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ORIGINAL ARTICLE

Interdependence of neck pain prevalence with neck disability and sleep quality among Nigerian seamstresses

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Abstract

Seamstresses, due to the nature of their profession, often face ergonomic challenges stemming from prolonged sitting, repetitive motions, and the adoption of awkward postures. These factors could affect sleep quality and contribute to an increased risk of musculoskeletal disorders, including but not limited to, carpal tunnel syndrome, neck and back pain, and shoulder strain. It seems necessary, therefore, to evaluate the association of neck pain prevalence with neck disability and sleep quality among Nigerian seamstresses. 169 participants of ages 18 and above with varying levels of experience were recruited using a convenience sampling technique. The measure employed has 4 sections containing socio-demographics, Nordic Musculoskeletal Questionnaire, the Sleep Quality aspect of the Pittsburgh sleep quality index and Neck Disability Index. Descriptive statistics such as frequencies, and percentages were used to summarize the data and provide an overview of the respondents' prevalence of neck pain. Pearson's Chi square was used to test the association of neck pain prevalence with sleep quality and neck disability at 0.05 alpha level. The lifetime and 12-month prevalence of neck pain were 83.4% and 73.4% respectively. 39 (23.1%) reported good sleep quality. About 45.6% of the respondents' reported no neck disability. There is no statistically significant relationship between neck disability and the prevalence of neck pain (χ^2 = 6.416, p = 0.601). However, a significant relationship was observed between the prevalence of neck pain and sleep quality (χ^2 = 4.411, p = 0.036).Seamstresses have a high prevalence of neck pain due to long hours of static positions. Poor sleep quality was also associated with neck pain. Nonetheless, there was no significant relationship between neck disability and pain prevalence, although, sleep quality, pain intensity, and neck disability are interconnected in the present study.

Keywords: sleep quality · musculoskeletal disorders · physical disability

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Introduction

Neck pain is a complex condition with multiple contributing factors, and it represents a significant issue in today's society (Kazeminasab et al., 2022). While it may not be the most prevalent musculoskeletal disorder, its impact is very substantial (Cohen, 2015). Neck pain is the presence of discomfort in the region bordered inferiorly by the inferior spinous process of T1, extending laterally to the outer margins of the neck, and superiorly by the superior nuchal line. According to the Global Burden of Disease report in 2015, neck pain ranked as one of the primary contributors to disability worldwide across numerous countries. Seamstresses have consistently been found to have high prevalence of neck pain. This could be attributed to the overload of muscles, skeleton and connective tissue system at work and monotonous hand movements. Seamstress for example, must lean forward to focus on the work area, simultaneously using their hands to guide the fabric towards the needle because of continuous precision and repetitive movement required while operating the sewing machine, especially in low technologically developed countries such as Nigeria. Working as a seamstress encompasses repetitive tasks such as cutting, sewing, embroidery, pressing, and finishing work. These activities often require the seamstress to maintain a posture with a curved back and a bent head and neck over the sewing machine (Mekonnen et al., 2020). Prolonged periods of working in this uncomfortable posture can lead to an increase in neck pain. Furthermore, insufficient quantity and quality of sleep has been shown to be closely associated generally with the heightened prevalence of musculoskeletal pains.

Neck pain has been reported to be significantly associated with continuous work without breaks, working for more than 8 hours per day, prolonged periods of sitting in the same position, and engaging in high levels of repetitive activities among seamstress (Biadgo et al., 2021). The relationship between sleep quality and neck pain is bidirectional and closely intertwined (Kovacs et al., 2015). Poor sleep quality can exacerbate neck pain and vice versa. When individuals experience discomfort or pain in their neck, it can make it challenging to find a comfortable sleeping position, leading to disrupted sleep patterns (Carl et al., 2021). This, in turn, can result in fatigue, reduced pain tolerance, and heightened sensitivity to pain, creating a cycle of discomfort. Conversely, inadequate or disturbed sleep can also contribute to the development or worsening of neck pain (Yabe et al., 2022). Neck pain if not addressed could lead to neck disability, that is, limitations or impairments in the normal functioning of the neck, which may include restricted range of motion, difficulty with daily activities, and decreased quality of life due to pain and associated symptoms (Howell et al., 2011). Conversely, neck disability can also exacerbate neck pain. When the neck is not used optimally due to limitations in movement or strength, it can lead to muscle imbalances, increased stress on certain structures, and potentially more pain (Czępińska et al., 2023). This creates a cycle where pain and disability reinforce each other. It is worth noting that neck pain severity that is said to associate with neck disability and sleep quality is never the same across communities in the same country and neither is it the same across countries. For this reason, the interdependence of neck pain with neck disability and sleep quality may not be the same as found elsewhere. It seems necessary, therefore, to evaluate the association of neck pain prevalence with neck disability and sleep quality among Nigerian seamstresses.

