

## The Quality of Life of Individuals with Chronic Lower Back Pain after the Completion of a Work Hardening Programme in Cape Town, South Africa: A Pilot Study

Lee Ann Jacobs Nzuzi Khuabi<sup>1</sup>, Gwen Beatrix Cloete<sup>1</sup> and Mogammad Soeker<sup>2\*</sup>

<sup>1</sup>Department of Occupational Therapy, University of Stellenbosch, South Africa

<sup>2</sup>Department of Occupational Therapy, University of the Western Cape, South Africa

### Abstract

**Background:** Work-hardening, contributes to an individual's Quality of Life and their ability to return to work.

**Objectives:** This study aimed to determine whether a work-hardening programme reduces the pain levels and Quality of Life of individuals with low back pain.

**Methodology:** The authors utilised a pre- post intervention study design in order to conduct the study.

**Results:** Seventeen [n=17] individuals with lower back pain participated in the study. The Short Form 36 and Oswestry lower back pain questionnaire were used to measure Quality of Life of and pain in clients before and after participating in a work hardening programme.

**Results:** The quality-of-life pre-intervention versus one month post intervention was 64.6% [CI 52-77] [SD 24.2] to 66.4% [CI 55- 78] [SD 21.9]. The quality-of-life post-intervention versus one-month post- intervention was 66.5% [CI 53-80] [SD 24.8] to 66.4% [CI 55-80] [SD 21.9]. There was a reduction in pain perception from 24.9% [CI 14- 35] [SD 19.6] to 13.6% [CI 05-20] [SD 14.1].

**Conclusion:** The pilot study indicates that there was no statistically significant data to confirm that participation in a work hardening programme reduces pain levels and enhances the Quality of Life of individuals with low back pain.

**Keywords:** Occupational therapy; Work hardening; Return to work; Quality of Life ; Chronic lower back pain

### Introduction

It is a well-known fact in vocational rehabilitation that low back pain is a cause of absenteeism in the workplace [1]. Mngoma indicates that 80% of adults in Canada and the United Kingdom experience lower back pain at least once during their lives. The average life-time prevalence of adolescents with lower back pain is 36% and adults are 62% in South Africa [1]. Research conducted by Loisel [2] indicated that lower back pain is more prevalent amongst Africans than other western communities. Chronic lower back pain could result in physical, emotional, and psychological impairment and require specific rehabilitative interventions due to the social-economic impact on individuals. The factors contributing to medical and occupation-related lower back pain include clinical history, socio-demographics, and work factors. Work-hardening rehabilitation programmes are used to address these issues. The benefits of an intensive work-hardening rehabilitation programme are often critiqued due to a lack of evidence-based practice related to work hardening [3]. Occupational Therapists are involved in the vocational rehabilitation of individuals with low back pain. Some of the tasks include educating clients on back hygiene principles, energy conservation methods and life-skills aimed at enhancing their ability to resume work [4].

### Prevalence of low back pain (LBP)

According to Poulain, et al. [5] almost 80% of the population is affected by low back pain. In African countries the occurrence of lower back-pain is 62% in comparison to European countries where the prevalence is between 49%-70%. However, statistics indicate that the return-to-work rate is significantly reduced to 50% in the event where

an individual has been off work in excess of 6 months and nil if off for longer than two years [5]. In a study conducted by Poulain, et al. [5] 43% of males responded to the post intervention questionnaires compared to 57% females who responded to the post intervention questionnaires. Furthermore, the authors indicated that 54% of 58 participants who returned to work, returned to sedentary type of work.

### Factors influencing return to work and Quality of Life (QoL)

Turk and Burwinkle [6] report that workers who have been absent from work for more than 6-12 months may never return to work and may experience complications. In a clinical trial study, conducted by Sang and Eria [7] they found that 52% of clients suffering from chronic lumbar back pain could return to work after participating in a work-hardening programme. In a study conducted by Hodges, Humphreys, Eck, Covington, Harrom [8] they found that the average return to work rate of workmen's compensation clients was 55%. The latter figures are suggestive of improved surgical and rehabilitation techniques over the past 15 yrs [8].

