THE EFFECTIVENESS OF EDUCATING McKENZIE EXERCISES IN REDUCING LOW BACK PAIN AND DISABILITY DUE TO LONG STANDING IN SECURITY GUARDS: QUASI EXPERIMENTAL STUDY.

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Abstract

Introduction: Security guards spend most time of their herculean job working in erect position. Low back pain is a common denouement of this prolong standing. McKenzie exercises derived from McKenzie method of Mechanical Diagnosis and Therapy is a common practice in physical therapy to efficiently taper low back pain. **Aim and objective:** 1) To educate the participants about McKenzie exercises for low back pain. 2) To see the effectiveness of educating McKenzie exercises in reducing low back pain and disability. **Procedure:** For this quasi experimental study 94 security guards fulfilled the inclusion criteria. Extended Nordic Musculoskeletal Questionnaire was used to identify low back pain among the participants after taking consent. Numeric Pain Rating scale and Ronald- Morris Low back pain and disability questionnaire were incorporated to measure the initial levels of pain and disability. Education about the McKenzie exercises for low back pain was provided to the security guards in sessions along with handouts illustrating exercises. A home exercise plan was also instructed. The participants were followed for 2 weeks to measure any reduction in the level of low back pain and disability. **Results:** The result of the study showed a highly significant difference ($P<0.0005$) in the initial and final intensity of pain. Regarding disability out of 24 items on Ronald Morris Disability Questionnaire the mean of 10 items showed significant while 4 items showed highly significant difference on the responses of participants before and after educating McKenzie exercises.

Conclusion: Thus, it was concluded that McKenzie exercises are indeed effective in reducing and in some cases completely treating low back pain and disability.

Key words: Low back pain (LBP), Extended Nordic Musculoskeletal Questionnaire (NMQ-E), Numeric Pain Rating scale, Ronald- Morris Low back pain and disability questionnaire (RMQ), McKenzie exercises, McKenzie method of Mechanical Diagnosis and Therapy.

Introduction

What if it's not the gun but the holder who is rusty. Standing at the security; exposed to the external brutal weather condition topped with constant impatient traffic honks, squabbles of visitors for not possessing official cards, combating bootless attempts of day trippers on improper entry, unceasing salutations to men in black out of coercive power along with interior conditions like age associated degenerative changes, dwindling muscles flexibility, fixed joint ranges, underlying systematic diseases and lack of caffeine to perdure the poker face that is the cherry topping of this taxing profession is indeed a herculean job. Any addition to the already existing strenuous work can lead an individual to abort even the most covet job. But if the afore-mentioned addition is in the form of time- hallowed pain in the region that holds against the force of gravity in the vigilant job of a security guard, even an un fortunate blink to attain a little relieve can lead to a major fall.

McKenzie exercises for low back pain derived from McKenzie method of Mechanical Diagnosis and Therapy (MDT) has been the focus of interest of many researchers owing to the serendipitous nature of its occurrence and practicing Physical therapists due to its easy application and reliable results. This research holds the same essence to test the efficacy of its concept.

Aims and Objectives

- To educate the participants about McKenzie exercises for low back pain.
- To see the efficacy of educating McKenzie exercises in reducing low back pain and determine the level of change in disability and pain intensity.

Material and Methods

Data collection tools

Consent form, Extended Nordic Musculoskeletal Questionnaire (NMQ-E), Roland-Morris Low Back Pain And Disability Questionnaire (RMQ) and Numeric Pain Rating Scale, ball point and chair for demonstration were used.

Main study parameter

Pain intensity and disability.

Study type

Quasi experimental study.

Sample size

100 security guards were initially recruited in the study out of which 94 provided the final follow up forming the final sample size of 94 security guards.

Sampling Population

All civilian and ex-military service security guards were invited to participate in the study. The average age of security guards was 40 and with an average duty time of 8 hours.

Sampling Technique

Convenient sampling

Setting

Security guards working at the Main and New campus of GC University Faisalabad and Faisalabad Institute of Cardiology (FIC) were targeted in the study. A large portion of the data were collected from the GC University campuses including security guards from both morning and evening shifts. Security of only evening shift were included from Faisalabad Institute of Cardiology (FIC).

