ASSOCIATION BETWEEN PSYCHOLOGICAL SYMPTOMS, PARTICIPATION IN CORE ACTIVITIES AND HEALTH-RELATED QUALITY OF LIFE AMONG SPINAL CORD INJURY SURVIVORS IN SELECTED COUNTIES, IN KENYA

MINAH KINANU GUANTAI

MASTER OF SCIENCE
(Physiotherapy (Neuro-Rehabilitation))

JOMO KENYATTA UNIVERSITY OF

AGRICULTURE AND TECHNOLOGY

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Association between Psychological Symptoms, Participation in Core Activities and Health-Related Quality of Life among Spinal Cord Injury Survivors in Selected Counties, in Kenya

Minah Kinanu Guantai

A thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Physiotherapy (Neuro-Rehabilitation) of the Jomo Kenyatta University of Agriculture and Technology

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DECLARATION

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

Signature………………………………………………Date…………..……………

Minah Kinanu Guantai

This thesis has been submitted for examination with my/our approval as University Supervisors.

Signature………………………………………………Date…………..……………

Dr. Joseph Mwangi Matheri, (PhD)

JKUAT, Kenya

Signature………………………………………………Date…………..……………

Dr. Wallace Karuguti, PhD

JKUAT, Kenya

Signature………………………………………………Date…………..……………

Dr. James Kamau Kanyoro (PhD)

Mathare Mental Teaching and Referral Hospital, Kenya

DEDICATION

I dedicate this work and give special thanks to my husband, Mr. Daniel Mutegi and my wonderful daughters for being there for me throughout the entire master’s program. All of you have been my best supporters. And most of all, thank you, Lord, for always being there for me.

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ABBREVIATION AND ACRONYMN

DASS	Depression Anxiety Stress Scale
GDP	Gross Domestic Product
HRQol	Health Related Quality of Life
KMO	Kaiser-Meyer-Olkin
NACOSTI	National Commission for Science technology and Innovation
SCI	Spinal Cord Injury
WHO	World Health Organization
WHOQOL	World Health Organization Quality of Life

DEFINITION OF TERMS

Spinal cord injury: Is the injury of the spinal cord from the foramen magnum to the cauda equina occurs as a result of pressure, incision or contusion (Mcdonald & Sadowsky, 2002).

Tetraplegia: is the result of an injury above the first thoracic vertebra and is characterized by paralysis of the trunk, lower limbs, and the upper limbs (Kirshblum *et al*., 2014).

Participation: actions and involvement in life situations such as taking part, being engaged in an area of life, being accepted, or having access to needed resource (WHO, 2007).

Health-related Quality of Life: A person's perception of their position in life in the context of the culture and worth systems in which they live relative to their goals, expectations, value and concerns (Post, 2014).

Psychological symptom: Is a divergence from what is well thought-out as usual and it indicates the mental disorder to the person (Hirsch & Wallace, 1996).

Core activities: These are defined as skills required managing one's physical and social needs (Gurcay *et al*., 2010).

Domains; sets of related physiological functions, anatomical structures, activities, tasks, areas of life and external influences (Van Brakel *et al*., 2006).

ABSTRACT

Globally, rehabilitated spinal cord injury survivors in the communities continue to experience psycho-social challenges that impede their return to pre-injury lifestyle and/or achieve optimal functional independence. Therefore, the main purpose of the study was to determine the association between psychological symptoms and participation in core-activities as well as in health-related quality of life amongst spinal cord injury survivors in Nairobi, Machakos and Nakuru Counties in Kenya.A cross-sectional study utilizing quantitative methods was conducted on a sample of 186 spinal cord injured survivors in Nairobi, Nakuru and Machakos counties. Potential participants were identified from the databases of National Spinal Injury Hospital in Nairobi, Nakuru level 5 Hospital, Naivasha county referral Hospital and Machakos level 5 hospital. In addition, purposive sampling technique was employed to recruit participants identified in the databases. Data was collected using a combination of the Participation Scale (P-scale), Depression, Anxiety, Stress Scale version 21 ($DASS_{21}$) and World Health Organization Quality of Life questionnaire (WHOQOL-BREF). Data was entered into two separate MS Excel sheets and later imported into Statistical Package for Social Sciences version 25 (SPSS 25). Data was re-entered from the questionnaires where discrepancy was noted and corrected. Thereafter, descriptive statistics were calculated and presented in frequency tables. Further one-way analysis of variance (ANOVA) was done to test the influence of the participation in core activities variables and health-related quality of life HRQol variables by psychological symptoms. The level of significance was set at < 0.05. Ethical clearance was sought from JKUAT- Ethical Review Committee while authority to conduct the study was secured from the NACOSTI (Ref no. NACOSTI/P/19/63727/30278; Date. 21st May, 2019). In addition, permission to conduct the study was sought from the County commissioners, Ministry of education, Ministry of health and participating hospitals ERCs. A 72% (n=134) prevalence of psychological symptoms was recorded amongst the 186 participants. Noteworthy, lowly educated males aged <45 years, and earning less than USA $500 (Kshs. 50,000) annually were the most affected by SCI. At least 53.8% of the sample (n=100) had depression although anxiety was the most prevalent symptom, that is, 65.6% (n=122) among the three psychological symptoms measured. Concerning

HRQoL, the environmental domain had the lowest mean (44.71% SD 15.07%) percentage reported. This implies that most SCI survivors felt that the environmental domain affected their HRQoL compared to other domains. Regarding participants' involvement in core activities, majority, 119 (64%) reported to experience severe participation restriction in all domains. There was a significant association between County of residence and having or not having psychological symptoms (*P*=.003). Further, there was a statistically significant association between self-care (domain of participation) and psychological symptoms (*P*=.000). In addition, there was a statistically significant association between psychological symptoms and HRQoL physical health domain (*P*=.008). In conclusion, 3 out of 4 SCI patients in the study sample suffer from psychological symptoms and 1 out of 2 have depression. These are lowly educated poor young male adults. Although integrated and living in the community after rehabilitation, SCI patients do experience poor HRQoL in their environments and self-care problems mostly. The study further shows that psychological symptoms status may influence SCI survivors' physical, HRQoL and self-care activity. The results of this study form baseline data for future research and policy pertaining to SCI patients' wellbeing.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Spinal cord injury is a highly destructive condition that leads to intense life changes and the fact that renders the person incapacitated (World Health Organization & International Spinal Cord Society, 2013; Singh *et al*., 2011). Previous studies have reported that the global estimate incidence of SCI 15–40 per million (Lee *et al*., 2014) while in developing countries 25.5 in a million (Rahimi-Movaghar *et al*., 2013) per annum. In been reported (Lee *et al.*, 2014). Whereas, there is no health-related quality of life documented data on SCI addition, sub-Saharan African countries, annual incidences of 21–29 per million populations have in Kenya. The level of participation of people with spinal cord injury post-rehabilitation is declining globally (World Health Organization, 2015). This is despite the long-term goal of spinal cord injury (SCI) rehabilitation being to achieve community reintegration of survivors with the maximum possible level of functional independence and a return to pre-injury lifestyle (Swinnen *et al.*, 2010). Participation is defined as an individual's unique response to the reality of living with a disability relative to environmental, personal, and cultural factors influences (Carpenter *et al*., 2007). Disparate factors have been associated with community participation of rehabilitated persons with SCI. For example, previous studies have linked employment and lifestyle satisfaction to community participation amongst individuals post SCI (Carpenter *et al.*, 2007; Blauwet *et al.*, 2013). In a Thailand cross-sectional study conducted amongst 139 community-living persons with SCI Suttiwong *et al.* (2015) found that the availability of social support and the individual's functional performance predicted community participation. Additionally, a study amongst 128 individuals with SCI, aged at least 65 years conducted in China, Post and Reinhardt (2015) found that lower age at onset of SCI was associated with better participation and life satisfaction. Further previous research has shown that individuals with SCI level independence and social protection predict their health-related quality of life (HRQoL) (Hicken *et al*., 2002).

Changes in the quality of life of both the persons with SCI and their close persons are paramount (Lude *et al*., 2014; Chang *et al*., 2012). Devaki and Maheswari (2011) and Wilson *et al*. (2011) posit that HRQoL as a broad multidimensional concept includes one's subjective assessment of the congruence between his/her life expectations and achievements, that is, satisfaction in everything including physical health, family, education, employment, wealth, safety, security, freedom, religious beliefs, finance, and the environment. Nonetheless Post and van Leeuwen (2012) argue that despite the myriad of challenges faced by people with SCI, most of them adapt to a favourable HRQoL after rehabilitation. For instance, in an Indian, study involving 364 paraplegic participants, Ganesh and Mishra (2016) found that interventions promoting physical activity and employment help to improve HRQoL among spinal cord injured survivors. In contrast, some previous research has shown that on average, SCI is associated with lower life satisfaction (Hicken *et al.*, 2002), reduced HRQoL (Craig *et al., 2009*; Martz *et al.*, 2005), deepening of depression, anxiety and other psychological symptoms (Khazaeipour *et al*., 2015). Although the absence of anxiety and depression post SCI rehabilitation is a positive indicator of good quality of life, participation and community integration (Martz *et al*., 2005) a lower HRQoL in SCI survivors is associated with the increase of depressed mood (Mousavi, 2017; Coura *et al*., 2013). Tran, Dorstyn and Burke (2016) argue that psychological symptoms at acute stages of SCI without appropriate attention may advance to a chronic state.

This notwithstanding, psychological symptoms including depressive disorders are more frequent in persons with SCI compared to the able-bodied (Saunders, Krause & Focht, 2011; Kago, 2005). One example, is the Australian research involving forty participants both paraplegic and tetraplegic SCI survivors, in which Mitchell, Burns and Dorsty (2008) found that 45% of them experienced elevated levels of anxiety. Further, in a related study among 443 adults both non-traumatic and traumatic SCI survivors, in Australia, Migliorini, New and Tonge (2009) found a prevalence of 37%,30%,25% for depression, anxiety and stress respectively. Moreover, in the general population the estimated prevalence of anxiety disorders ranges between 4.8% and 10.9% (Baxter *et al*., 2013) and 4.7% (4.4–5.0%) for major depressive disorder worldwide (Ferrari *et al.*, 2013). Researchers have linked psychological morbidity in patients with SCI to the increased hospital stay, reduced functional improvement, and difficulties in adjustment after rehabilitation (Tran, Dorstyn & Burke, 2016 ; Kraft & Dorstyn, 2015and Increase human and economic cost and family instability (Merritt *et al*., 2019).

Most of these studies have been conducted in developed countries such as Australia (Mitchell *et al*., 2008), Canada (Carpenter *et al*., 2007), Thailand (Suttiwong *et al*., 2015) and Switzerland (Lude *et al*., 2014). Very few studies have been documented on persons with SCI HRQoL and level of participation in core-activities in low-middle income countries including in Africa. In Sub-Saharan Africa, literature regarding the burden of psychological symptoms, HRQoL and level of participation in core-activities of daily life amongst SCI survivors is limited, with no reported studies conducted in Kenya. This study was to fill this gap. Therefore, the purpose of this study was to determine the burden of psychological symptoms amongst spinal cord injury survivors, their participation in core-activities and health-related quality of life in selected counties, in Kenya.

1.2 Statement of the Problem

Research evidence has shown that people with SCI encounter difficulties coping with normal life following discharge from institutionalized rehabilitation centers worldwide (Øderud, 2014). In Sub-Saharan Africa, more specifically **IN KENYA**, there is paucity of information concerning the burden of psychological symptoms, HRQoL and level of participation in core-activities amongst SCI survivors. Additionally the link between psychological symptoms, and participation in core activities of daily living including health-related quality of life amongst rehabilitated spinal cord injury survivors, is not documented. Whereas the level of participation of SCI survivors is not explained by the modalities used in rehabilitation (Swinnen *et al*., 2010), the need to establish the association between psychological symptoms status and the level of participation and health-related quality of life amongst SCI survivors is worthwhile.

1.3 Justification of the study

It is envisaged that the findings of this study shall provide key information that will increase the knowledge of physiotherapists and other healthcare professionals regarding SCI survivors. In turn these professionals will design suitable evidence-based rehabilitation programs that have a higher likelihood to improve SCI survivors' level of participation in activities of daily living, HRQoL and to alleviate suffering from psychological symptoms. Further, this new knowledge will contribute to health-related policies, the wellbeing of people with SCI and that of the caregivers thus, improving their health and social outcomes after rehabilitation. This has potential to reduce morbidity and cost of care, increase productivity, and socio-economic stability not only to families of SCI survivors but also nationally. The study findings are envisaged to also provide a baseline for future interventional research studies towards mitigation of impact of psychological symptoms on people with SCI.

1.4 Aim of the Study

To determine the association between psychological symptoms, and participation in core-activities as well as health-related quality of life amongst spinal cord injury survivors in selected counties, in Kenya.

1.4.1 Specific objectives

1. To determine the prevalence of selected psychological symptoms (depression, anxiety and stress) amongst rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya.
2. To determine the level of participation in core-activities of daily living amongst rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya.
3. To determine the health-related quality of life amongst rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya.

4. To determine the relationship between psychological symptoms status, participation and HRQoL of rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya.

1.5 Research questions

1. What is the prevalence of the selected psychological symptoms (depression, anxiety and stress) amongst rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya?
2. What is the level of participation in core-activities of daily living amongst rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya?
3. What is the health-related quality of life amongst rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya?
4. Is there a relationship between psychological symptoms status, participation and HRQoL of the rehabilitated spinal cord injury survivors in Nairobi, Nakuru and Machakos counties in Kenya?

CHAPTER TWO

LITERATURE REVIEW

2.1 Epidemiology Spinal Cord Injury

Disparate global epidemiologic data is available on Spinal Cord injury. A case in point Wyndaele and Wyndaele (2006) posited that globally SCI affect between 10.4 and 83 per million inhabitants per year with one-third of SCI survivors being tetraplegic and 50% having a complete lesion. In contrast, Lee *et al*. (2014) reported that the global estimate of SCI is 15–40 per million with a mean of 23 per year. In developing countries, the incidence of SCI is reported to be 25.5 in a million per annum (Rahimi-Movaghar *et al*., 2013). Whereas there is inadequate data on the incidence of SCI in low-middle-income countries; in sub-Saharan African countries, annual incidences of 21–29 per million populations have been reported (Lee *et al*., 2014). In a study conducted in Botswana, using data from Princess Marina Hospital to explore the local epidemiology and outcomes of SCI, Löfvenmark *et al*. (2015) found that the annual incidence of SCI was 13 per million of the population. However, what is more important is its distribution between age groups and sexes. Wyndaele and Wyndaele (2006) estimated 33 years as the mean age of SCI survivors and the sex distribution as 3.8 to 1 for men and women respectively. In concurrence, Rahimi-Movaghar *et al.* (2013) reported a mean age of 32.4 years and more males compared to females are affected by SCI. In a Kenyan study conducted at Kenyatta National Hospital on patients diagnosed with SCI, Kinyanjui and Mulimba (2016) reported a mean age of 37.6 years with males more than females being affected. In many Sub-Saharan African countries, road traffic crashes (Draulans *et al.*, 2011; Löfvenmark *et al*., 2015) and falls (Rahimi-Movaghar *et al*., 2013) are the leading causes of traumatic SCI.

2.2 Effects of SCI on individuals' well-being

After SCI, survivors experience low self-esteem, poor self-image and negative mood that impede interpersonal interactions and relationships (Amsters *et al*., 2016). People with SCI also experience, on average, higher levels of distress and lower levels of life satisfaction compared with the general population (Post & van Leeuwen, 2012). More importantly, female SCI survivors experience lower mental health scores and in particular those with tetraplegia lower physical health scores (Andresen *et al*., 2016). In contrast, previous research has shown that male SCI survivors preserve interests in maintaining fertility although they have high rates of severe erectile and ejaculatory dysfunctions (Morrison *et al.*, 2017). Anderson *et al*. (2007) observed that sexual dysfunction is a major issue to an overwhelming majority of people living with SCI that negatively impact their HRQol.

Research evidence has shown that various factors such as sexuality and fertility issues, high rates of divorce in both pre and post existing marriages negatively affect SCI survivors' need for life-long care (DeVivo *et al*., 1995 ; DeVivo and Fine, 1985). According to Schwartz et al. (2018) the relationship between individuals with SCI and their family and peers is likely to be altered physically, socially as well as psychologically. Previous research has also shown that people with a higher level of SCI present with autonomic dysfunction which lead to incontinence and palpitations (Inskip *et al.*, 2018) spasticity and pain syndromes (Andresen *et al., 2016*; Finnerup *et al*., 2016; Sezer, Akkuş and Uğurlu, 2015). Further, people with SCI are susceptible to respiratory, cardiovascular, urinary and bowel complications, pressure ulcers, osteoporosis and bone fractures (Sezer *et al.*, 2015). Gagnon *et al*. (2005) also observed that during functional transfer activities people with SCI encounter difficulties in movement strategies and muscular demand. These complications and difficulties not only hinder people with SCI from accomplishing their activities of daily living but also negatively impact on their functional independence and HRQoL (Andresen *et al*., 2016; Finnerup *et al*., 2016; Sezer, Akkuş and Uğurlu, 2015; Gagnon *et al*., 2005).

2.3 Life expectancy since SCI

Previous research has shown people with SCI have reduced life expectancy (Noe *et al*., 2017; Middleton *et al*., 2012; Frankel et al., 1998). In a study that examined the overall survival and mortality over time in terms of age at the time of injury at Spinal Cord Injury Centre of Western Denmark medical archives, Noe *et al*. (2017) reported a higher mortality among SCI survivors above 60 years of age at injury. Additionally, in the USA, statistical data shows reduced life expectancy among SCI survivors attributable to pneumonia and septicaemia (White & Black, 2017). Further, in a 50-year Australian study to analyse acute and long-term mortality, estimate life expectancy and identify survival patterns of individuals experiencing traumatic SCI, Middleton *et al*. (2014) found that their survival rate was predicted by the neurological impairment.

However, research evidence has shown that there is an improvement in life expectancy (both immediate and long-term survival) following traumatic SCI, since the Second World War, though shorter compared to that of the general population (Middleton *et al.*, 2012; *Frankel et al*., 1998). McColl *et al.* (1999) reported an increase in life expectancy of about 5 years in the study on life expectancy and health among (n=286) spinal cord injured adults in Canada. A UK retrospective study (covering 70 years) that investigated long-term survival of traumatic SCI cases (n=5483) with a mean age at injury of 35.1 years that survived 1-year post-injury, Savic *et al*. (2017) found that life expectancy not only depended on the level and completeness of injury but also ventilator dependency, age and gender. Further, research evidence has also shown that several factors play part in the length of survival of SCI clients including medical services, level of care sought (Middleton *et al*., 2012; Frankel *et al*., 1998), completeness of injury, age and gender (Savic *et al.*, 2017). However, the global average life expectancy is above 70 years though there is inequality across and within countries *(Roser et al.*, 2013).

2.4 Participation in Community, social and civic life

Spinal cord injured survivors may often experience difficulties when attempting to participate in various community activities (Conroy & McKenna, 1999). Previous studies indicate that participation in community, social or civic life activities is a function of the interaction of various factors including social support, employment, time since injury, neurologic status, health status, income and functional independence (Braaf *et al*., 2017; Carr *et al.*, 2017; Suttiwong *et al*., 2015; Paul *et al*., 2013; Anderson, Krajci & Vogel, 2003; Whiteneck *et al.*, 1999). In a study conducted amongst SCI survivors who received initial rehabilitation in a Regional Model Spinal Cord Injury System, in Washington DC, in their 1st and 20th anniversary post-injury to assess factors that influence community reintegration of people with SCI, Whiteneck *et al.* (1999) found that age, gender and ethnicity significantly influence community participation**.** While in a study to assess socioeconomic and work outcomes between recipients' and those not receiving compensation, over two and a half years following SCI, Paul *et al*. (2013) found that financial support complement re-integration into community and upgrade the HRQoL. In a systematic review of literature to examine the current knowledge of how social support and social skills are associated with aspects of health, functioning and quality of life of persons living with SCI, Müller *et al.* (2012) found that social support was linked to physical functioning, mental health, and adjustment.

This notwithstanding, the many factors that hinder SCI survivors from participating in the community, social or civic life, their behaviours, lifestyle changes, and access to resources in the environment need to be put into consideration (Richards *et al.*, 1999). Furthermore, participation in community, social or civic life has been attributed to factors such as environmental adaptation, accessibility, and cleanliness of bathrooms (Braaf *et al.*, 2017), public spaces (such as roads, missing or inadequate ramps, inaccessible restrooms) and negative attitudes (Aldersey *et al*., 2018). Aldersey *et al.* (2018) further noted that women in wheelchair compared to men face greater barriers of access in a range of community spaces and activities. In a cross-sectional community study conducted in Sweden to examine the effect of environment (housing accessibility) on participation of people with SCI, Norin *et al*. (2017) concluded that housing design features were associated with fewer self-care activities. In a study amongst 160 people with SCI survivors in Sweden to describe how they perceive their participation in life situations and to determine the relationship between their participation and perceived problems, Lund *et al.* (2005)

found that individuals perceived severe participation restriction in mobility-outdoors, work, education and social interactions. In concordance, Noreau *et al.* (2005) in a study to determine participation after SCI in Canada found that individuals reporting mobility, education participation restriction most often present with limitations in social integration, and financial independence. This may lead to limited opportunities to vocational training, employment and social interactions.

