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Low back pain: Prevalence and functional impairment among the general population in Tabuk city, Saudi Arabia

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ABSTRACT

Objectives: Low back pain (LBP) is a main cause of disability worldwide and can negatively affect the individual's life and work quality. This research aimed to estimate the prevalence of chronic non-specific LBP among the general population of Tabuk city, Saudi Arabia, and to evaluate its related risk factors and functional impairment.

Methods: A cross-sectional survey study was performed through a web-based and structured questionnaire consisting of sociodemographic data and risk factors. We used the Modified Oswestry LBP Disability Questionnaire (Arabic version) to measure the disability index among the study participants. The invitation to participate in the questionnaire was posted on different social media platforms.

Results: LBP was found in 46% of the participants (n = 768), and it was significantly associated with multiple risk factors, including age group ≥30 years old (P = 0.002), obesity (P = 0.002), smoking (P = 0.004), having comorbidities, particularly anemia, diabetes, hypertension, and hyperthyroidism ($P < 0.001$), and positive history of psychological problems (P = 0.039). Regular practice of physical activities had a significant protective effect (P = 0.032). The Oswestry Disability Index reported minimal disability among participants who had LBP.

Conclusion: The study detected a relatively high prevalence of LBP in Tabuk (46.2%, 95% confidence interval [CI]: 42.7–49.8%) and identified several significant risk factors, including age ≥30 years, body mass index ≥25 kg/m^2, smoking, and presence of comorbidities and psychological factors. Regular exercise was a protective factor against chronic LBP. The Oswestry Disability Index showed minimal disability and functional impairment.

Keywords: Chronic pain, Disability evaluation, Functional status, Low back pain, Tabuk

INTRODUCTION

Low back pain (LBP) is described as "pain in the area on the posterior aspect of the body from the lower margin of the twelfth ribs to the lower gluteal folds with or without pain referred into one or both lower limbs that lasts for at least 1 day."[1] Non-specific LBP is a major musculoskeletal disease with a global estimated prevalence of 9.4%. Therefore, it is considered to be among the most common musculoskeletal diseases.[2]

A systematic analysis of the Global Burden of Disease Study[3] estimated that the age-standardized prevalence per 100,000 of LBP in 2019 was highest in high-income

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North America (12,314.6 with 95% uncertainty interval (UI) 11,322.5–13,367.9), followed by central Europe (9982 with 95% UI 8822.9–11,299) and high-income Asia Pacific (9493.2 with 95% UI 8298.9–10,825.8). On the other hand, the lowest age-standardized prevalence estimates were in East Asia (5222.7 with 95% UI 4625.2–5,881.0), South Asia (5485.6 with 95% UI 4831.9–6,219), and Southern Sub-Saharan Africa (5776 with 95% UI 5108.2–6,542.9).

Despite the lack of adequate information on the spread of LBP in Saudi Arabia, earlier reports showed a pattern ranging from 53.2% to 79.17%.[4] Several conditions have been recognized as risk factors for LBP. These include lifestyle, professional car driving, hard labor work, obesity, poor general health, smoking,[5,6] and psychological factors.[7] Furthermore, LBP is increasingly recognized as a worldwide public health concern and a high socioeconomic burden, negatively affecting individual life quality.[8] Based on the 2010 Global Burden of Disease Study, LBP is among the ten leading problems responsible for the greatest number of disability-adjusted life years globally.[9] Former reports described the serious effect of LBP among health professionals and showed that it negatively impacts life and work quality.[10,11]

Several studies have assessed the impact of LBP on health expenditure. Besides the direct treatment costs, LBP leads to indirect costs such as productivity loss and disability payments. The indirect costs amount to more than 80% of the total costs of LBP.[12,13] The burden of LBP (per capita per year) was €410 in Europe and €317 in Australia in 2014 prices.[14]

The present study aimed to estimate the prevalence of chronic non-specific LBP among the general population of Tabuk city, Saudi Arabia, and to evaluate its related risk factors and functional impairment.

