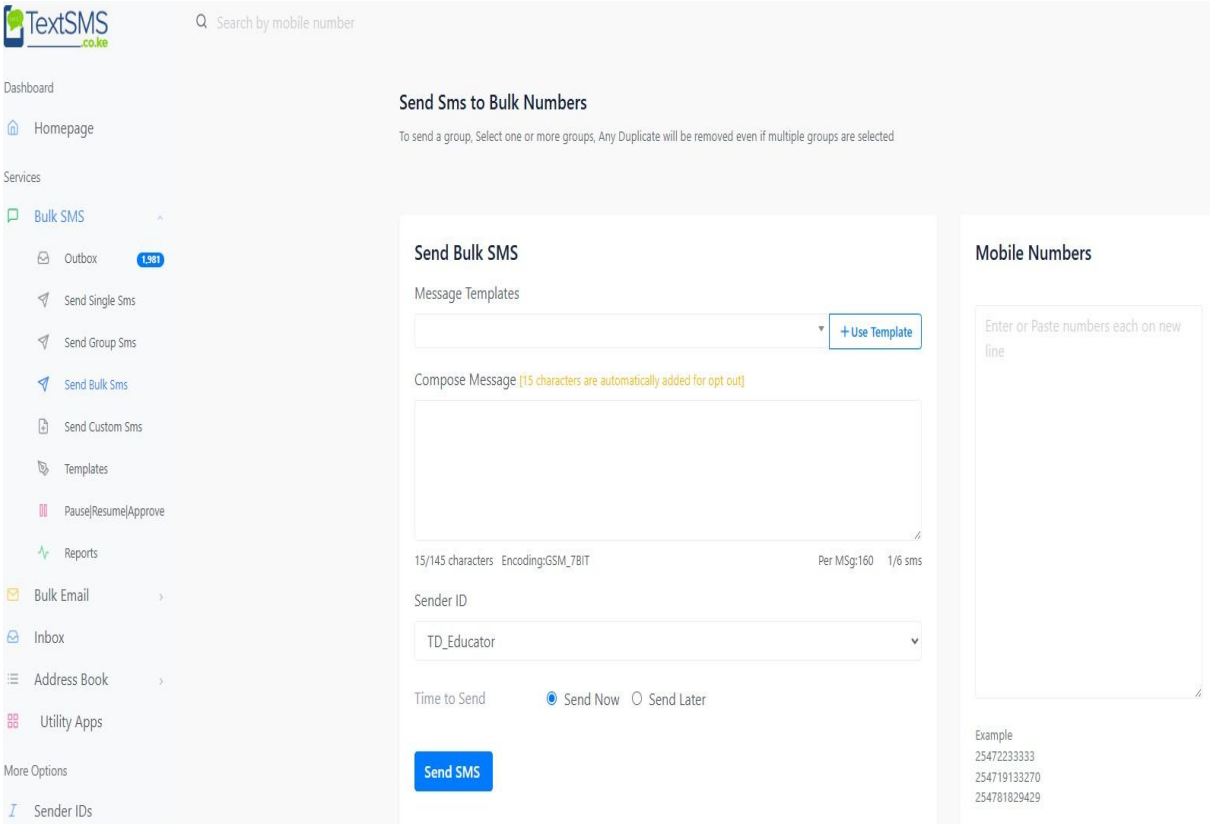
TRUCKER EDUCATOR

at **JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, THIKA ROAD, KIAMBU THIKA WEST DISTRICT JUJA P.O BOX 62000, 00622 - JUJA,** have/has been duly registered under Number **BN-ZWS8YAWQ** pursuant to and in accordance with the provisions of the Registration of Business Names Act and Rules thereunder.