2.5 Participation in Major Life Areas

Researchers have reported that early vocational rehabilitation amongst people with SCI increases their likelihood to participate in major life areas including employment, paid work or education (Trenaman, Miller & Escorpizo, 2014; Meade *et al.*, 2008; Schönherr *et al.*, 2004). In a systematic review to evaluate employment outcomes for individuals with SCI, Trenaman, Miller and Escorpizo (2014) found that acquiring or returning to durable employment confirmed a significant achievement and measure of successful rehabilitation. Also, a survey conducted at the Centre for Rehabilitation Beatrixoord from 1990 until 1998 in the Netherlands involving 69 clients with SCI to explore the process of reintegration in paid work following traumatic SCI established that positive expectations in paid work in SCI clients was associated with vocational re-training of the patient (Schönherr *et al.*, 2004). Further, an observational longitudinal cohort study to describe a novel early vocational rehabilitation program conducted amongst 100 adults with SCI admitted to spinal units within 2 years, in Sydney, Australia, Middleton *et al.* (2015) found 34.5% were in paid employment, 36% unemployed and 13% were students or in-training workers and 17% were in vocational rehabilitation. Ottomanelli and Lind (2009) in a review of literature on employment rates and predictors of employment after SCI, the benefits and barriers involved found an average employment rate of approximately 35%. In a survey of 445 individuals with SCI's need of services that they had or were interested in receiving in the Commonwealth of Virginia, Meade *et al.* (2008) found that only 32% had met the need for vocational services, 24.2% expressed interest in new job skill and 21.3% acquiring a job but were hindered by affordability and accessibility of the services.

Previous studies have shown that several factors influence people with SCI participation in major life areas including affordability and accessibility of rehabilitation services (Solheim & Leiulfsrud, 2018; Meade *et al.*, 2008). Injury-related factors, employment history, psychosocial issues, and disability benefits status (Ottomanelli & Lind, 2009), education, community mobility (Anderson & Vogel, 2002), have also been linked to people with SCI participation. For example, in a retrospective study using data of 195 paediatric-onset SCI clients from archives of Shriners Hospital for Children in USA, Anderson and Vogel (2002) found that education, community mobility, functional independence, and decreased medical complications, community integration, independent driving, independent living, higher income, and life satisfaction were associated with employment. Similarly, in Norwegian cross-sectional study conducted amongst 320 persons with SCI to assess how the employed compare with the non-employed in their job motivation, labour discrimination, quality of life, everyday coping, health and pain suffering, Solheim and Leiulfsrud (2018) found that the ability to continue working in the same organization and education was associated with pre-injury employment status in both sexes. In an Australia Longitudinal study to explore the outcomes of people with SCI (early vocational rehabilitation, contextual factors and employment outcomes), Hilton *et al*. (2017) found that education status, relationship and subjective wellbeing significantly increased the odds of being employed while tertiary education prior to injury was associated with eight times increased odds of being in employment.

On the other hand, in one cross-sectional study of 149 adults with chronic SCI to determine the association between participation in organized sports programs and employment, Blauwet *et al.* (2013) found that participation in organized sports was positively associated with employment. Similarly, another cross-sectional survey amongst 781 adults with SCI (aged 18-64 years) to identify barriers and facilitators to employment after SCI and labor force participation, in the USA, showed that facilitators were more highly related to labor force participation than barriers (Krause & Reed, 2010). This notwithstanding, researchers have shown that barriers such as discrimination by employers against people using wheelchairs (Solheim & Leiulfsrud, 2018) and lack of vocational rehabilitation (Solheim & Leiulfsrud, 2018;

Hanson, Nabavi & Yuen, 2001; Tasiemski *et al*., 2000) affect participation in employment, sports and leisure activities of SCI survivors in both gender.

2.6 Effect of SCI on Participation Core Activities

Results of studies on the effect of SCI on individuals' participation in core activities of daily living vary. In a study conducted amongst 57 people with SCI in Beatrixoord, Netherlands, Centre for Rehabilitation, to determine the changes in participation in vocational and leisure activities after their reintegration in society, Schönherr *et al.* (2004) found that 60% successfully reintegrated in work with a reduction in hours spent on paid work and sporting activities. Tasiemski *et al*. (2000) established that levels of sporting/recreational activities and employment decreased significantly after SCI. Additionally, at National Spinal Injuries Centre in the UK to examine the levels of sporting/recreational activities, education and employment in 45 people with SCI, Tasiemski *et al.* (2005) found that involvement in sport and recreation was associated with higher levels of education and employment. Moreover, a cross-sectional retrospective study in Switzerland to describe the frequency of participation in sport and its correlates amongst persons with SCI, Rauch *et al*. (2014) observed that persons with SCI (with tetraplegia) especially women participated significantly less often.

2.7 Factors Influencing Persons with SCI Participation in Core Activities

Researchers have established that a host of factors influence persons with SCI participation in vocational, sports and leisure activities including employment (Blauwet *et al.*, 2013; Kehn & Kroll, 2009 ; Schönherr *et al*., 2004 ; Tasiemski *et al*., 2000). Blauwet *et al*. (2013) posit that factors such as personal motivation, independence, affordability, availability and accessibility of facilities, equipment and personal assistants, including fear of injury not only influence persons with SCI work participation but also in sports and leisure activities. A qualitative study conducted among 48 individuals with SCI, in Florida USA, to determine whether persons with spinal cord injury participation in sports affected their level of community integration, Hanson, Nabavi and Yuen (2001) found that athletes with SCI had significantly higher scores on physical independence, mobility, occupation and social integration than non-athletes. Blauwet *et al*. (2013) in a cross-sectional study of 149 adults with chronic SCI to determine the association between participation in organized sports programs and employment in adults with chronic SCI found that participation in organized sports was positively associated with current employment status. This notwithstanding, injury level, active membership in a club, frequency of participation in sports before the onset of SCI correlate with social activities participation in community settings (Rauch et al., 2014) including wheelchair skills performance (Fliess-douer *et al.,* 2013). Further previous researches have also shown that the geographic and architectural (presence of storey buildings) accessibility and transportation issues act as barriers to SCI survivors' full reintegration and participation in society (Vissers *et al*., 2008; Levins, Redenbach & Dyck, 2004). Moreover, the risk of psychological symptoms presents a major concern towards SCI survivors' full reintegration and functioning in community settings.

2.8 Psychological symptoms

Individuals with SCI have been reported in several studies to be at a higher risk of negative psychological symptoms compared to the general population (Le & Dorstyn, 2016; Williams & Murray, 2015; Khazaeipour *et al*., 2014; Craig, Tran & Middleton, 2009; Migliorini, New & Tonge, 2009; Mitchell, Burns & Dorsty, 2008; Krause, Kemp & Coker, 2000; Elliott &Frank, 1996). In a systematic review to examine the prevalence of negative psychological states in people with SCI, mediating and contextual factors, Craig, Tran and Middleton (2009) found a 27% prevalence rate of abnormal levels of psychological morbidity. *Lidal et al.* (2008) in a Norwegian mortality study on the cause of death and risk indicators for death in patients with spinal cord injury conducted among 387 individuals found that risk indicators for death were psychiatric diagnosis and alcohol or substance abuse. In a similar study in India conducted among 50 people, to assess psycho-social problems amongst patients with SCI, Singh *et al*. (2011) found that they suffered from psychological, sexual function and social adjustments problems including difficulties maintaining family and partner relationships, as well as sleep disturbances.

According to Craig *et al*. (2013) and Elliott and Frank (1996), depressive disorders are the most common form of psychological symptoms affecting people with SCI. In a cross-sectional study conducted in Iran amongst 134 SCI survivors to determine the prevalence of depression and associated factors, Khazaeipour, Taheri-Otaghsara and Naghdi (2015) found a prevalence rate of 49.3% who had mild to severe depression. Similarly, Krause, Kemp and Coker (2000) in a USA survey among 1391 SCI survivors, found a prevalence rate of 48% of depressive symptoms which were attributed to their socioeconomic status (education and income), age, gender and ethnicity. Additionally, in a meta-analysis, Williams and Murray (2015) found an estimated mean prevalence of 22.2% for depression following SCI with a lower-bound and an upper-bound of 18.7% and 26.3% respectively. In addition, Migliorini, New and Tonge (2009) in an Australian community cross-sectional study amongst SCI survivors (n=443) to examine the likelihood of depression, anxiety and stress in adults with non-traumatic SCI compared with adults with traumatic SCI found that the prevalence was 37%, 30%, 25% for depression, anxiety and stress respectively. In the general population, Ferrari et al. (2013) following a systematic review to evaluate depressive disorder reports that the global point prevalence of depression is 4.7% (4.4–5.0%). Additionally, Baxter *et al*. (2013) in a systematic review and meta-regression to estimate the prevalence of anxiety disorders globally, found a 7.3% (4.8–10.9%) prevalence of anxiety ranging from 5.3% (3.5–8.1%) in African cultures to 10.4% (7.0–15.5%) in Euro/Anglo cultures. Recently WHO (2017) estimated the global prevalence of depression and anxiety to be 4.4% and 3.6% respectively.

2.9 Factors Influencing Psychological symptoms

Previous research reports indicate that the rate of psychological symptoms in SCI survivors is related to aging (Jokela, Batty & Kivimäki 2013), gender, ethnicity, divorce and socioeconomic statuses (Saunders *et al.*, 2011) as well as increased time since injury (Hoffman *et al.*, 2011; Fann *et al*., 2011; Krause, Kemp & Coker, 2000). Further, researchers have also demonstrated that depressive symptoms are associated with longer hospitalization periods, increased medical complications, lower functional independence and increased morbidity (Riggins *et al*., 2011; Schönherr *et al.*, 2000). A USA study conducted amongst 2,256 individuals with SCI to identify demographic, injury, and discharge factors associated with the major depressive disorder at 1 and 5 years post-injury, Arango-Lasprilla *et al*. (2011) found that being unemployed, having no bladder management at discharge and high school education predict depression among persons aged 35–55 years old at the time of injury. A nationwide population-based cohort study in Taiwan assessing anxiety and depression in survivors with traumatic SCI, Lim *et al*. (2017) indicated that males with SCI under 35 years old who had low income, had a higher risk of anxiety or depression. Previous research evidence also link anxiety in adults with SCI to excessive worry, fear or panic *(Mitchell et al*., 2008) and feelings of helplessness (A. Craig *et al*., 2009). This notwithstanding, Claudia, Vignola and Marcassa (2014) posits that stress can lead to the onset of depression or anxiety which negatively impact on functional performance and HRQoL. More importantly, depression has been linked to substance abuse, suicidal tendencies (Fann *et al.*, 2011) and is among the leading causes of disability worldwide (Riolo *et al*., 2005; Üstün *et al*., 2004).

2.10 Impact of Depression

Although depression is treated and a marked decrease in symptoms achieved, depressive illnesses remain a cause of disability on the patient (WHO, 2017) and a substantial burden on family and society (Ishak *et al.*, 2011). In particular, relapse affects performance and HRQoL (Ishak *et al.*, 2011). Previous research also indicates that depression not only leads to family conflict, school dropout, absenteeism, substance abuse and suicide but also negatively impact work participation especially in young adults (WHO, 2017; Sobieraj *et al.*, 1998). In a prospective cohort study conducted in North-Western China amongst people with depression and chronic illness to examine the impact of physical and mental health status on job loss and job turnover rates, Wang *et al*. (2014) found that those with depression had a higher risk of unemployment and poor work outcomes compared to those with other forms of chronic illnesses. Thus, psychological symptoms and states particularly depression may negatively impact SCI survivor’s HRQoL.

2.11 Health-related Quality of life

A qualitative study to assess HRQoL in people with SCI following the earthquake in China among 14 SCI survivors by Tasiemski, Nielsen and Wilski (2010) found that the individuals had low HRQoL. A retrospective study of archival records kept by the Queensland Spinal Cord Injuries Service in Australia, of 270 SCI survivors, to investigate the relationship between quality of life and disability across the lifespan for people with SCI, Barker *et al.* (2009) found that HRQoL was significantly poorer for people with SCI compared to the Australian norm. Barker *et al.* (2009) argue that the decrease in HRQoL among SCI survivors is linked to secondary impairments, participation restrictions and activity limitations but not with neurological level, age or time since injury. According to Gurcay *et al.* (2010) in a cross-sectional study conducted in a hospital in Turkey to assess the quality of life in SCI survivors, the physical health domain was found to be the lowest under HRQoL domains. However, Kennedy and Rogers (2000) argue that the quality of life of people who have a spinal cord injury remains stable during the first year following discharge. In contrast, a previous study on changes in HRQoL in persons with SCI and their close persons during the first 2 years post-injury conducted among 347 individuals with SCI, established that HRQoL increases for persons with SCI from onset (Lude *et al*., 2014).

According to Augutis and Anderson (2012) individual SCI survivors fighting spirit, downward comparison and helping others is linked to positive perceived emotion and acceptance. In a cross-sectional descriptive study in Iran by Mousavi (2017) to determine the role of depressed mood in HRQoL in patients with spinal cord injury found that there was a significant and direct relationship between depression and HRQoL. Moreover, in a US retrospective study to examine the Health-related quality of life factors and change in mobility in individuals with SCI one-year post-injury, Riggins *et al.* (2011) found that increase in pain and depressed mood was associated with low HRQoL.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Area of Study

The areas of study namely Nairobi, Nakuru and Machakos were selected using simple random sampling from three clusters of the 47 Counties stratified based on the Human Poverty Index (HPI) (GOK & UNDP, 2009). The 47 counties were classified as low, medium and high according to the HPI respectively. Sampling involved two basic steps, that is, obtaining the list of names of all the 47 Counties, writing the names on small pieces of paper that are folded, mixed and random sampling is performed. Table 3.1 summaries the clusters.

Table 3.1: Summary of Counties by Clusters

S/No.	Level of HPI	Counties
	Low (HPI≤30.0)	Kiambu, Kirinyaga, Murang'a, Nairobi, Nyandarua, Nyeri
	Medium(HPI >30.1<33.0)	Mombasa, Kwale, Kilifi, Tana River, Lamu, Taita, Taveta, Uasin-Gishu, Trans-Nzoia, Elgeyo-Marakwet, Nandi, Baringo, Laikipia, Nakuru, Narok, Kajiado, Kericho, Bomet, West-Pokot, Samburu, Turkana
	High (HPI>33.1)	Marsabit, Isiolo, Meru, Tharaka-Nithi, Embu, Kitui, Machakos, Makueni, Siaya, Kisumu, HomaBay, Migori, Kisii, Nyamira, Garissa, Wajir, Mandera

Nairobi County consists of 17 sub-counties all covering 684 square kilometres with an estimated population of 3,1 38,369 (Kenya National Bureau of Statistics, 2009). The Nairobi County borders Kiambu County to the North and West, Kajiado to the South and Machakos to the East. Nakuru County is administratively divided into 11 sub-counties covering 7, 509.5 square kilometres with an estimated population of

1,603,325 as per the 2009 National Population and Housing Census, with a greater number living in the rural. It borders Baringo to the north, Laikipia to the northeast, Nyandarua to the east, Kajiado to the south, Narok to the southwest with Bomet and Kericho to the west. Machakos County consists of 8 sub-counties covering 5,952.9 square kilometres. According to the 2009 Kenya Population and Housing census, the Machakos County estimated population of 1,098,584 with the majority living in rural areas. The county borders Nairobi and Kiambu counties to the west, Embu to the north, Kitui to the east, Makueni to the south, Kajiado to the southwest, and Muranga and Kirinyaga to the northwest.

3.2 Research Design

This study used a cross-sectional study design utilizing quantitative methods. A cross-sectional study is commonly used to determine the prevalence of an outcome of interest, at a point in time, from a given population where the participants included, are selected from a sampling frame (Levin, 2006; Mann, 2003). In addition, cross-sectional study designs may be used for population-based surveys (Setia, 2016). Therefore, the cross-sectional study design is the most appropriate design for this study whose focus was to determine the association between psychological symptoms and participation in core-activities as well as health-related quality of life amongst spinal cord injury survivors. This was a multi-center study (in the selected counties).

3.3 Study Population

In the 2009 census there were 3,138,369; 1,603,325 and 1,098,584 people in Nairobi, Nakuru and Machakos counties of Kenya respectively (Kenya National Bureau of Statistics, 2009). World Health Organization estimates that the global incidence of SCI, both traumatic and non-traumatic, is between 40 - 80 cases per million population but does not provide the global estimated prevalence (World Health Organization & International Spinal Cord Society, 2013). Therefore, the study population was spinal cord injury survivors living in Nairobi, Nakuru and Machakos Counties estimated to be 188, 96 and 65 people on average respectively; that is 349 SCI survivors.

3.4 Sampling method

In this study, purposive sampling was used. A purposive strategy was preferred for use because there was limited number of SCI survivors who could contribute to the study by virtue of knowledge or experience as recommended by Tongco (2007). A sample SCI survivor was recruited voluntarily into the study from Nairobi, Nakuru and Machakos counties respectively. The county referral hospitals located in Nairobi, Nakuru and Machakos counties where the SCI survivors' records were kept were visited (see table 3.2). Scooping of the Past medical records was undertaken to identify the potential participants who then were recruited into the study

Table 3.2: Selected hospitals according to the counties

Nairobi	**National spinal cord injury hospital**
Nakuru	Nakuru Level 5 Hospital Naivasha level 4 Hospital
Machakos	Machakos level 5 Hospital

3.4.1 Sample Size Determination

According to Israel (1992) calculation of a sample size considers the size of the population of interest, margin of error, confidence interval and amount of variance the researcher was expecting from the responses he or she received. In this study sample size was determined using the Yamane formula;

$$n = \frac{N}{1+N(e)^2}$$

Where, n is the sample size, N is the population size, and e is the level of precision

In this study population N=349, Margin of error is 0.05

$$n = \frac{N}{1+N(e)^2} = \frac{349}{1+349(.05)^2} = 186$$

Therefore, the researcher recruited 101, 51, and 34 SCI survivors in Nairobi, Nakuru and Machakos respectively.

3.4.2 Inclusion Criteria

The study participants were all SCI survivors aged 18 years and above. Only those who had a medical diagnosis of SCI from a recognized medical doctor irrespective of the cause and lived in the community in the selected counties were included in the study.

3.4.3 Exclusion Criteria

Potential participants who did not meet the inclusion criteria were excluded from the study. Re-hospitalized SCI survivors at the time of this study were excluded.

3.5 Research Instruments

Three data collection tools were used (appendix 1,2). These included The Participation Scale to measure the level of participation, the Depression, Anxiety and Stress Scale (DASS) version 21.0 for measuring psychological symptoms and the World Health Organization Quality of Life questionnaire (WHOQOL-BREF). The first tool, the Participation scale is designed for use in rehabilitation, stigma reduction and social integration programs (Van Brakel *et al.*, 2006). The Participation Scale has 18 items measuring Learning and applying knowledge (one item), Communication (one item), Mobility (three items), Self-care (three-item), Domestic life (three items), Interpersonal interactions and relationships (three items), Major life areas (three items), and Community, social and civic life (three items) domains. The second tool, that is, the Depression, Anxiety, Stress Scale (DASS) version 21 is designed to measure the dimensions of depression, anxiety, and stress (Henry & Crawford, 2005). The Depression Anxiety Stress Scales 21 (DASS-21) is a short form of Lovibond and Lovibond (1995) 42-item self-report measure of depression, anxiety, and stress (DASS). The DASS21 has 21 items measuring Depression (seven items), Anxiety (seven items) and Stress (seven items). The third tool is the WHOQOL-BREF which arose from a need for a genuinely international measure of the quality of life and a commitment to the continued promotion of a holistic approach to health and health care (World Health Organization, 1996). It has 26 items physical health has (seven items), psychological (six items), social relationship (three items), environment (eight items); and two items, one measuring overall QOL and another measuring general health. The tools were translated into Kiswahili and back-translated into English by a qualified linguist. Permission was sought from the authors of the tools used and authority was granted.

