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ORIGINAL RESEARCH

Assessment of the Burden of Chronic Neck and/or Shoulder Pain on Quality of Life Among Saudi Adults: A Cross-Sectional Study

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Background: Chronic neck and shoulder pain (NSP) impairs quality of life (QoL), yet data its impact in the Saudi population remain limited. This study assessed NSP's effect on physical, psychological, social, and environmental QoL among Saudi adults.

Methods: A cross-sectional study (May–September 2024) in Saudi Arabia used a self-administered Arabic questionnaire covering sociodemographics, NSP features, and QoL (WHOQOL-BREF). Adults ≥18 with self-reported NSP were included; those with cognitive impairments were excluded.

Results: This study included 2,171 Saudi adults (mean age: 29 ± 12 years; 54% female). The mean overall QoL score was 69 ± 21.69, with domain-specific means of 65 (physical), 59 (psychological), 60 (social), and 60 (environmental). Combined NSP was significantly associated with reduced QoL, most notably in the physical health ($\beta = -8.14$, $p < 0.001$) and overall QoL ($\beta = -6.83$, $p < 0.001$) domains. Chronic neck pain lasting >1 year significantly reduced QoL in physical ($\beta = -7.69$, $p<0.05$), psychological ($\beta = -6.20$, $p<0.05$), and overall domains ($\beta = -11.33$, $p<0.05$), while pain lasting 6–12 months also negatively impacted QoL ($\beta = -4.42$ to -9.18, $p<0.05$). Similarly, shoulder pain >1 year lowered physical ($\beta = -7.53$, $p<0.05$) and overall QoL ($\beta = -5.13$, $p<0.05$), and pain <6 months affected physical ($\beta = -5.53$, $p<0.05$), social ($\beta = -6.28$, $p<0.05$), and environmental domains ($\beta = -6.07$, $p<0.05$). Depression and anxiety worsened QoL across all domains ($\beta = -4.05$ to -10.21, $p<0.05$). Positive predictors included higher income ($\beta = 5.76$ to 9.11, $p<0.05$), regular exercise ($\beta = 2.29$ to 7.23, $p<0.05$), male gender ($\beta = 3.71$, $p<0.05$), moderate coffee intake ($\beta = 3.74$–3.77, $p<0.05$), and older age ($\beta = 0.23$, $p<0.05$). Conversely, diabetes, high BMI, and rural residence were associated with poorer QoL ($\beta = -0.39$ to -8.67, $p<0.05$).

Conclusion: Chronic NSP markedly reduces QoL, especially with prolonged pain and mental health issues. Early care, psychological support, and lifestyle changes are essential for better outcomes. Long-term studies are needed to inform tailored interventions.

Plain Language Summary: Chronic neck and shoulder pain (NSP) is common and can seriously affect people's daily lives. This study looked at how NSP impacts adults in Saudi Arabia, especially in terms of their physical, emotional, social, and living conditions. Over 2,000 adults took part, and results showed that people with pain lasting more than six months had a lower quality of life (QoL), especially if they also had depression or anxiety. Women, people with other health problems like diabetes or high body weight, and those living in rural areas were more affected. On the other hand, regular exercise, higher income, being male, and moderate coffee drinking were linked to better well-being. The study highlights the need for early treatment, mental health care, and healthy lifestyle changes to improve QoL.

Keywords: neck pain, shoulder pain, quality of life, musculoskeletal diseases, surveys and questionnaires, Saudi Arabia

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Introduction

Musculoskeletal disorders are one of the leading causes of disability worldwide.[1] According to the Global Burden of Disease (GBD) Study 2017, they are the second-highest contributors to global disability-adjusted life years (DALYs), highlighting their significant impact on population health.[1,2] Among these disorders, neck and shoulder pain (NSP) stands out as a highly prevalent and burdensome condition that affects individuals across various age groups, occupations, and lifestyles. NSP is not limited to temporary discomfort; it can lead to substantial functional limitations, psychological distress, and impaired quality of life (QoL) when persistent over time. Chronic NSP specifically reduces physical function (eg, mobility limitations), psychological well-being (eg, increased stress), and social participation (eg, work absenteeism), as demonstrated by WHOQOL-BREF studies in musculoskeletal populations.[3,4]

Globally, the co-occurrence NSP is increasingly recognized as a distinct and more debilitating clinical presentation than pain in either region alone. Studies report that 15–25% of the general population experience combined NSP, which is associated with significantly greater functional impairment, higher healthcare utilization, and more severe reductions in QoL compared to isolated neck or shoulder pain.[5,6] In similar Middle Eastern contexts, a recent study found that patients with combined NSP reported 30% lower physical health scores and 25% lower mental health scores on the SF-36 scale than those with single-site pain.[7] This pattern suggests that combined NSP represents a particularly severe subset of musculoskeletal burden, though data specific to the Saudi population remains scarce.

NSP is increasingly recognized as a public health concern, both globally and in specific national contexts like Saudi Arabia. As urbanization, sedentary lifestyles, and screen-related work increase, the incidence of musculoskeletal issues has risen. The WHOQOL-BREF, validated extensively in Arab musculoskeletal cohorts, has shown 82–89% reliability in capturing these multidimensional impacts.[8] Studies have shown that NSP significantly impacts health-related quality of life (HRQoL) by limiting daily functioning, contributing to physical discomfort, and increasing the risk of anxiety and depression.[9,10] Chronic NSP—pain lasting more than three to six months—is especially detrimental, as it not only affects physical health but also exacerbates emotional and psychological conditions. Moreover, previous studies have found a strong association between chronic pain and depressive symptoms such as anhedonia, particularly among women.[11]

The prevalence of NSP in Saudi Arabia is particularly concerning. Research suggests that 38.2% to 53.5% of people experience neck pain, while 21.6% to 34.4% suffer from shoulder pain. A more detailed recent study reported that 76.8% of participants experienced muscle tension, stiffness, pressure, or dull pain in the neck and shoulder area, with a mean pain score indicating mild chronic discomfort. These rates are significantly higher than those observed in Western countries like Sweden (26%) and Norway (34%).[12,13] NSP in the Saudi population has been related to modifiable factors including poor posture, prolonged use of mobile devices, obesity, and occupational stress.[14] Despite this high burden, there is limited public awareness, early screening, or standardized treatment pathways to manage NSP in the general population.

Although several studies have assessed impact of NSP on QoL domains in occupationally specific cohorts such as teachers, healthcare workers, or office employees in Saudi Arabia, little is known about its broader impact on the general adult population. This narrow focus limits the generalizability of findings and fails to capture the diverse lifestyle, work conditions, and stressors experienced across various social groups. Moreover, many of these studies do not fully explore the multidimensional nature of HRQoL, such as its psychological and social components, which are critically affected by chronic pain.