Study duration

October 2018-December 2018

Selection and description of the participants

The permission letter for the study was approved and signed by the head of security guards in the administration department of the targeted institutes. All security guards were gathered at the end or beginning of their duty time. Purpose of the study was explained and participants consent was taken prior to filling the questionnaire. Questionnaires were distributed among all the security guards who were present at the time of the visit and who were willing to participate in the research. Questionnaires were filled for the patients who were unable to read or otherwise, understand the questionnaire. Security guards who were not comfortable or hesitant with providing information were not included. Individual attention was given to participants that had trouble grasping the concept of McKenzie exercise, the questionnaire or the home exercise plan. Any participant who did not understand the questionnaire or made a mistake in filling the questionnaire were reproached.

Inclusion criteria

Data was collected from security guards of 18 to 60 years of age. All security guards who were able to understand the questionnaire, research and its purpose, and who were happy to provide the information were given the questionnaires or were asked the questions. Consent was taken from each participant. Participants were assured that their names and contact numbers are optional, and if they provide this information, it will remain confidential and will not be revealed in research. Security guards with complains of low back pain (LBP) with or without leg pain for a period of more than 6 weeks and who were able to understand and speak Urdu language were recruited. Security guards willing to perform McKenzie exercise formed the inclusion criteria.

Exclusion criteria

The exclusion criteria contained female security guards. Security guards who did not give the consent, and who were not willing to participate, even after the basic information regarding research was provided to them, were excluded from this study. Security guards with problems with communication. Recent back surgery. Suspected serious pathology. Recent trauma and radiculopathic pain below the knee are excluded. Security guards suffering from less than 6 weeks of low back pain were also excluded.

Questionnaires incorporated

Extended Nordic Musculoskeletal Questionnaire (NMQ-E)

It is an extended version of Nordic Musculoskeletal questionnaire focused to compare the complains of pain and discomfort in various regions like neck, low back or shoulder. The participants fill the questionnaire depending upon their symptoms from nine regions showed in the body map. Additional questions are also enlisted to further access the level of disability and functional limitation. (Dawson A.P et al 2009. Mokhtarinia, H., Shafiee, A., & Pashmdarfard, M. (2015).

Ronald Morris Disability Questionnaire (RMQ)

It is a 24-point scale questionnaire that is used to assess the level of functional disability experienced by the patient due to low back pain on daily basis. It consists of 24 questions based on activities of daily life like using the stairs, getting dressed, kneeling down etc. Higher no. of affirmative answer on this questionnaire displays greater level of disability in the patient (Stratford PW et al., 1996, Nusbaum L et al 2001, Alessandra Narciso Garcia et al., 2015).

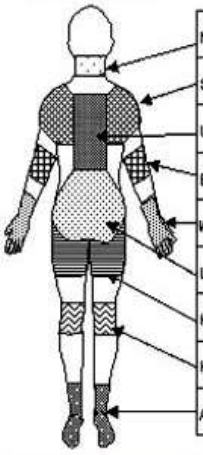
Numeric Pain Rating Scale

The Pain Numerical Rating scale is an 11- point scale which ranges from 0 to 10. It is used in the medical field for people that find it easy to quantify their perceived pain, be it dull or sharp. The starting point on the scale is 0 which means "no pain", 10 representing "the worst pain" experienced by the patient while point 5 shows a pain between the two extremities (Alessandra Narciso Garcia et al., 2015, Hatrick C.T et al., 2003).