3.5.1 Reliability and Validity of the Measurement Instruments

The Participation Scale has been found to provide valid, reliable, practical and sensitive data. According to Thammaiah *et al*. (2018) the scale has a Cronbach's alpha score of 0.90, which is regarded as excellent and has acceptable inter-item correlation (ICC <0.60). Van Brakel *et al*. (2006) who developed the instrument reported that the P-Scale had Cronbach's alpha coefficient of 0.92, a stable intra-interviewer reliability of 0.83 and inter-interviewer reliability of 0.80 with good discrimination (between controls and clients). The P-scale also showed good validity and reliability in a previous study in Nepal (Cronbach's alpha coefficient 0.93 for the whole scale and 0.78 and 0.93 for the subscales) (Stevelink *et al*., 2013). According to Henry and Crawford (2005), the DASS-21 subscales can validly be used to measure the dimensions of depression, anxiety, and stress. A psychometric study by Tran, Tran and Fisher (2013) found a high internal consistency of the DASS-21 sub-scales, ranging from 0.70 for the Stress subscale to 0.88 for the overall scale. According to Tran, Tran and Fisher (2013) the scale can detect the common mental disorders of depression and anxiety with a 79.1% sensitivity of and a specificity of 77.0%. Previous test performance in DASS 21 depression on SCI survivors found a sensitivity of 0.57 and a specificity of 0.76 (Mitchell *et al*., 2008). Mitchell, Burns and Dorsty (2008) posit that DASS-21 has clinical utility as a screening measure for assessing Depression, Anxiety and Stress in patients with SCI. The depression subscale of the DASS-21 is reported to have a sensitivity of 57.0% and a specificity of 67.0% while the anxiety subscale is reported to have a sensitivity of 86.0% and a specificity of 64.0% (Mitchell *et al*., 2008).

Jang *et al.* (2004) reported that the WHOQOL-BREF is a valid tool for assessing persons with traumatic spinal cord injury. Statistical tests of psychometric properties of the WHOQOL-BREF in evaluating the HRQoL of adults in the U.S showed it had satisfactory internal consistency (ICC 0.82–0.95) across all domains (Bonomi *et al.*, 2000). In its use among persons with traumatic brain injury WHOQOL-BREF showed it had good to very good internal consistency (ICC 0.75 ∼ 0.89) and a test-retest reliability (ICC 0.74 ∼ 0.95),(Chiu *et al*., 2006). Table 3.3 summarizes the reliability analysis derived from the response questionnaires.

Table 3.3: Reliability Tests

Scale	**Variable**	**Measures**	**Cronbach's Alpha**	**Number of items**
DASS$_{21}$	Psychological symptom status	• Depression • Anxiety • Stress	0.957	21
The Participation Scale	Participation core-activity	• Mobility • Self-care • Domestic • Communicate /learn • Major life areas • Interpersonal interaction • Community /social/civic	0.932	18
WHOQoL-BREF	Health-related Quality of life (HRQoL)	• Physical health • Psychological • Social-relationship • Environment	0.903	26
SOURCE:	Primary data			

The Cronbach's Alpha coefficient ranged between 0.903 for WHOQoL BREF measure for (HRQoL) to 0.957 for DASS21 measure psychological symptom status. The results indicate that the measurement scales used in this study were reliable and adequately measured the variables of the study. The reliability coefficient for all the constructs used in this study exceeded the 0.6 lower level of acceptability recommended by Gliem and Gliem (2003) and was within the 0.70 ICC and above as advocated by Nunnally (1994) and are therefore reliable and acceptable for further analysis.

3.6 Sampling Adequacy

In the current study the variables and tests of sampling adequacy were used to test the validity. The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and the Bartlett's Test of Sphericity were employed. Bartlett's Test of Sphericity was used to examine redundancy between the variables that could be summarized with a small number of factors (Williams, Onsman & Brown, 2010). The test should be significant ($p<.05$), for factor analysis to be considered suitable (Williams *et al.*, 2010). The following is Bartlett's Test of Sphericity formula:

$$\chi^2 = -\left(n - 1 - \frac{2p+5}{6}\right) \times \ln|R|$$

Table 3.4 (a) Shows Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and Bartlett's test of sphericity.

Table 3.4: Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

		Bartlett's Test of Sphericity			
Factors (Domains)	KMO Test	Approx. Chi-Square	Df	Sig.	Determinant
Psychological symptom	.794	162.373	20	.0111	0.321
Participation	.811	296.237	6	.0032	0.067

Quality of Life (QoL)	.843	130.229	10	.0218	0.230

SOURCE: Primary data

In this study, the KMO results were interpreted as categorized by the Kaiser, Meyer and Olkin measure of sampling adequacy (Dziuban & Shirkey, 1974) as follows:

Table 3.5: Interpretation of KMO value

KMO value	**DCV**
0.90 to 1.00	Marvelous
0.80 to 0.89	Meritorious
0.70 to 0.79	Middling
0.60 to 0.69	Mediocre
0.50 to 0.59	Miserable
0.00 to 0.49	Don't Factor

Note: **DCV**: Degree of common variances

In this study the scales had values above the threshold of 0.7 as established by Williams, Onsman and Brown (2010): Psychological symptom status (.794), participation in core-activity domain (.811) and HRQoL (.843). Williams, Onsman and Brown (2010) stated that KMO of 0.50 is an acceptable degree for sampling adequacy with values above 0.5 being better. Bartlett's Test of sphericity which analyzes if the samples are from populations with equal variances produced p-values less than 0.05 ($p < .001$). Since the Bartlett's test levels of significance were less than 0.05 for all factors it further indicates an acceptable degree of sampling adequacy. Psychological symptoms status had a Chi square (χ^2) value of 162.373 ($P< 0.001$), participation (296.237; $P<0.0111$) and HRQoL (130.229, $P < 0.0218$).

3.7 Pilot Study

A pilot study was conducted on SCI survivors in Kiambu County who were not included in the main study. This was vitally important for this research in order to check out whether the questions were understood by the potential participants and for errors of translated version. Only errors of translated version were found and were corrected.

3.8 Data collection Procedure

Audience was sought from department’s in-charges in the respective hospitals, for the potential participants records. All potential participants were contacted on phone and after making arrangements visited their households. All the participants were provided with a written explanation and orally briefed about the study. All the SCI survivors meeting the inclusion criteria signed written consents before being allowed to participate in the study. Guardians of those who were unable to signed on their behalf. Each participant completed the research instrument and was assisted by the principal researcher and research assistants where necessary. The completed questionnaires were then collected and kept in a safe for further computation away from the study area.

3.9 Data Management and Analysis

The completed tools were coded and stored by the principal researcher in a safe. Collected data was keyed in 2 separate Microsoft Excel Software sheets and compared for discrepancy. The principal researcher re-entered data from the questionnaires where discrepancy was noted. Once correct data entry was completed, it was imported into SPSS software version 25.0 and analysis done. Descriptive statistics were calculated and presented in summary tables~~.~~ Later, one-way analysis of variance (ANOVA) was performed to explore the relationship between the variables. In this study SCI survivor’s HRQoL was described as either poor, moderate or good based on the percentage scores. A poor HRQoL was ascribed to those who scored equal or less than 33.3% of the responses while a moderate HRQoL and a good HRQoL was assigned to those scoring more than 33.3% to 66.6% and more than 66.6% respectively.

3.10 Ethical Consideration

Approval to carry out the study was sought from Jomo Kenyatta University of Agriculture and Technology Ethical Review Committee (appendix 8). While authority to conduct the study was sought from National Commission for Science, Technology and Innovation (appendix 9) and further sought from the County Commissioners, Ministry of education and Ministry of health (appendix 11,12,13,15,16,17,19,20,21). Permission to collect data was sought from the participating Hospitals Medical superintendents (appendix 14, 18, 22, 23). Participation was voluntary and all participants in this study gave written consents (appendix 4, 6). The researcher gave a written explanation of the nature and purpose of the research to potential participants (appendix 3, 5) before they were recruited into the study. The participants were free to withdraw from the study if they so wished at any time during the course of the data collection.

CHAPTER FOUR

RESULTS

4.1 Participants Social-Demographic Characteristics

In this study, a total of 186 SCI survivors were approached; 100% responded; 101, 51 and 34 from Nairobi, Nakuru and Machakos counties respectively. Regarding gender distribution from the three counties, 118 of the 186 rehabilitated SCI survivors were male (63.4%) and 68 were females (36.6%). Regarding age distribution majority, 59 of rehabilitated SCI survivors (31.7%) were between the age of 26-35 years; 57 (30.6%) were aged between 36-45 years while 26 (14%) were between 18-25 years old. Regarding their education level, majority, 77 (41.4%) of the participants had primary school level and below, while 39 (20.43%) had had vocational training. With regard to participants' marital status, majority, 98 (52.7%) were married while 58 (31.2%) were single. According to participants' family monthly income, majority of them, 95 (51.4%) earned below $500 (KES 50,000). The results further revealed that majority, 142 (76.34%) of the participants' injury was less than 5 years old. Table 4.1 summarizes the participants' social-demographic characteristics.

Table 4.1: Social-demographic characteristics amongst rehabilitated SCI survivors by county of residence

Characteristic	Nairobi		Machakos		Nakuru		Total	
	N	**%**	N	%	**N**	**%**	**N**	**%**
Gender (n=186)								
Male	63	62.38	25	73.53	30	58.82	118	63.40
Female	38	37.62	9	26.47	21	41.18	68	36.60
Total	101	100	34	100	51	100	186	100
Age (n=186)								
18-25 Years	12	11.8	8	23.53	6	11.76	26	14.00
26-35 Years	39	38.61	9	26.47	11	21.57	59	31.70
36-45 Years	30	29.70	8	23.53	19	37.25	57	30.60
46-55 Years	13	12.87	4	11.76	6	11.76	23	12.40
56 and above Years	7	6.93	5	14.71	9	17.65	21	11.30
Total	101	100	34	100	51	100	186	100
Education Level (n=186)								
Primary and below	47	46.53	10	29.41	20	39.22	77	41.40
Secondary School	18	17.82	4	11.76	8	15.69	30	16.12
College/Diploma	1	0.99	5	14.71	4	7.84	10	5.38
Vocational Training	26	25.74	5	14.71	8	15.69	39	20.43
University	9	9.91	10	29.41	11	21.50	30	16.1
Total	101	100	34	100	51	100	186	100
Marital Status (n=186)								
Single	39	38.61	7	20.59	12	23.53	58	31.20
Married	47	46.53	22	64.71	29	56.86	98	52.70
Separated	8	7.92	2	5.88	5	9.80	15	8.11
Divorced	5	4.95	1	2.94	4	7.84	10	5.40
Widowed	1	0.99	2	5.88	1	1.96	4	2.15
Cohabiting	1	0.99	0	0	0	0	1	0.53
Total	101	100	34	100	51	100	186	100
Family Income Level (n=186)								
Less Than 50,000	37	36.60	25	73.53	33	64.71	95	51.40
50,001 - 100,000	14	13.86	8	23.53	14	27.45	36	19.51
100,001-200,000	3	2.97	0	0	0	0	3	1.61
200,001 - 300,000	1	0.99	0	0	0	0	1	0.5
300,001 or More	1	0.99	0	0	1	1.96	2	1.08
Refused to say	46	45.54	0	0	3	5.88	49	26.34
Total	101	100	34	100	51	100	186	100
Time Since Injury (n=186)								
<5 years	76	75.25	24	70.59	42	82.35	142	76.34
6-15 years	21	20.79	8	10.89	8	15.69	37	19.90
>15 years	4	3.96	2	5.88	1	1.96	7	3.80
Total	101	100	34	100	51	100	186	100

SOURCE: Primary data

4.2 Prevalence of Psychological Symptoms

A prevalence of **7**2 % (n=134) was recorded amongst the participants in this study (*see table 4.2*). In addition, there was a statistically significant association between County of residence with psychological symptoms status (*P*=0.003).

Table 4.2: Prevalence of Psychological Symptoms

County Residence	**With psychological symptoms**		**Without psychological symptoms**		**X^2 (df); P. Value**
	N	%	N	%	
Nairobi	65	34.9	47	46.5	11.633 (2), *P*= .003
Nakuru	46	24.7	5	2.7	
Machakos	23	12.4	11	5.9	
Total	**134**	**72**	52	28	

4.2.1 Distribution of participants by reported psychological symptoms.

Results indicate that some participants reported having more than one psychological symptom; 100 reported having depression; 122 reported having anxiety; 88 reported having stress. According to participants distribution by level of severity of symptoms, 94 (50.5%) had moderate-to-severe anxiety symptoms, 68 (36.5%) had moderate-to-severe depression and 69 (37.1%) had moderate-to-severe stress symptoms. Table 4.3 summarizes participants’ psychological symptoms status and the level of severity.

Table 4.3: Analysis of Participants Psychological Symptoms Status by Severity of Symptoms

Psychological	**Normal**		**Mild**		**Moderate**		**Severe**		Total
symptoms	n	%	n	%	n	%	n	%	n (%)
Depression	86	46.2	32	17.2	25	13.4	43	23.1	186(100)
Anxiety	64	34.4	28	15.1	37	19.9	**57**	30.6	186(100)
Stress	98	52.7	19	10.2	30	16.1	39	21.0	186(100)

4.*3* The level of participation restriction in core-activities domain amongst rehabilitated spinal cord injury survivors

The results indicate that a large proportion of the participants perceived mild to severe restriction in one or more core-activity. Majority, that is, 36% (n=67) reported severe restriction in self-care, and 27.4% (n=51) in major life areas. However, only 19.9% (n=37) reported experiencing severe restriction in mobility and a similar proportion, 19.9% (n=37) interpersonal interactions and relationship. According to participant's distribution by level of participation restriction, 76.9% (143) had mild-to-severe domestic life restriction. Table 4.4 summarizes the participants' level of participation restriction in core-activities.

Table 4.4: Participants' level of participation restriction in core-activities

Participation Domains	**Level of participation restriction n= (186)**								
	No restriction		**Mild**		**Moderate**		**Severe**		**Total**
	n	%	N	%	n	%	n	%	n (%)
Self-care	82	44.1	13	7.0	24	12.9	67	36	186(100)
Domestic life	43	23.1	33	17.7	64	34.4	46	24.7	186(100)
Communication/learning	46	24.7	40	21.5	55	29.6	45	24.2	186(100)
Major life areas	47	25.3	29	15.6	59	31.7	51	27.4	186(100)
Interpersonal-interactions relationship	57	30.6	27	14.45	65	34.9	37	19.9	186(100)
Community, social and civic life	47	25.3	43	23.1	58	31.2	38	20.4	186(100)
Mobility	52	28	48	25.8	49	26.3	37	19.9	186(100)

4.3.1 The overall level of participation restriction

The study established the level of participation in general amongst SCI survivors, 64 % (n=119) had severe restriction. However, 14.5% (n=27) had no restriction. Table 4.5 summarizes the level of severity.

Table 4.5: Overall participants' level of participation restriction in core-activities

	No restriction	**Mild restriction**	**Moderate restriction**	**Severe restriction**	**Total**
n(%)	27 (14.5%)	18 (9.7%)	22(11.8%)	119 (64%)	186 (100%)

SOURCE: Primary data

The HRQoL amongst rehabilitated spinal cord injury survivors

The participants recorded the lowest mean score (44.71% SD: 15.07%) on their HRQoL under the environmental domain and high mean scores in physical health, psychological and social relationships. Table 4.6 summarizes participants' HRQoL.

Table 4.6: The HRQoL amongst rehabilitated spinal cord injury survivors

	Level of HRQoL									
	poor		Fair		Good		Minimum %	Maximum %	Mean %	SD %
	n	%	n	%	n	%				
Physical health	24	12.9	137	73.7	25	13.4	17.86	92.86	49.21	14.43
Psychological	32	17.2	131	70.4	23	12.4	12.50	91.67	49.93	14.71
Social relationships	49	26.3	104	55.9	33	17.7	8.33	91.67	49.15	17.23
Environment	52	28.0	114	61.3	20	10.8	15.62	87.50	44.71	15.07

4.5 Association between Psychological Symptoms Status (as an independent variable) and Participation and HRQoL (as dependent variables)

Results show there was a statistically significant difference between groups as determined by one-way ANOVA of Psychological symptoms status and physical health (F (2,183) =5.017, *P*<.008) and, self-care (F(2,183)=8.708, *P*<.000) (See Table 4.7)).

Table 4.7: Analysis of association between psychological symptoms status, and participation and HRQoL

		ANOVA Sum of squares	df	Mean square	F	Sig.
Major life restriction	Between Groups	.804	2	.402	2.142	.120
	Within Groups	34.320	183	.188		
	Total	35.124	185			
Interaction's restriction	Between Groups	.219	2	.109	.743	.477
	Within Groups	26.927	183	.147		
	Total	27.145	185			
Learn communicate	Between Groups	.480	2	.240	1.287	.279
	Within Groups	34.143	183	.187		
	Total	34.624	185			
Community restriction	Between Groups	.552	2	.276	1.461	.235
	Within Groups	34.572	183	.189		
	Total	35.124	185			
Domestic restriction	Between Groups	.552	2	.261	1.469	.233
	Within Groups	32.537	183	.178		
	Total	33.059	185			
Mobility restriction	Between Groups	.386	2	.193	.953	.388
	Within Groups	37.076	183	.203		
	Total	37.462	185			
selfcare	Between Groups	3.984	2	1.992	8.708	**.000**
	Within Groups	41.865	183	.229		
	Total	45.849	185			
Environmental	Between Groups	59.869	2	29.935	.130	.878
	Within Groups	42044.710	183	229.753		
	Total	42104.579	185			
Social health	Between Groups	923.695	2	461.848	1.553	.214
	Within Groups	54427.450	183	297.418		
	Total	55351.145	185			
Psychological health	Between Groups	143.387	2	71.694	.329	.720
	Within Groups	39907.856	183	218.076		
	Total	40051.243	185			
Physical health	Between groups	2002.313	2	1001.157	5.017	**.008**
	Within Groups	365175.744	183	199.551		
	Total	380520.057	185			

Correlation is significant at the $p< 0.05$

CHAPTER FIVE

DISCUSSION

5.1 Prevalence of Psychological Symptoms amongst SCI Survivors

Psychological symptoms are a common problem amongst SCI survivors living in the community. Our study results are consistent with recent findings by WHO (2017), that some people with SCI experience psychological symptoms simultaneously (comorbidity). Overall, the current study established that up to 72% of SCI participants reported having psychological symptoms. The present study finding is lower than the 92% prevalence (anxiety, depression and stress combined) reported in an Australian study (Migliorini *et al.*, 2009). The difference in the prevalence between the two studies could be explained by the differences between the average ages of the samples who participated in the two studies. In the present study the mean age range was 26-35 years whilst that of the Australia was 50.4 years which is higher. According to WHO (2017); Jokela, Batty and Kivimäki (2013), the prevalence of psychological symptoms increases with age. In the general population studies the majority of mental health conditions affect older individuals (WHO 2017). Therefore, older SCI survivors may be at a higher risk for poor mental health. In addition, the difference between the two studies could be explained by the differences between the two countries population literacy profiles, that is, Australia being a developed country the literacy level may be higher than in Kenya as a developing country therefore the Australian could have not let anything to chance. This also implies there may have been socio-economic differences between people with SCI in both countries.

In the current study, a 53.3% prevalence of depression symptoms was reported amongst the 186 SCI survivors who participated. Similar to these findings, was in the Krause, Kemp and Coker (2000) study in the USA and Khazaeipour, Taheri-Otaghsara and Naghdi (2015)in Iran who reported 48% and 49.3% prevalence of depression respectively. However, the current study finding is lower than the 63.9% and 74.1% prevalence of depression reported in studies conducted in Korea (Shin *et al.*, 2012) and Iraq (Al-Abbudi *et al.*, 2017) respectively. Several dimensions may help explain differences in the prevalence rates of psychological symptoms between the current study and those conducted in Korea and Iraq. To begin with, the fact that the Kenyan study participants were in community settings while the Korea and Iraq samples were in-patients. Hospitalization impacts on individuals' normal social and economic activities and also their ability to fulfill family roles. Besides, differences in the duration since SCI between the present study and those conducted in other countries (Korea and Iraq) may also explain the differences in the prevalence of psychological symptoms. The observed decrease in prevalence for psychological symptoms seen between people with SCI dwelling in community settings and in-patient is in line with Saunders, Krause and Focht (2012) reported 20.6% prevalence of depression among in-patients that dropped to 18% five (5) years after reintegration into the community setting.

Further, the current study shows that 65.6% of SCI survivors suffer from anxiety, while half (53.3%) suffer depression and nearly an equal proportion (47.3%) suffer from stress. In contrast, Migliorini, New and Tonge (2009) found a lower prevalence of depression (37%), anxiety (30%), and stress (25%) in a cross-sectional Australian community study. Perhaps the present study results could be a function of contextual differences between Kenya and Australia; Kenya is a developing country with higher poverty and low access to social security and supportive/ assistive technologies while Australia is a developed country with higher per capita GDP and increased access to social security, welfare compensation and supportive/ assistive technologies. However, a previous study estimate of psychological symptoms; specifically, depression diagnosis after SCI ranged between 18.7% and 26.3% with a mean of 22.2% (Williams & Murray, 2015). Coincidentally, Williams and Murray (2015) values are higher than those of the general population's estimate of 7.3% for anxiety (Baxter *et al.*, 2013) and 4.7% for major depression globally (Baxter *et al*., 2013).