**\*Corresponding author:** Mogammad Soeker, Department of Occupational Therapy, University of the Western Cape, South Africa, Tel: +0827175432; E-mail: msoeker@uwc.ac.za

**Received:** 4-Apr-2022, Manuscript No: omha-22-59107; **Editor assigned:** 6-Apr-2022, PreQC No: omha-22-59107 (PQ); **Reviewed:** 20-Apr-2022, QC No: omha-22-59107; **Revised:** 22-Apr-2022, Manuscript No: omha-22-59107 (R); **Published:** 29-Apr-2022, DOI: 10.4172/2329-6879.1000405

**Citation:** Khuabi LAJN, Cloete GB, and Soeker M (2022) The Quality of Life of Individuals with Chronic Lower Back Pain after the Completion of a Work Hardening Programme in Cape Town, South Africa: A Pilot Study. *Occup Med Health* 10: 405.

**Copyright:** © 2022 Khuabi LAJN, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Qualities of life is defined as consisting of a combination of factors but are not limited to the environment, standard of living, mental and physical health, social position and work satisfaction and education [9]. The common factors that contribute to an individual's Quality of Life include creativity, freedom to create, a healthy mind, a healthy body and environmental factors [9]. It could be argued that the assessment of an individual's Quality of Life, particularly individuals experiencing LBP, is complicated; however, it could be used to measure the effectiveness of treatment programmes.

### Workplace intervention

Ravenek, et al. [10] in his two-year ergonomic and multidisciplinary intervention with individuals who experienced low back pain and were sick-listed for 3-4 months found that workers used less sick leave in comparison with those returning to work without any adaptations in the workplace.

Schaafsma, et al. [11] who conducted a systematic review on the effectiveness of work hardening with workers, found that the effectiveness of physical conditioning as part of a return to work strategy in reducing sick leave for workers with back pain, compared to usual care or exercise therapy, remains unclear. However they concluded that by including workplace visits or the use of workplace intervention renders a conditioning programme effective. It could therefore be argued that there is a need for studies specifically focusing on determining the Quality of Life of individuals who completed a multi-disciplinary work rehabilitation programme.

## Methodology

### Aim

To determine whether an intensive work-hardening programme for individuals with low back pain improves their functionality and Quality of Life, reduces their pain levels and ultimately enhance their ability to return to work post intervention.

It is hypothesized that the pain levels, Quality of Life and ability to return to work of clients with chronic low back pain will improve after participating in a work hardening programme.

### Research design

The pre post intervention research design is a form of experimental design that focuses on a single group with the provision of intervention during the experiment. These research designs do not have a control group to compare with an experimental group [12].

### Participants

Convenience sampling was used to select twenty [n=20] participants from the statistical records of a rehabilitation centre that focuses on work-hardening in the area of Cape Town.

The researcher used the Yemane formula,  $n = \frac{N \cdot e}{N + e}$  where  $n$  = the corrected sample size,  $N$  = population size and  $e$  = margin of errors where ( $e=0.05$ ) the confidence coefficient is 95% and an error level of 5% [13]. Therefore if 20 were used as the population size, a sample of 17 participants would be associated with a confidence coefficient of 95%.

### Inclusion criteria

Males and females between the ages of 24 – 50 years who were employed prior to the programme, and who had undergone surgery for low back pain, were included in the study.

### Exclusion criteria

Participants experiencing psychiatric symptoms according to the Diagnostic and Statistical Manual IV; medical conditions such as multiple orthopaedic problems, and pregnant women were excluded.

### Description of The Work Hardening Programme

A specialised work hardening programme in the Northern Suburbs of Cape Town was used as the intervention for the current study. The participants included patients who were referred to the work hardening programme by medical doctors, employers and the Road Accident Fund. The aim of the specialised work-hardening programme is to reduce work related sickness, absenteeism and to facilitate case management throughout South Africa. The return to work rehabilitation facilities are located in warehouses that consist of lecture rooms for the lower back education which contains traditional physiotherapy and occupational therapy intervention and designated exercise areas. These areas create a space where functional rehabilitation can take place. The simulated work environment consists of apparatuses such as lifting stations, scaffolding for climbing, trolleys for pushing and pulling, and wheelbarrows for pushing cement. Each work-hardening programme occurs over an estimated period of 6 weeks, where the client engages in physical activities, work simulation activities, life skills and pre-vocational sessions, as well as workplace counselling.

