

Work-related musculoskeletal pain and characteristics of brewery workers in southwest Nigeria- a pilot study

Dor musculoesquelética relacionada com o trabalho e características dos trabalhadores de cervejaria no sudoeste da Nigéria - Um estudo-piloto

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ABSTRACT | BACKGROUND: Work-related musculoskeletal pain (WMSP) is a common symptom associated with work-related musculoskeletal disorders. It is aggravated by poor lifting techniques, inappropriate ergonomics, repetitive movements and awkward posture during the course of performing one's duties. Variables such as age, marital status, work experience, alcohol, smoking and exercise habits have been found to play major roles in WMSP prevalence among different categories of workers. **OBJECTIVES:** This study focused on the lifetime, 12-month and point prevalence of WMSP in association with the socio-demographics, lifestyle and work-related characteristics of brewery workers in Osun state, Southwest, Nigeria. **METHOD:** A descriptive research design was utilized, and a total of eighty-nine (89) participants were recruited with strict adherence to the inclusion criteria. A 28-item questionnaire was developed to obtain specific information on the prevalence and pattern of WMSP, while anthropometric measurements (weight and height) of each participant were measured. Collected data were organized and analyzed using descriptive statistics and Chi square test. **RESULTS:** The lifetime, 12-month and point prevalence of WMSP among the participants were 96.6%, 93.3%, and 57.3% respectively. The low back was the mostly affected body region. Significant associations exist between each of the lifetime, 12-month and point prevalence of WMSP and participants' marital status. Furthermore, a significant association exists between the point prevalence of WMSP and participants' age. **CONCLUSION:** It was concluded that there was a high prevalence of WMSP among brewery workers in Osun state, Southwest, Nigeria.

KEYWORDS: Work-related musculoskeletal pain. Work-related musculoskeletal disorders. Lifetime prevalence. 12-month prevalence. Point prevalence. Brewery workers.

RESUMO | CONTEXTO: A dor osteoarticular relacionada ao trabalho (DORT) é um sintoma comum associado a perturbações musculoesqueléticas relacionadas com o trabalho. É agravada por más técnicas de elevação, ergonomia inadequada, movimentos repetitivos e postura incômoda durante o exercício das suas funções. Variáveis como a idade, o estado civil, a experiência profissional, o álcool, o tabagismo e os hábitos de exercício têm desempenhado um papel importante na prevalência das DORT entre as diferentes categorias de trabalhadores. **OBJETIVOS:** este estudo centrou-se na prevalência ao longo da vida, de 12 meses e pontos das WMSP em associação com as características socio-demográficas, de estilo de vida e de trabalho dos trabalhadores da indústria cervejeira no Estado de Osun, sudoeste, Nigéria. **MÉTODO:** um design de pesquisa descritiva foi utilizado, e um total de oitenta e nove (89) participantes foram recrutados com estrita adesão aos critérios de inclusão. Foi desenvolvido um questionário de 28 itens para obter informações específicas sobre a prevalência e o padrão de DORT, enquanto medições antropométricas (peso e altura) de cada participante foram medidas. Os dados coletados foram organizados e analisados usando estatísticas descritivas e teste de Qui quadrado. **RESULTADOS:** A prevalência de DORT ao longo da vida, 12 meses e pontos entre os participantes foi de 96,6%, 93,3% e 57,3%, respectivamente. As costas baixas eram a região corporal mais afetada. Existem associações significativas entre cada uma das idades, a prevalência de 12 meses e pontos das DORT e o estado civil dos participantes. Além disso, existe uma associação significativa entre a prevalência pontual de DORT e a idade dos participantes. **CONCLUSÃO:** concluiu-se que havia uma elevada prevalência de DORT entre os trabalhadores da cervejaria no Estado de Osun, sudoeste, Nigéria.

PALAVRAS-CHAVE: Dor musculoesquelética relacionada com o trabalho. Perturbações musculoesqueléticas relacionadas com o trabalho. Prevalência. Prevalência de 12 meses. Prevalência de pontos. Trabalhadores da cervejaria.