Depression is a major psychiatric condition of public health concern worldwide that not only affects patients but the society at large (Riolo *et al*., 2005; Üstün *et al*., 2004; Elliott & Frank, 1996). According to WHO (2017) depression is ranked as the single largest contributor of disability among young adults, with an estimated 7.5% of the years lost to disability (YLDs). Additionally, depression is the leading contributor of the global burden of disease as per Disability-adjusted Life Years (DALYs), (WHO, 2017). Previous studies have also identified depression as the most common psychological symptom post SCI (Craig, Tran & Middleton, 2009; Elliott & Frank, 1996). Depression not only affects individual's level of functioning and HRQoL but also increases the risk of: somatic health conditions such as cardiovascular disease, stroke, diabetes, ability to void, erectile dysfunction and lack of libido (Lee *et al.*, 2016; Penninx et al., 2013). Moreover, it increases the risk for substance abuse and suicidal tendencies (Khazaeipour, Taheri-Otaghsara & Naghdi, 2015; Khazaeipour *et al*., 2014; Middleton *et al.*, 2014; Lidal *et al.*, 2008). This implies that SCI survivors are at high risk of poor mental health and participation restriction in the community. Therefore, there is an implication for mental health services for SCI patients that combine initial screening, follow-up screening, prevention and management for psychological symptoms.

5.2 Level of participation in core-activities amongst rehabilitated SCI survivors

The current study established that most SCI survivors experience restrictions in one or more core activity domains. Similar results were reported by Gross-Hemmi *et al.* (2019) and Lund *et al.* (2005) that most SCI victims experience restrictions in two or more core activities of daily living. However, while in the current study most participants were restricted in self-care activity, Lund *et al*. (2005) reported SCI survivors' restriction in: social support, exercise (issues pertaining to outdoor activities) and gardening while Gross-Hemmi *et al.* (2019) reported that their sample was highly restricted in major life areas domain. The variance in results between the present study finding and those of Lund *et al.* (2005) and (Gross-Hemmi *et al*., 2019) could be attributed to differences in the study contexts and intruments used. In Sweden, there are universal welfare homecare services that are offered both privately or publicly for Swedish disabled and the aged (Szebehely & Trydegård, 2012). With fewer resources for the public facility, as is the case in Kenya this may lead to compromised care. Additionally, while participants in the current study lived largely in a high HPI context, the Gross-Hemmi *et al.* (2019) and Lund *et al*. (2005) studies were conducted in Switzerland and Sweden which are developed (middle income) countries with low HPI. According to Gross-Hemmi *et al.* (2019) most of the participants had secondary education and below. Higher education is a determinant for a better lifestyle, stable job and better neighborhood (Solheim & Leiulfsrud 2018 ; Tasiemski *et al*. 2005).

The WHO (2007) international classification of functioning, disability and health (ICF), describes participation as a function of an interplay of both environment (societal attitude, buildings, roads, transportation) and personal factors (education and income). In this context, the current study also established that most participants experienced participation restriction in major life areas (education, work). In contrast, Suttiwong *et al*. (2015) in Thailand and Paul *et al*. (2013) in New Zealand reported that most SCI people retained or progressed in their career status. This difference could be attributed to the fact that majority of those in New Zealand were in paid employment and some were entitled to Accident Compensation while a higher number of Kenyan SCI participants were lowly educated, unemployed and/or had no compensation. More importantly, 88.5% participants with SCI in the Thailand study had secondary education level and above (Suttiwong *et al*., 2015) while 41.4 % of those in the present study had primary level of education and below. The young men with low education compared to women are more likely to engage in higher-risk socio-economic activities that may result in SCI. Ahmed *et al*. (2018) recent research findings supports the view that, in low income settings, men compared to women were 2 times more likely to engage in high risk occupations. Consequently, their low economic status and non-existent social-security expose them to participation restriction compared to people with SCI in developed countries who may have functional social security arrangements. This implies that in communities with extreme marginalization, people with SCI are most likely to live in severe poverty which further lowers the potential to participate in core-activities of daily living. Poverty impairs access to appropriate insurance for work-related injuries**.** In addition, poverty has implications on rehabilitation outcomes including the potential of persons with SCI performance after re-integration. Therefore, an implication for policy on social protection which targets at risk populations to ensure they undergo comprehensive rehabilitation including vocational rehabilitation into productive functioning and coping strategies post SCI to safeguard individuals’ HRQoL.

5.3 Health-related quality of life amongst rehabilitated SCI survivors

It is clear from the current study that SCI survivors experience a lower quality of life after reintegration. The current study found that participants experienced a poorer HRQoL under the environmental domain similar to SCI participants in a Brazilian study Øderud (2014). These findings are similar for Kenya and Brazil, under the environmental domain (leisure, housing, health services, transportation and education were assessed), this largely depends on an individual's financial status, which in Kenya could be lower. Other studies present contrasting results. In particular, Gurcay *et al*. (2010) using the same tool in Turkey, found that SCI survivors had low HRQoL under the physical health domain. Further, in Greece, Tzanos *et al*. (2016) reported SCI survivors experienced better HRQoL in the environmental domain as compared to other domains (psychological wellbeing, physical capacity and social relationship). The different results could be explained by the differences in the contexts where the studies were conducted where Kenya and Greece are a lower middle-income country with: low literacy, less infrastructure and technological resources as compared to Turkey that is a developed country with higher literacy levels, superior infrastructure and supportive technologies. Moreover, the current study was conducted in a community setting while the study by Gurcay *et al.* (2010) was in a hospital setting. In rural areas challenges pertaining to HRQoL can be attributed to geographical and financial inaccessibility of daily needs. As used in this present study, the ability to meet daily needs is supported by the geographically and financially accessibility to the individuals in need. To some extent, this has implications for a social security package to forestall decline in HRQoL of people with SCI. Also, there is an implication for policy on infrastructure in Kenya to integrate universal design as is internationally recognized, to increase accessibility in built environments and transportation for people with disabilities. Thailand is an example where the government has provided a ministerial regulation under vehicle licensing that supports the use of advanced assistive devices for the disabled. Locally, the adoption of universal design has a high likelihood to improve SCI survivors HRQoL by promoting more opportunities for socio-economic activities (Kovindha, 2017).

5.4 Association between psychological symptoms status and participation and HRQoL

Psychological symptoms have an effect on participation in core activities and HRQoL led by SCI survivors. The results of the present study showed that there was a significant association between psychological symptoms status and SCI survivors' participation in self-care. This is similar to previous research reports that showed that (in)ability to self-care was strongly influenced by psychological status (Munce *et al*., 2014; Claudia, Vignola & Marcassa, 2014; Coura *et al*., 2013). However, low education may limit chances of employment leading to individuals experiencing financial constraints and poor HRQoL. Financial constraints may affect access to vital information and resources that have implications on their performance of core-activities of daily living or overall wellbeing. According to Khazaeipour *et al*. (2014) a productive lifestyle positively impacts SCI survivors' psychological wellbeing thus improve their overall HRQoL. Therefore, this highlights the need for rehabilitation professionals to consider individuals with SCI psychological symptom status as an important clinical aspect during the rehabilitation process and follow up. Moreover, there is implication for innovation of assistive devices and focused use of modern-day technologies to improve the functional capacity of people with SCI. There is also an implication for rehabilitation guidelines to emphasize acquisition by people with SCI of culturally appropriate social roles acquisition by individuals living with SCI. This has the potential to guide their behavior through understanding.

CHAPTER SIX

SUMMARY, CONCLUSIONS RECOMMENDATIONS AND LIMITATIONS

6.1 Summary

In summary, while 3 out of 4 SCI survivors suffer psychological symptoms, it is apparent that poor young male adults with low education are the most at risk of sustaining SCI. It is also clear that most people with SCI suffer psychological symptoms with anxiety as the most common. The magnitude of psychological symptoms is higher than that of the general population reported globally which raises public health concern.

It is expected that after community reintegration SCI survivors engage in core activities of daily life (major life areas, learning and applying knowledge, mobility, self-care, communication, domestic life, interpersonal interactions and relationships, and community, social and civic life). However, in this study, SCI survivors experienced participation restrictions in several core activities with self-care presenting as the most challenging. By extension, this implies that functional performance in self-care should be a key focus of rehabilitation and should incorporate social support, family members and environment adaptation.

Whereas, physical health, psychological, social relationship and the environment are very important variables that affect ones' HRQoL, in the present study people with SCI presented with low HRQoL attributed to the environment. The results showed that psychological symptoms status is significantly associated with both the SCI survivors' physical health aspect of HRQoL and participation self-care. Hence, there is implication for mental health services to forestall decline physical health aspect of HRQoL. In addition, there is implication for a national prospective study to screen SCI survivors for psychological symptoms.

6.2 Conclusion

In conclusion, the current study shows that more than 3 out of 4 (72%) SCI survivors suffered from psychological symptoms. The current study shows that poor young adult males with low education are the most at risk of SCI. In addition, SCI survivors experience a decrease in participation in all core activities of daily life with self-care being the domain they feel most often restricted. It was also apparent that SCI survivors live a low HRQoL mainly in their environments. The study further shows that psychological symptoms greatly impact SCI survivors' HRQoL and participation in core activities of daily living, particularly the self-care and physical health domains. These results would certainly contribute to health policies more specifically on the kind and quality of care provided to people living with SCI to improve their overall wellbeing. The results form a suitable baseline for Physiotherapists and other stakeholders to design suitable programs that have potential to improve SCI survivors' participation in core activities, HRQoL and lessen psychological symptoms after reintegration in community settings. A national burden of psychological symptoms, interventional studies on the treatment of psychological symptoms and the impact on HRQoL amongst SCI survivors is worthwhile. A longitudinal study is recommended to explore a periodical change of psychological symptoms, participation in core-activities and health-related quality of life amongst SCI survivors.

6.3 Recommendations

Based on the findings of this study, the following recommendations are made.

A. Practice: In order to lower and manage psychological symptoms there need to:

  - Integrate mental health services in rehabilitation for SCI survivor's
  - Capacity training of rehabilitation professionals on mental health principles for rehabilitation of SCI survivor's way of life
  - to minimize participation restriction and improve HRQoL
  - Provision of assistive devices matched to need of persons with SCI.

B. Policy: In order to facilitate SCI survivors' participation, the researcher recommends:

C. Environmental design and adaptationsFurther research:

- Establish a national database of SCI survivors and their profiles with regard to participation in core activity domains and well-being.
- National prospective study to measure SCI survivor’s mental health.

6.4 Limitation

The study had some limitations; first, the purposive sampling technique was used to reach participants whose results cannot be generalized to the general population. Secondly, individuals with a history of psychological symptoms prior to SCI were not excluded from the study. Thirdly, methodologically those who were not contacted due to the sampling method used might have a different experience.

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APPENDICES

Appendix I: Questionnare

Demographic					
S/No.	*Instructions: Mark √ in the space provided.*				
1)	Gender	Female =2			
		Male =1			
2)	What is your Age? (in Years)	1 =18-25 2 =26-35		4 = 46-55 5 = 56-65	
3)	Race	1. Black	2. White	3. Asian	4. Other
4)	Education level	1=No formal education 2=Primary school 3=Secondary school 4=vocational training 5=college/Diploma 6=University			
5)	Number of years since injury …………………				
6)	Level of SCI	1= cervical 2= Upper thoracic	3= mid thoracic 4= lower thoracic	5= lumbar	
7)	Category of injury	1= complete 2= Incomplete			
8)	Initial treatment received	1= surgical 2=conservative			

9)	Marital status	1= Single 2= Married 3= Separated 4= Divorced	5= Windowed 6= Cohabiting
10)	What describes your current work status best?	1= Employed 2= Self-employed, e.g. own business or farming 3= Non-paid work, e.g. volunteer/ charity 4= Student	5= Housekeeping /house maker 6= Retired 7= Unemployed (health reasons) 8= Other specify………………………
11)	Mode of Transportation	Public =1 Personal car =2	Other (specify)……=3
12)	Residence	Urban	
		2. Rural	
13)	What is your main source of income?	1= Employment 2= Business	3= Disability grant 4= Retirement benefits
14)	What is your family's income?	1= Less than Kshs.50,000 2= KShs. 50,001 to 100,000 3= KShs. 100,001 to 200,000	4= KShs. 200,001 to 300,000 5= KShs. 300,001 or more 6= Refused to say

WHOQOL

Please read each question, assess your feelings, and circle the number on the scale that gives the best answer for you for each question.

	(Please circle the number)				
	Very poor	**Poor**	**Neither poor nor good**	**Good**	**Very Good**
1. How would you rate your quality of life?	1	2	3	4	5
	Very dissatisfied	**Dissatisfied**	**Neither satisfied nor dissatisfied**	**Satisfied**	**Very satisfied**
2. How satisfied are you with your health?	1	2	3	4	5
The following questions ask about **how much** you have experienced certain things in the last two weeks					
	Not at all	**A little**	**A moderate Amount**	**Very much**	**An extreme Amount**
3. To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4. How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5. How much do you enjoy life?	1	2	3	4	5
6. To what extent do you	1	2	3	4	5

feel your life to be meaningful?					
	Not at all	**Slightly**	**A moderate Amount**	**Very much**	**Extremely**
7. How well are you able to concentrate?	1	2	3	4	5
8. How safe do you feel in your daily life?	1	2	3	4	5
9. How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

	Not at all	**A little**	**Moderately**	**Mostly**	**Completely**
10. Do you have enough energy for everyday life?	1	2	3	4	5
11. Are you able to accept your bodily appearance?	1	2	3	4	5
12. Have you enough money to meet your ends?	1	2	3	4	5
	Not at all	**A little**	**Moderately**	**Mostly**	**Completely**
13. How available to you is the information that you need in day to day life?	1	2	3	4	5
14. To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

	Very poor	**Poor**	**Neither poor nor well**	**Well**	**Very well**
15. How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how **good** or **satisfied** you have felt about various aspects of your life over the last two weeks.

	Very dissatisfied	**Dissatisfied**	**Neither satisfied nor Dissatisfied**	**Satisfied**	**Very Satisfied**
16. How satisfied are you with your sleep?	1	2	3	4	5
17. How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18. How satisfied are you with your capacity for work?	1	2	3	4	5
19. How satisfied are you with yourself?	1	2	3	4	5
20. How satisfied are you with your Personal relationships?	1	2	3	4	5
21. How satisfied are you with your sex life?	1	2	3	4	5
22. How satisfied are you with the support you get from your friends?	1	2	3	4	5
23. How satisfied are you with the conditions of your living place?	1	2	3	4	5
24. How satisfied are you with the access to health services?	1	2	3	4	5
25. How satisfied are you with the mode of transportation?	1	2	3	4	5

The follow question refers to **how often** you have felt or experienced certain things in the last two weeks.

	Never	**Seldom**	**Quite Often**	**Very often**	**Always**
26. How often do you have negative feelings, such as blue mood, despair, anxiety depression?	1	2	3	4	5

	Participation scale	Not specified not	Yes	Sometimes	No	irrelevant, I don't	NO problem	Small	Medium	Large	SCORE
1	Do you have equal opportunity as your peers to find work?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
2	Do you work as hard as your peers do? (same hours, type of work etc)		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
3	Do you contribute to the household economically in a similar way to your peers?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
4	Do you make visits (travel) outside your village as much as your peers do?(except for treatment) e.g. visit friends, market nearby villages		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
5	Do you help other people (e.g. neighbours, friends or relatives)?		0								
	If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
6	Do you take as much part in casual recreational/social activities as do your peers? (e.g. sports, chat, meetings)		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
7	Are you as socially active as your peers are? (e.g. in religious/community affairs)		0								
	If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
8	Do you visit other people in the community as often as other people do?		0								
	If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
9	Are you comfortable meeting new people?		0								
	[If sometimes, no or irrelevant] How big a problem is it for you?						1	2	3	5	
10	Do you have the same respect in the community as your		0								

	peers?										
	If sometimes, no or irrelevant] How big a problem is it for you?						1	2	3	5	
11	Do you move around inside and outside the house and around the village / neighbourhood just as other people do?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
12	In your village, do you visit all the public places/common places? (including schools, shops, offices, market and tea/coffee shops)		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
13	Do you have opportunity to take care of yourself (appearance, nutrition, health, etc.) as well as your peers?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
14	In your home, do you do household work?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
15	In family discussions, does your opinion count?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
16	In your home, are the eating utensils you use kept with those used by the rest of the household?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
17	Do you take part in major festivals and rituals as your peers do? (e.g. weddings, funerals, religious festivals)		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
18	Do you feel confident to try to learn new things?		0								
	[If sometimes, no or irrelevant] How big a problem is it to you?						1	2	3	5	
	Total										

DASS 21

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no rights or wrong answers. Do not spend too much time on any statement. *The rating scale is as follows:*

0= did not apply to me at all
1= Applied to me to some degree, or some of the time
2= Applied to me to a considerable degree, or a good part of time
3= Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (e.g., in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3

18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Appendix II: Hojaji

DEMOGRAFIA					
S/No.	*maagizo: Weka alama ya ✓kwa nafasi uliyopewa*				
1)	Jinsia	Kike=2			
		Kiume=1			
2)	Una Umri gani (kwa miaka)	1 =18-25 2 =26-35 3 =36-45	4 = 46-55 5 = 56-65		
3)	Utaifa	1. Mwafrika	2. Mzungu	3.Asia	4. Nyingine
4)	Kiwango cha Elimu	1=Elimu ya Msingi au chini 2=Elimu ya Sekondari 3=Elimu ya Ufundi 4=Astashahada 5=Chuo Kikuu			
5)	Idadi ya miaka tangu kupata jeraha				
6)	Jeraha la uti wa mgongo	1= Kizazi 2=Upande wa juu wa kifua	3= Katikati ya kifua 4=Upande wa juu wa kifua	5= sehemu ya chini ya uti wa mgongo)	
7)	kiwango cha jeraha	1= Jeraha kamili 2= jeraha lisilo kamili			
8)	Matibabu ya awali uliyopokea	1= Upasuaji 2=Matibabu bila upasuaji			
9)	Hali ya Ndoa	1= Sijaoa/Sijaolewa 2= Nina Ndoa 3= Nimetengana 4= Mtalaka	5= Mjane/Mgane 6= Naishi na Mwenza bila ndoa)		
10)	Hali yako ya Ajira ni ipi	1=Nimeajiriwa 2= Nimejiajiri 3= Kazi za kujitolea 4= Mwanafunzi	5= Mtunza nyumba 6= Mstaafu 7= Sijaajiriwa kwa sababu za kiafya		
11)	Njia ya Usafiri	1=Usafiri wa Umma 2=Usafiri Binafsi)	3=Nyinginezo (Elezea)		
12)	Makazi	Mjini			
		2. Kijijini			
13)	Ni nini chanzo chako cha kipato	1= Ajira 3=Msaada wa Ulemavu 2= Biashara 4= Mafao ya Kustaafu			
14)	Kipato chako cha Familia ni kiasi gani	1= Chini ya 50,000Kshs 2= Ksh50,000 mpaka 100,000 3= KShs. 100,001 to 200,000	4=Kshs200,001mpaka300,000 5= ksh 300,001 na zaidi 6= Hutaki kusema		

SHIRIKA LA AFYA DUNIANI UBORA WA MAISHA

Tafadhali soma kila swali na jitafakari hisia zako, na weka alama kwa namba itakayowakilisha maoni yako kwa usahihi

	(Please circle the number)				
	Dhaifu Sana	**Dhaifu**	**Si dhaifu wala vizuri**	**Vizuri**	**Vizuri sana**
1.Unoanaje ubora wa maisha yako?	1	2	3	4	5
	Hairidhishi kabisa	**Hairidhishi**	**Hairidhishi wala kuridhisha**	**Inaridhisha**	**Inaridhisha sana**
2. Ni kwa kiasi gani unaridhishwa na afya yako	1	2	3	4	5

Maswali yafuatayo yanauliza kuhusu mambo uliyoyapitia kwa majuma mawili yaliyopita

	Hapana kabisa	**Kidogo**	**Kwa kiasi cha wastani**	**Sana**	**Iliyopitisha a kisasi**
3. Ni kwa kiasi gani unahisi maumivu yanakuzuia kufanya jambo unalotaka kufanya	1	2	3	4	5
4. Ni kwa kiasi gani unahitaji matibabu kufanya kazi katika maisha yako ya kila siku	1	2	3	4	5
5. Ni kwa kiasi gani unafurahia maisha	1	2	3	4	5
6. Ni kwa kiasi gani unahisi maisha yako yana maana	1	2	3	4	5
	Hata kamwe	**kidogo**	**wastani**	**sana**	**Kupita kiasi**
7.Ni kwa kiasi gani unaweza kuwa makini	1	2	3	4	5
8.Ni kwa kiasi gani unajisikia salama kwenye maisha yako ya kila siku	1	2	3	4	5
9. Ni kwa kiasi gani mazingira yako ni salama	1	2	3	4	5

Maswali yafuatayo yanauliza kuhusu kiasi gani uliweza kufanya mambo kwa majuma mawili yaliyopita

	Hapana kabisa	**Kidogo**	**wastani**	**mara nyingi**	**ya kutosha**
10. Je, una nguvu za kutosha kwa kazi za siku nzima	1	2	3	4	5
11.Je,unakuibali hali ya mwili wako	1	2	3	4	5
12. Una fedha za kutosha kukidhi mahitaji yako	1	2	3	4	5

	Hapana kabisa	**kidogo**	**wastani**	**mara nyingi**	**ya kutosha)**
13. Ni kwa kiasi gani unapata taarifa unazohitaji kwenye maisha yako ya kila siku	1	2	3	4	5
14. Ni kwa kiasi gani una muda wa kufanya shughuli za burudani	1	2	3	4	5
	Vibaya kabisa	**vibaya**	**Si vibaya wala vizuri**	**Vizuri**	**Vizuri sana**
15. Ni kwa kiasi gani unaweza kutembea	1	2	3	4	5

Maswali yafuatayo yanakuuliza juu ya kuridhishwa kwako na vipengele mbalimbali vya maisha yako kwa majuma mawili yaliyopita

	Hairidhishi kabisa	**Hairidhishi**	**Hairidhishi wala Kuridhika**	**inaridhisha**	**Inaridhisha sana**
16. Ni kwa kiasi gani unaridhishwa na usingizi unaopata	1	2	3	4	5
17. Ni kwa kiasi gani unaridhishwa na uwezo wako wa kutekeleza majukumu yako ya kila siku?	1	2	3	4	5
18. Ni kwa kiasi gani uanaridhishwa na kazi yako?	1	2	3	4	5
19.Ni kwa kiasi gani unaridhishwa wewe mwenyewe?	1	2	3	4	5
20.Kwa kiasi gani unaridhishwa na mahusiano yako ya kibinafsi?	1	2	3	4	5
21. Ni kwa kiasi gani unaridhishwa na uhusiano wako wa kimapenzi?	1	2	3	4	5
22. Ni kwa kiasi gani unaridhishwa na msaada unaoupata kutoka kwa marafiki?	1	2	3	4	5
23.Ni kwa kiasi gani unaridhika na mazingira unayoishi?	1	2	3	4	5
24. Ni kwa kiasi gani unaridhishwa na upatikanaji wa huduma za kiafya?	1	2	3	4	5
25. Ni kwa kiasi gani	1	2	3	4	5

unaridhishwa na njia za usafiri?					