Extended Nordic Musculoskeletal Questionnaire (NMQ-E)

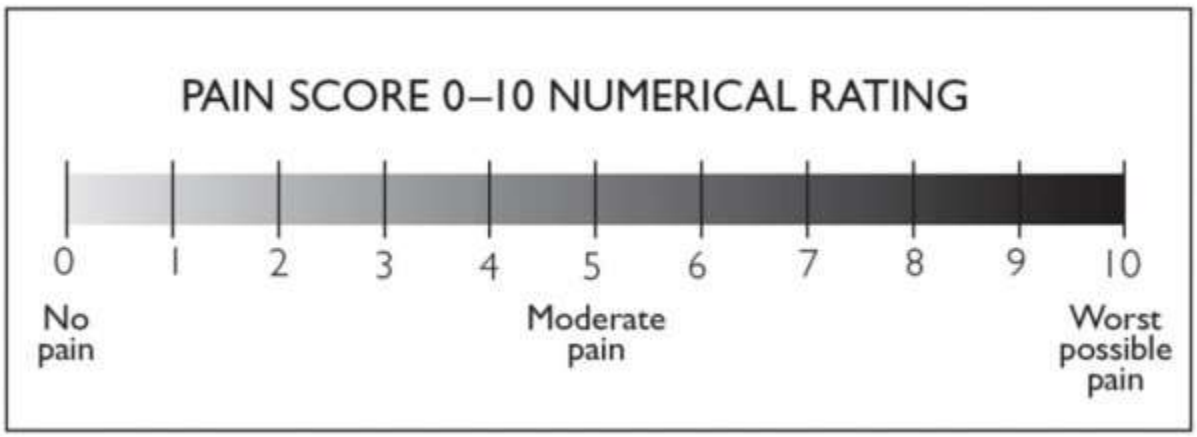
How to answer the questionnaire:

Please answer by putting a cross in the appropriate box - one cross for each question. Answer every question, even if you have never had trouble in any part of your body. Please answer questions from left to right before going down to the next body region. This picture shows how the body has been divided. Limits are not sharply defined and certain parts overlap. You should decide for yourself which part (if any) is or has been affected.



	Have you **ever** had trouble (ache, pain or discomfort) in:	**If 'No', go on to the next body region. If 'Yes', please continue**	At the time of initial onset of the trouble, what was your age?	Have you **ever** been hospitalised because of the trouble?	Have you **ever** had to change jobs or duties (even temporarily) because of the trouble?	Have you had trouble (ache, pain, discomfort) at any time during the **last 12 months?**	**If 'No', go on to the next body region. If 'Yes', please continue**	Have you had trouble (ache, pain, discomfort) at any time during the **last month (4 weeks)?**	Have you had trouble (ache, pain, discomfort) **today?**	During the **last 12 months** have you at any time:			
										been prevented from doing your normal work (at home or away from home) because of the trouble?	seen a doctor, physio-therapist, chiropractor or other such person because of the trouble?	taken medication because of the trouble?	taken sick leave from work/ studies because of the trouble?
NECK	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
SHOULDERS	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
UPPER BACK	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
ELBOWS	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
WRISTS/ HANDS	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
LOW BACK	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
HIPS/ THIGHS	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
KNEES	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
ANKLES/ FEET	☐ No ☐ Yes		___ years	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes		☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes

Numeric Pain Rating Scale



Patient's Name:_____Date:_____

Roland-Morris LOW BACK PAIN DISABILITY QUESTIONNAIRE

When your back hurts, you may find it difficult to do some of the things you normally do.
Mark only the sentences that describe you today.

1) [ ] I stay at home most of the time because of my back and/or leg pain.

2) [ ] I walk more slowly than usual because of my back and/or leg pain.

3) [ ] Because of my back and/or leg pain, I am not doing any jobs that I usually do around the house.

4) [ ] Because of my back and/or leg pain, I use a handrail to get upstairs.

5) [ ] Because of my back and/or leg pain, I lie down to rest more often.

6) [ ] Because of my back and/or leg pain, I have to hold onto something to get out of an easy chair.

7) [ ] Because of my back and/or leg pain, I try to get other people to do things for me.

8) [ ] I get dressed more slowly than usual because of my back and/or leg pain.

9) [ ] I stand up only for short periods of time because of my back and/or leg pain.

10) [ ] Because of my back and/or leg pain, I try not to bend or kneel down.

11) [ ] I find it difficult to get out of a chair because of my back and/or leg pain.

