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Risk Factors Associated with Lower Back Pain among Nurses: A Case of National Rehabilitation Centre in Ruwa, Zimbabwe

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Abstract:

Health care providers are exposed to a myriad of occupation safety and health hazards both in the private and public sector. Nurses and other health professional are exposed to awkward postures, repetitive movements, force exertion and manual handling for prolonged periods. Low back pain (LBP) is a public health problem worldwide and is a common cause of work-related disorder among workers, especially in the nursing profession. The objectives of the study were to ascertain the prevalence of lower back pain among nurses at National Rehabilitation Centre and identify and assess risk factors associated with back pain among nurses at National Rehabilitation Centre. The research was carried out using a cross sectional study design. A total of 100 nurses were randomly selected. A Modified Nordic Musculoskeletal Questionnaire (NMQ) was used to assess prevalence, interference and physician visits by nurses. A predesigned questionnaire was used to assess risk factors. Descriptive statistics and Pearson's Chi-square tests were used to analyse data. All data was analysed using SPSS version 25. Results show that the age of nurses ranged between 26 and 64 years (42 ± 9.2) and majority of them (64%) were married. Very few nurses (6%) were male which means that the rehabilitation nursing field is female dominated. The highest reported pain was in the lower back in the past 12 months which was 72% with 12% in the past 7 days. This was followed by upper back which recorded 32% in the past year and 13% in the past week. Age and having chronic conditions were significantly associated with lower back pain among nurses with $p =$ values of 0.031 and 0.020 respectively. Results also indicate that there was a significant association between lower back pain with environmental factors ($\chi^2 = 9, p = 0.014$), job-related factors ($\chi^2 = 26, p = 0.000$) and physical factors ($\chi^2 = 18, p = 0.020$). In conclusion, there is high prevalence of lower back pain among nurses. Lower back pain was associated with age, environmental factors and job-related factors. There is need for training, exercises, and assessment of individual capacities to prevent lower back pain among rehabilitation nurses.

Keywords: Association, low back pain, nurses, risk factors, prevalence

1. Introduction

The nursing profession is one of the critical and essential services in any country (Chiwaridzo et al., 2018). Health care is one of the basic needs each person must have for them to live (Oke and Adeyekun, 2013). Despite their importance, health care providers are exposed to a myriad of occupation safety and health hazards both in the private and public sector (Smith et al., 2003; Anderson and Oakman, 2016; Hamaidet al., 2016). These hazards include biological, chemical, physical and more importantly ergonomic hazards. Nurses and other health professional are exposed to awkward postures, repetitive movements, force exertion and manual handling for prolonged periods (Dhluwane et al., 2018). This exposure coupled with other personal factors such as age can lead to the development or aggravation of work-related musculoskeletal disorders (Mtetwa et al., 2020). Low back pain is considered a common musculoskeletal concern that may be either acute or chronic, caused by a variety of diseases and disorders that affect the lumbar spine, namely the first to fifth lumbar vertebrae, or the sacroiliac joint (Dlungwane et al., 2018).

Low back pain (LBP) is a public health problem worldwide and is a common cause of work-related disorder among workers, especially in the nursing profession (Chiwaridzo et al., 2018). Recruitment and retention of nurses is a challenge, and the nursing shortage has been exacerbated by the burden of occupational injuries such as Low Back Pain and related disabilities (Richardson et al., 2018). The prevalence and factors associated with low back pain remain unclear in the nursing profession (Dlungwane et al., 2018; Richardson et al., 2018).

Various studies have shown that the main occupational risk factors associated with LBP in nurses are lifting and moving patients (Dlungwane et al., 2018), sustained postures, job organization, poor ergonomic structures (Richardson et al., 2018), improper work design, low social support, poor job satisfaction, staff shortages and poor working conditions (Dlungwane et al., 2018). Nurses are reportedly the hardest hit by LBP among health-care professionals. Unabated, low back pain interferes with productive work and quality of life (Chiwaridzo et al., 2018).