Method

The cross-sectional design was adopted in this study. The study population included one-hundred and sixty-nine (169) respondents in Benin City, Edo State, Nigeria. A convenience sampling technique was employed to recruit respondents for the present study.

Inclusion criteria

1. Respondents who have been working as seamstress for at least 6 months
2. Seamstress who are above 18 years of age

Exclusion criteria

1. Seamstress with any form of neck deformity or who had a history of neck pain prior to starting work as a seamstress.
2. Seamstress-in-training (Apprentices).

Ethical approval was obtained from the Ministry of Health, Edo State, Nigeria, before the commencement of the study. The respondents were properly informed about the purpose of the study and all consented to participate voluntarily after which they signed a written informed consent. Nordic Musculoskeletal Questionnaire was used to assess neck pain. The Nordic Questionnaire for musculoskeletal symptoms covers various aspects, including demographic details, overall health, musculoskeletal discomfort, work-related elements, and leisure-time physical activity. It aims to gauge

the frequency, severity, and locations of pain or discomfort in specific body regions like the neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees, and ankles/feet. Additionally, it gathers data on how often symptoms occur and their duration. Moreover, Neck Disability Index (NDI) was employed to measure neck disability. The NDI, comprising 10 items related to pain intensity and daily activities, assesses neck-specific disability. Each section involves 6 statements scored from 0 to 5, culminating in a total score representing the degree of disability, calculated as a percentage of the maximum possible score (50). Higher percentages indicate increased disability. More so, Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. The PSQI is a brief self-report questionnaire to measure sleep quality. The PSQI consists of 24 questions or items that range from 0 (best) to 3 in seven different aspects (worst). These seven variables can be broadly divided into sleep disruption factors and sleep efficiency factors (sleep quality, sleep latency, sleep duration, and habitual sleep efficiency) (sleep disturbance, use of sleep medications, and daytime disturbance). All the measures have been found to have good validity and reliability in the literature (Odole et al., 2011; Ji-Rong et al., 2012; Zhang et al., 2020; Chairani, 2020). All the measures were administered face to face by the researchers to the respondents and the rate of retrieval was 100%.

Descriptive statistics such as frequencies, and percentages were used to summarize the data and provide an overview of the respondent's prevalence of musculoskeletal pain. Inferential statistics of Pearson's Chi square was used to determine the relationship between prevalence of neck pain with sleep quality and neck disability. Statistical significance was accepted for $\alpha = 0.05$. All the analyses were performed using the IBM SPSS Statistics, version 20.0.

Results

Table 1 shows the demographic data of the respondents. The age of the respondents ranged from 19 to 56 years, with a mean age of 35.94 ± 8.39 years. The average daily working duration was 9.68 ± 0.74 hours, within a range of 7 to 11 hours. Respondents had between 1 and 33 years of working experience, with a mean of 10.39 ± 7.36 years.

Table 1. Demographic characteristics of the respondents

Variable	Category	Frequency
Ethnicity		
Esan	11	6.5
Delta	8	4.7
Benin	126	74.6
Hausa	1	0.6
Yoruba	2	1.2
Igbo	1	0.6
Others	20	11.8
Marital status		
Single	53	31.4
Married	97	57.4
Divorced	2	1.2
Widow	16	9.4
Widower	1	0.6
Educational level		
Primary	19	11.2
Secondary	62	36.7
Tertiary	88	52.1
	Mean ± SD	Min. – Max.
Age (years)	35.94 ± 8.39	19 – 56
Working duration (hours)	9.68 ± 0.74	7 – 11
Working experience (years)	10.39 ± 7.36	1 – 33

The lifetime prevalence of neck pain among the respondents was 141 (83.4%) while the 12 month and 7 days prevalence were 124 (73.4%) and 71 (42.0%) respectively. This is reflected in Figure 1 (a, b, c).