MATERIALS AND METHODS

Study design, setting, and population

In this cross-sectional survey, a questionnaire with 36 questions was employed. The setting of the study was Tabuk, one of the major cities in Saudi Arabia. Adults aged 18–65 living in Tabuk city were invited to participate in the research. Non-specific LBP was defined as LBP with no identified cause that explained the symptoms. Chronicity of LBP was considered when the pain continued for more than 3 months.[15] Participants with a history of LBP due to trauma, congenital spine malformation, infection, malignancy, or inflammatory arthritis were excluded from the study. Furthermore, participants with a history of lumbar spine surgery or active pregnancy were excluded from the study.

The survey was administered over 6 months, from October 2020 to April 2021. The data were collected using a web-based and self-administrated questionnaire on Google Forms. The invitations to participate in the survey were posted on different Social Media platforms, such as “Facebook” and “Twitter.” The technique was non-probability convenience sampling.

The survey collected demographic data from the respondents, including age, gender, weight, and height. Respondents then answered specific questions regarding their socioeconomic state, general health, phycological health, eating habits, smoking, and physical activity. In addition, respondents answered the Arabic version of the Modified Oswestry LBP Disability Questionnaire (MODQ).[16] The previous studies have shown that MODQ had fair to great test-retest reliability with intraclass correlation coefficient values ranging from 0.90 to 0.98.[17,18]

Two experts assessed the questionnaire for clarity and face validity. Then, it was tested on a pilot sample of 20 subjects who were not involved in the final analysis. The time needed to complete the questionnaire ranged from 7 to 10 min.

Sample size calculation and statistical analysis

The study sample size was estimated using the Qualtrics XM Platform Sample Size Calculator, with a confidence level of 99% and a margin of error of 1%. The estimated sample size was 663 participants. The analysis was performed utilizing the SPSS program (IBM SPSS Statistics) for Windows, version 26 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized as frequencies. The associations between the studied groups were evaluated utilizing Fisher's exact test, Pearson's Chi-square test for independence, or Fisher-Freeman-Halton exact test. The MODQ score was summarized as the interquartile range (IQR; expressed as 25–75th percentiles), median, and minimum and maximum values. Backward elimination logistic regression analysis was performed to define parameters significantly contributing to LBP, using relevant variables having $P < 0.1$ in the univariate analysis. Backward elimination multiple regression was done to assess factors significantly affecting the MODQ score, and adjusted odds ratio was calculated for each factor along its 95% CI. Statistical significance was adopted at $P < 0.05$. The reliability (internal consistency) of the MODQ score was tested in our sample using Cronbach's alpha analysis.

RESULTS

A total of 768 eligible participants from the whole population of Tabuk city completed the questionnaire and were included in this study. Cronbach's alpha was 0.846, suggesting fair internal consistency.

Demographics

Of the study population, 77.2% of the respondents were women, while 22.8% were men. The age group distribution of the participants was age group 18 to above 60 years, and about 54.43% belonged to the age group 18–29. About 21.6% of the participants finished secondary school or less, 66.8% had a university degree, 3.4% had a post-graduate degree, and 8.2% had a diploma. About 39.1% of the study population were working, 1.6% were housewives, 42% were students, and 17.3% were not working/retired [Table 1].

The prevalence of LBP among the studied participants (n = 768) was 46.2% (95% CI: 42.7–49.8%). Multiple risk factors were associated with LBP; the age group 30–39 years was the most affected (58.8%) with LBP, while the age group 18–29 years was the least affected (37.6%). About half (50.2%) of the overweight (body mass index [BMI] = 25.0–29.9) participants and even a higher percentage (58.3%) of the obese (BMI ≥30) participants were affected. A higher prevalence of LBP was among diploma holders (60.3%) and participants who were actively working (54.7%). On the other hand, students were the least affected (34.1%) compared to other occupational categories. Furthermore, smokers were more affected (59.5%). Both gender and work nature showed no significant association [Table 1]. Medical comorbidities were significantly associated with LBP (59.1%) (P < 0.001) [Table 2]. Finally, there was a higher prevalence (50.2%) of LBP among participants who did not practice physical exercise (P = 0.036) [Table 3].

Backward-elimination logistic regression analyses for potential risk factors of LBP in the studied participants

Table 1: Association between the sociodemographic data and low back pain in the studied participants (total n=768).