Boughattas et al., (2017), stated that in the United Kingdom it is estimated that 116 million production days are lost due to low back pain related work incapacity and the resulting economic cost is around 12 billion pounds. Low back pain related sick leave puts a lot of strain on the services and on the remaining staff that are expected to cover the duties of a person who is off sick. Sickness absenteeism from low back pain is an essential indicator of low back pain related disability (Dlungwane et al., 2010).

Few studies have been conducted on low back pain in Africa and there is an assumption that low back pain prevalence is lower in Africa when compared to other countries (Oke and Adeyekan, 2013; Chiwaridzo et al., 2018). The mean point prevalence of low back pain in Africa among the adult population is 32% and the chronic low back pain prevalence among Africans ranges from 14%-72% (ILO, 2018).

Risk factors for low back pain can be categorized under two major groups as individual risk factors and occupational risk factors. Occupational risk factors consist of two subgroups as physical such as working postures and psychosocial factor such work pace and work stress (Dev et al., 2018). It is stated that the individual risk factors for low back pain in nurses such as increase in the age, low economic status and smoking increase the frequency of low back pain and exercise protects low back health and reduces low back pains (Stieglitz et al., 2016).

Low back pain is a major hazard in the workplace, particularly in the nursing profession (Chiwaridzo et al., 2018). The main occupational risk factors for nurses are lifting and moving patients; frequent twisting and bending, sustained postures, ergonomic structuring, job organization, poor job satisfaction, shortage of staff and poor working conditions (Farooq et al., 2015). Recruitment and retention of nurses is a serious problem, and the nursing shortage has been exacerbated by occupational injuries and related disabilities. It is estimated that in the United Kingdom each year 12% of nursing personnel will consider a job transfer to decrease the risk of low back pain and another 12%-18% will leave the nursing profession due to chronic back pain (Akinci et al., 2014). Although Zimbabwean nurses are not dissimilar from other nurses, contextual differences necessitate local studies to be conducted for relevant solutions to be proffered. Understanding the prevalence and factors associated with WMSDs among nurses is important for health policy administrators and health-care workers to curtail the existence of the problem. Currently, there is dearth of literature documenting the magnitude, consequences and factors associated with LBP among rehabilitation nurses as compared to other health professionals. Therefore, this study endeavours to assess risk factors for WRMDs among rehabilitation nurse and to come up with recommendations that can be applied to prevent exposures. The objectives of this study were to ascertain the prevalence of LBP among nurses, using a modified Nordic Musculoskeletal Questionnaire and identify risk factors associated with LBP among nurses at National Rehabilitation Centre, Ruwa.

2. Study Area

The study was conducted at the National Rehabilitation Centre in Ruwa which is located 20km from Harare. It is a dormitory town of Harare city. Most families in Ruwa depend much on employment provided in the capital city of Harare. However due to urbanization and retrenchment of workers a number of people are forced to work in the informal sector as way of living and supporting their families financially.

2.1. Study Population

The study targeted rehabilitation nurses of the Ruwa National Rehabilitation centre in Ruwa, Zimbabwe. The study included only nurses that have at one year working experience as rehabilitation nurse. The study excluded those nurses engaged in other activities other than rehabilitation activities.