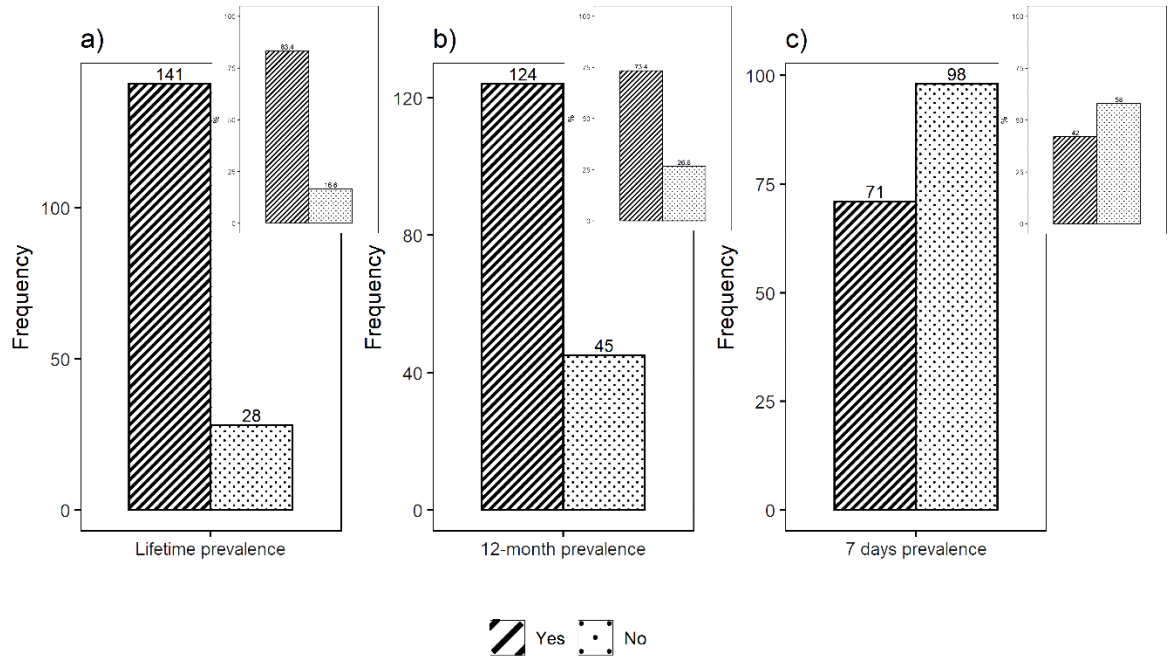

Figure 1. Prevalence of neck pain among respondents

As shown in Table 2, 54 (32.0%) of the respondents reported to have > 7 hours sleep duration while 12 (7.1%) reported to have a sleep duration of < 5 hours which represents the least representing group. Regarding sleep latency, 60.0 respondents (35.5%) reported experiencing severe sleep latency, while the group with the least representation consisted of 28 (16.6%) reporting mild sleep latency. More than half of the respondents 122 (72.2%) reported to have a very good sleep quality while 9.0 (5.3%) reported to have a fairly bad sleep quality. Majority of the respondents 60.0 (35.5%) reported to have a sleep efficiency > 85% while the least reported sleep efficiency between 75% - 84% were reported by 28.0 (16.6%) of the respondents. Overall, 130 (76.9%) respondents reported poor sleep quality and 39 (23.1%) reported good sleep quality.

Table 2. Sleep habits of the respondents

Variable	Category	Frequency
Sleep duration		
>7 hours	54.0	32.0
6-7 hours	40.0	23.7
5-6 hours	63.0	37.3
<5 hours	12.0	7.1
Sleep Latency		
Normal	60.0	35.5
Mild	28.0	16.6
Moderate	39.0	23.1
Severe	42.0	24.9
Sleep Quality		
Very good	122.0	72.2
Fairly good	38.0	22.5
Fairly bad	9.0	5.3
Very bad	0.0	0

Table 2 (continued). Sleep habits of the respondents

Variable	Category	Frequency
Sleep Efficiency		
>85%	60.0	35.5
75% - 84%	28.0	16.6
64% - 74%	39.0	23.1
< 65%	42.0	24.9
Total Sleep Quality		
Poor	130	76.9
Good	39	23.1

Table 3 shows the neck disability index of the respondents. 77 (45.6%) reported no disability, 56 (33.1%) reported mild disability, 29 (17.2%) reported moderate disability, 6 (3.6%) and 1 (0.6%) reported severe and complete disability.

Table 3. Neck disability index of the respondents

Variable	Frequency	Percentages
No disability	77	45.6
Mild disability	56	33.1
Moderate disability	29	17.2
Severe disability	6	3.6
Complete disability	1	0.6

From Table 4, the results of the Chi-square test revealed the association of neck pain prevalence with neck disability and sleep quality. The analysis indicated that there is no statistically significant relationship between neck disability and the prevalence of neck pain (χ^2 = 6.416, p = 0.601). However, a significant relationship was observed between the prevalence of neck pain and sleep quality (χ^2= 4.411, p = 0.036).

Table 4. Association of neck pain prevalence with sleep quality and neck disability

Variable	Prevalence of neck pain				
	Yes	No	χ^2	Cramer's V	p-value
Neck disability					
No disability	65	12	6.416	0.195	0.601
Mild disability	46	10			
Moderate disability	23	6			
Severe disability	6	0			
Complete disability	1	0			
Sleep quality					
Good	35	4	4.411	0.162	0.036*
Poor	107	23			

While a chi-square test revealed a significant association between neck pain and sleep quality, this relationship was no longer significant after adjusting for age and working duration in the binary logistic regression model. This indicates that age and/or working duration may confound the relationship between neck pain and sleep quality. This is shown in Table 5.