Therefore, this study examined the determinants of NSP and their influence on QoL across physical, psychological, social, and environmental domains in Saudi adults using a validated and structured tool, aiming to generate comprehensive, generalizable insights and clarify how sociodemographic, clinical, and behavioral factors interact to shape QoL outcomes. Accordingly, the study hypothesizes that chronic NSP significantly reduces QoL across all domains and that sociodemographic, clinical, and lifestyle factors modulate this relationship.

Materials and Methods

This cross-sectional study was conducted in Saudi Arabia between May to September 2024. The target population comprised adults aged ≥18 years either self-reported current or previous neck and/or shoulder pain irrespective of

duration. Participants were recruited from the general population rather than a pre-existing clinical database, and the presence of pain was self-identified through screening questions at the beginning of the online questionnaire (eg, "Have you experienced neck pain, shoulder pain, or both in the past 12 months?"). Only participants who answered "Yes" to at least one of these questions were included in the final analysis, while those reporting no pain were automatically excluded.

Participants were excluded if they had a history of recent trauma (within 6 months), surgery, congenital musculoskeletal disorders, vision impairment, or cognitive impairments affecting their ability to complete the questionnaire. The study utilized an online, self-administered survey to maximize accessibility across all regions of Saudi Arabia. Participants assessed the survey through a secure link provided with electronic consent.

Data Collection Tools

Data was collected using a self-administered, online questionnaire developed through Google Forms. The questionnaire was presented in simple Arabic to ensure accessibility and ease of understanding for the target population. It consisted of three main sections: (1) sociodemographic information including age, weight, height, residency, region, monthly income, and exercise; (2) specific items addressing musculoskeletal pain in the neck and shoulder regions, including duration and frequency; and (3) health-related QoL assessment.

To distinguish between isolated and combined pain conditions, participants were asked two separate questions: one regarding neck pain and another regarding shoulder pain. Those reporting pain in both areas were categorized under "combined neck and shoulder pain", while those indicating pain in only one region were classified accordingly to ensure that overlapping cases were clearly identified, allowing subgroup analyses (neck only, shoulder only, combined pain) to be performed transparently.

The pain-related questions were adapted and validated based on established tools from previous studies[15,16] ensuring content reliability and relevance. HRQoL was adapted using the World Health Organization QoL (WHOQOL-BREF) instrument, a widely recognized and validated tool for evaluating physical, psychological, social, and environmental domains.[17]

Prior to distribution, the questionnaire was piloted with 30 participants to assess clarity and technical functionality. Minor revisions were made to improve readability. Recruitment occurred via social media platforms, regional healthcare networks, and university mailing lists to ensure representation across Saudi Arabia's five regions (Central, Eastern, Western, Northern, and Southern).

Sample Size and Sampling Technique

Convenience sampling was used to collect data. Authors from the five main regions of Saudi Arabia (Central, Eastern, Western, Northern, and Southern) collaborated to distribute an online questionnaire and collect responses from the general population. Cochran's formula was used to determine the required sample size. The initial sample size (η_0) for an infinite population was calculated as follows:

$$n_0 = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}$$

Where:

Z = 1.96 (for 95% confidence level)

ρ = (assumed proportion)

e = (margin of error)

$$n_0 = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.03)^2} = 1067.11 \approx 1068$$

For the finite adult population (N = 24,295,216; source: Saudi General Authority for Statistics, 2023 projection,[16] the adjusted sample size was:

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

The minimum required sample size was 1,068 participants. To improve statistical accuracy and address potential missing or incomplete responses, the final sample size was increased to 2,171 participants.

Statistical Analysis

All data analyses were conducted using R software (version 4.2.3). Descriptive statistics, including means, standard deviations, and frequencies were calculated for sociodemographic and anthropometric characteristics, as well as for variables related to chronic NSP. To assess the impact of pain on QoL, multiple linear regression models were fitted with QoL domain scores (physical, psychological, social, environmental, and overall) as dependent variables. All statistical tests were two-sided, with a significance level set at $\alpha = 0.05$. Results were reported with corresponding beta coefficients, 95% confidence intervals, and p-values where applicable.

Ethical Considerations

Ethical approval for this study was obtained from the Research Ethics Committee at Jazan University (Reference number: REC-45/11/1114). The study was conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki. All ethical guidelines were strictly adhered to throughout the research process. Participation in the study was entirely voluntary with the option to withdraw at any time and informed consent was obtained from all participants through a digital consent form presented at the beginning of the questionnaire. All responses were anonymous and confidential. Data was securely stored, with access limited to the research team.

Results

Sociodemographic, Clinical, and Anthropometric Characteristics of Study Participants

The study included 2,171 participants with a mean age of 29 (±12 years), predominantly females (54%). Most were from the Central Region of Saudi Arabia (27%) and urban areas (83%). The majority held university degrees (73%) and reported a monthly income below 5,000 SR (60%). Participants had an average height of 165 cm (±9.5 cm), weight 69 kg (±19 kg), and BMI 25 (±6.1). The prevalence of chronic diseases was relatively low: hypertension (5%), diabetes (8%), asthma (7%), and cancer (<1%). Additionally, 10% reported depression, while 18% reported anxiety.

NSP were each reported by 39% of participants. Among those with neck pain, 22% experienced symptoms for more than a year, while 23% of those with shoulder pain reported chronic pain lasting over one year. A small proportion of participants (10% for neck and 13% for shoulder) reported a history of trauma that occurred more than six months prior to the study.

Lifestyle factors revealed that 86% consumed coffee, with 60% drinking it three or more times per week. Just over half (53%) engaged in some form of exercise, and the majority had never smoked (81%). Prolonged sitting due to sedentary work was reported by 43% of participants. Smart device usage was widespread, with 39% using devices for 4–8 hours per day and 35% for 8 or more hours daily (Table 1).

Table 1 Sociodemographic, Clinical, and Anthropometric Characteristics of Study Participants (n = 2171)

Characteristics	Mean ± SD
Age	29 ± 12 years
Height	165 ± 9.5
Weight	69 ± 19
BMI	25 ± 6.1

(*Continued*)

Table 1 (Continued).

Characteristics	Frequency (%)
Sex	
Male	996 (46%)
Female	1175 (54%)
Region	
Central Region	588 (27%)
Eastern Region	513 (24%)
Northern Region	309 (14%)
Southern Region	357 (16%)
Western Region	404 (19%)
Residency	
City	1804 (83%)
Village	367 (17%)
Education level	
Secondary school and less	459 (21%)
University (Bachelor's and Diploma)	1577 (73%)
Postgraduate studies (Master's, PhD, and others)	135 (6%)
Employment	
Engaging in tasks that involve frequent manual handling of heavy loads	38 (2%)
Performing sedentary work requiring prolonged periods of sitting	931 (43%)
Undertaking work that necessitates extended periods of standing	411 (19%)
Income/month	
Less than 5000	1301 (60%)
5000-9999	390 (18%)
10,000-14,999	237 (11%)
≥15,000	243 (11%)
Smart devise use	
2 hours or less	167 (8%)
2 - 4 hours	393 (18%)
4 - 8 hours	857 (39%)
8 hours or more	754 (35%)

(*Continued*)

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Table 1 (Continued).