Variables	Low back pain >3 months				Statistical tests	
	Yes (n=355)		No (n=413)		Test statistic	P-value
	n	Row%	n	Row%		
Age (years)						
18–29	157	37.6$	261	62.4$	30.136[a]	<0.001*
30–39	87	58.8$	61	41.2$		
40–49	83	53.2	73	46.8		
50–59	27	62.8	16	37.2		
≥60	1	33.3	2	66.7		
Gender						
Female	276	46.5	317	53.5	0.107[b]	0.744
Male	79	45.1	96	54.9		
Body mass index						
Underweight (<18.5)	21	34.4	40	65.6	25.290[b]	<0.001*
Normal (18.5–24.9)	101	37.0$	172	63.0$		
Overweight (25.0–29.9)	124	50.2	123	49.8		
Obese (≥30)	109	58.3$	78	41.7$		
Education						
Secondary school or less	66	39.8	100	60.2	10.314[b]	0.016*
University degree	235	45.8	278	54.2		
Post-graduate	16	61.5	10	38.5		
Diploma	38	60.3$	25	39.7$		
Employment status						
Working	164	54.7$	136	45.3$	33.293[b]	<0.001*
Housewife	7	58.3	5	41.7		
Student	110	34.1$	213	65.9$		
Not working/Retired	74	55.6	59	44.4		
Work nature						
Sitting or standing/walking for short periods	71	46.1	83	53.9	0.282[a]	0.975
Sitting >6 h/day	105	48.4	112	51.6		
Standing/walking >6 h/day	52	47.7	57	52.3		
Intense effort and carrying weight >5 kg daily	4	50.0	4	50.0		
Smoking						
No	305	44.6	379	55.4	6.712[b]	0.010*
Yes	50	59.5	34	40.5		

[a]Fisher-Freeman-Halton exact test, [b]Pearson's Chi-square test for independence, n: Number, *Significant at P<0.05, $Significant difference from the other group

Table 2: Association of chronic diseases with low back pain in the studied participants (total *n*=768).

Variables	Low back pain >3months				Statistical test	
	Yes (*n*=355)		No (*n*=413)		Test statistic	*P*-value
	n	Row%	*n*	Row%		
Chronic diseases						
No	203	39.7	308	60.3	25.938[a]	<0.001*
Yes	152	59.1	105	40.9		
Anemia	60	56.1	47	43.9	4.853[a]	0.028*
Diabetes mellitus	23	67.6	11	32.4	6.568[a]	0.010*
Hypertension	29	72.5	11	27.5	11.721[a]	0.001*
Hypothyroidism	21	61.8	13	38.2	3.456[a]	0.063
Hyperthyroidism	8	80.0	2	20.0	4.650[b]	0.031*
Heart disease	3	100.0	0	0.0	FE	0.098
Obesity	0	0.0	2	100.0	FE	0.502
Cancer	1	50.0	1	50.0	FE	1.000
Autoimmune disease	6	66.7	3	33.3	FE	0.315
Bronchial asthma	20	47.6	22	52.4	0.035[a]	0.852
Others	16	84.2	3	15.8	11.309[b]	0.001*

[a]Pearson's Chi-square test for independence, [b]Fisher-Freeman-Halton exact test, FE: Fisher's exact test, *n*: Number, *Significant at $P<0.05$

Table 3: Association of anxiety, diet, and exercise with low back pain in the studied participants (total *n*=768).

Variables	Low back pain >3 months				Statistical test	
	Yes (*n*=355)		No (*n*=413)		Test statistic	*P*-value
	n	Row	*n*	Row		
Within the past months: constant anxiety, stress, non-concentration, indecision, depression, sleepiness or insomnia, lack of interest, and non-enjoying doing things						
No	48	39.0	75	61.0	3.054[a]	0.081
Yes	307	47.6	338	52.4		
Consuming healthy diet						
Always	32	46.4	37	53.6	1.709[a]	0.635
Sometimes	169	45.3	204	54.7		
Rarely	103	49.8	104	50.2		
Never	51	42.9	68	57.1		
How often do you exercise per week?						
Never	221	50.2[$]	219	49.8[$]	6.654[a]	0.036*
1–3 days	105	40.7	153	59.3		
4–7 days	29	41.4	41	58.6		
How often do you do stretching exercises per week?						
Never	287	47.2	321	52.8	1.287[a]	0.526
1–3 days	60	42.0	83	58.0		
4–7 days	8	47.1	9	52.9		
Type of exercise						
Resistance	25	29.4	60	70.6	10.868[a]	0.001*
Cardio	110	41.5	155	58.5	3.618[a]	0.057
Competitions	2	13.3	13	86.7	6.658[a]	0.010*
Stretching	21	38.2	34	61.8	1.541[a]	0.214