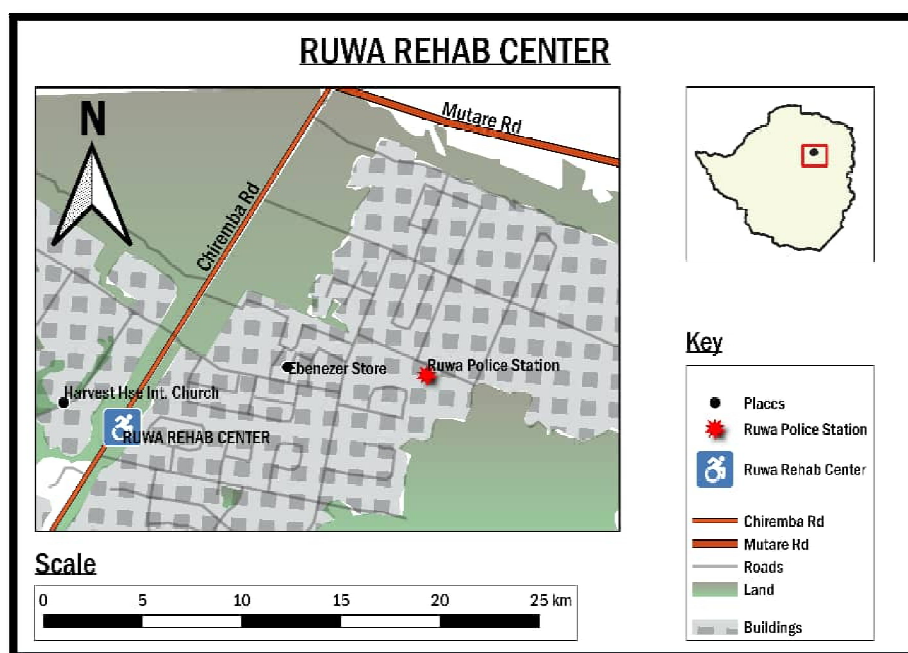


Figure 1: Research Area

2.2. Research Design

The research was carried out using a cross sectional study design. This design allowed for the researcher to gain knowledge and an understanding of the underlying risk factors that might be leading to the development of the LBP in nurse at a given point in time. The Nordic musculoskeletal discomfort questionnaire was used to collect information of the different working postures of the nurses use and the pre-designed questionnaire to collect information on personal and job-related factors that might contribute to the development of the LBP.

2.3. Sampling Technique

The purposive sampling technique was used in this study. All rehabilitation nurses who were available and willing to participate in this study were recruited to participate. Initially the researcher recruited 120 respondents. Out of these, a total of 100 returned the filled questionnaire giving a response rate of 83%.

2.4. Pre-Designed Questionnaire

The questionnaire was designed and administered to the employees to be sampled from each section. The questionnaire comprised of three sections, Section A: Demographic Information, Section B: Risk factors leading to low back pain and Section C: Lower back pain survey. Respondents were informed that their responses would be treated with confidentiality and used for this study only. The researcher administered questionnaires to the respondents from rehabilitation nurses and Supervision sections, the rest of the respondents from other sections were asked questions whilst the researcher recorded their responses on the questionnaire, this enabled the researcher to hear more information about the conditions to which the employees are exposed to. This instrument has been widely used in ergonomics literature.

2.5. Ethical Considerations

Every participant was informed about the study's purpose, significance and aims. For confidentiality reasons, no names, registration numbers or any information that may lead to the identification of the participants was collected for publication. Written informed consent was sought from the participants. Medical superintendent and the Matron to give institutional approval and permission to have access to the nurses. Participants were assured that the information gathered will be used strictly for research and academic purpose only and not going to be divulged indiscreetly to the authorities at the institutions or any other person. In addition, participants were allowed to withdraw from the study at any time without any consequences to them.

2.6. Pilot Study

To test the reliability of the data collection instruments, a pilot study was conducted. This study involved pre - testing the questionnaire among 10 randomly selected study participants from all the departments under consideration. The researcher assessed whether it was effective to self-administer the questionnaire or to distribute them and collect later. The researcher also assessed whether study participants were able to answer questions on the questionnaire correctly. The questionnaire was improved and the researcher decided to distribute the questionnaire to the study participants and collected the filled questionnaires after a week.

2.7. Data Analysis

Data was tested for normality first using the Kolmogorov Smirnov test and it was found normal. All analysis was done using SPSS version 20.0. Demographic data was analyzed using descriptive statistics and the Pearson's Chi-square test was used to determine the association between risk factors and lower back pain at 95% significance level.