Table 5. Binary logistic regression between prevalence of neck pain and sleep quality

Variable						95% C.I for Exp(B)	
	B	S.E.	Wald	Sig.	Exp(B)	Lower	Upper
Neck pain	0.546	0.581	0.882	0.348	1.726	0.553	5.392
Age	-0.030	0.022	1.809	0.179	0.970	0.928	1.014
Working duration	0.007	0.256	0.001	0.977	1.007	0.610	1.663
Constant	2.163	2.681	0.651	0.420	8.696		

Discussion

It was observed from the present study that there is no significant relationship between neck disability and the prevalence of neck pain among Nigerian seamstresses. However, a significant relationship was observed between the prevalence of neck pain and sleep quality. This is inconsistent with findings from a study by Czepinska et al. (2023), where there was a significant weak positive correlation between neck pain and neck disability but no significant relationship was observed between the prevalence of neck pain and sleep quality. Equally, a study by Yabe et al., (2022) showed that sleep disturbance was significantly associated with neck pain, which was worse with a longer duration of sleep disturbance. Pre-existing sleep problems were strongly correlated with neck pain in the present study. Though limited studies have been conducted in the past to bring forth the relationship between sleep quality and neck pain, this study has identified a connection between sleep disturbances and neck pain. Furthermore, Artner et al. (2013) reported that approximately 42.22% of people with neck pain presented with sleep disturbance associated with the onset of neck pain, and the association was stronger as the duration of sleep disturbance increased. In the present study, the researchers believe that the ability of the seamstresses to tolerate pain and still go on with their activities of daily living is a possible reason why no relationship was found between the neck pain the study participants experienced and neck disability. This shows that the biological, economic and psychological factors, play a role in seamstresses' continuous participation in activities of daily living despite experiencing neck pain. The association between neck pain and sleep quality could be attributed to the sleeping habits of the seamstresses which could worsen or reduce the pain. These habits could include but not limited to sleeping using an appropriate pillow or not, getting maximum hours of sleep to enable body recovers or not. The interdependence between sleep quality and the prevalence of musculoskeletal pain involves a complex interplay of biological and psychological mechanisms. An increase in cytokine production and inflammatory mediators can lead to sleep disturbances (Andreucci et al., 2020; Engert & Besedovsky, 2025). Conversely, poor sleep can cause daytime tiredness and fatigue, which may heighten pain perception (Finan et al., 2013; Andreucci et al., 2020).

Moreover, this study also showed that there was no significant relationship between sleep quality and neck disability. This is in contrast to a study by Muñoz-Muñoz et al., (2012) where a group of subjects who exhibited moderate neck disability, 68% reported poor sleep quality, showing an association between sleep quality, pain intensity and neck disability suggesting an interaction between these factors. The study by Munoz Munoz et al, included individuals who had myofascial trigger points and neck pain, and the presence of myofascial trigger points was found to contribute to the mechanical neck pain causing aches and disrupting the sleep pattern of respondents. In the present study, feedbacks from the respondents revealed that the major factor affecting sleep quality and pattern, was not neck disability, but the sleepless nights spent working, the excessive latent period they spent watching movies and using the internet, the awkward positions assumed while asleep, this shows that although in pain, the participants do actively participate in their daily activities.

Conclusion

The present study has revealed a significant association between sleep quality and neck pain prevalence. However, neck disability was found to be independent of the prevalence of neck pain. This study, therefore, highlights the necessity for targeted interventions for neck pain aimed at improving sleep quality among seamstresses. This would enhance the well-being and productivity of seamstresses in the garment industry, thereby fostering a healthier and more sustainable work environment for them.

Limitations

The findings of this study are limited by the size and representativeness of the sample, as well as the use of self-reported measures to assess variables, particularly neck disability, which may be subject to recall bias. Furthermore, a post-hoc power analysis was conducted using the observed effect size (w = 0.161), a significance level of 0.05, and a sample size of 169. The achieved power for detecting the association between neck pain and sleep quality using the Chi square test (df = 1, χ^2 = 4.411) was approximately 55%. This suggests that the study may have been underpowered to detect small effect sizes.

Future studies should aim to recruit a larger and sample size across multiple locations, and employ probability sampling methods to improve representativeness of the sample. Additionally, clinician-administered evaluations of the cervical spine should be integrated alongside self-reported questionnaires to help provide a more comprehensive assessment of neck disability.

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Competing interests

The authors have declared that no competing interests exist.

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