[a]Pearson's Chi-square test for independence, *n*: Number, *Significant at $P<0.05$, [$]Significant difference from the other group

showed that the probability of having LBP was significantly higher in those ≥30 years old ($P = 0.002$), obese (BMI ≥25 kg/m^2; $P = 0.002$), smokers ($P = 0.004$), with comorbidities ($P < 0.001$), and with a positive history of psychological problems ($P = 0.039$) [Table 4]. In addition, practicing regular physical activity had a significant protective effect ($P = 0.032$). The competition type of exercise was associated with the least number of affected people with

Table 4: Backward-elimination logistic regression analysis for potential risk factors of chronic back pain in the studied participants (total n=768).

Model	Reference category	*P*-value	Adjusted OR	95% CI for adjusted OR
Initial model				
Age ≥30 years	<30 years	0.015*	1.62	1.10–2.38
BMI ≥25 kg/m^2	<25 kg/m^2	0.002*	1.68	1.21–2.32
Employment working	Not working	0.729	1.07	0.74–1.55
Smoker	Non-smoker	0.004*	2.03	1.25–3.29
Comorbidities	None	<0.001*	2.05	1.49–2.82
Psychological factors	None	0.039*	1.55	1.02–2.36
Regular exercise	No exercise	0.034*	0.72	0.53–0.98
Final model				
Age ≥30 years	<30 years	0.002*	1.68	1.21–2.32
BMI ≥25 kg/m^2	<25 kg/m^2	0.002*	1.68	1.21–2.33
Smoker	Non-smoker	0.004*	2.05	1.26–3.31
Comorbidities	None	<0.001*	2.06	1.50–2.83
Psychological factors	None	0.039*	1.55	1.02–2.36
Regular exercise	No exercise	0.032*	0.72	0.53–0.97

BMI: Body mass index, CI: Confidence interval, OR: Odds ratio, *Significant at P<0.05

LBP, followed by resistance, stretching, and lastly cardio [Table 4]. In contrast, gender, education, and work nature did not significantly affect LBP [Table 1].

The duration of LBP among participants was presented from 3 months to above 3 years, and about 36.6% were for 3–6 months. MODQ score % (n = 355); 12.0%. A score of 12.0% presents a minimal disability [Table 5]. Factors associated with increased severity of LBP include age (P < 0.001), frequency of exercise (P = 0.001), and medical comorbidities (P = 0.023) [Table 6].

DISCUSSION

The present study demonstrates a high prevalence of LBP among the surveyed population in Tabuk city. The prevalence of LBP among our participants was 46.2% (95% CI: 42.7–49.8%), which is in line with that reported by a recent systematic review[19] in India (48%, 95% CI 40–56%). Meanwhile, a higher rate was reported by Awaji,[4] who found that the prevalence of LBP in Saudi Arabia ranged from 53.2% to 79.17%. In addition, a meta-analysis that aimed to estimate the prevalence of LBP in Saudi Arabia reported that the rates ranged between 64% and 89% and were measured within specific professional groups, not within the general public.[20] Results from studies in other gulf countries showed a tendency also toward higher prevalence rates of LBP among the general population, with rates of 64.6% (95% CI, 60.7–68.5) in the United Arab Emirates[21] and 56.5% (95% CI, 54.2–58.8) in Qatar.[22] These results reinforce the fact that LBP is a natural health concern problem. On the other hand, much lower rates of chronic LBP were reported by studies in Germany (15.5%)[23] and Brazil (28.8%).[24] One study found no significant association between age and LBP.[6] The variations in the prevalence of LBP among the studies can be explained by differences in study design, population characteristics, and participants' lifestyles. For example, individuals in developed countries may be keener to keep practicing physical exercises and preserve their body weight. In addition, some studies were conducted within specific professional categories that are more prone to suffer from LBP as healthcare workers,[20] so the prevalence rates are expected to be higher than those derived from studies conducted on the general population.