12) [ ] My back is painful almost all of the time.

13) [ ] I find it difficult to turn over in bed because of my back and/or leg pain.

14) [ ] I have trouble putting on my socks (or stockings) because of pain in my back and/or leg pain.

15) [ ] I sleep less well because of my back and/or leg pain.

16) [ ] I avoid heavy jobs around the house because of my back and/or leg pain.

17) [ ] Because of back and/or leg pain, I am more irritable and bad tempered with people than usual.

18) [ ] Because of my back and/or leg pain, I go upstairs more slowly than usual.

19) [ ] I change positions frequently to try to get my back and /or leg comfortable.

20) [ ] My appetite is not very good because of my back and/or leg pain.

21) [ ] I can only walk short distances because of my back and/or leg pain.

22) [ ] Because of my back and/or leg pain, I get dressed with the help of someone else.

23) [ ] I sit down for most of the day because of my back and/or leg pain.

24) [ ] I stay in bed most of the time because of my back and/or leg pain.

Statistical Analysis

The data was analyzed using SPSS version 17.0. Paired sample t test was applied to check the difference in the pain intensity of before and after educating McKenzie exercises in the same subjects.

Results

Pain Intensity

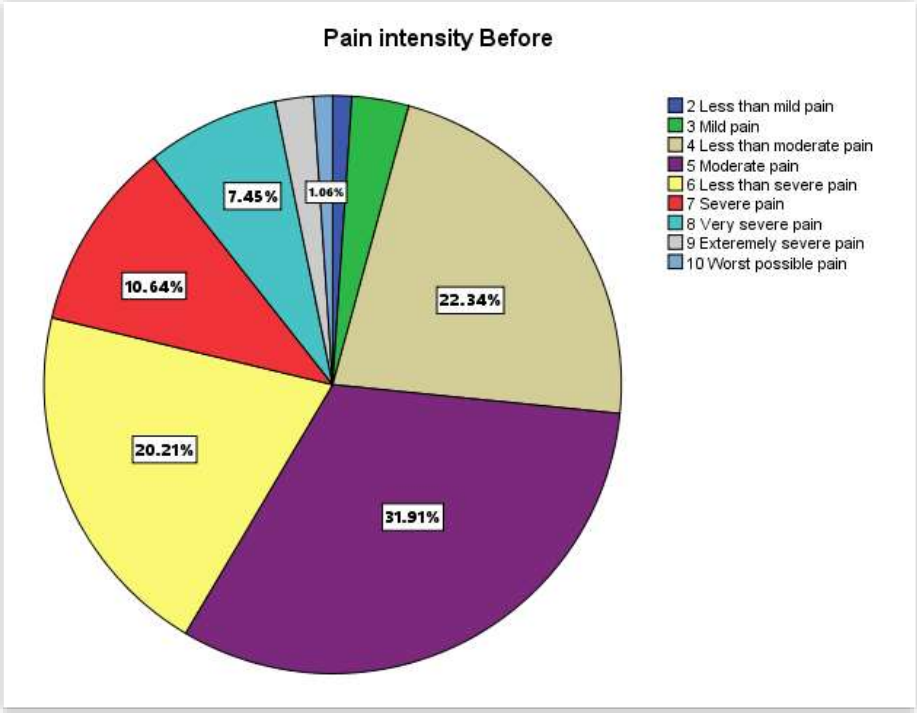
On the basis of "intensity of pain" before educating McKenzie Exercise out of 94 participants 1.1% (Scale 2) reported of having less than mild pain, 3.2% mild pain(Scale 3), 22.3% less mild pain(Scale 4), 31.9% moderate pain(Scale 5), 20.2% less than severe pain(Scale 6), 10.6% severe pain(Scale 7), 7.4% very severe pain(Scale 8), 2.1% extremely sever pain (Scale 9) and 1.1% worst possible pain(Scale 10).