Introduction

One of the global issues contending with workers' safety is the problem of work-related musculoskeletal disorders (WMSDs); which are injuries affecting the human musculoskeletal system¹. There is no doubt that one's musculoskeletal health is critical to maintaining economic, social, and functional independence. Efficient musculoskeletal health is also central to physical activity, an essential strategy to reduce risk of different non-communicable diseases. Work-related musculoskeletal pain (WMSP) is a common symptom of WMSDs, manifesting as pain in the neck, upper back, lower back, upper and lower extremities²⁻³. This ultimately affects the quality of an individual's life, often resulting in sick leave, decreased morale and early retirement, which would certainly impose a major economic burden on its sufferers⁴.

Industrial workers are often concerned with the creation of products through a string of multiple and tasking processes. This set of workers usually have a higher probability of developing WMSP due to repetitive physical movements and assumption of uncomfortable postures during work⁵. The Nigerian brewing industry is providing countless number of direct and indirect employment opportunities for the society, nevertheless, the complex nature of work-related activities of brewery workers ranging from consistent lifting of equipment, mixing of different ingredients, cleaning, equipment maintenance, operation of hand-powered tools and repeated packaging of their products, could predispose brewery workers to WMSP in the long run.

Specific characteristics such as; age, gender, marital status, educational qualification, body mass index, alcohol, smoking and exercise habits, work posture, length of professional experience, and non-observance of break periods during work tend to play important roles in the prevalence of WMSP among different occupational groups, although these characteristics are not explicitly regarded as the causes of WMSP⁶⁻⁸. In spite of extensive researches on WMSP vis-à-vis different working populations, few studies have explored WMSP with respect to brewery workers in Nigeria and Africa as a continent. This current situation is unsatisfactory considering how WMSP could affect these workers negatively. The timing of this study is perfect going by the prediction that African beer market would grow faster than any other region

between 2015-2020, as a result of rising population, urbanization, and increased gross domestic products⁹. This prediction can only be fulfilled if the workforce of the African brewery sector is in optimum condition with respect to its health. It is therefore necessary to estimate the lifetime, 12-month and point prevalence of WMSP among brewery workers in Osun state, Southwest, Nigeria in association with their socio-demographics (age, marital status and educational qualification), lifestyle (alcohol, smoking and exercise habits), and work-related characteristics (length of professional experience and non observance of break periods during work).

Methods

This study was carried out between June 3rd, 2019 and August 2nd, 2019 at a privately-owned brewing company situated in Osun state, Southwest, Nigeria, and a descriptive research design was utilized. After ethical clearance by the University of Benin, Nigeria, eighty nine (89) brewery workers were recruited using a purposive sampling method, which involved the following inclusion criteria; full-term employees, with a minimum of one (1) year working experience, staff members who were involved in operating machinery, lifting of objects, prolonged posture. Exclusion criteria included; individuals who were involved in other occupations (farming, bricklaying, welding, etc.) that could also predispose them to having WMSP, individuals with a history of severe musculoskeletal disorders (such as kyphosis, scoliosis). Individuals with rheumatoid arthritis, previous musculoskeletal surgeries (such as joint replacement) were also excluded from the study.

The research objectives were initially explained to all participants, and they were assured of the confidentiality of their responses before obtaining their informed consents. The information on the prevalence and pattern of WMSP were obtained using a self-administered questionnaire. This questionnaire consists of seven sections, with a total of 28 items. Section A (items 1-9) involved information on the biographic data of the respondents while section B (items 10-12) was meant for respondents' lifestyle (exercise, smoking and alcohol habits). Section C (items 13-16) focused on respondents' professional experience while section D (items 17-18) involved information on the work posture mostly adopted by

respondents. Section E (items 19-25) was meant for the prevalence of WMSP while section F (items 26-27) focused on time off work. Section G (item 28) involved work-related stress. Prior to the commencement of the study, face validity and content validity were adopted to test the validity of the questionnaire, while its reliability was established through test-retest method involving ten (10) brewery workers. The value ($r = 0.85$) indicated that the questionnaire was good enough for the purpose of data collection as planned by the researcher. The anthropometric measurements (weight and height) of each participant were subsequently measured with a bathroom weighing scale and stadiometer respectively.