Characteristics	Frequency (%)
Smoking	
Ex-smoker	106 (5%)
Never	1768 (81%)
Current	297 (14%)
Coffee consumption	1863 (86%)
Coffee consumption/weak	
Less than three times a week	571 (26%)
Three times a week and more	1292 (60%)
Exercise	1155 (53%)
Exercise/week	
Once a week	397 (18%)
Two to three times	524 (24%)
Chronic diseases	
Hypertension	105 (5%)
Diabetes	184 (8%)
Heart disease	30 (1%)
Blood disease	32 (1%)
Asthma, COPD	152 (7%)
Osteoporosis	26 (1%)
Cancer	8 (0.4%)
Depression	223 (10%)
Anxiety	387 (18%)
Musculoskeletal related characteristics	
Neck	
History of neck trauma	207 (10%)
Neck Pain	850 (39%)
Duration of neck pain	
Less than six months	238 (11%)
Six months to a year	134 (6%)
More than a year	473 (22%)
Shoulder:	
History of shoulder trauma	276 (13%)
Shoulder pain	839 (39%)

(*Continued*)

Table 1 (Continued).

Characteristics	Frequency (%)
Duration of shoulder pain	
Less than six months	222 (10%)
Six months to a year	155 (7%)
More than a year	497 (23%)

Note: "History of neck/shoulder trauma" refers to incidents occurring more than six months prior to the study.
Abbreviations: COPD, Chronic Obstructive Pulmonary Disease; n, Sample size.

Impact of NSP on QoL

The overall mean QoL score was 69 ± 21.69. The domain-specific scores were as follows: physical health, 65 ± 18; psychological health, 59 ± 22; social health, 60 ± 25; and environmental health, 60 ± 22 (Figure 1).

The Relationship Between Neck Pain and QoL Domains

Several factors were significantly associated with all QoL domains. Regular exercise improved physical (β = 2.29), psychological (β = 3.54), social (β = 1.30), and environmental health (β = 3.48), with the strongest effect on overall QoL (β = 7.14). Higher income with participants earning 5,000–9,999 SR (β = 6.75), and >15000 SR showed improvements across all domains (β = 6.12). Higher BMI was significantly associated with poorer QoL across multiple domains—physical (β = −0.18), psychological (β = −0.21), and environmental health (β = −0.17)—with a pronounced negative effect on overall QoL (β = −0.40, $p < 0.001$).

In contrast, depression and anxiety significantly reduced QoL. Depression was associated to lower scores across physical (β = −4.05), psychological (β = −6.84), social (β = −9.93), and environmental health (β = −5.13), as well as

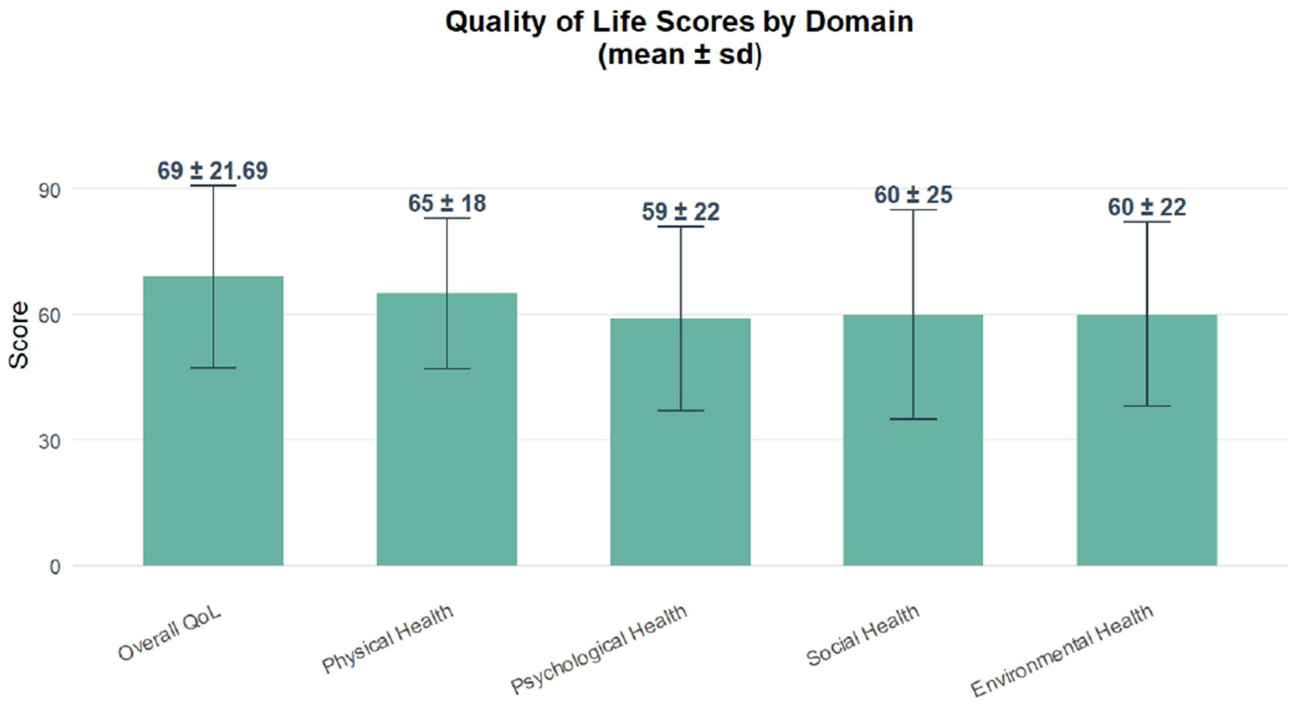

Figure 1 Distribution of quality-of-life domains.

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overall QoL (β = −4.92). Anxiety similarly showed broad negative associations, with the strongest impact on psychological health (β = −7.93).

Neck pain of 6 months to 1 year duration significantly reduced physical (β = −4.42) and psychological health (β = −6.52), with an even greater impact observed in pain lasting more than one year on both physical (β = −7.69) and psychological domains (β = −6.20). Additionally, age was modestly associated with better scores across psychological (β = 0.23) and social domains (β = 0.15) Living in rural areas reduced physical (β = −0.99) and environmental (β = −4.44) scores.

Factors with domain-specific effects were as follows: male gender showed improved physical health (β = 3.71, $p < 0.001$), electronic device use >8 hours/day was associated with better environmental health (β = 6.46, p = 0.001), coffee consumption showed a positive association with physical health (β = 2.22, p = 0.034), while osteoporosis (β = −7.24), and diabetes mellitus (β = −2.93, $p = 0.035$) negatively impacted physical health (Table 2).