The intensity of LBP was mild in approximately half the participants, which may be explained by the relatively high percentage of young adults in our sample who are not expected to suffer from severe LBP, as aggravating factors such as osteoporosis and physical inactivity are less prevalent in this age group.

The present study analyzed the association of the participants' sociodemographic and lifestyle factors with the presence of chronic LBP. A significant association (P < 0.001) was found between age and LBP, with the highest prevalence rates in those aged between 50 and 59 years (62.8%). However, the age group with the second highest rate was "30–39 years" (58.8%), which may be explained by the convenient sampling technique employed in our study. Hence, the number of included young adults was higher than that of the elderly. Our findings partially agree with the results of a systematic review, which found that the prevalence of chronic LBP increased linearly and progressively from the third decade of life until the age of 60.[25] Meanwhile, an updated overview of worldwide rates of LBP reported that the rates of LBP increase gradually from birth till reaching the peak between 40 and 50 years and then decrease progressively with advancing age.[26] However, the authors included all cases of LBP without reporting separate results for chronic LBP.

Table 5: Characteristics of low back pain in the studied participants (total *n*=355).

Characteristics of pain	Participants with LBP >3 months	
	n	**%**
Duration of LBP		
3–6 months	130	36.6
6 months–1 year	35	9.9
1–2 years	58	16.3
2–4 years	36	10.1
>4 years	96	27.0
Pain intensity		
I can tolerate the pain I have without having to use pain medication	194	54.6
The pain is bad, but I can manage it without having to take pain medication	73	20.6
Pain medication provides me with complete relief from pain	25	7.0
Pain medication provides me with moderate relief from pain	23	6.5
Pain medication provides me with little relief from pain	26	7.3
Pain medication has no effect on my pain	14	3.9
Personal care (e.g., washing, dressing)		
I can take care of myself normally without causing increased pain	261	73.5
I can take care of myself normally, but it increases my pain	74	20.8
It is painful to take care of myself, and I am slow and careful	14	3.9
I need help, but I am able to manage most of my personal care	6	1.7
Lifting		
I can lift heavy weights without increased pain	88	24.8
I can lift heavy weights, but it causes increased pain	155	43.7
Pain prevents me from lifting heavy weights off the floor, but I can manage if the weights are conveniently positioned (e.g., on a table)	35	9.9
Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned	44	12.4
I can lift only very light weights	20	5.6
I cannot lift or carry anything at all	13	3.7
Walking		
Pain does not prevent me from walking any distance	238	67.0
Pain prevents me from walking more than 1 mile. (1 mile=1.6 km)	68	19.2
Pain prevents me from walking more than 1/2 mile	19	5.4
Pain prevents me from walking more than 1/4 mile	26	7.3
I am in bed most of the time and have to crawl to the toilet	4	1.1
Sitting		
I can sit in any chair as long as I like	135	38.0
I can only sit in my favorite chair as long as I like	97	27.3
Pain prevents me from sitting for more than 1 h	91	25.6
Pain prevents me from sitting for more than 1/2 h	21	5.9
Pain prevents me from sitting for more than 10 min	10	2.8
Pain prevents me from sitting at all	1	0.3
Standing		
I can stand as long as I want without increased pain	107	30.1
I can stand as long as I want, but it increases my pain	145	40.8
Pain prevents me from standing for more than 1 h	40	11.3
Pain prevents me from standing for more than 1/2 h	35	9.9
Pain prevents me from standing for more than 10 min	22	6.2
Pain prevents me from standing at all	6	1.7
Sleeping		
Pain does not prevent me from sleeping well	273	76.9
I can sleep well only by using pain medication	56	15.8
Even when I take medication, I sleep < 6 h	13	3.7
Even when I take medication, I sleep < 4 h	9	2.5

(Contd...)