Data analysis

Data were analyzed descriptively and inferentially using IBM SPSS Statistics 20.0. The descriptive statistics of mean, frequency, standard deviation, and percentages were used to analyze the data, while Chi square test was used to determine if there were associations between the prevalence of WMSP (lifetime, 12-month and point) and socio-demographics, lifestyle, and work-related

characteristics of the participants. The level of significance was set at $p \leq 0.05$.

Results

The age range of the participants was between 20-59 years, with the largest proportion (41.6%) in the 30-39 group. Seventeen participants (19.1%) had Senior Secondary School Certificate (SSCE), sixty-six participants (74.2%) either had Ordinary National Diploma Certificate (OND), Higher National Diploma Certificate (HND), or Bachelor's Degree (BSc), while six participants (6.7%) had a Master's degree (MSc). The mean weight and height of the participants were $73.02\text{kg} \pm 11.63$ and $1.71\text{m} \pm 0.08$ respectively, with a mean body mass index (BMI) of $25.16 \text{ kg/m}^2 \pm 3.90$. Six participants (6.7%) do exercise regularly according to WHO's recommendations, fifty-five participants (61.8%) do take alcohol and four participants (4.5%) do smoke. Participants' mean working days was $5.73 \text{ days} \pm 0.75$. Sixty-two participants (69.7%) spent 6-8 hours on their jobs daily, while twenty-seven participants (30.3%) spent 9-11 hours on their jobs daily. Participants' mean length of professional experience is $9.16 \text{ years} \pm 6.60$. Forty-six participants (51.7%) do not observe break periods at work.

Table 1. Socio-demographics of participants

Marital Status	%	Age group	%	Educational Qualification	%
Single	18.0	20-29	16.9	SSCE	19.1
Married	82.0	30-39	41.6	OND, HND & BSc	74.2
		40-49	29.2	MSc	6.7
		50-59	12.4		

Table 2. Lifestyle of participants

Habit	%
Exercise	6.7
Alcohol	61.8
Smoking	4.5

Table 3. Work-related characteristics of participants

Daily work duration (Hours)	Frequency	Length of professional experience (Years)	Frequency
6-8	62	1-5	25
9-11	27	6-10	41
		11-15	10
		16-20	7
		21-25	4
		26-30	1
		31-35	1

The lifetime, 12-month and point prevalence of WMSP among the participants were 96.6%, 93.3%, and 57.3% respectively. During the period of study, 7.9% of the participants experienced neck pain, while 7.9% experience upper back pain. 38.2% of the participants experienced lower back pain, while 4.5% experienced pain at the elbow region. 16.9% experienced shoulder pain, while 4.5% experienced pain at the hip region. 28.1% experienced knee pain, 7.9% experienced ankle pain, while 6.7% experienced pain in the foot.

Chi-square test was used to determine the associations between the lifetime prevalence of WMSP and participants' marital status, age, educational qualification, exercise habit, smoking habit, alcohol habit, length of professional experience, and non observance of break periods during work (table 4). These associations were found to be statistically non-significant at 0.05 level of significance except for marital status (0.025).

Table 4. Chi-square test result for the associations between lifetime prevalence of WMSP and participants' socio-demographics, lifestyle, work-related characteristics

Variable	p-value
Socio-demographics	
Marital Status	0.025*
Age	0.520
Educational Qualification	0.149
Lifestyle	
Exercise	0.636
Smoking	0.702
Alcohol	0.302
Work-related characteristics	
Length of professional experience	0.726
Non observance of break period	0.068

Chi-square test was used to determine the associations between the WMSP experienced by participants in the last twelve months and their marital status, age, educational qualification, exercise habit, smoking habit, alcohol habit, length of professional experience, and non observance of break periods during work (table 5). These associations were found to be statistically non-significant at 0.05 level of significance except for marital status (0.034).

Table 5. Chi-square test result for the associations between 12-month prevalence of WMSP and participants' socio-demographics, lifestyle, work-related characteristics.