Maswali yafuatayo yanahusu ni mara ngapi umehisi mambo fulani kwa majuma mawili yaliyopita

	Hata kamwe	**Kwa kiasi kidogo**	**Mara nyingi**	**Mara nyingi sana**	**Kila wakati**
26. Ni mara ngapi unakuwa na fikra hasi, kukata tamaa, wasiwasi na huzuni?	1	2	3	4	5

	kiwango cha ushiriki	halijajibiwa	ndio	mwingine	hapana	Haina maana	hakuna shida	kidogo	wastan	kiwango kikubwa	Alama
1	Je una nafasi sawa ya kupata kazi na watu wa rika lako?		**0**								
	Je, tatizo ni kubwa kiasi gani ?						1	2	3	5	
2	Je unafanya kazi sawa sawa na watu wa rika lako?		0								
	Je, tatizo ni kubwa kwa kiasi gani?)						1	2	3	5	
3	Je, unachangia sawa sawa kiuchumi kama watu wa rika lako ?		0								
	Je tatizo ni kubwa kiasi gani kwako?						1	2	3	5	
4	Je unasafiri mara kwa mara kwenda nje ya kijiji chako kama watu wa rika lako (isipokuwa kwa matibabu) mfano kutembelea marafiki, kwenda sokoni karibu na kijiji ?		0								
	Je tatizo ni kubwa kiasi gani kwako?						1	2	3	5	
5	Unasaidia watu wengine mfano majirani, marafiki au familia		0								
	Je, tatizo ni kubwa kwa kiasi gani?						1	2	3	5	
6	Je unashiriki kwenye shughuli za kijamii kama watu wa rika lako		0								
	Je, ni tatizo kubwa kiasi gani?						1	2	3	5	
7	Je unashiriki mambo ya kijamii kama watu wa rika lako?		0								
	Je tatizo ni kubwa kiasi gani kwako ?						1	2	3	5	
8	Je unatembelea watu wengine ndani ya jamii kama wenzako?		0								
	Je tatizo ni kubwa kiasi gani kwako ?						1	2	3	5	
9	Je unajisikia vizuri kukutana na watu wengine ?		0								
	Je, ni tatizo kubwa kiasi gani						1	2	3	5	
10	Je unapata heshima sawasawa ma watu wa rika lako		0								
	Je, ni tatizo kubwa kiasi gani						1	2	3	5	
11	Je unaweza kwenda ndani, nje au karibu na nyumba kama wanavyofanya watu wengine		0								
	Je tatizo ni kubwa kiasi gani kwkao						1	2	3	5	
12	Je unaweza kutembelea maeneo yote ya umma ndani ya kijiji chako (kama shule,maduka,maofisi,sokoni,duka la chai au kahawa		0								
	Je tatizo nikubwa kiasi gani kwako						1	2	3	5	
13	Je una nafasi ya kujihudumia mwenyewe(mwonekano, lishe, afya na kadhalika		0								
	Je tatizo nikubw akiasi gani kwkao						1	2	3	5	
14	Je unafanya kazi za nyumbani		0								
	Je tatizo ni kubw akiasi gani kwako?						1	2	3	5	
15	Je kwenye mikutano ya familia mawazo yako yanaheshimiwa		0								
	Je, ni tatizo kubwa kiasi gani						1	2	3	5	
16	INyumbani, vyombo unavyotumia kulia chakula vinawekwa pamoja na vile vya watu wengine.		0								
	Je ni tatizo kubwa kiasi gani?						1	2	3	5	

17	Je, unajihusisha na sherehe mbalimbali kama wanarika wenzako. Mfano arusi ,matanga au sherehe za kidini		0								
	je ni tatizo kubwa kiasi gani?						1	2	3	5	
18	unajisikia ukiwa na ujasiri wa kujaribu mambo mapya?		0								
	Je ni tatizo kubwa kiasi gani?)						1	2	3	5	
	Jumla										

DASS 21

Tafadhali soma sentesi zifuatazo na weka alam ya duara kwenye namba 0.1.2 au 3 amabzo zinaonyesha ni kwa kaisi gani sentesi hiyo inahusiana na maisha yako kwa majum amawiliyaliyopita. Hkauna majibu sahihi au yasiyo sahihi. Usitumie muda mrefu kwenye sentesi moja.

0= Haikunihusu

1= Ilinihusu kwa kiasi fulani,ama wakati mwingine

2=Ilinihusu kwa kiasi kikubwa, au wakati

3= linihusu kwa kiwango kikubwa sana, au wakati mwingi

1	Ninapata shida kuinama	0	1	2	3
2	ligundua ukavu kwenye mdomo wangu	0	1	2	3
3	Sikuweza kupata hisia chanya kabisa	0	1	2	3
4	Nilipata ugumu kupumua mfano kupumua kwa haraka	0	1	2	3
5	Nilipata ugumu wa kujihamasisha kufanya mambo	0	1	2	3
6	Nilikuwa na hali ya kukuza mambo	0	1	2	3
7	Nilipata hali ya kutetemeka (mfano kwa mikono)	0	1	2	3
8	Nilihisi kuwa nilitumia nguvu nyingi za ufahamu	0	1	2	3
9	Nilikuwa na wasiwasi na hali ambayo ingesababisha niwe na hofu na kuonekana mjinga)	0	1	2	3
10	Ninahisi sina kitu cha kutegemea	0	1	2	3
11	Nilijikuta nimekasirika	0	1	2	3
12	Nilijikuta ninapata shida kutulia	0	1	2	3
13	Nilijikuta nina kosa mori	0	1	2	3
14	Sikuweza kuvumilia mambo yaliyonizuia kuendelea na mambo niliyokuwa nikiyafanya	0	1	2	3
15	Nilihisi niko karibu sana kutishika	0	1	2	3
16	Nilikosa shauku ya kitu chochote	0	1	2	3
17	Nilihisi nimekosa thamani ya utu	0	1	2	3
18	Nilihisi wasiwasi	0	1	2	3
19	Niligundua matendo ya moyo wangu nilipokosa uwezo wa kimwili	0	1	2	3
20	Nilipata uoga bila sababu	0	1	2	3
21	Nilihisi maisha hayana maana	0	1	2	3

Appendix III: Information Sheet

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
P.O. Box 62000 – 00200 NAIROBI, KENYA

+254202602270

info@jkuat.ac.ke or guantaiminah@gmail.com

Dear Participant,

I am a postgraduate student undertaking a master’s degree in the department of rehabilitation sciences at the *Jomo Kenyatta University of Agriculture and Technology*. As part of the study I’m expected to conduct research. *The title of my research is “***Correlation between psychological symptoms, participation and quality of life amongst spinal cord injury survivors, in Kenya**.” Information gathered in this study will be important in planning a holistic approach in participation and quality of life amongst persons with spinal cord injuries. This shall be helpful to persons with spinal cord injury and their families in the country.If you agree to participate in this study I will consult with you to arrange a suitable time and day for the collection of the relevant information. Participation in the study will involve filling a questionnaire taking at least 20 minutes. The information you give will be treated with utmost respect and confidentiality. This provides you with an opportunity to appreciate and contribute to scientific research that may provide information about participation and quality of life for Persons with Spinal Cord Injury that could be useful to healthcare workers and contribute to health policies among others. There is absolutely minimal risk to you for participating in this study. It is expected that you will experience minimal discomfort or stress from the questions asked in the interview. You don't have to respond to every question or provide information you do not want to provide and can withdraw from participating at any time. Referral to a professional counselor in case you suffer unexpected negative experiences will be made. Occasionally, a follow-up interview might be necessary to clarify some information. The researcher could request your participation for the follow-up interview before a lapse of two years. All participants will be identified using codes and the information kept in secure filling cabinet or safe so as to safeguard their anonymity and all the individuals directly or indirectly referred to in the questionnaire. In the future the researcher will destroy all code lists.If you have any questions or concerns before or after the study, you may contact me through phone or email given hereunder.

Contact numbers of researcher: Minah Kinanu Guantai

Phone: +254 729 496 639; Email: info@jkuat.ac.ke or guantaiminah@gmail.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Rehabilitation Science Department: Supervisor – Dr Joseph Mwangi Matheri email: mmatheri@gmail.com OR Dr Wallace Karuguti email mugambiw80@gmail.com OR Dean of the College of Health Sciences: *Jomo Kenyatta University of Agriculture and Technology*. P.O. Box 62000 – 00200 NAIROBI, KENYA .This research has been approved by the *Jomo Kenyatta University of Agriculture and Technology* Senate Research and Ethics Committee.

Appendix IV: Consent Form

I..agree to participate in the study being conducted by Ms Minah Kinanu Guantai a post-graduate student doing Master of Science degree in the department of rehabilitation at *Jomo Kenyatta University of Agriculture and Technology*, Kenya. She has informed me that this is a study for her Master of Science degree designed to gather information that will assist in the determining the correlation between psychological symptoms, participation and quality of life amongst spinal cord injury survivors, in Kenya.

” **I understand that:**

— Participation is voluntary and will involve interview taking at least 20 minutes mutually as agreed upon by me and the researcher.

— The benefits I may expect from the study are; (a) an appreciation of scientific research and (b) an opportunity to contribute to scientific research that may provide information about effects of psychological symptoms on participation, and quality of life amongst spinal cord injury survivors that could be useful to healthcare workers and contribute to health policies among others.

— The researcher does not foresee any risks to me participating in this study and it is expected that I will experience minimal discomfort or stress from the questions asked.

— I do not have to respond to every question or provide information I do not want to provide and I can withdraw from participating at any time.

— The researcher may contact me within two years to request for clarification of responses I will give in the interview.

— Codes identifying participants will be kept in secure filling cabinet or safe so as to safeguard the anonymity of myself and all the individuals directly or indirectly referred to in the questionnaire(s). I understand that in the future the researcher will destroy all codes lists.

— Only people associated with the study will see/listen to my responses. To protect privacy pseudonyms will be assigned for publications and presentations, unless written consent is provided. My responses will not be associated with my name: instead my name will be converted to a code number when the researcher stores the data.

— The researcher will answer any other questions about the research either before or after the research. If

Contact numbers of researcher: **Minah Kinanu Guantai**

Phone: +254 729 496 639; Email: info@jkuat.ac.ke or guantaiminah@gmail.com

Head of Rehabilitation Science Department: Supervisor – **Dr. Joseph Mwangi Matheri** email: mmatheri@gmail.com **OR Dr. Wallace Karuguti** email mugambiw80@gmail.com **OR** Dean of the College of Health Sciences: *Jomo Kenyatta University of Agriculture and Technology*. P.O. Box 62000 – 00200 NAIROBI, KENYA .This research has been approved by the *Jomo Kenyatta University of Agriculture and Technology* Senate Research and Ethics Committee.

Signature: Witness:

ing my participation in this study and I understand I may withdraw from participating at any time.

I have other questions or concerns I can address them to the researcher by email or phone.

Appendix V: Taarifa

Ndugu mshiriki,

Mimi, ni mwanafunzi anaesomea shahada ya pili katika idara ya tiba ya mwili katika Chuo Kikuu cha Jomo Kenyatta University of Agriculture and Technology. Kama sehemu ya masomo hayo ninatarajiwa kufanya utafiti. Kichwa cha utafiti wangu ni **'Athari za Dalili za kisaikolojiaJuu ya kushiriki, na maisha bora miongoni mwa waathirika wa Uti wa mgongo, Kenya.'** Kwa hiyo, ili kukamilisha lengo hili, moja ya malengo muhimu ni mipango na mfumo wa jumla katika kushiriki, na maisha bora miongoni mwa waathirika wa Uti wa mgongo, Napia katika kusaidia waathirika wa Uti wa mgongo na familia zao katika nchi ya Kenya kwa muda mrefu. Kama unakubali kushiriki katika utafiti huu mimi nitashauriana na wewe kupanga muda muafaka na siku kwa minajili ya ukusanyaji wa habari husika. Kushiriki katika utafiti huu utahusisha kushiriki kikamilifu katika majadiliano ya kundi itakayochukua angalau dakika ishirin (20). Habari utakazotoa zitawekwa kama siri na kwa heshima kubwa.Hii inakupa fursa kubwa kuchangia utafiti wa kisayansi ambayo inaweza kutoa taarifa juu ya changamoto zinazowakabili walemavu za kihuduma na misaada ya kibinafsi. Hii inaweza kuwa na manufaa kwa wafanyakazi wa idara ya afya, utetezi wa haki za binadamu na kwa makundi ya waathirika wa Uti wa mgongo miongoni mwa wengine. Kuna hatari ndogo kabisa kuwa kushiriki katika utafiti huu.

Inatarajiwa kuwa utakuwa na usumbufu ndogo au dhiki kutoka kuulizwa maswali wakati wa majadiliano ya kundi. Sio lazima ujibu kila swali au kutoa taarifa usizotaka kutoa na unaweza kukosa kushiriki wakati wowote. Utaelekezwa kwa mshauri mtaalamu katika ukipatikana unateseka kusiyotarajiwa.

Mara kwa mara, kuwezekana watafiti kukufuata ili uweze kufafanua baadhi ya habari iliyo kuwa muhimu wakati wa mahojiano. Mtafiti inaweza kuomba ushirika kama huo wa mahojiano kabla ya miaka miwili kuisha. Washiriki wote watatambuliwa kwa kutumia kodi na habari zao zitawekwa salama kwa sefu ili kuhifadhi usalama wa majina ya watu wote waliyoshiriki kwa utafiti. Katika siku zijazo mtafiti mkuu ataharibu orodha yote ya kanuni na kanda. Kama una maswali yoyote au wasiwasi kabla au baada ya utafiti, unaweza kuwasiliana na mimi kwa njia ya simu au barua pepe.

Ukiwa una maswali yoyote kuhusu utafiti huu au haki yako kama mshiriki au kama una matatizo yoyote tafadhali unaweza kuwasiliana wasiliana, na wafuatao:

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Contact numbers of researcher: **Minah Kinanu Guantai**

Phone: +254 729 496 639; Email: info@jkuat.ac.ke or guantaiminah@gmail.com

Head of Rehabilitation Science Department: Supervisor – **Dr Joseph Mwangi Matheri** email: mmatheri@gmail.com**OR** **Dr Wallace Karuguti** emailmugambiw80@gmail.com**OR** Dean of the College of Health Sciences: *Jomo Kenyatta University of Agriculture and Technology*. P.O. Box 62000 – 00200 NAIROBI, KENYA

This research has been approved by the *Jomo Kenyatta University of Agriculture and Technology* Senate Research and Ethics Committee.

Appendix VI: Fomu ya Idhini

Jina la Utafiti wa Mradi: Athari za Dalili za kisaikolojiaJuu ya kushiriki, na maisha bora miongoni mwa waathirika wa uti wa mgongo,KenyaKwa uhuru na kwa hiari yangu ninakukubali kushiriki katika kundi hili la mjadala kuhusu huduma na misaada kwa watu wenye ulemavu. Nimekukubali sauti yangu iwekwe kuwa mkanda wakati wa ushirika wangu katika utafiti huu wa dakika tisaini. Nakubaliana sitatoa taarifa yoyote itakayojadiliwa na kundi hili. Mjadala huu unafanywa na timu ya Bi Minah Kinanu Guantai ambaye ni mwanafunzi katika Chuo Kikuu cha Jomo Kenyatta University of Agriculture and Technology, Kenya. Naelewa kwamba madhumuni ya utafiti ni kuwa na majadiliano ya kundi na kutoa maoni yangu ya changamoto za huduma na misaada zinazowakabili waathirika wa uti wa mgongo eneo langu. Majadiliano itahusu changamoto chanya na hasi za waathirika wa uti wa mgongo, za kikazi, wanavyoishi kwa kujitegemea, na huduma zinazotolewa na mashirika kama vile afya, ukarabati, elimu, vituo vya muhula, huduma za jamii au NGO. Naelewa kwamba utambulisho wangu hautafunuliwa na kwamba naweza kuondoka kwa utafiti au kuondoka chumbani wakati wowote bila ya kutoa sababu. Naelewa kwamba hata kama au sitashiriki, na maoni yoyote nitakayotoa wakati wa majadiliano, haitaathiri faida yangu au haki ya kupokea huduma kwa wakati huu au katika siku zijazo.Naelewa kwamba sitaweza kupokea faida yoyote moja kwa moja kutoka kushiriki katika utafiti, lakini kushiriki kwangu kunaweza kusaidia wengine katika siku zijazo. Ninaelewa kwamba nitapokea Shilingi mia tano (500) za Kenya ya nauli yangu. Nimejibiwa maswali yangu yote kuhusu utafiti huu kwa lugha minayoelewa. Pia nimeelzwa chenye ninahitajika kufanya wakati wa utafiti. Nimesoma na kuelewa maelezo haya na nimekubali kushiriki katika utafiti huu.

Jina la mshiriki .... Sahihi ya mshiriki..........................

Shahidi .... Tarehe ....