### Data Collection and Analysis

The research participants had to fill in two self-report questionnaires, namely the "Oswestry lower back pain questionnaire" [14] and the "SF-36 Health-related Quality of Life questionnaire" [15], at different time frames i.e. 1) before the intervention, 2) after the intervention and 3) 6 weeks after the completion of the intervention. Once permission to conduct the study was obtained from the organization providing the work-hardening intervention, informed consent was obtained from the participants included in the study. The manager of the rehabilitation facility contacted the participants and informed them about the study, they were informed of their right not to participate in the study and that they could withdraw from the study if they choose to do so. The names of possible research participants were sent to the researchers by the manager of the rehabilitation facility. The researchers then contacted the possible participants. Approval to conduct the study was approved by the Health Research Ethics Committee of Stellenbosch University [S 12/11/312].

## Data Collection

### Process that was followed in the intervention programme

**Phase 1:** Pre-intervention: Once the researchers received consent from the manager (of the chosen practice facility) to include their clients and make use of the facility to conduct this study in Cape Town, the therapists screened and identified clients who met the study's inclusion and exclusion criteria. At baseline, research participants completed a socio-demographic questionnaire, the Oswestry lower back pain questionnaire and the SF Health-related Quality of Life questionnaire (pre-intervention). The therapists explained the questions to the participants in order to ensure that they understood the questions. The data were collected and captured by the test administrators on an Excel spread sheet over the three different time periods. The researchers and biostatistician analysed the results of the study in conjunction with the use of a statistics programme.

**Phase 2:** During intervention and post-intervention-The

standardised self-report questionnaires, namely, the “Oswestry lower back pain questionnaire” (OLBPQ) and the SF-36–“Quality of Life Questionnaire” were completed by the participants at the various intervention points and when they were back at work for 1 month.

**Phase 3:** One month post intervention -The questionnaires were completed telephonically at this point in time.

### Reliability and Validity

The SF- 36 Health related Quality of Life questionnaire was used to assess the individual’s Quality of Life. According to Gardner et al. [13] the validity of the SF-36 Health-related Quality of Life questionnaire as an innovative outcome-determinant for primary care. They indicated that the SF 36 had good validity and reliability. The response rate for the SF-36 questionnaire was high (83%) and the rate of completion for each section was over 95%. Considerable proof was found for the reliability of the SF-36 (Cronbach’s alpha greater than 0.85, reliability coefficient greater than 0.75 for all dimensions except social functioning) and for construct validity in terms of distinguishing between groups with expected health differences. The Oswestry lower back pain questionnaire was used to gather data regarding the individual’s self-perceived pain experiences.

### Data Analysis

Data were first captured in Excel and analysed using SPSS together with the assistance of a statistician. The researchers used the Students T Test in order to ensure comparison in Quality of Life between pre-intervention, post intervention and one month post-intervention. P-values of less than 0.05 were considered statistically significant. The data was analysed in consultation with a statistician using the STATISTICA statistics programme [17].

### Results

Table 1 describes the characteristics of the 17 participants [n= 17] and reflects that [2/17] participants were female and [15/17] were male. The original sample consisted of 20 participants, however two participants could not complete the second round of questionnaires as they could not be contacted post-intervention and one participant passed away during the intervention phase of the study. Furthermore, the mean age category of the participants was 30-34 years; the majority of the participants had a high school level of education. The participants were mainly employed before their injuries, with 60% [6/10] of the participants employed in semi-skilled occupations and 40% in unskilled occupations.

### Quality of Life

Table 2 indicates that although there was an increase in the Quality

of Life from 64.6% [CI 52-77] [SD 24.2] to 66.5% [CI 53-80] [SD 24.8], this was not statistically significant, (p-value = 0.594).