The Relationship Between Shoulder Pain and QoL Domains

The linear regression analysis revealed significant associations between shoulder pain and QoL domains, with several key predictors emerging. Higher income levels demonstrated the strongest positive impact, particularly for participants earning >15,000 SR (β = 5.76–8.86) and 5,000–9,999 SR (3.68–6.97), which enhanced all QoL domains. In contrast, depression (β = −5.21) and anxiety (β = −4.70) negatively influenced overall QoL. Similarly, shoulder pain lasting less than 6 months significantly impaired physical (β = −5.53), social (β = −6.28), and environmental health (β = −6.07), while chronic pain (>1 year) primarily affected physical health (β = −7.53). Interestingly, electronic device use (2 – −4 hours/day: β = 1.45–2.31; 4–8 hours/day: β = 1.12–3.14) and regular exercise (β = 1.50–3.67) were associated with better psychological, social, and environmental health scores, while coffee consumption specifically improved physical QoL (β = 2.08). Furthermore, male gender predicted better physical (β = 3.72) and environmental (β = 2.15) QoL, and older age showed mild but consistent benefits for psychological (β = 0.23) and social (β = 0.18) health. Regional disparities were evident, as participants from the Eastern region (β = −1.27 – −2.47) and rural areas (β = −1.01– −2.55) reported significantly lower QoL scores, particularly in physical and environmental domains. Notably, diabetes mellitus was associated with an overall QoL decline (β = −3.42) (Table 3).

The Relationship Between Combined NSP and QoL

Combined NSP (where individuals have neck and shoulder pain) significantly reduces QoL across most domains after adjusting for covariates. The largest effect was observed in physical health (β = −8.14, 95% CI: −9.83 to −6.45, p < 0.001), followed by overall QoL (β = −6.83, 95% CI: −8.87 to −4.80, p < 0.001), social relationships (β = −3.18, 95% CI: −5.67 to −0.68, p = 0.013), and environment (β = −2.39, 95% CI: −4.58 to −0.20, p = 0.032). The psychological domain showed a borderline significant negative association (β = −2.03, 95% CI: −4.16 to 0.10, p = 0.062).

Discussion

This study assessed the predictors associated with combined NSP and its effect on physical, psychological, social, and environmental QoL domains among adults in Saudi Arabia. NSP showed a strong overall impact, while separate analyses revealed distinct patterns for neck pain and shoulder pain across QoL domains. Daily electronic device use (2–8 hours) showed a dual impact: while increasing NSP risk, it was paradoxically associated with improved psychological, social, and environmental QoL. This apparent contradiction may reflect technology's role in facilitating communication and access to resources, despite its physical strain. A 2025 systematic review of over 43,184 participants across 13 countries found that screen time exceeding six hours daily significantly elevated the risk of NSP—by 82% for mobile phone use (OR = 1.82) and 23% for computer use (OR = 1.23).[18] Supporting this, a 2024 Jeddah study found 42% of participants used smartphones for over five hours daily, with 64.6% reporting neck pain and 42.3% shoulder pain.[19] Moderate device use (2–8 hours/day) enhances QoL by reducing stress, maintaining social connections, and enabling resource access. However, excessive use (>6 hours/day) increases NSP risk through poor posture and sleep disruption.[20] These dual effects highlight technology's complex role in modern wellbeing. Balanced usage is key to maximizing benefits while minimizing physical harm.

Table 2 The Relationship Between Neck Pain and Quality of Life Domains

Predictors	Physical Health			Psychological Health			Social Health			Environmental Health			Overall QoL Score		
	Beta	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**
Neck pain	−2.63	−6.29 – 1.04	0.160	3.63	−1.00 – 8.26	0.124	−0.52	−5.92 – 4.88	0.850	1.39	−3.35 – 6.13	0.566	1.75	−2.63 – 6.12	0.434
Neck pain duration															
< 6 months	−0.43	−4.45 – 3.58	0.833	−4.56	−9.64 – 0.53	0.079	−0.76	−6.69 – 5.17	0.802	−3.08	−8.29 – 2.13	0.246	−3.81	−8.61 – 1.00	0.120
6 months to 1 year	−4.42	−8.94 – −0.10	**0.023**	−6.52	−11.36 – −1.69	**0.008**	−4.52	−10.17 – 1.12	0.116	−4.77	−9.73 – 0.19	0.059	−9.18	−14.58 – −3.78	**0.001**
> 1 year	−7.69	−11.52 – −3.87	**<0.001**	−6.20	−11.92 – −0.48	**0.034**	−3.55	−10.23 – 3.12	0.296	−5.05	−10.91 – 0.80	0.091	−11.33	−15.90 – −6.76	**<0.001**
Age	0.08	−0.01 – 0.16	0.087	0.23	0.12 – 0.34	**<0.001**	0.15	0.02 – 0.28	**0.019**	0.09	−0.02 – 0.20	0.108	0.23	0.13 – 0.34	**<0.001**
Gender (reference: Female)															
Male	3.71	1.91 – 5.51	**<0.001**	1.66	−0.53 – 3.84	0.137	0.61	−1.94 – 3.16	0.640	2.36	0.12 – 4.60	**0.039**	0.33	−1.74 – 2.39	0.757
Body Mass Index (BMI)	−0.18	−0.31 – −0.06	**0.005**	−0.21	−0.37 – −0.05	**0.011**	−0.06	−0.24 – 0.13	0.558	−0.17	−0.33 – −0.01	**0.042**	−0.40	−0.55 – −0.25	**<0.001**
Exercise	2.29	0.15 – 4.43	**0.036**	3.54	1.67 – 5.42	**<0.001**	1.30	−0.89 – 3.49	0.244	3.48	1.55 – 5.40	**<0.001**	7.14	5.36 – 8.91	**<0.001**
Smoking history (reference: never)															
Ex-smoke	−3.63	−7.02 – −0.23	**0.036**	1.41	−1.52 – 4.33	0.346	−0.14	−5.18 – 4.90	0.957	−2.45	−6.88 – 1.97	0.277	−2.00	−6.08 – 2.08	0.336
Current	−1.63	−3.94 – 0.67	0.165	−2.69	−7.01 – 1.62	0.221	1.35	−2.07 – 4.76	0.439	−0.16	−3.16 – 2.83	0.914	−2.42	−5.18 – 0.35	0.087
Region (reference: central region)															
Eastern Region	−1.66	−3.73 – 0.41	0.116	−1.74	−4.37 – 0.90	0.196	−1.16	−4.24 – 1.91	0.457	−2.27	−4.96 – 0.43	0.099	−1.71	−4.20 – 0.77	0.177
Northern Region	−0.67	−3.00 – 1.66	0.573	−1.44	−4.40 – 1.51	0.338	1.54	−1.91 – 4.99	0.382	−2.20	−5.23 – 0.83	0.155	−1.39	−4.19 – 1.40	0.328
Southern Region	−0.03	−2.49 – 2.42	0.980	0.04	−3.07 – 3.15	0.981	0.06	−3.57 – 3.70	0.972	−1.12	−4.31 – 2.07	0.490	−0.75	−3.69 – 2.20	0.619
Western Region	−1.87	−4.02 – 0.28	0.089	−0.99	−3.72 – 1.75	0.480	−1.03	−4.22 – 2.17	0.528	−2.44	−5.24 – 0.36	0.088	−2.90	−5.49 – −0.32	**0.028**
Residence (reference: urban)															
Rural	−0.99	−3.13 – 1.15	0.363	−2.76	−5.46 – −0.06	**0.045**	−0.58	−3.73 – 2.57	0.717	−4.44	−7.21 – −1.68	**0.002**	−2.15	−4.70 – 0.40	0.099
Education (reference: high school or lower)															
Bachelor	0.21	−1.58 – 2.00	0.816	0.35	−1.93 – 2.62	0.765	−0.37	−3.02 – 2.29	0.787	−0.85	−3.18 – 1.49	0.477	−1.33	−3.48 – 0.82	0.225
Postgraduates	0.45	−3.10 – 4.00	0.804	0.14	−4.37 – 4.65	0.951	−2.52	−7.78 – 2.74	0.348	−2.58	−7.20 – 2.04	0.274	−2.81	−7.08 – 1.45	0.196