After educating McKenzie exercise out of 94 participants that followed the given 2 weeks home exercise plan while 6 participants didn't follow the given instructions or the exercise. Out of those 94 participants after the follow up 2.1% had no pain (Scale 0), 1.1% had slight pain (Scale1),3.2% less than mild pain (Scale 2),14.9% less than mild pain(Scale 3),27.7% less than moderate pain(Scale 4), 28.7% moderate pain(Scale 5), 13.8% less than severe pain(Scale 6).5.3% severe pain(Scale 7), 2.1% very severe pain(Scale 8), 1.1% extremely severe pain (Scale 9)and there was no case of worst possible pain.

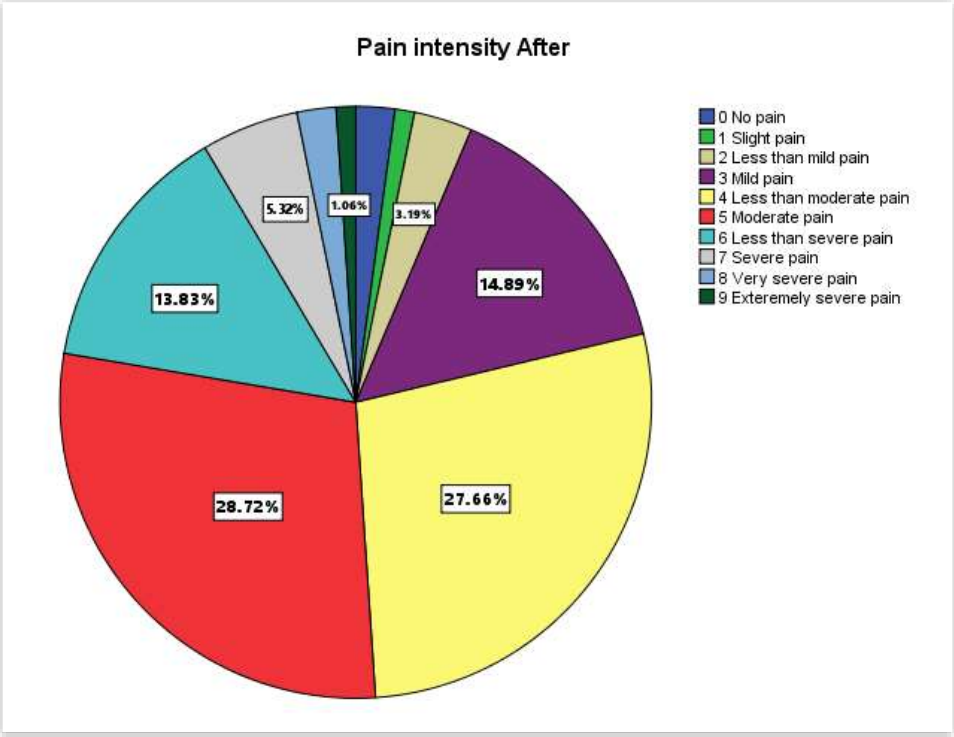
Intensity of Pain	N	Mean	SD	*Df*	t-value	P-value
Before	94	5.4574	1.47134	93	8.233	.000
After	94	4.5319	1.54295			

The table 12-b. above explores significant difference between the intensity of pain before (M=5.4574, SD=1.47134) and after (M=4.5319, SD=1.54295) educating McKenzie exercise on low back pain.

Pie Chart 4.12 a (1)- Percentage of pain intensity before educating McKenzie exercises



Pie Chart 4.12 a (2)- Percentage of pain intensity after educating McKenzie exercises



Disability

Regarding Ronald- Morris low back pain and disability questionnaire, overall out of 24, mean of 10 items i.e. participants staying at home most of the time because of pain, number of participants lying more often due to back pain, participants reported of dressing at a slow pace because of pain, standing for shorter periods of time because of back, participants that had difficulty bending, kneeling down or to pick things from the ground, participants having trouble turning over in bed, participants who had trouble sleeping, participants unable to do heavy jobs at the house, the participants that used to sit more often at house because of low back and the participants lying down in bed at house because of low back pain explored high significant change ($p<0.0005$).

