



## Prevalence rate of Low Back Pain and Its relationship to Demographic Factors, Body Mass Index, and Education in Ergonomic Principles among Rural Men, AqQala City, 2016.

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**Background:** In addition to individual problems and conditions, low back pain reduces working capacity, resulting in the waste of time and absence from the work, and increases healthcare costs and economic losses. This study aimed to determine the prevalence rate of low back pain and its relationship to demographic factors, body mass index, and education in ergonomic principles in rural men.

**Methods and Materials:** This study was a cross-sectional descriptive study. Study population was consisted of 215 men from the village of AqQala city. Data collection tool was Nordic questionnaire. Data were analyzed using SPSS software version 19 and chi-square test and descriptive statistics.

**Results:** About 54.88% of the patients (67.82% workers and 40% farmers) during the last year have been experiencing discomfort in the lower back.  $\chi^2$  statistics analysis showed a significant relationship between low back pain and occupation, BMI, age, and education in ergonomic principles ( $P \leq .05$ ). There was no relationship between low back pain and level of education ( $P = .085$ ). Only 13% of the participants

were trained in ergonomic principles.

**Conclusions:** Considering the high prevalence rate of low back pain as well as significant relationship between BMI and education in ergonomic principles with back pain, the need is felt for training of these people in how to lose weight, how to implement ergonomic principles in laboring and agricultural activities and carrying heavy objects, how to avoid bad work situations, how to maintain and care for the waist, how to perform simple exercises for strengthening and flexibility of lower back muscles.

**Keywords:** Low back pain, Body mass index, Rural men.

### Introduction

Physical health and a good physical condition have a special importance in human life. Favorable or unfavorable changes in physical health can affect people's quality of life. Although awkward postures is considered as a physical anomaly, but it can impose irreparable effects on the quality of life (Daneshjoo & Dadgar, 2011; Anwantanakul et al., 2011). Spinal cord keeps the skeleton of upper body and plays an important role in body's functions and in carrying out the body's duties. Regarding its importance, if this part of the body is exposed to too much pressure, not only internal organs would be at risk, but also skeletal and muscular structure of the upper body would be imbalanced and affect the motor activity of daily life (Kendall & McCreary, 1983). The backbone

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structure contains the arches of cervical, thoracic, and lumbar. Among these, lumbar due to its weight bearing function is more exposed to numerous hazards. As well, muscle weakness affects arch formation, deviations, and back pain (Kapandji, 2005). Work-related back pain is considered as the most common cause of musculoskeletal disability in the world so that injured workers request for professional indemnity. Economic aspects of this disorder have attracted the attention of many officials and led to multiple efforts to achieve a comprehensive approach for prevention and treatment of low back pain (Bombardier & Buchwald, 1996; Bergenudd & Nilsson, 1988). In recent years, job-related back pain has become a major concern. Low back pain is one of the most common work-related musculoskeletal disorders so that in 2010, about 227000 people required for leave for several days due to low back pain. Costs associated with absenteeism and treatment are considered as another part of the problem (Ahmadi et al., 2014). World Health Organization statistics indicate the increased prevalence rate of low back pain among the various social classes (Alghadir & Anwer, 2015). There are several personal and career risk factors causing back pain. Personal factors include gender, weight, physical activity, age, stature; and occupational factors associated with increased back pain include hard physical labor, constant and standing work conditions, repetitive bending and twisting, lifting, pushing, and pulling (Edlich, Woodard & Haines, 2001; Levy & Wegman, 2000). Improper motion habits leading to a change in curvature of the spine especially in the waist area could be considered as other possible causes of back pain (Sokhangooyi, 2000). Asymmetric body postures required in different professions and muscle weakness along with mechanical stress during work can make a person experiencing this complication (Farahpoor & MarviEsfahani, 2004). In a study conducted in 2015 on Azerbaijani farmers, the prevalence rate of low back pain has been reported to be 81.5% (Omran et al., 2015). Also, 2% of the population of America reported the occupational injuries as the cause of their back pain (Daneshjoo & Dadgar, 2011). In another study conducted in Sweden, 12.5% of all absenteeism from the work was caused by low back pain (Hansson et al., 1985). Also, in England, 3.5 million working days are missing due to abnormalities in skeletal muscle and back pain

(Coole, Watson & Drummond, 2010). Low back pain can reduce the effective performance throughout the world, and absenteeism imposes a huge economic impact on the individual, family, society, industry, and government. Researchers have found that back pain, like in western countries, is a major problem in low- and middle-income countries (Hoy et al., 2010). In many studies, the prevalence rate of low back pain in different professions (e.g. doctors, workers, farmers and other groups) has been reported to be from 15% to 84% (Li et al., 2012). Since the villagers form a large part of the population and by taking into account their productive role in agricultural production, little research has been done on low back pain and its causes in this group of Iranian, especially in the city under study. Such studies could help determine the prevalence and risk factors of low back pain. The aim of this study was to determine the prevalence rate of low back pain and its relationship to demographic factors, body mass index, and education in ergonomic principles, and also to offer strategies for prevention and control.