3. Results

3.1. Demographic and Risk Factors for Back Pain among Nurses

Results of demographic and job-related characteristics of Ruwa Rehabilitation Center nurses are presented in Table 1. Results show that the age of nurses ranged between 26 and 64 years (42 ± 9.2) and majority of them (64%) were married. Very few nurses (6%) were male which means that the rehabilitation nursing field is female dominated. The mean work experience of nurses was 11 ± 8.4 (range 1-38). Majority of nurses (81%) did not engage in physical activities such as sport, gym or farming with 90% being non-smokers. Less than half of the participants had some chronic conditions such as diabetes, hypertension and arthritis. About 95% pointed to the fact that their job involved bending, twisting and awkward postures with more than 95% using defective tools. Majority of nurses cited nature of work as causes of back pain with fewer (10%) citing non-work-related causes.

Variables	Variables
Age (yrs) Mean (SD) 42 (9.2) Range 26-64	Smoking n (%) Yes 10 (10) No 90 (90)
Marital status n (%) Married 64 (64) Single 24 (24) Divorced 8 (8) Separated 4 (4)	Chronic conditions n (%) Diabetes 5 (5) Hypertension 31 (31) Arthritis 4 (4) None 60 (60)
Gender n (%) Male 6 (6) Female 94 (94)	Physical risk factors n (%) Prolonged sitting 5 (5) Bending, twisting, awkward 95 (95)
Work experience Mean (SD) 11 (8.4) Range 1-38	Environmental Factors n (%) Bumpy uneven ground 4 (4) Use of defective tools 96 (96)
Physical activities n (%) Yes 19 (19) No 81 (81)	Work-related Factors n (%) Nature of work 65 (65) Work organization 25 (25) Non-work related 10 (10)

Table 1: Demographic and Work-Related Details of Rehabilitation Nurses

3.2. Prevalence of Lower Back Pain among Nurses

Figure 4.1 presents the one-year prevalence, one week prevalence, interference and physician visits of Ruwa Rehabilitation nurses due to work-related pain, ache and numbness. The highest reported pain was in the lower back in the past 12 months which was 72% with 12% in the past 7 days. This was followed by upper back which recorded 32% in the past year and 13% in the past week. A total of 13 respondents reported that back pain interfered with their normal activities with only 12 reporting that they pain caused them to visit a physician.

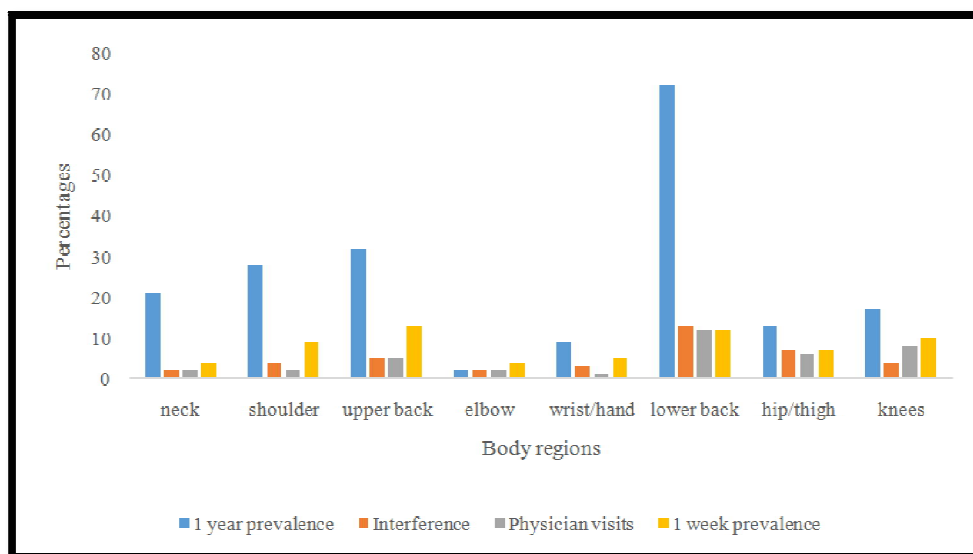


Figure 2: Prevalence, Interferences and Physician Visits by Nurses in the Past Year and Past 7 Days