(*Continued*)

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Table 2 (Continued).

Predictors	Physical Health			Psychological Health			Social Health			Environmental Health			Overall QoL Score		
	Beta	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**	**Beta**	**95% CI**	**P-value**
Employment (reference: unemployed)															
Engaging in tasks that involve frequent manual handling of heavy loads	−1.59	−7.17 – 3.98	0.575	−1.27	−8.32 – 5.77	0.723	−1.89	−10.12 – 6.33	0.651	−3.25	−10.47 – 3.97	0.377	−5.13	−11.79 – 1.53	0.131
Performing sedentary work requiring prolonged periods of sitting	0.04	−1.68 – 1.75	0.967	−0.61	−2.80 – 1.57	0.581	−0.32	−2.87 – 2.23	0.806	−1.86	−4.10 – 0.38	0.103	−1.08	−3.14 – 0.98	0.304
Undertaking work that necessitates extended periods of standing	0.37	−1.78 – 2.52	0.738	0.22	−2.52 – 2.95	0.877	1.29	−1.90 – 4.48	0.428	−0.62	−3.42 – 2.19	0.666	1.86	−0.73 – 4.44	0.159
Income (reference: less than 5000 Saudi Riyal)															
Between 5000–9999 SR	3.64	1.54 – 5.73	**0.001**	3.16	0.50 – 5.82	**0.020**	4.88	1.78 – 7.99	**0.002**	4.16	1.44 – 6.88	**0.003**	6.75	4.24 – 9.26	**<0.001**
Between 10000–15000 SR	2.76	0.08 – 5.43	**0.044**	2.83	−0.57 – 6.22	0.102	4.98	1.02 – 8.94	**0.014**	3.12	−0.36 – 6.59	0.079	4.43	1.22 – 7.63	**0.007**
> 15000 SR	6.92	4.13 – 9.70	**<0.001**	6.56	3.02 – 10.10	**<0.001**	8.40	4.27 – 12.53	**<0.001**	9.11	5.48 – 12.73	**<0.001**	6.12	2.77 – 9.46	**<0.001**
Use of electronic devices (reference: less than 2 hours)															
2 - 4 hours	2.48	−0.58 – 5.54	0.112	6.21	2.31 – 10.10	**0.002**	5.63	1.08 – 10.17	**0.015**	7.54	3.55 – 11.53	**<0.001**	−0.77	−4.45 – 2.91	0.682
4 - 8 hours	2.79	−0.13 – 5.70	0.061	5.88	2.18 – 9.58	**0.002**	5.29	0.97 – 9.61	**0.016**	8.17	4.38 – 11.96	**<0.001**	−2.13	−5.63 – 1.37	0.233
>8 hours	−0.42	−3.42 – 2.59	0.786	2.60	−1.22 – 6.43	0.181	1.45	−3.01 – 5.91	0.523	6.46	2.55 – 10.38	**0.001**	−5.38	−8.99 – −1.77	**0.004**
Coffee consumption	2.22	0.17 – 4.28	**0.034**	−0.56	−3.16 – 2.05	0.676	1.37	−1.67 – 4.40	0.379	−0.04	−2.71 – 2.63	0.979	3.74	1.28 – 6.20	**0.003**
Heart disease	−3.23	−9.73 – 3.26	0.329	−4.73	−13.00 – 3.53	0.262	−2.09	−11.74 – 7.55	0.670	−3.59	−12.06 – 4.88	0.406	3.90	−3.92 – 11.71	0.328
Diabetes mellitus	−2.93	−5.66 – −0.21	**0.035**	0.26	−3.21 – 3.73	0.883	0.29	−3.75 – 4.34	0.886	−0.01	−3.57 – 3.54	0.993	−4.76	−8.04 – −1.49	**0.004**
Hypertension	3.84	−0.46 – 8.14	0.080	1.95	−2.72 – 6.62	0.413	0.55	−4.90 – 6.00	0.843	1.39	−3.40 – 6.18	0.570	−2.22	−6.63 – 2.20	0.325
Osteoporosis	−7.24	−13.93 – −0.54	**0.034**	−7.28	−15.81 – 1.25	0.094	−1.35	−11.31 – 8.60	0.790	−6.90	−15.64 – 1.83	0.121	−8.67	−16.73 – −0.61	**0.035**
Depression]	−4.05	−6.73 – −1.36	**0.003**	−6.84	−10.25 – −3.42	**<0.001**	−9.93	−13.92 – −5.95	**<0.001**	−5.13	−8.62 – −1.63	**0.004**	−4.92	−8.14 – −1.69	**0.003**
Anxiety	−6.47	−8.62 – −4.33	**<0.001**	−7.93	−10.66 – −5.20	**<0.001**	−5.30	−8.48 – −2.11	**0.001**	−6.35	−9.15 – −3.56	**<0.001**	−4.09	−6.67 – −1.51	**0.002**

Notes: Bold values indicate statistically significant associations ($p < 0.05$).