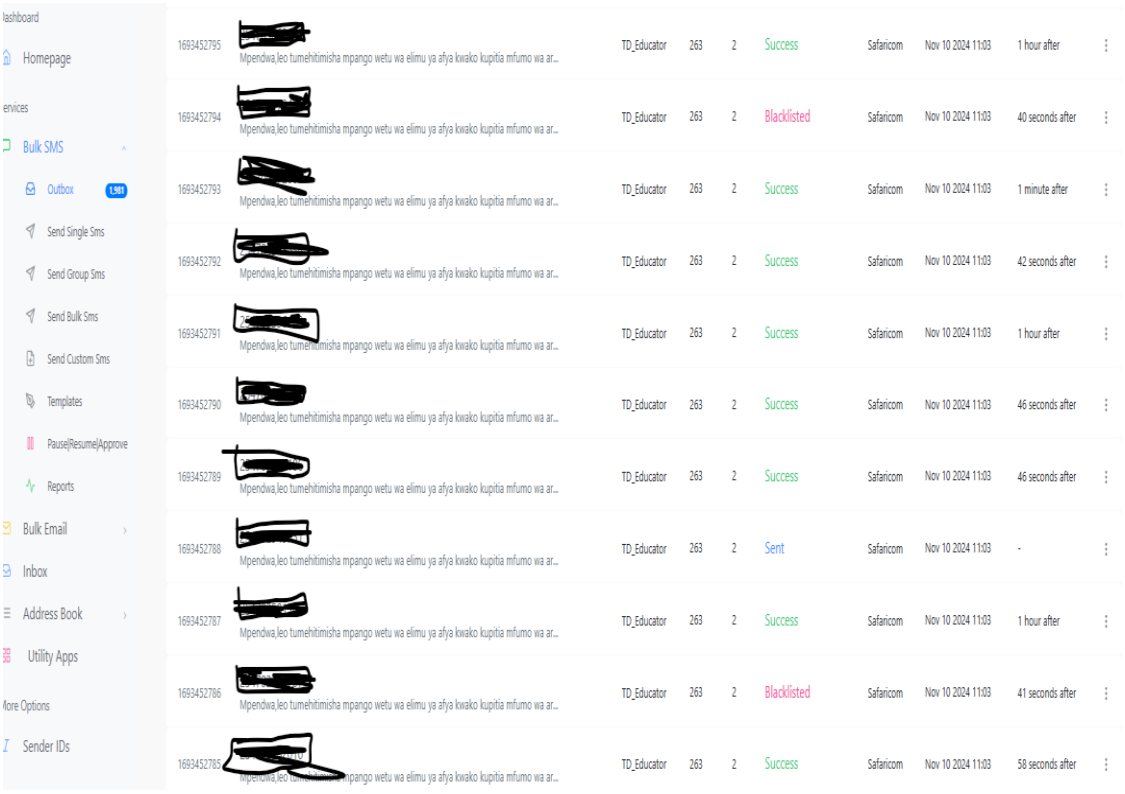
Given under my hand at **NAIROBI** on **Tue, 11 June, 2024**

Registrar

Appendix XVIII: TD_Educator Text Loading and Scheduling Digital Platform



Appendix XIX: TD_Educator Outbox Digital Platform



Appendix XX: Publications from this Doctoral Work

#	Publication Outputs	Type	Status
1.	Mutie C, Otieno B, Mwangi E, Kithuci K, Mutisya A, Gachohi J, Mbuthia G. Global burden of HIV among long-distance truck drivers: a systematic review and meta-analysis. ***BMJ Open.*** *2024 Aug 3;14(8):e085058. doi: 10.1136/bmjopen-2024-085058. PMID: 39097316; PMCID: PMC11298726.*	Systematic Review and Meta-analysis	Published
2.	Mutie C, Otieno B, Kithuci K, Gachohi J, Mbuthia G. Effectiveness of HIV prevention interventions targeting long-distance truck drivers: protocol for a systematic review and meta-analysis of global evidence. ***BMJ Open.*** *2024 Nov 14;14(11):e090062. doi: 10.1136/bmjopen-2024-090062. PMID: 39542465; PMCID: PMC11575331.*	Systematic Review and Meta-analysis-Review Protocol	Published
3.	Mutie C, Kithuci K, Gachohi J, Mbuthia G. "Even Though He Had Expressed Willingness to Take PrEP, He Declined When He Noticed the Drugs Were Packed in a Container Like That of ARVs": Exploring Barriers to HIV/AIDS Risk Reduction Among Long-Distance Truckers in Kenya. ***J Int Assoc Provid AIDS Care.*** *2025Jan-Dec;24:23259582251328814.doi: 10.1177/23259582251328814. Epub 2025 Mar 25. PMID: 40129293; PMCID: PMC11938451.*	Original research	Published
4.	Mutie C, Kithuci K, Gachohi J, Mbuthia G. A mobile phone text-based intervention to enhance HIV/AIDS risk reduction among long-distance truckers in Kenya: Development and validation using an e-Delphi technique. ***Digit Health****. 2025 Jun 20;11:20552076251353287. doi: 10.1177/20552076251353287. PMID: 40547438; PMCID: PMC12182623.*	Original research	Published
5.	Mutie C, Gachohi J, Kithuci K, Mbuthia G. Behavior Change Communication Strategies on Human Immunodeficiency Virus /Acquired Immunodeficiency Syndrome Risk Reduction for Long-Distance Truckers in Kenya. ***J Int Assoc Provid AIDS Care.*** *2025 Jan-Dec;24:23259582251377224. doi: 10.1177/23259582251377224. Epub 2025 Sep 15. PMID: 40953160; PMCID: PMC12437158.*	Original research	Published
6.	Mutie C, Gachohi J, Kithuci KR, Mbuthia G. Effectiveness of an mHealth intervention in HIV/AIDS risk reduction among long-distance truckers in Kenya: A quasi-experimental study. **Digit Health.** *2025 Oct 21;11:20552076251390322. doi:*	Original research	Published

	10.1177/20552076251390322. PMID: 41146677; PMCID: PMC12553905.		
7.	Mutie, C., Kithuci, K., Gachohi, J., & Mbuthia, G. (2026). Predictors of HIV risk and their implications for targeted interventions among long-distance truckers: A formative study. *International journal of STD & AIDS, 9564624261417531. Advance online publication.https://doi.org/10.1177/09564624261417531*	Original Research	Published
8.	Mutie C, Otieno B, Kithuci K, Gachohi J, Mbuthia G. Effectiveness of HIV prevention interventions targeting Long-distance truck drivers: a systematic review of global evidence. ***(BMJ Open.)***	Systematic Review	Under review