Table 5: *(Continued).*

Characteristics of pain	Participants with LBP >3 months	
	n	**%**
Even when I take medication, I sleep < 2 h	1	0.3
Pain prevents me from sleeping at all	3	0.8
Social life		
My social life is normal and does not increase my pain	232	65.4
My social life is normal, but it increases my level of pain	75	21.1
Pain prevents me from participating in more energetic activities (e.g., sports, dancing)	32	9.0
Pain prevents me from going out very often	10	2.8
Pain has restricted my social life to my home	5	1.4
I have hardly any social life because of my pain	1	0.3
Travelling		
I can travel anywhere without increased pain	187	52.7
I can travel anywhere, but it increases my pain	134	37.7
My pain restricts my travel over 2 h	21	5.9
My pain restricts my travel for over 1 h	7	2.0
My pain restricts my travel to necessary short journeys under 1/2 h	3	0.8
My pain prevents all travel except for visits to the physician/therapist or hospital	3	0.8
Employment/Homemaking		
My normal homemaking/job activities do not cause pain.	101	28.5
My normal homemaking/job activities increase my pain, but I can still perform all that is required of me	193	54.4
I can perform most of my homemaking/job duties, but pain prevents me from performing more physically stressful activities (e.g., lifting, vacuuming)	47	13.2
Pain prevents me from doing anything but light duties	6	1.7
Pain prevents me from doing even light duties	4	1.1
Pain prevents me from performing any job or homemaking chores	4	1.1
MODQ score (%)		
Median [IQR] (Min–Max)	12.0 [6.0–22.0] (0.0–86.0)	
MODQ result		
Median [IQR] (Min–Max)	6 [3–11] (0–43)	

LBP: Low back pain, MODQ: Modified oswestry low back pain disability questionnaire, IQR: Interquartile range, Max: Maximum, Min: Minimum, n: Number

The results of the present study also indicated a significant association between BMI and chronic LBP ($P < 0.001$), with a progressive increase in the prevalence rate with increased BMI. This result agrees with a meta-analysis that reported overweight and obesity as factors increasing the risk of LBP in men and women.[27] Moreover, a population-based longitudinal study in Finland found that abdominal obesity (defined by waist circumference) increased the risk of LBP by 40%.[6] The effect of BMI on chronic LBP may be explained by the increased mechanical load on the lumbar spine in overweight and obese subjects.

Smokers in the present study had a significantly higher rate of chronic LBP than non-smokers (59.5% vs. 44.6%, respectively, $P = 0.010$). Similarly, the previous studies reported that smoking was a risk factor for LBP.[6,24,28] Smoking can increase the risk of recurrence and persistence of LBP through the causation of intervertebral disc degeneration[29] and interfere with the healing process.[30]

We found that medical comorbidities and a history of psychological problems were both highly associated with LBP, and these findings are in complete agreement with Heliövaara.[5] The chronic diseases that were significantly associated with LBP in our sample included anemia, diabetes mellitus, hypertension, and hyperthyroidism. Diabetes mellitus is associated with fatty infiltration of paraspinal muscles, contributing to LBP.[31] The relationship between hypertension and LBP is not precisely clear. However, it could be partially explained by the chronic pain activating the hypothalamic-pituitary-adrenal axis and spinal reflexes, resulting in increased cortisol levels, peripheral resistance, heart rate, and stroke volume. Chronic exposure to LBP could eventually lead to arterial hypertension.[32] Several studies reported the association of chronic pain with hypertension.[33-36] A previous study in Saudi Arabia reported a significant association between anemia with LBP.[36] Iron deficiency anemia has been linked with the severity of disc

Table 6: Backward elimination multiple regression for factors affecting MODQ Score (%) in participants with low back pain (total n=355).

Model	*P*-value	B	SE	95% CI of B
Initial model				
Age	0.001*	2.73	0.82	1.12–4.34
Male	0.681	0.89	2.16	−3.36–5.14
Work condition	0.542	−0.28	0.45	−1.17–0.62
Usual diet	0.146	−1.32	0.91	−3.10–0.46
Frequency of exercise	0.001*	−3.78	1.15	−6.05–−1.51
Smoker	0.394	2.15	2.52	−2.80–7.10
Comorbidities	0.017*	3.62	1.51	0.64–6.60
Psychological factors	0.096	3.63	2.18	−0.65–7.92
BMI	0.860	−0.15	0.84	−1.80–1.50
Final model				
Age	<0.001*	2.72	0.72	1.31–4.13
Frequency of exercise	0.001*	−3.64	1.10	−5.81–1.47
Comorbidities	0.023*	3.30	1.45	0.46–6.15

BMI: Body mass index, MODQ: Modified Oswestry low back pain disability questionnaire, B: Regression coefficient, CI: Confidence interval, SE: Standard error of B. *Significant at $P<0.05$

degeneration, presumably due to decreased oxygen delivery to tissues.[36] As for the relationship between hyperthyroidism and LBP, the underlying mechanisms are unclear but may be related to the effect of severe untreated hyperthyroidism on the degree of bone mass, resulting in high bone turnover and osteoporosis.[37]