Table 3 The Relationship Between Shoulder Pain and Quality of Life Domains

Predictors	Physical Health			Psychological Health			Social Health			Environmental Health			Overall QoL Score		
	Beta	95% CI	P-value	Beta	95% CI	P-value	Beta	95% CI	P-value	Beta	95% CI	P-value	Beta	95% CI	P-value
Shoulder pain	−0.90	−4.66 – 2.86	0.637	2.40	−2.35 – 7.15	0.321	1.66	−3.88 – 7.20	0.557	2.57	−2.29 – 7.44	0.299	−2.03	−6.55 – 2.50	0.380
Shoulder pain duration															
< 6 months	−5.53	−9.64 – −1.43	**0.008**	−4.47	−9.66 – 0.71	0.091	−6.28	−12.32 – −0.23	**0.042**	−6.07	−11.37 – −0.77	**0.025**	−1.59	−6.53 – 3.35	0.527
6 months to 1 year	−4.22	−8.62 – 0.18	0.060	−1.29	−6.86 – 4.27	0.648	−3.38	−9.86 – 3.11	0.308	−1.84	−7.53 – 3.85	0.526	−0.65	−5.95 – 4.66	0.811
> 1 year	−7.53	−11.48 – −3.59	**<0.001**	−3.29	−8.27 – 1.70	0.196	−4.64	−10.46 – 1.17	0.118	−4.67	−9.77 – 0.43	0.073	−5.13	−9.88 – −0.38	**0.034**
Age	0.08	−0.00 – 0.17	0.063	0.22	0.11 – 0.33	**<0.001**	0.15	0.02 – 0.27	**0.026**	0.09	−0.02 – 0.21	0.108	0.23	0.13 – 0.34	**<0.001**
Gender (reference: Female)															
Male	3.72	1.99 – 5.45	**<0.001**	1.88	−0.30 – 4.06	0.091	0.73	−1.82 – 3.27	0.575	2.60	0.37 – 4.84	**0.022**	0.77	−1.31 – 2.85	0.466
Body Mass Index (BMI)	−0.16	−0.29 – −0.03	**0.014**	−0.20	−0.37 – −0.04	**0.013**	−0.05	−0.23 – 0.14	0.633	−0.16	−0.33 – 0.00	0.052	−0.39	−0.55 – −0.24	**<0.001**
Exercise	3.45	1.96 – 4.94	**<0.001**	3.67	1.79 – 5.55	**<0.001**	1.50	−0.70 – 3.69	0.181	3.58	1.65 – 5.50	**<0.001**	7.23	5.43 – 9.02	**<0.001**
Smoking history (reference: never)															
Ex-smoker	−3.36	−6.78 – 0.06	0.054	−2.66	−6.98 – 1.67	0.229	0.24	−4.81 – 5.29	0.926	−2.26	−6.69 – 2.17	0.317	−1.88	−6.01 – 2.24	0.370
Current	−2.06	−4.38 – 0.25	0.081	1.24	−1.68 – 4.17	0.405	1.06	−2.35 – 4.48	0.541	−0.39	−3.38 – 2.61	0.799	−2.88	−5.67 – −0.10	**0.043**
Region (reference: central region)															
Eastern	−2.13	−4.22 – −0.04	**0.046**	−1.85	−4.49 – 0.80	0.171	−1.27	−4.35 – 1.82	0.420	−2.47	−5.18 – 0.23	0.073	−2.18	−4.70 – 0.34	0.090
Northern	−1.03	−3.37 – 1.31	0.388	−1.65	−4.61 – 1.31	0.274	1.37	−2.08 – 4.82	0.436	−2.46	−5.49 – 0.56	0.111	−1.85	−4.67 – 0.97	0.197
Southern	−0.35	−2.81 – 2.11	0.781	−0.25	−3.36 – 2.86	0.876	−0.23	−3.86 – 3.40	0.900	−1.46	−4.64 – 1.72	0.368	−1.34	−4.31 – 1.62	0.374
Western	−1.88	−4.05 – 0.29	0.089	−1.01	−3.75 – 1.73	0.468	−1.08	−4.27 – 2.12	0.509	−2.55	−5.35 – 0.26	0.075	−2.96	−5.57 – −0.35	**0.026**
Residence (reference: urban)															
Rural	−0.95	−3.10 – 1.19	0.385	−2.59	−5.30 – 0.12	0.061	−0.24	−3.40 – 2.92	0.883	−4.21	−6.98 – −1.43	**0.003**	−1.86	−4.45 – 0.72	0.157
Education (reference: high school or lower)															
Bachelor	0.85	−2.72 – 4.43	0.639	0.52	−1.76 – 2.80	0.653	−0.27	−2.93 – 2.38	0.841	−0.68	−3.01 – 1.65	0.568	−2.20	−6.50 – 2.10	0.316
Postgraduates	0.36	−1.44 – 2.16	0.694	0.36	−4.16 – 4.87	0.877	−2.34	−7.61 – 2.92	0.383	−2.39	−7.01 – 2.23	0.311	−1.19	−3.36 – 0.98	0.284

(*Continued*)

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Table 3 (Continued).