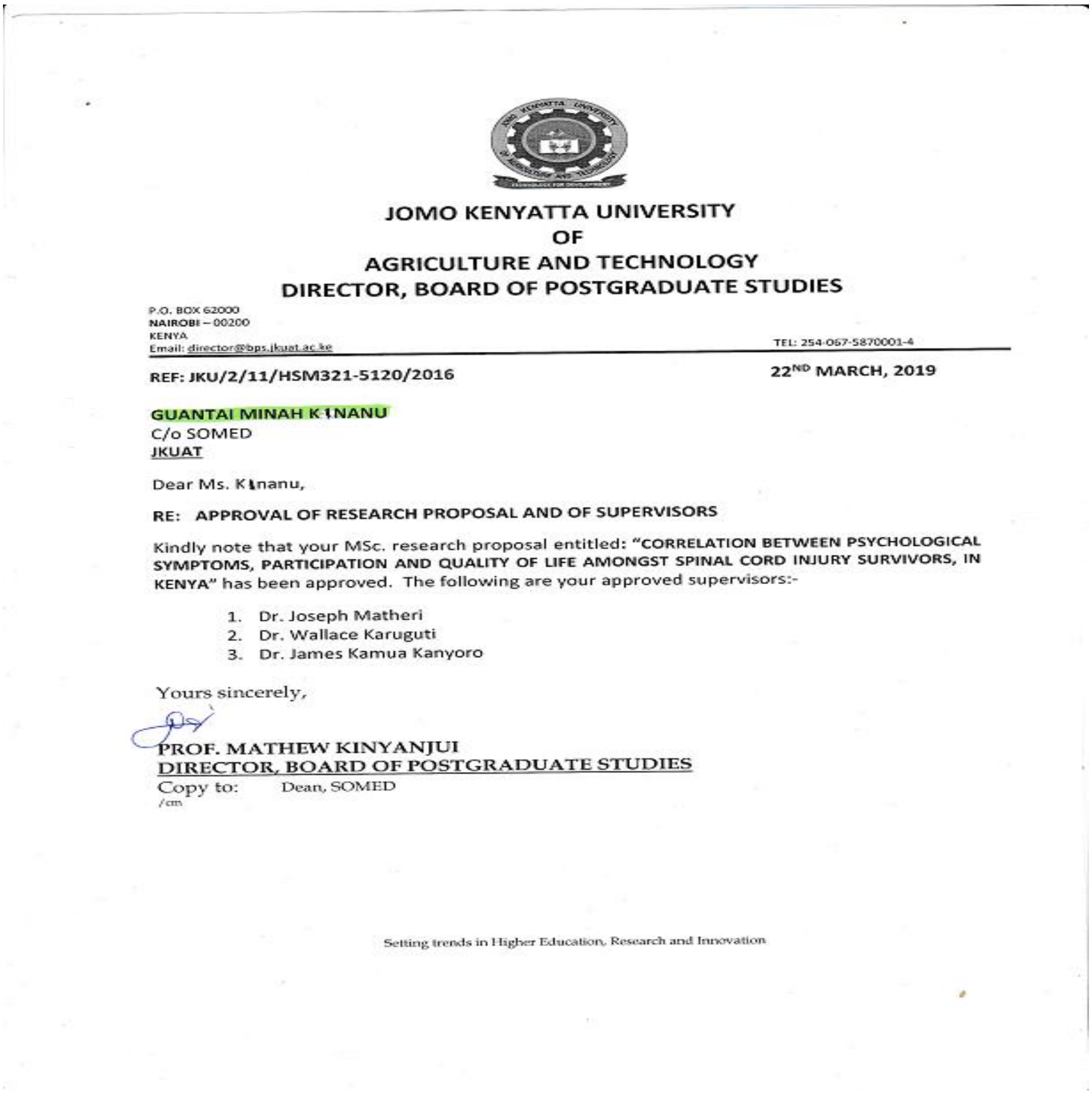
Kama, una maswali yoyote kuhusu utafiti huu au unataka ripoti ya matatizo yoyote kuhusiana na utafiti huu, tafadhali wasiliana na mtafiti mkuu, au msimamizi au katibu JKUAT - ERC.

Contact numbers of researcher: **Minah Kinanu Guantai** Phone: +254 729 496 639; Email: info@jkuat.ac.ke or guantaiminah@gmail.comHead of Rehabilitation Science Department: Supervisor – **Dr Joseph Mwangi Matheri** email: mmatheri@gmail.com**OR Dr Wallace Karuguti**

emailmugambiw80@gmail.com **OR** Dean of the College of Health Sciences: *Jomo Kenyatta University of Agriculture and Technology*. P.O. Box 62000 – 00200 NAIROBI, KENYA

This research has been approved by the *Jomo Kenyatta University of Agriculture and Technology* Senate Research and Ethics Committee.

Appendix VII: Board of Post Graduate Approval



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

P.O. BOX 62000
NAIROBI – 00200
KENYA
Email: director@bps.jkuat.ac.ke

TEL: 254-067-5870001-4

REF: JKU/2/11/HSM321-5120/2016

22ND MARCH, 2019

GUANTAI MINAH KĨNANU
C/o SOMED
JKUAT

Dear Ms. Kĩnanu,

RE: APPROVAL OF RESEARCH PROPOSAL AND OF SUPERVISORS

Kindly note that your MSc. research proposal entitled: **"CORRELATION BETWEEN PSYCHOLOGICAL SYMPTOMS, PARTICIPATION AND QUALITY OF LIFE AMONGST SPINAL CORD INJURY SURVIVORS, IN KENYA"** has been approved. The following are your approved supervisors:-

1. Dr. Joseph Matheri
2. Dr. Wallace Karuguti
3. Dr. James Kamua Kanyoro

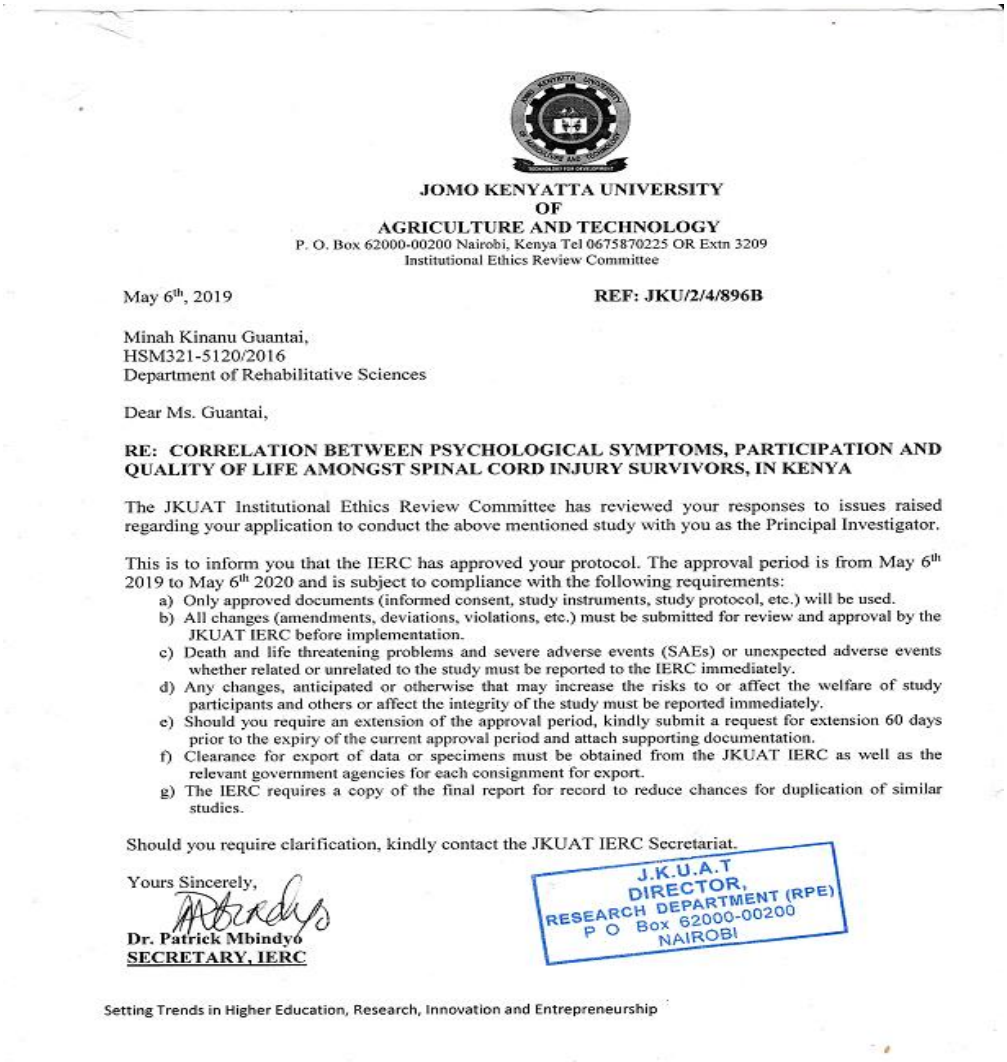
Yours sincerely,

PROF. MATHEW KINYANJUI
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Copy to: Dean, SOMED
/cm

Setting trends in Higher Education, Research and Innovation

Appendix VIII: Ethical Clearance JKUAT-ERC



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
P. O. Box 62000-00200 Nairobi, Kenya Tel 0675870225 OR Extn 3209
Institutional Ethics Review Committee

May 6th, 2019 **REF: JKU/2/4/896B**

Minah Kinanu Guantai,
HSM321-5120/2016
Department of Rehabilitative Sciences

Dear Ms. Guantai,

RE: CORRELATION BETWEEN PSYCHOLOGICAL SYMPTOMS, PARTICIPATION AND QUALITY OF LIFE AMONGST SPINAL CORD INJURY SURVIVORS, IN KENYA

The JKUAT Institutional Ethics Review Committee has reviewed your responses to issues raised regarding your application to conduct the above mentioned study with you as the Principal Investigator.

This is to inform you that the IERC has approved your protocol. The approval period is from May 6th 2019 to May 6th 2020 and is subject to compliance with the following requirements:

a) Only approved documents (informed consent, study instruments, study protocol, etc.) will be used.
b) All changes (amendments, deviations, violations, etc.) must be submitted for review and approval by the JKUAT IERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the IERC immediately.
d) Any changes, anticipated or otherwise that may increase the risks to or affect the welfare of study participants and others or affect the integrity of the study must be reported immediately.
e) Should you require an extension of the approval period, kindly submit a request for extension 60 days prior to the expiry of the current approval period and attach supporting documentation.
f) Clearance for export of data or specimens must be obtained from the JKUAT IERC as well as the relevant government agencies for each consignment for export.
g) The IERC requires a copy of the final report for record to reduce chances for duplication of similar studies.

Should you require clarification, kindly contact the JKUAT IERC Secretariat.

Yours Sincerely,

Dr. Patrick Mbindyo
SECRETARY, IERC

J.K.U.A.T
DIRECTOR,
RESEARCH DEPARTMENT (RPE)
P O Box 62000-00200
NAIROBI

Setting Trends in Higher Education, Research, Innovation and Entrepreneurship

Appendix IX: Authority from NACOSTI

NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/19/63727/30278**

Date: **21st May, 2019**

Minah Kinanu Guantai
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***Correlation between psychological symptoms, participation and health related quality of life amongs spinal cord injury survivors, in Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Machakos, Nairobi, and Nakuru Counties** for the period ending **21st May, 2020.**

You are advised to report to **the County Commissioners, the County Directors o Education, and the County Directors of Health Services, Machakos, Nairobi an Nakuru Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technolog and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of th final research report to the Commission within **one year** of completion. The soft cop of the same should be submitted through the Online Research Information System.

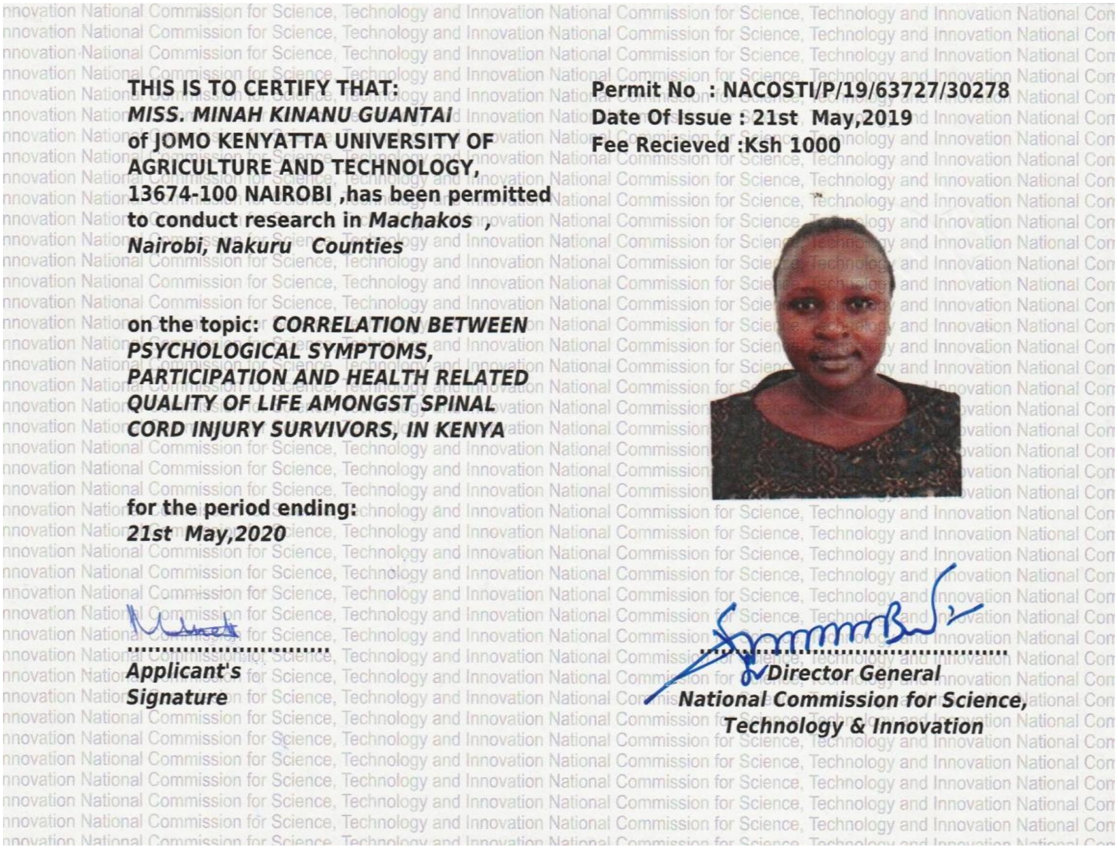
BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Machakos County

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

Appendix X: NACOSTI PERMIT



THIS IS TO CERTIFY THAT:
MISS. MINAH KINANU GUANTAI
of JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, 13674-100 NAIROBI ,has been permitted to conduct research in *Machakos , Nairobi, Nakuru Counties*

Permit No : NACOSTI/P/19/63727/30278
Date Of Issue : 21st May,2019
Fee Recieved :Ksh 1000

on the topic: *CORRELATION BETWEEN PSYCHOLOGICAL SYMPTOMS, PARTICIPATION AND HEALTH RELATED QUALITY OF LIFE AMONGST SPINAL CORD INJURY SURVIVORS, IN KENYA*

for the period ending:
21st May,2020

....
Applicant's Signature

....
Director General
National Commission for Science, Technology & Innovation

Appendix XI: Authority from County Commissioner Nairobi

NACOSTI

**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/19/63727/30278**

Date: **21st May, 2019**

Minah Kinanu Guantai
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***Correlation between psychological symptoms, participation and health related quality of life amongst spinal cord injury survivors, in Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Machakos, Nairobi, and Nakuru Counties** for the period ending **21st May, 2020.**

You are advised to report to **the County Commissioners, the County Directors of Education, and the County Directors of Health Services, Machakos, Nairobi and Nakuru Counties** before embarking on the research project.

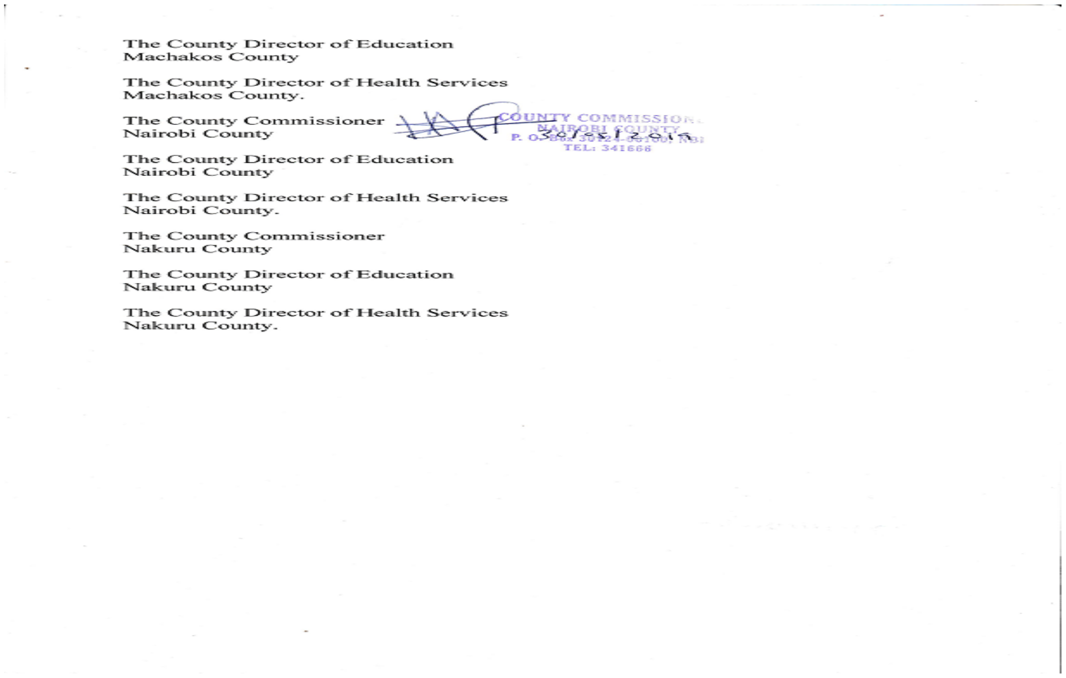
Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Machakos County

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified



The County Director of Education
Machakos County

The County Director of Health Services
Machakos County.

The County Commissioner
Nairobi County

COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666
30/05/2019

The County Director of Education
Nairobi County

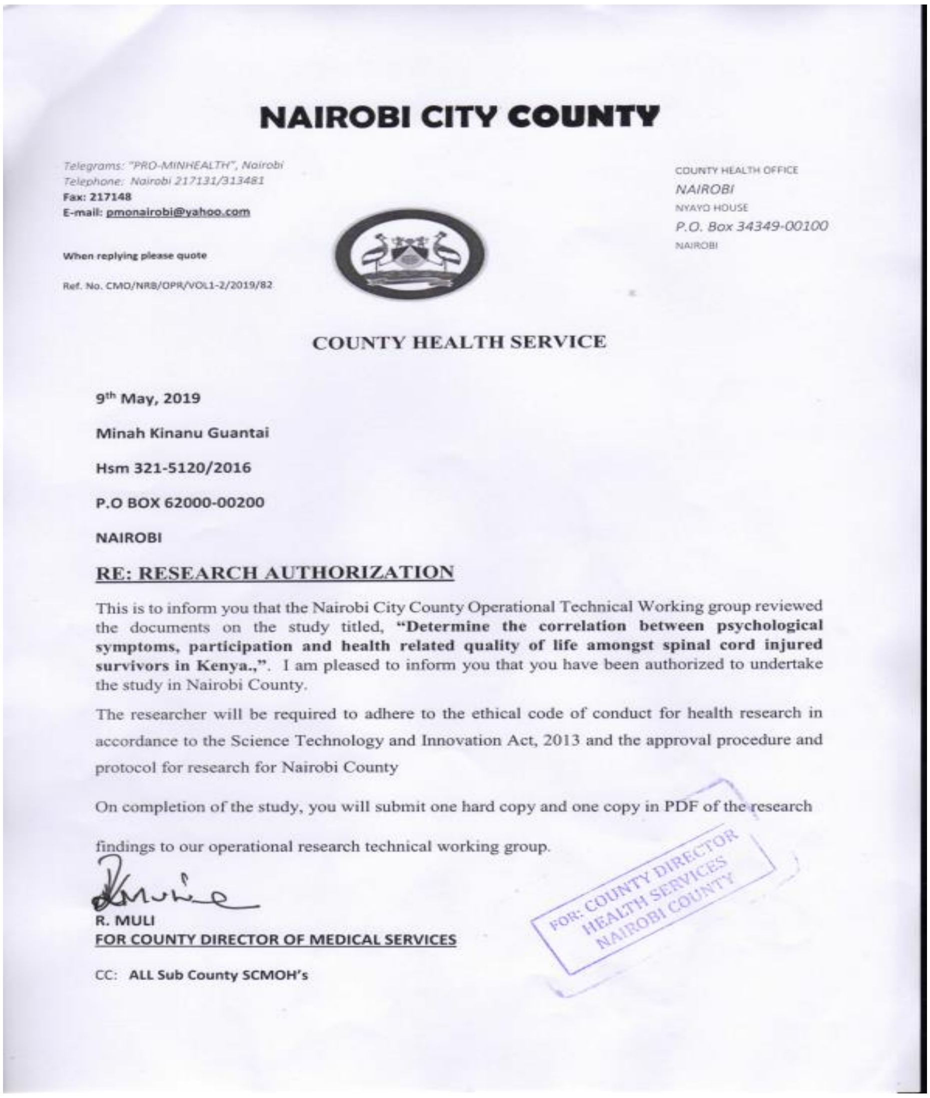
The County Director of Health Services
Nairobi County.

The County Commissioner
Nakuru County

The County Director of Education
Nakuru County

The County Director of Health Services
Nakuru County.