## Methods

The present study was a descriptive-analytic study. This study aimed to determine the prevalence rate of low back pain and its relationship to demographic factors, body mass index, and education in ergonomic principles on AghAltin men living in rural villages located in AghGhala. This study was conducted in 2016. The number of patients was 215 with 95% confidence interval and estimated maximum error of 5% ( $P$  value in a pilot study was 85%). The area under study was the rural villages of AghAltin. Among the 12 villages, six villages were randomly selected, and then from each village, 36 individuals (just from one village 35 individuals) were selected. For sampling, the first house on the right hand of health center while leaving the health center was selected. Then from each house all adults who aged  $\geq 18$  were selected. Then the sixth, eleventh, sixteenth houses selected and eligible individuals were assessed. The sampling continued until 36 individuals were assessed. In the villages without health house, the first house located on the right hand side of the main entrance road to the village was selected and then one out of the next five houses were selected until the sampling was completed. Inclusion criterion for the participants to be included in this study was being a married man

living in rural areas. Disabled and staff people were excluded. After obtaining informed consent, participants were given Nordic questionnaire that has high reliability and validity (Izadi, 2016). After completing the questionnaires and collecting required data, data were analyzed using SPSS software version 19 and descriptive statistics and chi-square tests with a significant level of 0.05.

## Results

Analysis of data showed that research units were consisted of 46.5% farmers and 53.5% workers. The prevalence rate of Low back pain was

54.88% in subjects. The mean age of the participants was  $40.17 \pm 8.72$  years. Only 13% ( $n = 28$ ) were trained in ergonomic principles (Table 1).

The results showed that most people with pain in their lumbar were worker. Most of the back pain was observed in the age ranges of 30 to 39 and 40 to 49. Most of the participants were overweight. Chi-square test showed significant differences between the prevalence rate of back pain and job, BMI, age, and training in ergonomic principles. There was no statistically significant difference between level of education and the prevalence rate of low back pain among rural men ( $\chi^2 = 0.085, p = .25$ ) (Table 2).

**Table 1. Demographic characteristics of rural men**

Variable	Category	Number (%)
Age	20-29	15 (6.97)
	30-39	84 (39.06)
	40-49	87 (40.46)
	50-59	23 (10.69)
	60 and above	6 (2.79)
Education level	Illiterate	50 (23.25)
	Primary	69 (32.09)
	Guidance	28 (13.02)
	High school	55 (25.58)
Occupation	Collegiate	13 (6.04)
	Farmer	100 (46.51)
	Worker	115 (53.48)
Education of Ergonomic principles	yes	28 (13.02)
	no	187 (86.97)
BMI	<18.5 Thin	5 (2.32)
	18.5-24.5 Normal	85 (39.53)
	25-29.5 Overweight	119 (55.34)
	30-40 Obese	6 (2.79)

**Table 2. The prevalence rate of low back pain in terms of occupation, education level, body mass index, age, and education in ergonomic principles**

Variable	Category	Number (%)		Chi-square test
		YES	NO	
Occupation	Farmer	40(33.89)	60(61.85)	0.001
	Working	78(66.10)	37(38.14)	
	Illiterate	27(22.88)	23(23.71)	
	Primary	37(31.35)	32(32.98)	
Education level	Guidance	12(10.16)	16(16.49)	0.085
	High school	34(28.81)	21(21.64)	
	Collegiate	8(6.77)	5(5.15)	
BMI	<18.5 Thin	2(1.69)		0.005
	18.5-24.5 Normal	35(29.66)		
	25-29.5 Overweight	77(65.25)		
	30-40 Obese	4(3.38)		
Age	20-29	11(9.32)	4(4.12)	0.04
	30-39	44(37.28)	40(41.23)	
	40-49	49(41.52)	38(39.17)	
	50-59	12(10.16)	11(11.34)	
	60 and above	2(1.69)	4(4.12)	
Education in ergonomic principles	yes	6(5.08)	22(22.68)	0.002
	no	112(94.91)	75(77.31)	