Predictors	Physical Health			Psychological Health			Social Health			Environmental Health			Overall QoL Score		
	Beta	95% CI	P-value	Beta	95% CI	P-value	Beta	95% CI	P-value	Beta	95% CI	P-value	Beta	95% CI	P-value
Employment (reference: unemployed)															
Engaging in tasks that involve frequent manual handling of heavy loads	−2.61	−8.19 – 2.98	0.360	−1.81	−8.86 – 5.25	0.616	−2.64	−10.87 – 5.59	0.530	−3.91	−11.13 – 3.31	0.289	−5.94	−12.66 – 0.79	0.083
Performing sedentary work requiring prolonged periods of sitting	0.10	−1.63 – 1.83	0.910	−0.69	−2.87 – 1.50	0.538	−0.35	−2.89 – 2.20	0.789	−1.92	−4.15 – 0.32	0.092	−1.17	−3.25 – 0.91	0.272
Undertaking work that necessitates extended periods of standing	0.06	−2.10 – 2.22	0.955	0.01	−2.72 – 2.74	0.993	1.15	−2.04 – 4.33	0.480	−0.77	−3.57 – 2.02	0.588	1.48	−1.12 – 4.09	0.264
Income (reference: less than 5000 Saudi Riyal (SR))															
Between 5000–9999 SR	3.68	1.57 – 5.79	**0.001**	3.24	0.58 – 5.91	**0.017**	4.99	1.88 – 8.10	**0.002**	4.28	1.55 – 7.00	**0.002**	6.97	4.43 – 9.51	**<0.001**
Between 10000–15000 SR	2.86	0.16 – 5.55	**0.038**	2.69	−0.71 – 6.09	0.121	4.96	0.99 – 8.92	**0.014**	3.03	−0.45 – 6.51	0.088	4.33	1.09 – 7.57	**0.009**
> 15000 SR	6.58	3.77 – 9.38	**<0.001**	6.36	2.81 – 9.91	**<0.001**	8.11	3.98 – 12.25	**<0.001**	8.86	5.24 – 12.49	**<0.001**	5.76	2.38 – 9.13	**0.001**
Use of electronic devices (reference: less than 2 hours)															
2-4 hours	2.54	−0.55 – 5.63	0.108	5.92	2.02 – 9.83	**0.003**	5.41	0.86 – 9.97	**0.020**	7.39	3.39 – 11.38	**<0.001**	−0.94	−4.66 – 2.78	0.619
4-8 hours	2.93	−0.00 – 5.87	0.050	5.64	1.93 – 9.35	**0.003**	5.05	0.72 – 9.37	**0.022**	7.97	4.18 – 11.77	**<0.001**	−2.27	−5.81 – 1.26	0.207
>8 hours	−0.50	−3.53 – 2.53	0.745	2.35	−1.47 – 6.18	0.228	1.14	−3.32 – 5.60	0.617	6.26	2.34 – 10.17	**0.002**	−5.66	−9.30 – −2.02	**0.002**
Coffee consumption	2.08	0.01 – 4.15	**0.049**	−0.47	−3.08 – 2.14	0.723	1.45	−1.60 – 4.49	0.351	0.03	−2.64 – 2.71	0.980	3.77	1.29 – 6.26	**0.003**
Heart disease	−3.83	−10.40 – 2.73	0.252	−4.94	−13.24 – 3.36	0.244	−2.67	−12.34 – 7.01	0.589	−4.01	−12.51 – 4.48	0.354	3.94	−3.96 – 11.85	0.328
Diabetes mellitus	−2.61	−5.36 – 0.14	0.063	0.26	−3.21 – 3.74	0.882	0.47	−3.58 – 4.52	0.819	−0.04	−3.59 – 3.52	0.984	−4.54	−7.85 – −1.23	**0.007**
Hypertension	1.05	−2.65 – 4.76	0.577	1.84	−2.85 – 6.52	0.442	0.36	−5.11 – 5.82	0.899	1.15	−3.64 – 5.95	0.638	−2.67	−7.13 – 1.80	0.242
Osteoporosis	−6.49	−13.25 – 0.27	0.060	−6.95	−15.49 – 1.59	0.111	−0.99	−10.95 – 8.97	0.845	−6.53	−15.27 – 2.21	0.143	−7.82	−15.96 – 0.32	0.060
Depression	−4.33	−7.04 – −1.63	**0.002**	−7.08	−10.50 – −3.66	**<0.001**	−10.21	−14.20 – −6.22	**<0.001**	−5.42	−8.92 – −1.92	**0.002**	−5.21	−8.46 – −1.95	**0.002**
Anxiety	−7.06	−9.21 – −4.90	**<0.001**	−8.21	−10.94 – −5.48	**<0.001**	−5.67	−8.85 – −2.49	**<0.001**	−6.59	−9.38 – −3.80	**<0.001**	−4.70	−7.29 – −2.10	**<0.001**

Notes: Bold values indicate statistically significant associations ($p < 0.05$).

Combined NSP exerts a substantial, independent negative impact on QoL, with the most profound decrement observed in the physical health domain (β = −8.14, p < 0.001). This strong association is corroborated by a 2021 cohort study by Bier et al, which found that concurrent NSP was the strongest predictor of poor physical functioning (β = −7.90, p < 0.001) compared to pain in either region alone, underscoring the synergistic disability caused by multi-site musculoskeletal pain.[21] The significant reduction in overall QoL (β = −6.83, p < 0.001) and social relationships (β = −3.18, p = 0.013) aligns with research by Genebra et al (2022), which reported that individuals with chronic neck-shoulder pain had significantly lower SF-36 social functioning scores (mean difference: −12.4 points, p<0.01) and were three times more likely to report social participation restrictions (OR=3.1, 95% CI: 1.8–5.2).[22] The borderline association with the psychological domain (β = −2.03, p=0.062) suggests a complex relationship that may be influenced by coping mechanisms. A recent Saudi Arabian study by AlOtaibi et al (2023) found that while 68% of patients with chronic musculoskeletal pain reported clinical anxiety scores (HADS≥8), only 42% received a depression diagnosis (p<0.05), potentially reflecting different manifestations of psychological distress in this population.[23] Collectively, these findings highlight that combined NSP is not merely a localized symptom but a pervasive condition that disrupts multiple facets of well-being, necessitating a holistic, multidisciplinary management approach.

Age was a significant factor for NSP and modestly associated to better psychological and social QoL scores. A cross-sectional study in Japan found that NSP was more prevalent among females (56.0%) compared to males (33.6%) and was associated with lower physical and mental QoL scores among individuals in their 40s and 50s.[24] A five-year French study also showed rising incidence with age, especially in women.[25] Consistent with our findings, male gender was associated with better physical health in neck pain and improved physical (β = 3.72) and environmental (β = 2.15) QoL in shoulder pain cases. A similar study conducted in China reported a higher impact among females (44.4%) compared to males (36.7%), attributing the difference to factors such as poor posture and psychological stress.[26] A notable association found between age, gender and the prevalence of NSP. Aging leads to musculoskeletal degeneration, such as disc thinning and joint wea r, increasing vulnerability to chronic pain. In women, hormonal changes—especially reduced estrogen—lower pain thresholds and contribute to inflammation. Additionally, females are more often engaged in repetitive tasks and sedentary roles that strain the neck and shoulders. Both groups may experience higher psychological stress, which can intensify pain perception. Poor posture and reduced physical activity further compound these risks.[27,28] These observations also help contextualize the low prevalence of chronic diseases in our cohort, as the relatively young mean age of participants (29 ± 12 years) likely accounts for the lower rates of conditions such as hypertension, type 2 diabetes, and cancer.

In our analysis, higher BMI was associated with poorer physical, psychological, and environmental health in neck pain, and with reduced physical and psychological health in shoulder pain. Higher BMI increases mechanical stress and inflammation, intensifying NSP and limiting mobility. It also raises the risk of anxiety and depression through body image concerns and social stigma, worsening pain perception and reducing physical activity.[29] Together, these factors impair physical and psychological health, lowering overall QoL. However, regular physical activity significantly enhanced all QoL domains, particularly overall QoL (β = 7.14). A 2023 Saudi random control trial showed that combining exercise with ergonomic adjustments improved functional disability (p = 0.001), reduced work stress (p = 0.001), and enhanced QoL (p = 0.012), compared to ergonomic changes alone.[30] Likewise, a 2024 US study found that engaging in aerobic activity was associated with a 65% reduction in the odds of poor HRQoL (OR=0.35, 95% CI: 0.21–0.57), while muscle-strengthening activities were related to a 50% reduction (OR=0.50, 95% CI: 0.26–0.98) in individuals with NSP.[31]

Economic and regional disparities also played a role. Higher income consistently improved all QoL domains. Participants earning 5,000–10,000 SAR reported better physical (β = 3.68), psychological (β = 3.24), social (β = 4.99), and environmental (β = 4.28) health, with even better results seen in those earning over 15,000 SAR. This aligns with established evidence that higher income facilitates better healthcare access,[32] reduces financial stress,[33] supports healthier lifestyles,[34] and provides safer living and working environments—factors that collectively enhance pain management and overall well-being.[35,36] However, contrasting evidence from a German study found that income explained less than 2% of variance in health-related QoL among chronically ill patients.[37] It may stem from the country's

universal healthcare and robust social support systems, which buffer income-related disparities and make illness severity and social support stronger QoL determinants.