Appendix XII: Authority from Ministry of Health Nairobi County



NAIROBI CITY COUNTY

Telegrams: "PRO-MINHEALTH", Nairobi
Telephone: Nairobi 217131/313481
Fax: 217148
E-mail: pmonairobi@yahoo.com

COUNTY HEALTH OFFICE
NAIROBI
NYAYO HOUSE
P.O. Box 34349-00100
NAIROBI

When replying please quote

Ref. No. CMO/NRB/OPR/VOL1-2/2019/82

COUNTY HEALTH SERVICE

9th May, 2019

Minah Kinanu Guantai
Hsm 321-5120/2016
P.O BOX 62000-00200
NAIROBI

RE: RESEARCH AUTHORIZATION

This is to inform you that the Nairobi City County Operational Technical Working group reviewed the documents on the study titled, **"Determine the correlation between psychological symptoms, participation and health related quality of life amongst spinal cord injured survivors in Kenya.,"**. I am pleased to inform you that you have been authorized to undertake the study in Nairobi County.

The researcher will be required to adhere to the ethical code of conduct for health research in accordance to the Science Technology and Innovation Act, 2013 and the approval procedure and protocol for research for Nairobi County

On completion of the study, you will submit one hard copy and one copy in PDF of the research findings to our operational research technical working group.

FOR: COUNTY DIRECTOR
HEALTH SERVICES
NAIROBI COUNTY

R. MULI
FOR COUNTY DIRECTOR OF MEDICAL SERVICES

CC: **ALL Sub County SCMOH's**

Appendix XIII: Authority from Ministry of Education Nairobi County

Republic of Kenya
MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING & BASIC EDUCATION

Telegrams: "SCHOOLING", Nairobi
Telephone; Nairobi 020 2453699
Email: rcenairobi@gmail.com
rdenairobi@gmail.com

When replying please quote

REGIONAL DIRECTOR OF EDUCATION
NAIROBI REGION
NYAYO HOUSE
P.O. Box 74629 – 00200
NAIROBI

Ref: **RCE/NRB/GEN/1/VOL. 1**

DATE: **29th May, 2019**

Minah Kinanu Guantai
Jomo Kenyatta University of
Agriculture & Technology
P O Box 62000-00200
NAIROBI

RE: RESEARCH AUTHORIZATION

We are in receipt of a letter from the National Commission for Science, Technology and Innovation regarding research authorization in Nairobi County on **"Correlation between psychological symptoms, participation and health related quality of life amongst spinal cord injury survivors, in Kenya".**

This office has no objection and authority is hereby granted for a period ending **21st May, 2020** as indicated in the request letter.

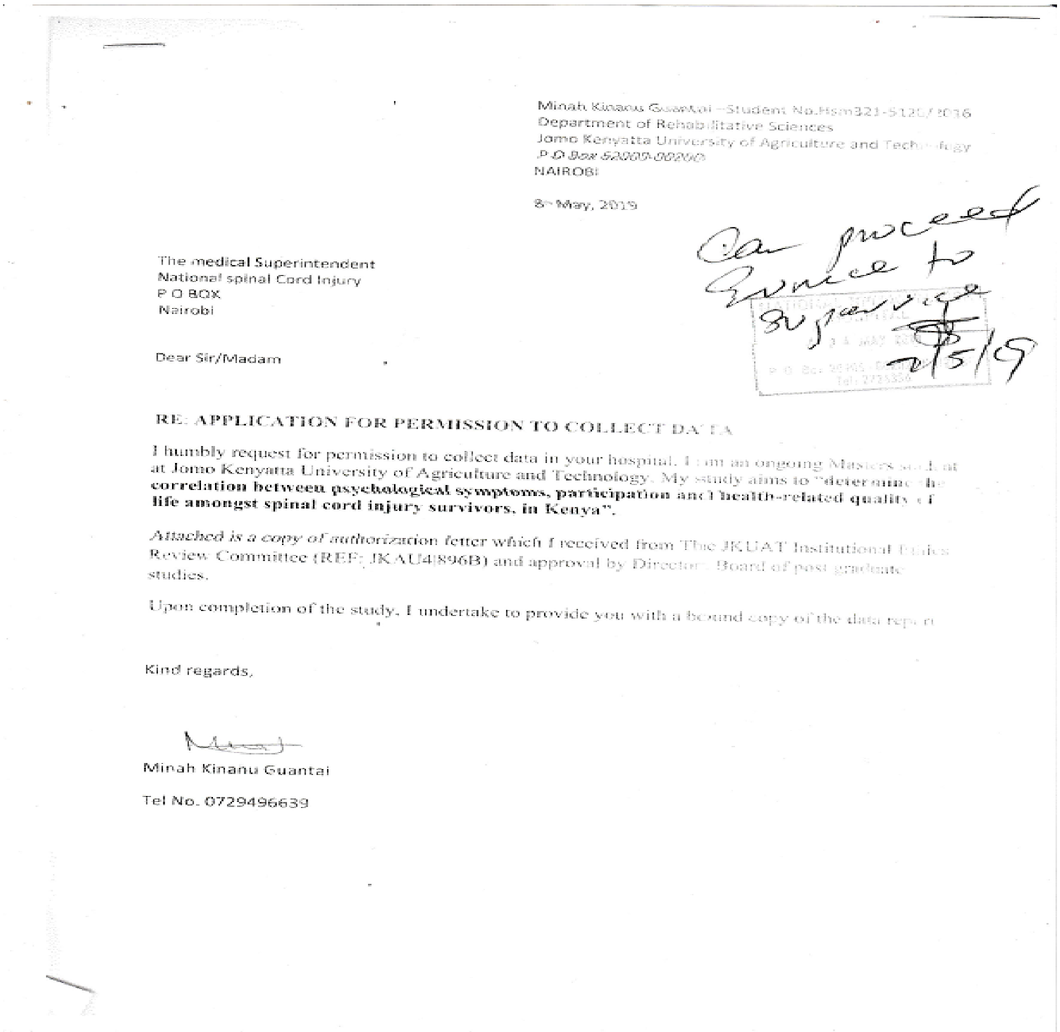
Kindly inform the Sub County Director of Education of the Sub County you intend to visit.

30 MAY 2019

KINOTI KIOGORA
FOR: REGIONAL DIRECTOR OF EDUCATION
NAIROBI

C.C
Director General/CEO
Nation Commission for Science, Technology and Innovation
NAIROBI

Appendix XIV: Permission from National Spinal Cord Injury Hospital



Minah Kinanu Guantai –Student No.Hsm321-5120/2016
Department of Rehabilitative Sciences
Jomo Kenyatta University of Agriculture and Technology
P.O Box 62000-00200
NAIROBI

8th May, 2019

Can proceed
Eunice to
supervise
2/5/19

The medical Superintendent
National spinal Cord Injury
P O BOX
Nairobi

Dear Sir/Madam

RE: APPLICATION FOR PERMISSION TO COLLECT DATA

I humbly request for permission to collect data in your hospital. I am an ongoing Masters student at Jomo Kenyatta University of Agriculture and Technology. My study aims to "**determine the correlation between psychological symptoms, participation and health-related quality of life amongst spinal cord injury survivors, in Kenya**".

Attached is a copy of authorization letter which I received from The JKUAT Institutional Ethics Review Committee (REF: JKAU4|896B) and approval by Director, Board of post graduate studies.

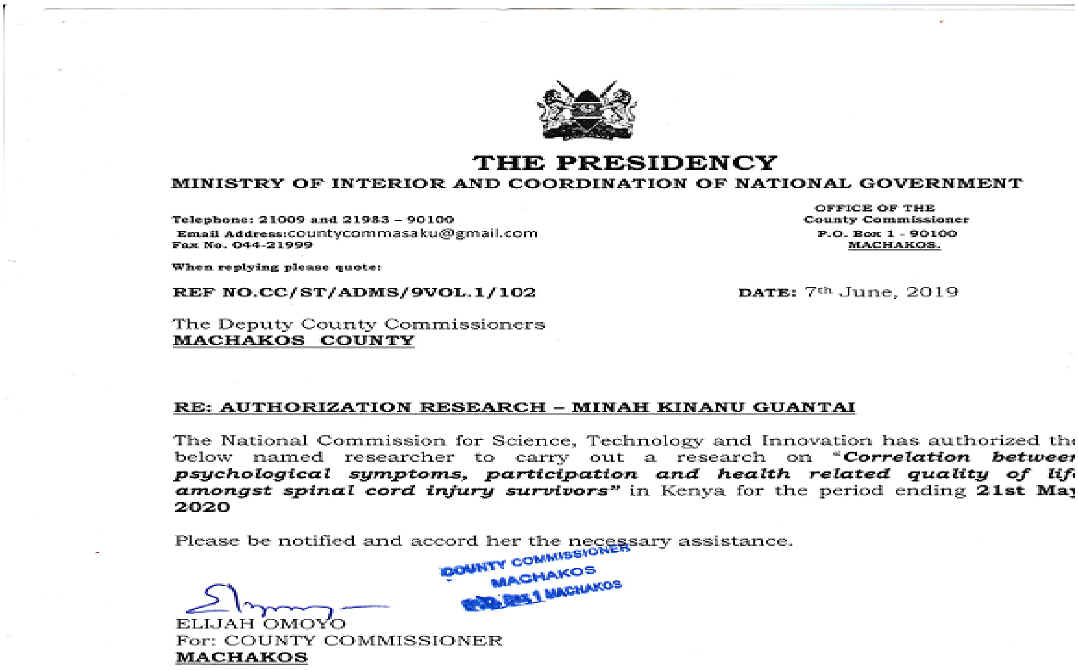
Upon completion of the study, I undertake to provide you with a bound copy of the data report

Kind regards,

Minah Kinanu Guantai

Tel No. 0729496639

Appendix XV: Authority from Commissioner Machakos County



THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telephone: 21009 and 21983 – 90100
Email Address:countycommasaku@gmail.com
Fax No. 044-21999

OFFICE OF THE
County Commissioner
P.O. Box 1 - 90100
MACHAKOS.

When replying please quote:

REF NO.CC/ST/ADMS/9VOL.1/102 **DATE:** 7th June, 2019

The Deputy County Commissioners
MACHAKOS COUNTY

RE: AUTHORIZATION RESEARCH – MINAH KINANU GUANTAI

The National Commission for Science, Technology and Innovation has authorized th below named researcher to carry out a research on ***"Correlation betwee psychological symptoms, participation and health related quality of lif amongst spinal cord injury survivors"*** in Kenya for the period ending **21st Ma 2020**

Please be notified and accord her the necessary assistance.

COUNTY COMMISSIONER
MACHAKOS
P.O. Box 1 MACHAKOS

ELIJAH OMOYO
For: COUNTY COMMISSIONER
MACHAKOS

Appendix XVI: Authority from Ministry of Education Machakos County

MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING
AND BASIC EDUCATION

Telegrams: "**SCHOOLING**" Machakos
Telephone: Machakos (
Fax: Machakos
Email –cdemachakos@yahoo.com
When replying please quote

OFFICE OF THE
COUNTY DIRECTOR OF
EDUCATION
P.O. BOX 2666-90100,
MACHAKOS

MKS/ED/CDE/R/4/VOL.3/56

7th June, 2019

Minah Kinanu Guantai
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION.

Reference is made to the letter from National Commission for Science, Technology and Innovation Ref: **NACOSTI/P/19/63727/30278** dated **21st May, 2019.**

You are hereby authorized to carry out your research on, **"Correlation between psychological symptoms, participation and health related quality of life amongst spinal cord injury survivors, in Machakos County Kenya"** for a period ending **21st May, 2020.**

07 JUN 2019

SIMON NJIRU
FOR: COUNTY DIRECTOR OF EDUCATION
MACHAKOS

Appendix XVII: Authority from Ministry of Health Machakos County

REPUBLIC OF KENYA

GOVERNMENT OF MACHAKOS COUNTY
DEPARTMENT OF HEALTH & EMERGENCY SERVICES
Director for Health Services

Telephone: +254-44-20575
Fax: 254-44-20655
When replying please quote

Machakos Highway
P.O. Box 2574-90100
Machakos

Ref: MOH/MKS/C4.VI/64

13th May, 2019

Minah Kinanu Guantai
HSM 321-5120/2016
P.O. Box 6200-00200
NAIROBI

Dear Ms. Kinanu

RE: RESEARCH AUTHORIZATION

I make reference to your request dated 13th May, 2019 on the above subject.

You are hereby authorized to carry out a study on the study entitled ***"Determine the correlation between psychological symptoms, participation and health related quality of life among spinal cord injured survivors in Kenya***" for the period ending 6th May, 2020 in Machakos County.

I am pleased to inform you that you have been authorized to undertake the study.

By a copy of this letter, the officers in charge are requested to offer you the necessary support.

Kindly note, you are supposed to furnish this office with a copy of your study findings at the end your study.

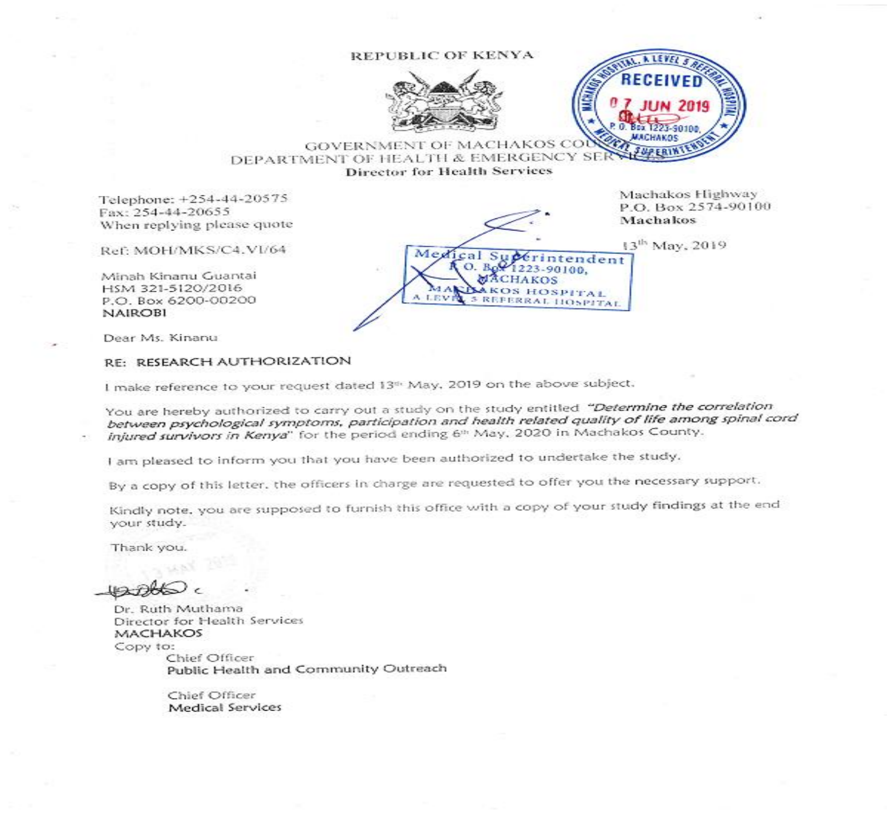
Thank you.

DIRECTOR
13 MAY 2019

Dr. Ruth Muthama
Director for Health Services
MACHAKOS
Copy to:
Chief Officer
Public Health and Community Outreach

Chief Officer
Medical Services

Appendix XVIII: Permission from Machakos Level 5 Hospital



REPUBLIC OF KENYA

GOVERNMENT OF MACHAKOS COU
DEPARTMENT OF HEALTH & EMERGENCY SERVICES
Director for Health Services

MACHAKOS HOSPITAL, A LEVEL 5 REFERRAL HOSPITAL
RECEIVED
07 JUN 2019
P. O. Box 1223-90100,
MACHAKOS
MEDICAL SUPERINTENDENT

Telephone: +254-44-20575
Fax: 254-44-20655
When replying please quote

Ref: MOH/MKS/C4.VI/64

Machakos Highway
P.O. Box 2574-90100
Machakos

13th May, 2019

Medical Superintendent
P. O. Box 1223-90100,
MACHAKOS
MACHAKOS HOSPITAL
A LEVEL 5 REFERRAL HOSPITAL

Minah Kinanu Guantai
HSM 321-5120/2016
P.O. Box 6200-00200
NAIROBI

Dear Ms. Kinanu

RE: RESEARCH AUTHORIZATION

I make reference to your request dated 13th May, 2019 on the above subject.

You are hereby authorized to carry out a study on the study entitled *"Determine the correlation between psychological symptoms, participation and health related quality of life among spinal cord injured survivors in Kenya*" for the period ending 6th May, 2020 in Machakos County.

I am pleased to inform you that you have been authorized to undertake the study.

By a copy of this letter, the officers in charge are requested to offer you the necessary support.

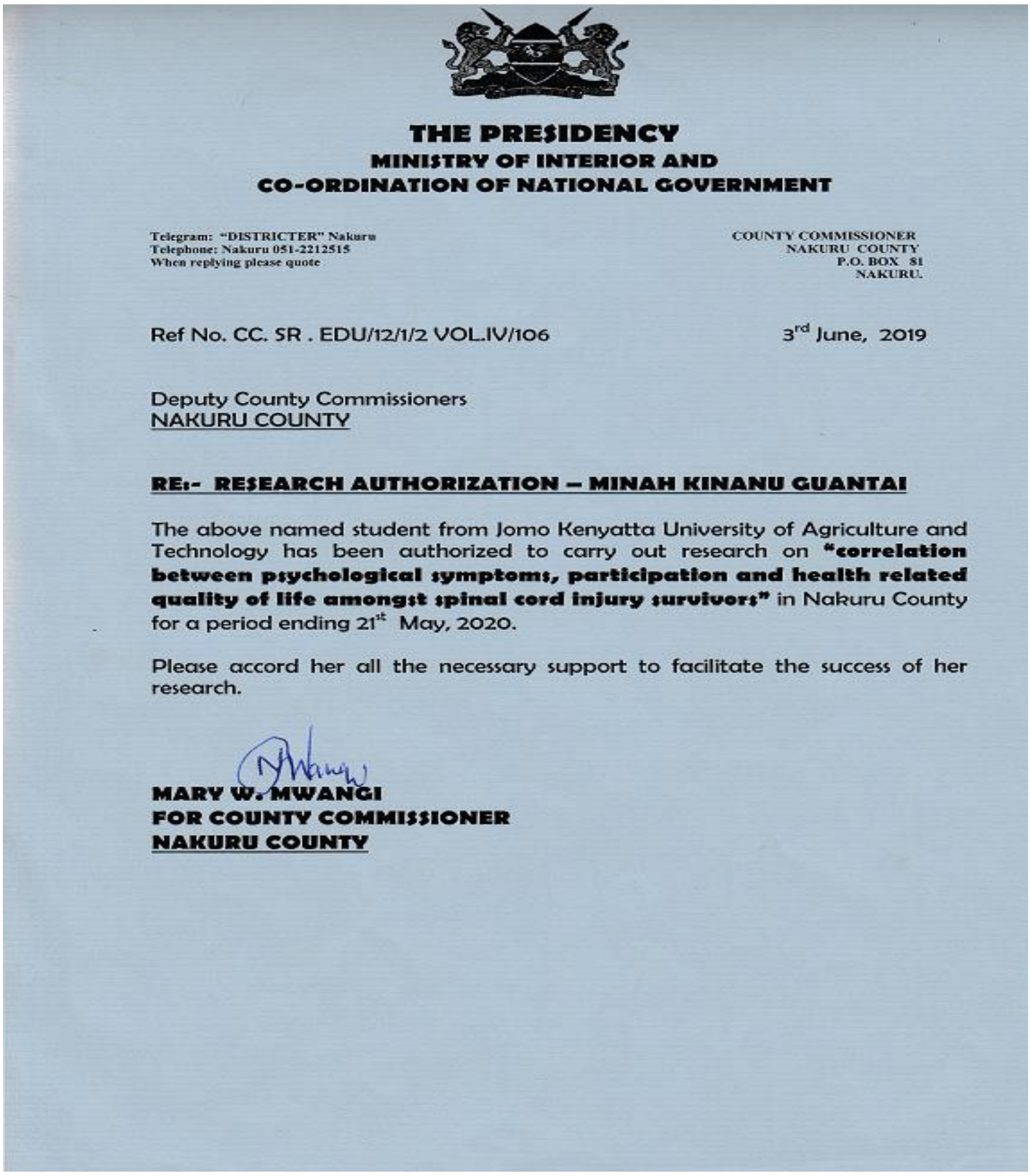
Kindly note, you are supposed to furnish this office with a copy of your study findings at the end your study.

Thank you.

Dr. Ruth Muthama
Director for Health Services
MACHAKOS
Copy to:
    Chief Officer
    Public Health and Community Outreach

    Chief Officer
    Medical Services

Appendix XIX: Authority from Commissioner Nakuru County



THE PRESIDENCY
MINISTRY OF INTERIOR AND
CO-ORDINATION OF NATIONAL GOVERNMENT

Telegram: "DISTRICTER" Nakuru
Telephone: Nakuru 051-2212515
When replying please quote

COUNTY COMMISSIONER
NAKURU COUNTY
P.O. BOX 81
NAKURU.