3.3. Risk Factors Associated Lower Back Pain among Rehabilitation Nurses

Results of demographic, physical and work-related factors associated with back pain among Ruwa Rehabilitation Centre nurses are presented in Table 4.3 below. Results show that age and having chronic conditions were the only demographic factors significantly associated with back pain among nurses with $p =$ values of 0.031 and 0.020 respectively. There is no association between back pain and gender, marital status, working experience and engaging in physical activities ($p > 0.05$). This clearly show that back disorders are not caused or aggravated the above-mentioned demographic variables Results also indicate that there was a significant association between back pain with environmental factors ($\chi^2 = 9, p = 0.014$), job-related factors ($\chi^2 = 26, p = 0.000$) and physical factors ($\chi^2 = 18, p = 0.020$) as shown in Table 4.3 below. This show that the environment where workers spend much on their time in aggravates the prevalence and severity of back pain. These environments include bumpy and uneven grounds, and work-related factors such as awkward postures, bending, twisting and the use of defective equipment. These are factors which need closer attention to prevent prolonged exposure to nurses.

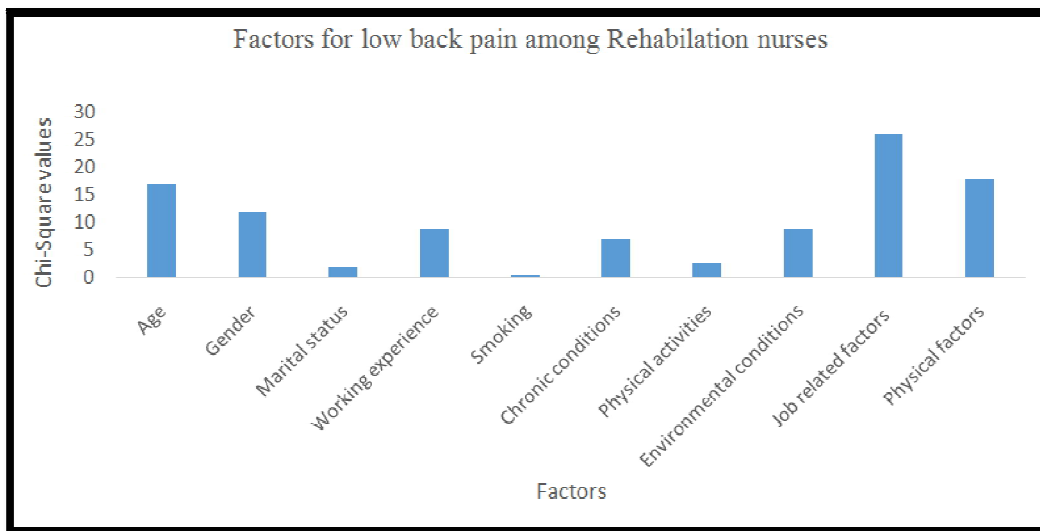


Figure 3: Factors for Lower Back Pain among Rehabilitation Nurses

Factors	χ^2	D.F	Sig.
Age	17	1	0.031
Gender	12	1	0.679
Marital status	2	1	1.081
Working experience	9	1	0.880
Smoking	0.571	1	1.670
Chronic conditions	7	1	0.020
Physical activities	2.80	1	2.110
Environmental conditions	9	1	0.014
Job related factors	26	1	0.000
Physical factors	18	1	0.041

Table 2: Chi-Square Results of Risk Factors for Lower Back Pain among Rehabilitation Nurses
 χ^2 Chi-Square Value, D.F= Degrees of Freedom, Bolded Mean Significance