Table 3 indicates that there was an increase in the Quality of Life from 64.6% [CI 52-77] [SD 24.2] to 66.4% [CI 55-78] [SD 21.9], (p-value= 0.805).

Table 4 indicates a decrease in the Quality of Life from 66.5% [CI 53-80] [SD 24.8] to 66.4% [CI 55-80] [SD 21.9], (p-value = 0.985).

### Pain perception

Table 5 indicates a decrease in the pain from 24.9% [CI 14-35] [SD 19.6] to 13.6% [CI 05-20] [SD 14.1], (p-value=0.06).

Table 6 indicates a decrease in the pain from 24.9% [CI 14-35] [SD 19.6] to 20.0% [CI 13- 27] [SD 12.9], (p-value =0.318).

Table 7 indicates a non-significant increase from 13.6% [CI 05- 20] [SD 14.1] to 20% [CI 13- 27] [SD 12.9] (p-value = 0.131).

Table 8 indicates that three quarters (76%, 13/17) of the individuals returned to work after the treatment. Almost 40% of those who returned to work were in an accommodated capacity (38.5%, 5/13). Of the five individuals who were not reasonably accommodated in the work place, three had an occupation requiring a medium physical demand (using the Dictionary of Occupational Titles), in comparison to the two participants whose occupation required light physical demand capacity. More than half (62%, 8/13) of the individuals returned to employment without accommodation. Of these individuals, (75%, 6/8) had an occupation requiring medium physical demand and (25%, 2/8) of the participants had a heavy physical demand capacity. Thirteen participants remained at work for more than 1 month.

### Discussion

Out of the seventeen individuals with Low Back Pain (LBP) (n=17), more than 50% fell within the 25-27 year age group, with the remainder being in the age group 30 – 39 years (35.3%). The fact that two thirds (76%) of the sample returned to work could indicate that the intervention could contribute to the return to work of individuals. It could be argued that financial pressure and an individual’s responsibility towards their family, depleted sick leave and loyalty towards their job, may have contributed to them resuming work. In a study conducted by Christensen [18], he indicated that the return to work rate of workers with low back pain is about 70% after they have participated in a work-hardening programme. The results of the current study reveal that 82% of the sample could return to work after participating in a work hardening programme [19]. The systematic review conducted by Dionne, Dunn & Croft [20] acknowledged that the health implications for the general work-force could become

**Table 1:** Demographics of individuals who participated in a work-hardening programme.

Age group, in years	Number of individuals (%)	Gender (%)		Education level	
		Male	Female	Secondary School	Primary School
25-29	2 (11.8%)	50%	50%	100%	
30-34	6 (35.3%)	100%		100%	
35-39	3 (17.6%)	100%		100%	
40-44	2 (11.8%)	100%			100%
45-49	2 (11.8%)	50%	50%		100%
50-54	1 (5.9%)	100%			100%
55-59	1 (5.9%)	100%			100%
Total	17 (100%)	88%	12%	8 Secondary School (47%)	9 Primary School (53%)

problematic over time, specifically in communities where the focus is on manual labour.

### Quality of Life (QoL) (pre-intervention versus post-intervention)

There was an increase in the Quality of Life from 64.6% to 66.5%, this was not statistically significant (p-value= 0.594), it could therefore be argued that the work-hardening programme failed to significantly improve the Quality of Life of individuals between the pre-intervention and post-intervention periods. It could be argued that physical capacity, successful return to work, job accomplishment and satisfaction within itself, does not constitute an improved Quality of Life but, in fact

**Table 2:** Pre- versus post-intervention Quality of Life of clients who participated in a work-hardening programme.

QoL Instrument	Pre-intervention	Post-intervention	P-value (Post-Pre)
	Mean (SD)	Mean (SD)	
HRQoL %	64.6 (24.2)	66.5 (24.8)	0.594

**Table 3:** Health related Quality of Life (pre- versus 1 month post intervention versus post-intervention).

QoL Instrument	Pre-intervention	1 Month After	P-value (1Month-Pre)
	Mean (SD)	Mean (SD)	
HRQoL %	64.6 (24.2)	66.4 (21.9)	0.805

**Table 4:** Post-versus 1 month Post-intervention Quality of life of clients who participated in a work-hardening programme.