An important finding in our study was that participants who never exercised were significantly more prone to chronic LBP than those who exercised regularly ($P = 0.036$). The previous studies reported physical activity as a potential protective factor for LBP.[38-41] Physical exercise is important to develop and strengthen back support.[38] Furthermore, weight-bearing exercises can reduce the severity of osteoporosis.[42] A meta-analysis by Shiri *et al.*[41] found that exercise alone reduced the risk of LBP by 33% and recommended a combination of strengthening with either stretching or aerobic exercises 2–3 times per week. As regards the type of exercise, we found that competition and resistance exercises were significantly associated with a lower rate of LBP. A meta-analysis by Searle *et al.*[43] reported that strength/resistance and coordination/stabilization programs showed a beneficial effect over other interventions in treating chronic LBP, while cardiorespiratory and combined exercise programs were ineffective. Another meta-analysis by Owen *et al.*[44] found that pilates, stabilization/motor control, resistance training and aerobic exercise training were the most effective treatments for LBP. However, the quality of the evidence was low. Hence, the SPINE20 advocacy group recommended regular exercise and maintaining physical activity as preventive strategies to limit spine problems.[45] A meta-analysis[46] that compared aerobic exercises to resistance exercise found that both decreased pain intensity in individuals with chronic non-specific LBP. Neither mode was superior in reducing pain intensity, but resistance exercise improved psychological well-being.

As far as we know, this research is one of the initial investigations of the prevalence of LBP in Tabuk as well as its associated risk factors. The major remarkable outcome of expressing from the data is that Oswestry LBP Disability Index scored 12% among the participants, which presents, according to Fairbank and Pynsent,[47] a minimal disability. Furthermore, it showed that most of the LBP intensity was mild. This means patients suffering from LBP can deal with most of their life activities. In general, no treatment is indicated; however, they are advised to engage in regular exercises.

The limitation of this study included that it may demonstrate a high LBP prevalence among the survey respondents, which could be attributed to convenient sampling along with our approach. It made individuals who were more willing to complete the survey those suffering from LBP. Research surveys rely on a participants' recall when filling out the survey and thus may be prone to bias. While we attempted to survey with clear questions and lacked ambiguity, every question is always subject to individual interpretation. Another limitation was that the majority of our sample was in the age group "18–29 years," which is probably due to high participation by medical students and residents as they are interested in health surveys. This young age group might not have much back pain compared to other age groups.

Finally, this survey provided insight into the prevalence of LBP, its related risk factors, and its impact on the life quality among the citizens of Tabuk city. The future studies are needed to establish prevention programs for LBP among the general population.

CONCLUSION

The current research detected a relatively high prevalence of LBP in Tabuk (despite being slightly lower than other Saudi studies) and identified several significant risk factors. The independent risk factors included age ≥30 years, BMI ≥25 kg/m^2, smoking, and the presence of comorbidities and psychological factors. Regular exercise was a protective factor against chronic LBP. The Oswestry Disability Index showed minimal disability and functional impairment.

Recommendations

We recommend increasing the awareness of family physicians and the general public regarding the magnitude of the problem of LBP and how the condition impacts individuals and everyday life activities. Also, some identified risk factors for LBP are preventable and should be controlled under medical supervision and compliance with those at-risk, such as smoking and obesity. Moreover, regular exercise should be encouraged as it is a protective factor that can reduce the risk and severity of LBP.

AUTHORS' CONTRIBUTIONS

All authors shared the study conception as well as the study design. Material preparation, data collection and analysis were carried out by FJW, ASA, SSA, and DMA. The first draft of the manuscript was prepared by AAA, AAAA, and NAA. All authors critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

ETHICAL APPROVAL

This study obtained approval from the Research Ethics Committee of the University of Tabuk, Tabuk, Saudi Arabia (Approval number: READ 0108; Date: September 15, 2020). The procedures followed in this study were in accordance with the Helsinki Declaration of 1975, as revised in 2000.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patients consent forms for this survey. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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CONFLICTS OF INTEREST

There are no conflicting relationships or activities.

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