4. Discussion

4.1. Prevalence of Lower Back Pain among Rehabilitation Nurses

Results of lower back pain complaints among Ruwa Rehabilitation nurses are presented in Table 4.2. Results indicate a very high prevalence of one-year prevalence of 72%. Anderson and Oakman (2016) in their systematic review study of Allied Health Professionals found out that the lower back region was the commonly reported site of work-related musculoskeletal pain. Results of the current study are also in agreement with those of Homaid et al., (2016) and Smith et al., (2003) who both reported a high prevalence of lower back pain among health care workers. The high prevalence of lower back pain can be attributed to the nature of work rehabilitation nurses are exposed to in their daily tasks. Nurses are involved in tasks that involve handling and taking care of disabled and injured patients (Chiwariidzo et al., 2018). This in return force workers to bend, twist of the lower back and work in awkward postures that contribute to the development of back pain (Dev et al., 2018). Continuous exposure to such risk factors eventually leads to the development of lower back pain. Results of the current study are also in agreement with those of Chiwaridzo et al., (2018) who reported a high prevalence of lower back pain among nurses at a referral hospital. In this regard, it therefore advised that intervention programs targeting the back region be implemented so that as to alleviate the high back pain prevalence. Intervention programs such as workplace redesign may be introduced so that nurse could not bend and twist for prolonged periods in the deliverance of their daily duties.

Results of this study also indicate that upper back prevalence was also high (32%). This can be explained by the fact that most of the task's nurses are involved affect both the upper body region and lower back regions (Oke and Odeyekun 2013). These tasks include lifting patients and supervising exercises. Less than half of all nurses reported lower back pain interfering with their normal work activities. This can be because when nurses are at work, they are duty roaster which involve rotation (Chiwariidzo et al., 2018). In this regard, even when muscles are strained, nurses can have rest and time for muscle recovery. Eventually this can alleviate chances of severe pain which may require physician services. Intervention programs such as exercises can be introduced and made compulsory to all nurses who are at risk or have reported lower back pain or any other musculoskeletal disorders so that the severity of this health problem is significantly reduced. Stretch exercise has been reported in past and recent literature to reduce the prevalence and severity of work-related musculoskeletal disorders including upper and lower back pain (Robertson et al., 2009; Shariat et al., 2018).

4.2. Risk Factors Associated with Lower Back Pain among Rehabilitation Nurses

About 95% of the sampled nurses pointed to the fact that their job involved bending, twisting and awkward postures with more than 95% using defective tools. These physical risk factors were significantly associated with lower back pain among rehabilitation nurses. Bending, twisting, uses of awkward postures are well documented risk factors in past literature (Smith et al., 2003, Oke and Adeyekun, 2013) and in recent literature (Mtetwa et al., 2020, Chiwaridzo et al., 2018). Since most of the tasks are conducted manually, nurses work in awkward postures due to uses of defective tools (Mtetwa et al., 2018). As discussed earlier in this study, awkward postures contribute to the development of lower back pain. It is important for all rehabilitation nurses to be subjected to ergonomics training (Roberson et al., 2009). Further Mtetwa et al., (2020) call for the need for workload analysis and distribution within individual capacities and capabilities. This can be done by adopting different state of the art technologies that alleviate the use of awkward postures and manual handling of patients and equipment by nurses. Majority of nurses cited nature of work as causes of lower back pain with fewer (10%) citing non-work-related causes. This can be explained by the fact that nurses spend most of their active time at work. At work, nurses are exposed to a myriad of risk factors described above (Chiwaridzo et al., 2018). Therefore, any intervention to prevent lower back pain must target work-related causes.