Variable	p-value
Socio-demographics	
Marital Status	0.034*
Age	0.515
Educational Qualification	0.069
Lifestyle	
Exercise	0.495
Smoking	0.582
Alcohol	0.538
Work-related characteristics	
Length of professional experience	0.690
Non observance of break period	0.075

Chi-square test was used to determine the associations between the point prevalence of WMSP and participants' marital status, age, educational qualification, exercise habit, smoking habit, alcohol habit, length of professional experience, and non observance of break periods during work (table 6). The associations with marital status and age were found to be statistically significant at 0.05 level of significance (0.001 and 0.008 respectively), while associations with educational qualification, exercise habit, smoking habit, alcohol habit, and length of professional experience were statistically non-significant.

Table 6. Chi-square test result for the associations between point prevalence of WMSP and participants' socio-demographics, lifestyle, work-related characteristics

Variable	p-value
Socio-demographics	
Marital Status	0.001*
Age	0.008*
Educational Qualification	0.918
Lifestyle	
Exercise	0.219
Smoking	0.077
Alcohol	0.513
Work Experience	
Length of professional experience	0.752
Non observance of break periods	0.877

Discussion

This study focused on the lifetime, 12-month and point prevalence of WMSP in association with the socio-demographics, lifestyle and work-related characteristics of brewery workers in Osun state, Southwest, Nigeria. The findings from this study depict a relatively high lifetime (96.6%), 12-month (93.3%) and point prevalence (57.3%) of WMSP among the participants. These seem to be in tandem with the outcome of other related studies, although their magnitudes differ as a result of variation in locality, country, studied population and method of data collection. For instance, a study involving brewery employees in Ogun state, South West Nigeria, reported a point prevalence of work-related musculoskeletal disorders as 69%¹⁰. Similarly, another study involving bottling workers in Enugu state, South East Nigeria, reported a 12-month prevalence of work-related musculoskeletal disorders as 91.4%¹¹. Other research studies involving brewery workers in Ghana and Rwanda reported that 36.7% and 86.4% of the employees respectively, sustained one form of work-related injury or the other¹²⁻¹³. The findings of this study and other related scientific works further corroborated the submission of Morken et al., 2002 which noted a frequent work-related musculoskeletal symptoms among industrial workers, especially those involved in manual material handling, poor postures, repetitive / stationary work, and vibration, of which brewery workers form an integral part¹⁴.

Previous studies involving brewery workers did not consider the associations between the prevalence of WMSP (lifetime, 12-month and point) and socio-demographics (age, marital status and educational qualification), lifestyle (alcohol, smoking and exercise habits), and work-related characteristics (length of professional experience and non observance of break periods during work). Therefore, direct comparison could not be made with them. However, the study involving brewery workers in Ghana established a significant association between employee's educational qualification, length of professional experience, working hours and occurrence of work-related injury¹². Furthermore, the study involving bottling workers in Enugu state, South East Nigeria found a significant association between increasing prevalence of work-related musculoskeletal disorders and high grand-work organizational risk level which makes it difficult for these workers to observe their break periods¹¹.

A limitation of this study is the purposive sampling method utilized to collect data from this under-researched population to develop an initial understanding needed for a more elaborate study. The authors acknowledge that this may create a bias as some people will inherently be more likely to volunteer than others. With the use of a probability sampling method, we understand the direction of the results may change. Thus, the generalization of this results should be used with caution.

Conclusion and recommendations

It can be concluded from this study that there was a high prevalence of WMSP among brewery workers in Osun state, with the low back region mostly affected. Maintaining the same posture for long periods by the workers was the major factor contributing to the development of WMSP among the participants. It is therefore recommended that brewery workers should be enlightened on a regular basis through seminars and workshops by experts on the dangers of WMSP, and how they can be prevented. Brewery workers should also be taught correct lifting techniques and good working postures.

Author contributions

Ogundiran OO conceptualized and conducted the research. He also wrote the manuscript. Agbonlahor E supervised and guided the research in its entirety. Oke KI co-supervised and guided the research in its entirety. Ogunsanya GI analyzed the research data

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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