Ref No. CC. SR . EDU/12/1/2 VOL.IV/106

3rd June, 2019

Deputy County Commissioners
NAKURU COUNTY

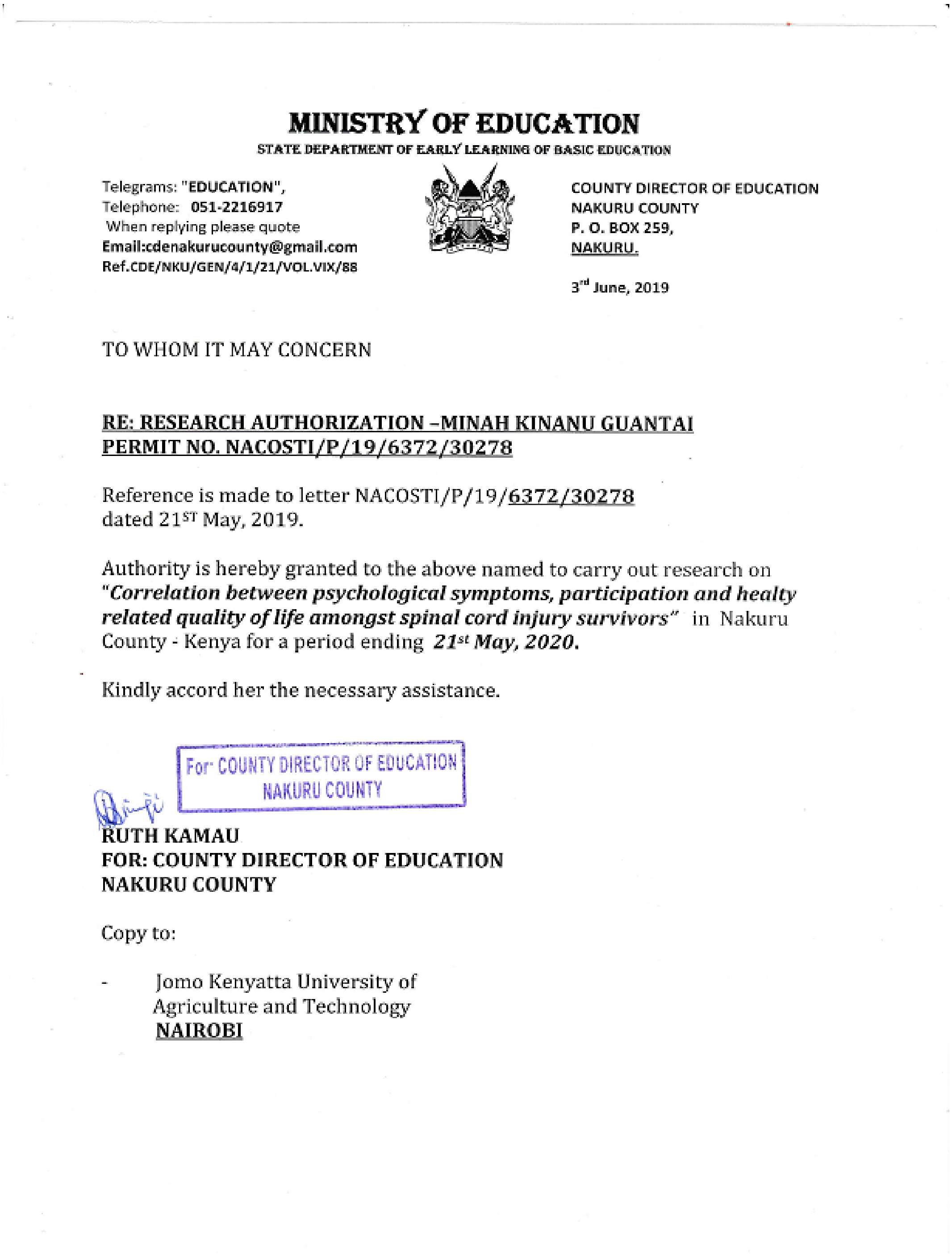
RE:- RESEARCH AUTHORIZATION – MINAH KINANU GUANTAI

The above named student from Jomo Kenyatta University of Agriculture and Technology has been authorized to carry out research on **"correlation between psychological symptoms, participation and health related quality of life amongst spinal cord injury survivors"** in Nakuru County for a period ending 21st May, 2020.

Please accord her all the necessary support to facilitate the success of her research.

MARY W. MWANGI
FOR COUNTY COMMISSIONER
NAKURU COUNTY

Appendix XX: Authority from Ministry of Education Nakuru County



MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING OF BASIC EDUCATION

Telegrams: "**EDUCATION**",
Telephone: **051-2216917**
When replying please quote
Email:cdenakurucounty@gmail.com
Ref.CDE/NKU/GEN/4/1/21/VOL.VIX/88

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY
P. O. BOX 259,
NAKURU.

3rd June, 2019

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION –MINAH KINANU GUANTAI
PERMIT NO. NACOSTI/P/19/6372/30278

Reference is made to letter NACOSTI/P/19/6372/30278 dated 21ST May, 2019.

Authority is hereby granted to the above named to carry out research on "***Correlation between psychological symptoms, participation and healty related quality of life amongst spinal cord injury survivors***" in Nakuru County - Kenya for a period ending ***21st May, 2020.***

Kindly accord her the necessary assistance.

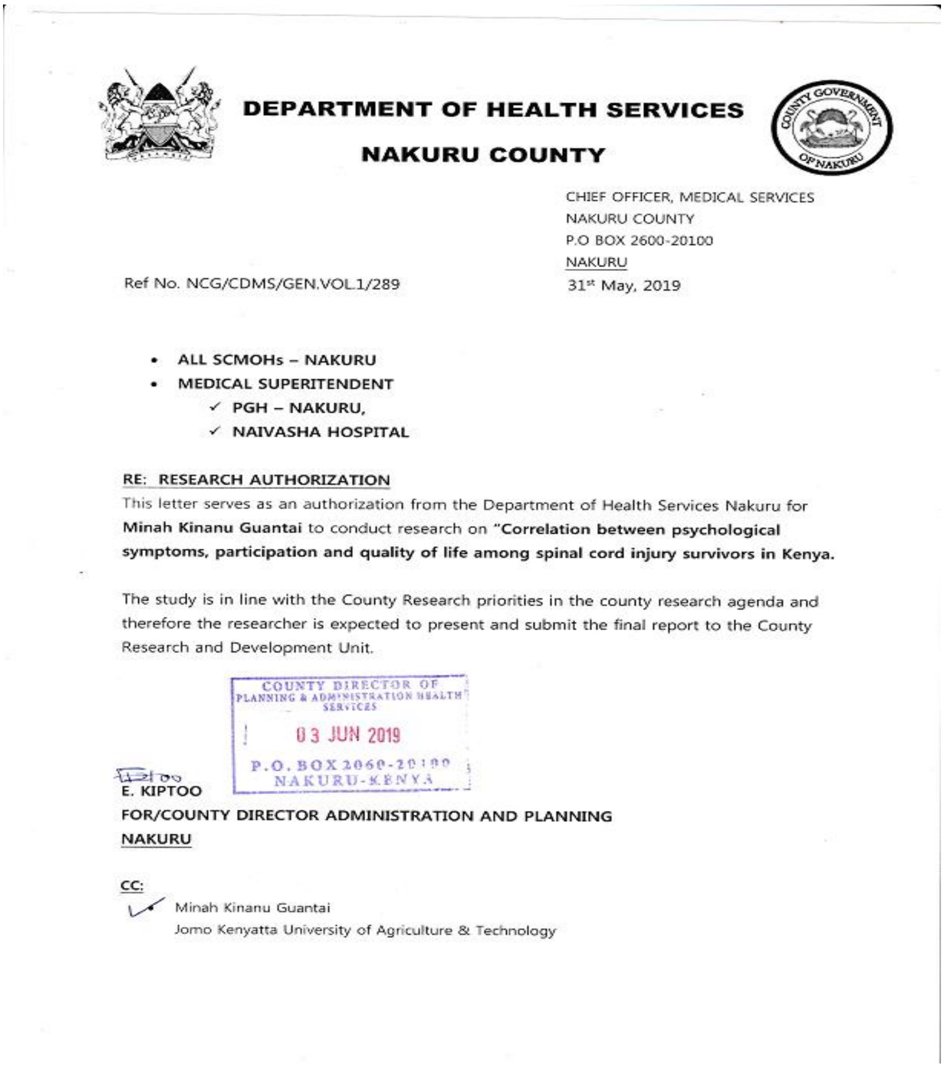
For· COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

RUTH KAMAU
FOR: COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Copy to:

- Jomo Kenyatta University of
  Agriculture and Technology
  NAIROBI

Appendix XXI: Authority from Ministry of Health Nakuru County



DEPARTMENT OF HEALTH SERVICES

NAKURU COUNTY

CHIEF OFFICER, MEDICAL SERVICES
NAKURU COUNTY
P.O BOX 2600-20100
NAKURU

Ref No. NCG/CDMS/GEN.VOL.1/289

31st May, 2019

- **ALL SCMOHs – NAKURU**
- **MEDICAL SUPERITENDENT**
  - ✓ **PGH – NAKURU,**
  - ✓ **NAIVASHA HOSPITAL**

RE: RESEARCH AUTHORIZATION

This letter serves as an authorization from the Department of Health Services Nakuru for **Minah Kinanu Guantai** to conduct research on **"Correlation between psychological symptoms, participation and quality of life among spinal cord injury survivors in Kenya.**

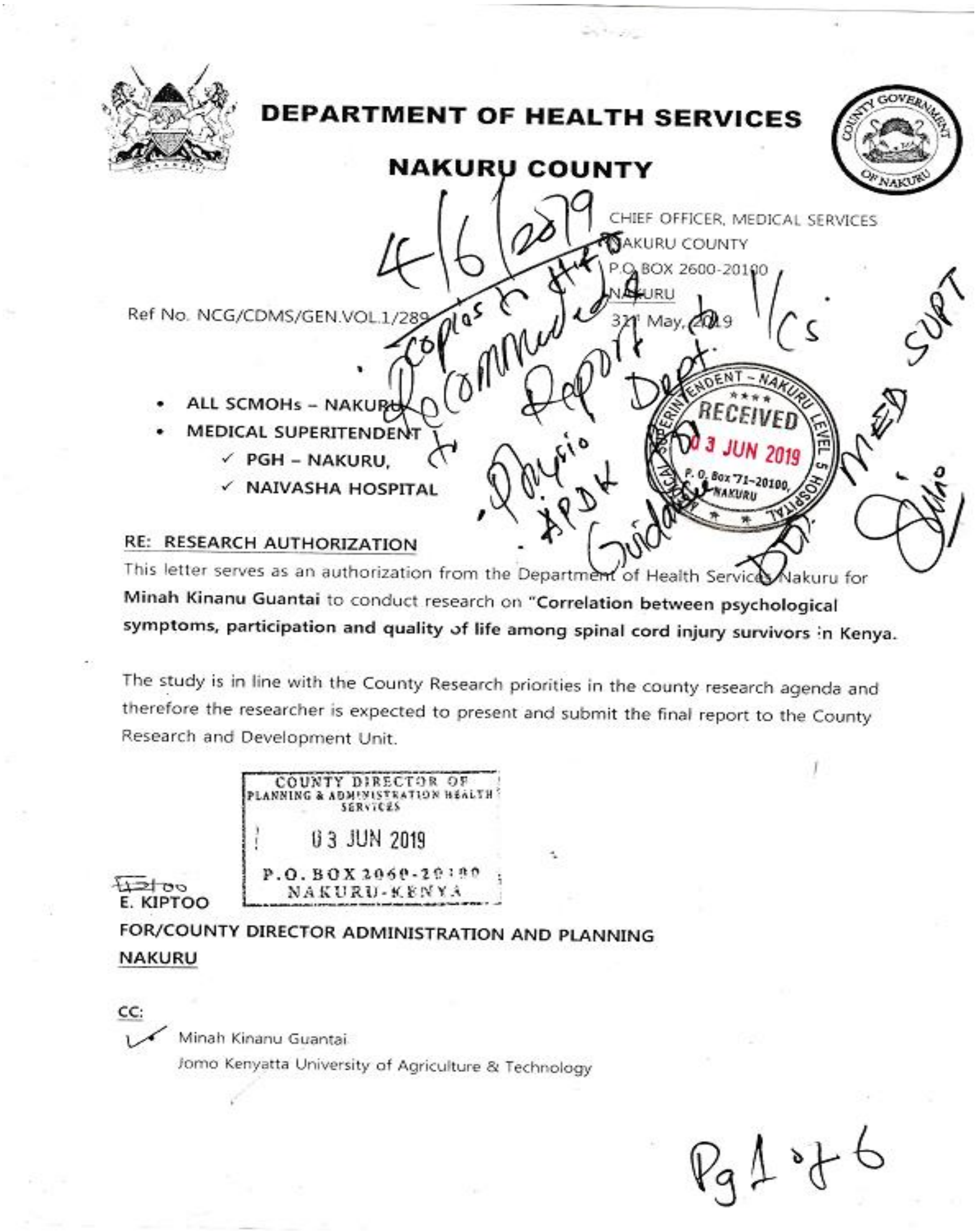
The study is in line with the County Research priorities in the county research agenda and therefore the researcher is expected to present and submit the final report to the County Research and Development Unit.

COUNTY DIRECTOR OF
PLANNING & ADMINISTRATION HEALTH
SERVICES
03 JUN 2019
P.O. BOX 2060-20100
NAKURU-KENYA

E. KIPTOO
FOR/COUNTY DIRECTOR ADMINISTRATION AND PLANNING
NAKURU

CC:
✓ Minah Kinanu Guantai
Jomo Kenyatta University of Agriculture & Technology

Appendix XXII: Permission from Nakuru Level 5 Hospital



DEPARTMENT OF HEALTH SERVICES

NAKURU COUNTY

CHIEF OFFICER, MEDICAL SERVICES
NAKURU COUNTY
P.O BOX 2600-20100
NAKURU
31st May, 2019

Ref No. NCG/CDMS/GEN.VOL.1/289

4/6/2019
Copies to H/o
Recommended to 1/CS
Report Dept.
&
Physio
APDK
Guidance
DD
DD
MED SUPT

- **ALL SCMOHs – NAKURU**
- **MEDICAL SUPERITENDENT**
  - ✓ **PGH – NAKURU,**
  - ✓ **NAIVASHA HOSPITAL**

MEDICAL SUPERINTENDENT – NAKURU LEVEL 5 HOSPITAL
RECEIVED
03 JUN 2019
P. O. Box 71–20100,
NAKURU

RE: RESEARCH AUTHORIZATION

This letter serves as an authorization from the Department of Health Services Nakuru for **Minah Kinanu Guantai** to conduct research on "**Correlation between psychological symptoms, participation and quality of life among spinal cord injury survivors in Kenya.**

The study is in line with the County Research priorities in the county research agenda and therefore the researcher is expected to present and submit the final report to the County Research and Development Unit.

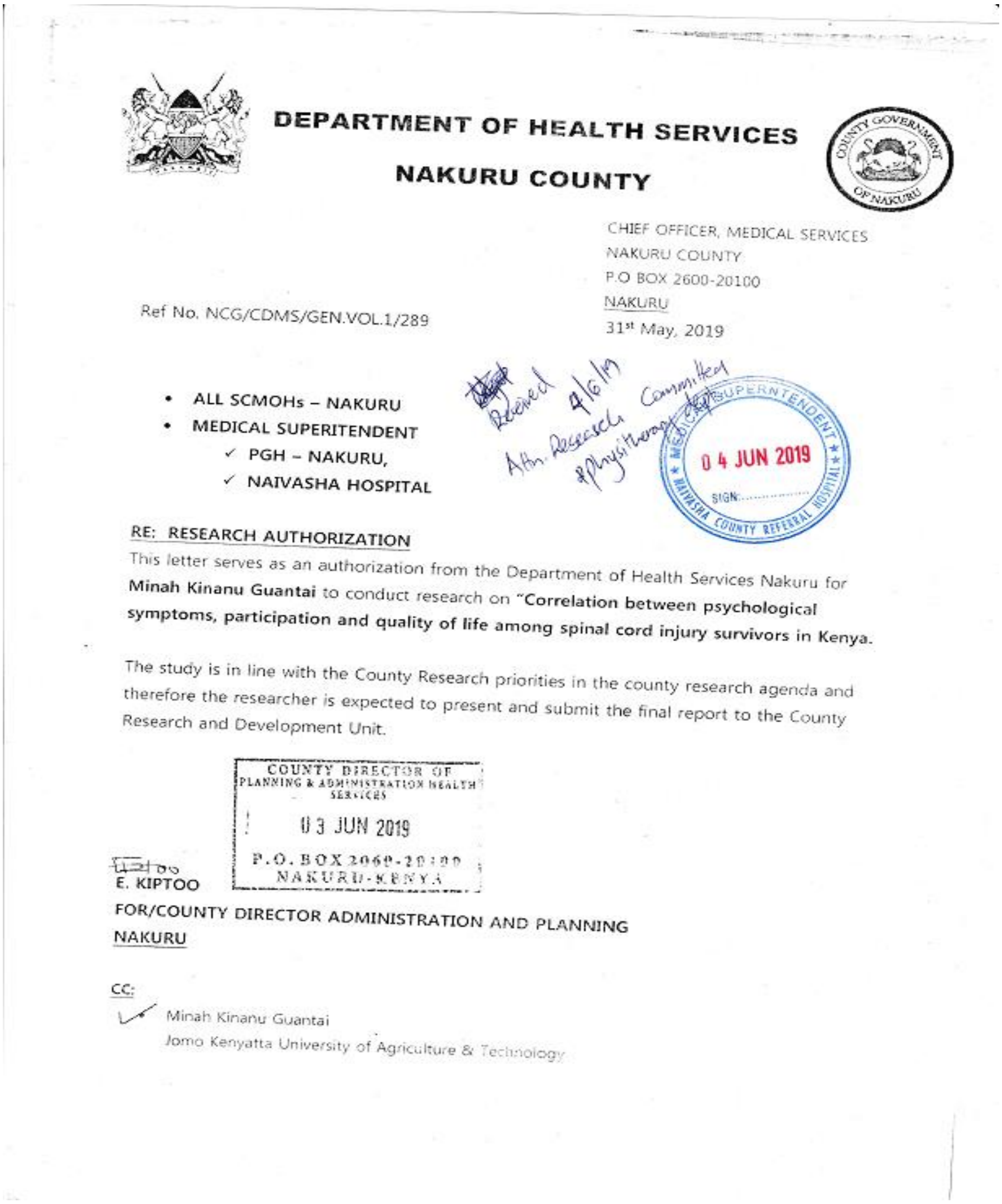
COUNTY DIRECTOR OF
PLANNING & ADMINISTRATION HEALTH SERVICES
03 JUN 2019
P.O. BOX 2060-20100
NAKURU-KENYA

E. KIPTOO
FOR/COUNTY DIRECTOR ADMINISTRATION AND PLANNING
NAKURU

CC:
✓ Minah Kinanu Guantai
Jomo Kenyatta University of Agriculture & Technology

Pg 1 of 6

Appendix XXIII: Permission from Naivasha County Referal Hospital



DEPARTMENT OF HEALTH SERVICES

NAKURU COUNTY

CHIEF OFFICER, MEDICAL SERVICES
NAKURU COUNTY
P.O BOX 2600-20100
NAKURU

Ref No. NCG/CDMS/GEN.VOL.1/289

31st May, 2019

- **ALL SCMOHs – NAKURU**
- **MEDICAL SUPERITENDENT**
  - ✓ **PGH – NAKURU,**
  - ✓ **NAIVASHA HOSPITAL**

Received 4/6/19
Attn. Research Committee
& Physiotherapy dept

MEDICAL SUPERNTENDENT
04 JUN 2019
SIGN:..................
NAIVASHA COUNTY REFERRAL HOSPITAL

RE: RESEARCH AUTHORIZATION

This letter serves as an authorization from the Department of Health Services Nakuru for **Minah Kinanu Guantai** to conduct research on "**Correlation between psychological symptoms, participation and quality of life among spinal cord injury survivors in Kenya.**

The study is in line with the County Research priorities in the county research agenda and therefore the researcher is expected to present and submit the final report to the County Research and Development Unit.

COUNTY DIRECTOR OF
PLANNING & ADMINISTRATION HEALTH
SERVICES
03 JUN 2019
P.O. BOX 2060-20100
NAKURU-KENYA

E. KIPTOO
FOR/COUNTY DIRECTOR ADMINISTRATION AND PLANNING
NAKURU

CC:
✓ Minah Kinanu Guantai
Jomo Kenyatta University of Agriculture & Technology