Results show that age and chronic conditions were the only demographic factors significantly associated with lower back pain among nurses with $p =$ values of 0.031 and 0.020 respectively. Increase in age has been noted in previous research as accelerating chances of developing lower back pain among farmers (Jain et al., 2018) and metal fabrication workers (Dev et al., 2018). In addition to that, Oke and Adeyekun (2013) found out that increase in age significantly associated with work-related musculoskeletal disorders including lower back pain among health care workers. There was a non-significant association between lower back pain and other demographic factors such as gender, marital status, working experience and engaging in physical activities ($p > 0.05$). These findings are in disagreement with those of past studies. A study by Homaid et al., 2016 reported a significant association between gender and lower back pain among operation room staff of a health facility in Saudi Arabia. The difference can be explained by the fact that there were more males than female who were recruited in the study which is a form of selection bias. In this regard future studies must find conclusive evidence on the relationship between other demographic factors and lower back pain among nurses and other rehabilitation professionals.

Results also indicate that there was a significant association between lower back pain with environmental factors. Working in bumpy and uneven ground using defective tools are some of the condition's rehabilitation nurses are exposed to on their daily routines (Anderson and Oakman, 2016). These are well known and well documented risk factors in health care facilities (Mtetwa et al., 2018) These conditions require a nurse to use more force using their lower back muscles. In the end they can develop lower back pain which can be severe to the extent of requiring physician services or interfering with a nurse's normal activities. Therefore, tools used by rehabilitation nurses must be regularly serviced, repaired and replaced if worn out (Mtetwa et al., 2020). Government and other non-governmental organizations must be involved in assisting rehabilitation institutions so that nurses and other rehabilitation staff are not exposed to hazards and risk factors that can affect their safety and health.

5. Conclusion

There is high prevalence of both upper and lower back pain among rehabilitation nurses. Increase in age is a significant risk factor for lower back pain among rehabilitation nurses. Nurses are exposed to awkward postures, bending, twisting and use of defective tool daily which is significantly associated with the reported cases of lower back pain. Work-activities are the main causes of lower back pain among rehabilitation nurses.

6. Funding

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Appendix

Questionnaire

My name is Tsitsi Nembaware, an undergraduate student in Safety Health and Environmental Science at Bindura University of Science Education. I would like to seek your assistance with information concerning RISK FACTORS ASSOCIATED WITH LOW BACK PAIN AMONG NURSES (A CASE OF NATIONAL REHABILITATION CENTRE, RUWA).

Please note that, the information will only be used for academic purposes and anonymity will be maintained.

[A] Personal Details

Instructions to respondents

- Tick on the appropriate answer.

• Fill in the provided spaces where applicable

1. Sex: Male Female
 2. Marital Status Married Single Divorced Separated
 3. Age.....
 4. How long have been working as a nurse
 5. Do you engage in physical activities such as sport: Yes No
 6. Do you smoke: Yes No

[B] Risk Factors Forlow Low Back Pain among Rehabilitation Nurses

7. Did you experienced low back pain in the past year?
 a) Yes b) No
 8. What does your job involve?
 a) bending b) twisting c) repetitive motion d) force
 e) prolonged standing f) prolonged sitting g) carrying
 g) lifting h) pulling i) working in an awkward posture j) pushing
 9. Describe the environmental conditions you are exposed to?
 a) Bumpy uneven ground conditions b) defective tools or equipment
 10. Which one of the following factors do you think contributes most to low back pain?
 a) Characteristics of nature of work b) Work organization
 c) Work infrastructure and layout d) Non-work related

[C] LOW BACK PAIN SURVEY

11. Do you do any physical activities which are not work related such as football, farming, and gym?
 a) Yes b) No
 9. If yes, which one and for how long? _____
 12. Do you have any chronic medical condition?
 a) Yes b) No
 13. If yes explain briefly: _____
 14. Have you ever been prevented from doing your normal work activities (at home or away from home) because of low back pain?
 a) Yes b) No
 15. Was the pain in the: upper back region low back region both
 16. If yes how many times has this happened? _____
 17. Did you seek medical attention for the pain?
 a) Yes b) No
 18. Have you been given seek leave in the past year?
 a) Yes b) No
 19. If yes, how many days in total have you taken? _____days.