## Discussion

The prevalence rate of low back pain in the previous 12 months was 54.88%. The prevalence rate of low back pain in workers and farmers were 67.82% and 40%, respectively. In studies conducted in different societies, it was reported to be 64.9% in Chinese workers (Xu et al., 2012), 52.8% in Municipal workers (Widanarko et al., 2011), 57.1% in industrial workers (Ahmadi et al., 2014), 50% in construction workers (Alghadir & Anwer, 2015), and 81.5% in Azerbaijani farmers (Omran et al., 2015). In another study among Irish farmers, most of the musculoskeletal disorders were back pain disorder (Osborne et al., 2010). The results of the present study is inconsistent with the results of the study conducted on Chinese workers but different with other studies. The prevalence rate of low back pain among farmers in this study is lower than the results of other studies. The reasons for this difference can be attributed to individual differences in age, work experience, career diversity, and the type of activity and training, which has been mentioned in other studies (Ahmadi et al., 2014). Other differences in type and activity level of workers (construction, mine, industry, municipal workers) and farmers (traditional agriculture, mechanization) should also be taken into account. There is a significant relationship between low back pain and the type of employment ( $P = .001$ ), and the results of other studies by Omran (Omran et al., 2015), Askaripoor (Askaripoor et al., 2013 and Widanarko et al., 2011) confirm our findings. Occupational factors such as repetitive lifting heavy objects using mechanical devices or electric hammer, bending and twisting the trunk of lumbar are associated with inter-vertebral disc degeneration. Although not well is known about the physiology of inter-vertebral disc degeneration, but the relationship between degeneration and back pain are evident (Ramezani et al., 2015). This study showed that there is no correlation between education level and back pain that is aligned with the results of Ramezani's study (Ramezani et al., 2015). Although in most previous studies, the prevalence rate of back pain in people with higher levels of education has been reported to be less than in those with lower levels of education due to their awareness of the important role of physical exercises, managing daily activities, avoiding repetitive strenuous activity, calcium intake, doing swimming and cycling, (Ramezani et al., 2015; Kwon et al., 2006), but as there is no such facilities available in the area under study because of poor economic conditions and lack of resources,

it seems that these findings are more associated with economic factors and possibilities effective on the implementation of knowledge than education level. In terms of body mass index, 55.34% of people have excess weight, and 2.79% were obese. There is significant relationship between low back pain and body mass index (BMI) ( $P = .005$ ), and the result of Ahmadi's (Ahmadi et al., 2014) and Hartmann's (Hartman et al., 2006) studies are confirmed. In addition, the study of Sadeghian showed high body mass index which increases 2.2 times the chance of suffering from back pain, on the other hand, additional abdominal weight puts pressure on the spine, which can cause chronic spasms in the lumbar region (Sadeghian et al., 2006). As it is shown in Table 2, there is a significant relationship between back pain and age ( $P = .04$ ), and the result of the studies by Ahmadi (Ahmadi et al., 2014) and Hartman (Hartman et al., 2006) are confirmed. The reason for this result is that with increasing age, the discs between the vertebrae experience severe changes (Degenerative), and the person become more susceptible to back pain (WHO, 2003). Based on the results of this study, it was found that there is statistically significant relationship between education in ergonomic science and prevalence rate of back pain ( $P = .002$ ). Sadeghian (Sadeghian et al., 2006) also emphasized on the role of education in preventing and reducing back pain. In another study, inadequate education on the application of ergonomic science is one of the causes of occurrence of musculoskeletal disorders such as back pain (Thornton et al., 2004). Organizing training courses as the most cost effective way could be a perfect solution for preventing and reducing low back pain (Nadri et al., 2015) as in many training centers of the United States of the America, in which specialized ergonomic practices as well as working with the equipment are presented in the syllabus of educational levels (Nadri et al., 2015). The limitations of this study can be mentioned as follow: the subjects were limited to males; it was a cross-sectional study which cannot identify causal relationships. In addition, due to self-report data, the results should be interpreted and compared cautiously.

## Conclusions

Considering high prevalence rate of low back pain particularly among workers as well as significant relationship between BMI and education in ergonomic principles with back pain, show that observing ergonomic principles may

decrease the incidence of low back pain in people. As well as obesity is a favorable ground for low back pain. So the needs felt for training these people on how to lose weight, how to implement ergonomic principles in carrying heavy objects, how to avoid bad work situations, how to maintain and care for the waist, how to perform simple exercises for strengthening and flexibility of lower back muscles.

### Acknowledgments

Researchers would like to thank from those who were involved in the project.

### Conflict of Interest

There is no conflict of interest for this article.

### Author contribution

HI: Study implementation, data collection and analysis, writing the first draft of Paper.

GHM, FE, MAH, and MHD: Study design and data analysis, editing and confirming the final draft of the paper.

HI, GHM, and MHD: Study design, confirming the final draft of the paper.

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**How to cite this article:** Izadirad H, Masoudy GH, Delshad M H, Elhami M, Feaz M, Mehdi A .Prevalence of low back pain and its relationship to demographic factors, body mass index and education ergonomic principles among rural men AqQala city, 2016. *IJMPP* 2016; V1, N4.P:157-162.