According to our findings, psychological comorbidities such as depression and anxiety significantly worsened all QoL domains. A 2025 US study demonstrated that adults with existing chronic pain were 3.4 times more likely to be treated for depression (22.4% vs 6.6%) and 2.9 times more likely for anxiety (24.5% vs 8.5%) compared to pain-free individuals.[38] This suggests that depression and anxiety not only worsen existing NSP but also increase vulnerability to developing it. On one hand, psychological distress amplifies pain perception through neurobiological mechanisms (eg, reduced serotonin/norepinephrine impairs pain inhibition,[39] and chronic stress increases muscle tension by 27–33%).[40] On the other hand, persistent NSP contributes to depression and anxiety via neuroinflammation (eg, elevated IL-6 levels),[41] activity limitations, and socioeconomic strain.[42]

Geographic disparities also emerged in participants from northern and southern regions. Rural residents exhibited poorer physical and environmental QoL metrics, consistent with a 2024 systematic review documenting elevated musculoskeletal risks in rural populations (shoulder pain OR = 1.42; general musculoskeletal pain OR = 1.26).[43] The disparities stem from three key factors: (1) occupational demands, with agricultural/construction jobs (43% rural vs 28% urban) increasing cervical spine load by 3.2-fold;[44] (2) healthcare access limitations, as central regions contain 67% of pain specialists[45] while rural areas require 2.8-hour average travel times to clinics;[46] and (3) environmental exposures, with 38% greater daily heavy lifting and 2.1 times higher whole-body vibration in rural areas. These findings align with the study of Global Burden of Disease reporting 19% greater neck pain disability burdens in economically disadvantaged regions,[47] underscoring the need for region-specific preventive strategies.

Pain duration was a major determinant of QoL. Pain lasting over a year was strongly associated with reduced physical health ($\beta = -7.53$), while even durations under six months showed significant effects ($\beta = -5.53$). These findings support the biopsychosocial model of chronic pain, where persistent nociception leads to central sensitization and functional decline.[48] Notably, neck pain predominantly affected psychological health through stress-mediated muscle tension and cervicogenic headaches,[49] while shoulder pain impaired social and environmental QoL by limiting functional independence.[50] These duration-dependent and domain-specific effects emphasize the need for early, targeted interventions addressing both physical and psychosocial dimensions of chronic NSP.

Interestingly, coffee consumption was positively associated with physical QoL in individuals with neck ($\beta = 2.22$) and shoulder pain ($\beta = 2.08$). These findings align with a large Spanish cohort study (n=11,423) where habitual coffee drinkers (≥3 cups/day) demonstrated significantly better mental health scores (mean difference: 4.2 points, 95% CI: 2.1–6.3) on the SF-36 mental component summary compared to non-drinkers. The observed benefits may stem from caffeine's adenosine receptor modulation, which exhibits transient analgesic and mood-enhancing effects.[51] The observed benefits may stem from caffeine's adenosine receptor modulation, which exhibits transient analgesic and mood-enhancing effects.[51] A 2018 Korean longitudinal study (N = 5,687) further supported this association, reporting that moderate coffee consumption (2–3 cups/day) associated with 23% lower odds (OR = 0.77, 95% CI: 0.64–0.93) of developing depression over 5-year follow-up.[52]

This study's findings highlight the need for clinicians to adopt an integrated, multidisciplinary approach when managing chronic NSP, addressing not only physical symptoms but also mental health, lifestyle, and socioeconomic factors. Early screening for anxiety, depression, and prolonged pain duration should be prioritized, while individualized treatment plans combining medical, psychological, and behavioral interventions can help improve patients' overall QoL and functional outcomes. These findings support Saudi Vision 2030's health goals by calling for workplace ergonomic reforms (eg, device-use guidelines) and integrated pain clinics combining physical/mental healthcare. Early intervention programs targeting high-risk groups (sedentary workers, rural residents) could reduce disability burdens by 18–22% based on our population-attributable fractions. Overall, despite the relatively favorable mean QoL score (69 ± 21), which suggests that most participants experienced mild pain, chronic or multi-site NSP can still substantially disrupt multiple domains of QoL, highlighting the importance of early and holistic management strategies. Future studies should also include the assessment of pain intensity using validated scales such as the Visual Analogue Scale (VAS) or the Numeric Pain Rating Scale (NPRS), to better quantify symptom severity, guide treatment stratification, and evaluate long-term outcomes.

The cross-sectional design of the study could lead to selection bias, limiting generalizability, especially among populations without internet access. The sample may have been disproportionately drawn from certain regions of Saudi Arabia, limiting generalizability to the entire national population. Additionally, the absence of clinical assessments and unmeasured factors like occupational or ergonomic risks may affect the accuracy and completeness of the findings.

Conclusion

This study highlights the significant impact of chronic NSP on the QoL among adults in Saudi Arabia, with prolonged pain duration, mental health comorbidities, and socioeconomic factors emerging as key determinants. Physical, psychological, social, and environmental well-being were all adversely affected, particularly in individuals with pain lasting more than one year and those experiencing anxiety or depression. However, the mean QoL score of 69 indicates that, on average, participants experienced only mild symptoms, with relatively limited impact on overall daily functioning. Sociodemographic factors including age, gender, education, income, and employment status were closely linked to QoL outcomes. Specifically, higher education levels and being employed were associated with better QoL, while lower education and unemployment were linked to poorer outcomes. Behavioral factors, including BMI, physical activity, and screen time—also played critical roles in influencing QoL outcomes. These findings underscore the urgent need for early diagnosis, integrated multidisciplinary management, and public health strategies that address both clinical and lifestyle-related contributors to musculoskeletal pain. Given the use of convenience sampling, the findings are specific to this study population and may not be generalizable to all adults in Saudi Arabia. Future research should adopt longitudinal and qualitative approaches to evaluate intervention outcomes and explore patient-centered care models for more effective pain management.

Institutional Review Board Statement

This study was approved by Jazan University's Scientific Research Ethics Committee Jazan University (Reference number: REC-45/11/1114).

Informed Consent Statement

Participants provided digital informed consent.

Abbreviations

NSP, Neck and shoulder pain; QoL, Quality of life; GBD, Global Burden of Disease; DALYs, Disability-adjusted life years; WHOQOL-BREF, World Health Organization Quality of Life; COPD, Chronic Obstructive Pulmonary Disease; SAR, Saudi Riyal; BMI, Body mass index.

Data Sharing Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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