QoL Instrument	Post-intervention Mean (SD)	1Month post intervention Mean (SD)	P-value (1 Month-Post)
HRQoL %	66.5 (24.8)	66.4 (21.9)	0.985

**Table 5:** Pain perception pre-versus post-intervention of individuals who participated in a work-hardening programme.

OLBPS (Oswestry lower back pain score)	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	P-value (Post-Pre)
OLBPQ%	24.9 (19.6)	13.6 (14.1)	0.06

**Table 6:** Pain perception pre-one month post intervention of clients who participated in a work-hardening programme.

OLBPS	Pre-intervention Mean (SD)	1Month After Mean (SD)	P-value (1Month-Pre)
OLBPQ %	24.9 (19.6)	20.0 (12.9)	0.318

**Table 7:** Pain perception post-intervention versus 1 month post intervention of clients who participated in a work-hardening programme.

OLBPS	Post-intervention Mean (SD)	1 Month After Mean (SD)	P-value (1Month-Post)
OLBPQ %	13.6 (14.1)	20.0 (12.9)	0.131

psychological factors such as apprehension, pain perception, limited mobility and other functional impairments, as well as work, family and environmental responsibilities, politics, financial burden and diminished cognition could be determinants of Quality of Life [18]. It could therefore be argued, despite there being no statistical significance when comparing the two measures (pre- and post-intervention), that Quality of Life of the individual could be related to external environmental and personal challenges that may not be directly related to the work-hardening programme.

### Quality of Life (QoL) (pre-intervention and one month post-intervention)

The findings indicate that even though there was an increase in the Quality of Life from 64.6% to 66.4%, this was not statistically significant (P-value: 0.805). Consequently the work-hardening programme failed significantly to improve the Quality of Life between the pre-intervention and one month post-intervention period. Possible reasons such as non-compliance with the techniques and principles as learnt within the work-hardening programme, together with limited support during the programme could have contributed to the lack of Quality of Life<sup>20</sup>. Rather an intervention programme should focus on psycho-social factors such as health-behaviour, job-satisfaction and work accomplishments in meeting targets at work [20].

### Quality of Life (post-intervention and one month post intervention)

The findings indicate that there was a decrease in Quality of Life from 66.5% to 66.4% which was not statistically significant (p-value = 0.985). According to Oleshkevych [9], possible reasons for the sample group's Quality of Life not improving could have been due to their age as many were from an older age group, with poor educational backgrounds, unstable financial incomes, earning a middle-class or below middle class salary, unstable social networks and low self-esteem with a negative outlook on life [21].

### Pain (pre-intervention and post-intervention)

Results revealed that there was a decrease in pain ranging from 24.9% to 13.6%, not statistically significant. (P-value=0.06). However, despite there not being a statistically significant result for the above periods, it could be argued that the facilitation of joint protection principles, proper body mechanics and proper pain management techniques could have contributed to their pain reduction. According to Lally, et al. [22] it takes more than two months before a new behaviour becomes automatic. It could be argued that if the participant does not incorporate the skills or methods learned in the work-hardening programme in their daily tasks, then the effect or the skills learned in the programme may not be internalised.

### Pain (pre intervention and one month pre intervention)

The programme failed to significantly improve pain between the

**Table 8:** Number of individuals returning to work and who have been reasonably accommodated.

Post intervention- % of individuals who RTW (1 Month- Post intervention)	Post intervention % of individuals who RTW (1 Month- Post intervention)	Gender of individuals who RTW- (1 Month-Post intervention)		RTW with Reasonable Accommodation	RTW without reasonable accommodation	Type of occupation returned to per work demand	
		Female	Male			Medium Work Demand	High work demand
4/17 (24%)	13/17 (76%)	1/13 (6%) Females RTW	12/13 (92%) Males RTW	5/13 (39%)	8/13 (62%)	6/8 (75%) Medium work demand	2/8 (25%) Heavy work demand