4 items participants that used hand rail to climb up the stairs, participants with back pain increasing with time, participants that used to climb stairs slowly because of low back pain and participants requiring someone's assistance in getting dressed depicted possible change ($p<0.05$).

10 items like slow walking due to trouble in back, participants not doing the usual work around the house, participants using other people for their work due to back, participants bothered by back pain all the time, participants that had trouble putting on socks, the attitude of the participants getting irritated and bad tempered to other people due to low back, the appetite of the people concerned with low back pain showed no specific change ($p>0.05$).

Discussion

The main finding of this quasi experimental study conducted between from October, 2018 to December, 2018 was educating McKenzie exercises has significant effectiveness in reducing low back pain caused by prolong standing among security guards.

Overall the response rate was 94%. Since the drop outs were less than 15%, intention to treat analysis was not applied in this study. The study showed a significance difference in pain intensity (Numerical pain rating scale) of the participants before and after educating McKenzie exercises ($p< 0.0005$) and the related disability; out of 24 items on Ronald-Morris pain disability scale 10 items showed significant difference ($p< 0.0005$) and 4 items showed possible significant difference ($p< 0.05$).

30% of all worker illness and occupational injuries are the outcome of prolong standing (Occupational Safety and Health Administration OSHA). Canadian studies show the tendency of low back pain is twice in people working in standing position than those working in sitting position.

This is the first study to check the efficacy of educating McKenzie exercise in security guards.

Apart from significant difference in pain intensity no case of "worst possible pain" was reported in the final responses of the participants. Some respondents even described having "no pain" in lower back.

Use of McKenzie exercises to reduce low back pain have been advocated in many Systematic reviews (Lam O.T et al., 2018) (Oliveira I. O. D ; et al 2016) (Kent P et al., 2010) (Clare H..A; et al 2004) and randomization trials (Waqar S; et al 2016) (Rosu OM and Ancuta C 2015) (Garcia A. N ; et al 2013) (Al-Obaidi S. M; et al 2013) (Peterson T., et al 2002).

Limitations of study

Of the most prominent limitation is that the sample was not randomized but collected through convenient sampling in time friendly manner. The study did not include nontreatment or placebo control group, which also can be considered a limitation as the effect of McKenzie education as it was not compared to any other educational programme or intervention to fully test its efficacy. Other limitations of this study were not monitoring the home exercise routine and not blinding both therapist and patients.

Conclusion

On the basis of data analysis of pain intensity, the no. of participants having severe pain considerably reduced. No cases of "worst possible pain" was observed in the final assessment and two participants even reported having "no pain" after 2 weeks follow up of educating McKenzie exercises. When it comes to disability, 14 out of 24 items on Ronald Morris Disability Questionnaire showed significant difference. Thus, in the lights of all the individual observations and respective results it will be no exaggeration to conclude that McKenzie exercises are indeed effective in reducing and in some cases completely treating low back pain and disability providing pain free life style.

Recommendations

McKenzie method forms its essence on the centralization phenomena but this study was not powered enough to permit this type of subgroup analysis. For future studies it is highly suggested to recruit patients on McKenzie method of diagnosis and treatment and to observe the centralization of pain and symptoms among occupational groups exposed to prolong standing to be benefited from the study for better quality of life.

To fully explore the attitude of participants towards McKenzie exercises further studies for the comparison of army trained cadet security guards with civilian security guards to observe the difference in response to McKenzie exercise is suggested.

Lastly, individual characteristic of the participant regarding pain perception also played an important role in the response to exercise and the respective follow up interview. Many security guards were hesitant in providing information or discussing any present musculoskeletal pain, afraid of the fact that it will be reported and they will face plausible confrontation for inefficiency in their duty even after describing the whole process and meaning of research or allowing them to keep their personal information. It is appealed through this study to the managing or the administrating staff of all government and private security guard's sectors to provide enough confidence and assurance to civilian or cadet security guards to make them able to discuss or receive help if their demanding job and lengthy duty hours provides discomfort or possible trouble in attaining healthy life style.

An eye distracted by the fears from the inside won't be able to protect from the fears of the outside.

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