post-intervention and one month post-intervention period [ $p=0.131$ ]. The study results indicated that while individuals with LBP returned to work, most of them were not accommodated at work, resulting in them being stressed and vulnerable with regard to job security. This contributed to an increase in fear avoidance behaviour towards re-injury and aggravated pain perception. According to the literature, Schaafsma, et al. [11] performed a pre-post experimental study where they concluded that the consistency of outcome measures depends on whether the client is consistent or inconsistent in answering the same questions over three different time periods. Another confounding factor that may have influenced the consistency of results included the client's own psychological well-being and interpersonal relationships with supervisors and other team members at work [1].

### **The number of individuals with LBP returning to work after a work-hardening programme**

The results indicated that 13 of the 17 individuals with LBP (82%), who participated in the work-hardening programme, successfully returned to work. Five (29%) individuals with LBP were accommodated in an alternative or accommodated position at work. According to van der Giezen, Anneke, Bouter & Nijhuis [23], males struggle to be accommodated in the work environment, especially in jobs that are highly specialised. This is important as many research studies focussing on lower back pain and return to work used pain as an outcome measure and sole determinant for return to work [23]. The current study supports the fact that pain should not be treated in isolation and could be incorporated as a component of vocational rehabilitation programmes. Pain management programmes should focus on functional and psychological methods of managing pain [24].

### **Summary and Conclusion**

A total of 17 individuals with LBP from an original total population of 20 individuals completed the programme. The study results reveal that no statistical significance was obtained in determining Quality of Life pre-intervention and post-intervention ( $p$ -value= 0.594), Quality of Life pre-intervention versus one month post-intervention ( $p$ -value: 0.805) and Quality of Life post-intervention (work-hardening programme) versus one month post-intervention ( $p$ -value = 0.985). Despite no statistical significance being obtained, 82% of the participants managed to return to work after completing the work hardening programme experienced.

### **Recommendations and Implications for Practice**

- The research results indicate that work-hardening programmes should focus equally on pain management as well as on the reduction in functional and psychological barriers that prevent an individual who is experiencing lower back pain, from returning to work.

- The results of the study indicated that a small degree of improvement in pain scores could relate to an advanced improvement in the individual's functional and psychological ability. It is therefore advised that health professionals should be aware of this finding, particularly when evaluating the effectiveness of rehabilitation programmes.

### **Limitations of The Study**

The data collection process took an extremely long time, which had an influence on the time frame which the author had anticipated for completing the study. A larger sample as well as the use of a

randomised control trial (RCT) may have contributed to obtaining statistical significance as related to Quality of Life and pain perception in the study. Therefore, in conclusion 1) the study was underpowered. 2) Work hardening may not be effective in enhancing the Quality of Life and pain in individuals with low back pain. Also that the slight increase in the individual's Quality of Life and pain may be due to natural improvements over time in the participants.

### **Data Availability**

The interview data used to support the findings of this study are restricted by the Human Research Ethics Committee, Stellenbosch University to protect participant confidentiality. Data are available from Mogammad Shaheed Soeker [msoeker@uwc.ac.za] for researchers who meet the criteria for access to confidential data.

### **Author Contributions**

The first and second authors were responsible for drafting the article. The third author was responsible for collecting data and analysing the data for the purpose of completing a Master's degree in Occupational Therapy.

### **Conflict of Interest**

The authors declare that there is no conflict of interest regarding the publication of this paper.

### **Funding Statements**

This research has not been funded by any organisation.

### **References**

1. Mngoma NF (2007) Evaluating outcomes of a return-to-work rehabilitation programme for clients with work-related low back pain. *Queen's QC Lib* 1974:198-208
2. Loisel P, Buchbinder R, Hazard R, Keller R, Scheel I, et al. (2005) Prevention of work disability due to musculoskeletal disorders: the challenge of implementing evidence. *J Occup Rehabil* 15: 507-524.
3. Iles RA, Davidson M, Taylor NF (2008) Psychosocial predictors of failure to return to work in non-chronic non-specific low back pain: a systematic review. *Occup Environ Med* 65: 507-517.
4. Leclerc A, Gourmelen J, Chastang J, Plouvier S, Niedhammer I, et al. (2009) Level of education and back pain in France: the role of demographic, lifestyle and physical work factors. *Int Arch Occup Environ Health* 82: 643-652.
5. Poulain C, Kernéis S, Rozenberg S, Fautrel B, Bourgeois P, et al. (2010) Long-term return to work after a functional restoration programme for chronic low-back pain clients: a prospective study. *Eur Spine J* 19: 1153-1161.
6. Turk DC, Burwinkle TM (2005) Clinical Outcomes, Cost-Effectiveness, and the Role of Psychology in Treatments for Chronic Pain Sufferers. *Prof Psychol Res Pr* 536: 602.
7. Sang LS, Eria LPY (2005) Outcome evaluation of work-hardening programme for manual workers with work-related back injury. *Work* 2: 297-305.
8. Hodges SD, Humphreys SC, Eck JC, Covington LA, Harrom Hb (2001) Predicting factors of successful recovery from lumbar spine surgery among workers' compensation clients. *J Am Osteopath Assoc* 101: 78-83.
9. <http://athensdialogues.chs.harvard.edu/cgi-in/WebObjects/athensdialogues.woa/wa/dist?dis92>
10. Ravenek MJ, Hughes ID, Ivanovich N, Tyrer K, Desrochers C, et al. (2010) A systematic review of multidisciplinary outcomes in the management of chronic low back pain. *Work* 35: 349-367.
11. Schaafsma FG, Whelan K, van der Beek AJ, van der Es-Lambeek LC, Ojajärvi A, et al. (2013) Physical conditioning as part of a return to work strategy to reduce sickness absence for workers with back pain. *Cochrane Database Syst Rev* 30: 1-5.

12. [https://www.ucg.ac.me/skladiste/blog\\_609332/objava\\_105202/fajlovi/Creswell.pdf](https://www.ucg.ac.me/skladiste/blog_609332/objava_105202/fajlovi/Creswell.pdf)
13. Adam AM (2020) Sample size determination of survey research. *J Sci Res* 26: 90- 97.
14. Ware, JE, Sherbourne CD (2021) The MOS 36-Item Short-Form Health Survey (SF-36): I. Conceptual Framework and Item Selection. *Med Care* 30: 473-483.
15. Fairbank JCT, Pynsent PB (2000) The Oswestry Disability Index. *Spine* 25: 2940-2953.
16. <https://patents.google.com/patent/US7454002B1/en>
17. Brazier JE, Harper R, Jones NM, O' Cathain A, Thomas KJ, et al. (1992) Validating the SF-36 health survey questionnaire: new outcome measure for primary care. *Biomech J* 305: 160-164.
18. Christensen FB (2000) Lumbar spinal fusion. Outcome in relation to surgical methods, choice of implant and postoperative rehabilitation. *Acta Orthopaedica* 75: 29-43.
19. Carlson RV, Boyd KM, Webb DJ (2004) The revision of the Declaration of Helsinki: past, present and future. *J Clin Pharmacol* 57: 695-713.
20. Dionne CE, Dunn KM, Croft PR (2006) Does back pain prevalence really decrease with increasing age? A systematic review. *Age Ageing* 35: 229-234.
21. Selander J, Marnetoft S, Bergroth A, Ekholm J (2002) Return to work following vocational rehabilitation for neck, back and shoulder problems: risk factors reviewed. *Disabil Rehabil* 24: 704-712.
22. Lally P, van Jaarsveld C, Potts, Wardle, H Wardle J (2009) How habits are formed: Modelling habit formation in the real world. *Eur J Soc Psychol* 40: 998-1009.
23. Van der Giezen AM, Bouter LM, Nijhuis FJ (2000) Prediction of return-to-work of low back pain clients sicklisted for 3-4 months. *Pain* 87: 285-294.
24. <https://www.ncbi.nlm.nih.gov/books/NBK82511/>