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Assessement of the prevalence of shoulder pains among ultrasound practitioners in Lagos state Nigeria

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Abstract

Background and Objective: Patient scanning involves awkward movements of the body including twisting and rotation of the wrist, stretching of the arms and downward pressure in the use of the transducer depending on the size of the patient, resulting in strain on the wrist, shoulder and elbow joints. The aim of this study was to evaluate the prevalence of shoulder pains among Sonographers in Lagos State Nigeria.

Materials and Methods: This was cross sectional survey which involved Sonographers selected randomly based on our inclusion criteria. Data were obtained using self-administered questionnaire. An ethical approval was obtained from the study centers, and participant's consent was properly sought. The obtained data were treated with high level of confidentiality. Data were processed and analyzed using both Excel version 2013 and Statistical Package for Social Sciences (SPSS) version 17. Statistical analyses were done using both descriptive and inferential (Chi-square) statistical tools with statistical significance set at $p<0.05$.

Results: Out of 147 subjects studied, those that had shoulder pains were 64.3% (n=95). Out of 64.3% (n=95) of the subjects that experienced shoulder pains, those within age groups 26-30 years and 36-40 years were highest 14.30% (n=21) respectively. Chi-Square value (X^2) = 33.028, degree of freedom =7, p=0.000 was noted when evaluating the relationship between age group and shoulder pains occurrence among the participants. This result revealed that Chi-Square value (X^2) = 8.580, degree of freedom =3, p=0.035, which shows that there was statistically significant relationship between workload and shoulder pains.

Conclusion: There was high prevalence of shoulder pains among sonographers in Lagos State as identified in this study. There was statistically significant relationship between the age group and workload of participants and the occurrence of shoulder pains in this study.

Keywords: sonographers, shoulder pains, ultrasound

Introduction

Ultrasound practioners are in high demand in Nigeria due to the relevance of the practice to clinical management of patients. However, the practice of ultrasound is ergonomically demanding which involve the psychological management of the patient, the ultrasonic equipment to be used, the seat and the office table for writing and the techniques to be employed in scanning, and according to Ransome [1], all these conditions place some physical and mental demands on the ultrasound practitioners. Patient scanning involves awkward movements of the body including twisting and rotation of the wrist, stretching of the arms and downward pressure in the use of the transducer depending on the size of the patient [2-3]. All these create point pressure on the ultrasound practioners resulting in strain on the wrist, shoulder and elbow just to mention a few of the body parts. Previous researches and observations in US and UK aknowledged the fact that the ultrasound practioners adopt various tortuous positions when performing scans and that they cannot relax before achieving quality diagnostic image to be interpreted in the interest of the patient [2].

The musculoskeletal symtoms reported among some ultrasound practioners are due to prolonged pressure on the transducer, abduction of shoulder, twisting of neck and trunk and tedious bending of the body [3]. Musculoskeletal injuries have been grouped into localized and diffused injuries and most of the pains in the upper arm have been associated with diffuse injury which is delicate in nature [4-8], reported high pevalence of wrist and shoulder injuries among sonographers with shoulder pains as the most prevalent, which they ascribed it to intensive workload, substandard equipment design, and lack of training and awareness among staff and employers. The bones of the shoulder are held together by various muscles, tendons and ligaments. The rotator cuff is composed of tendons which work in association with muscles to hold the ball and socket joint in place at the shoulder. It further provides mobility and strength to the shoulder joint [9]. Shoulder pain is one of the commonest muskuloskeletal pains which make people visit physicians most probably because the shoulder joint is also the most movable joint in the body [5]. Shoulder pain has numerous negative effects ranging from negative impact on personal health, limitation or inability to perform daily activities and negative impact on lifesttyle among those affected which is of great concern [10-14]. To the

best of our knowledge, there has not been any published work done to assess the prevalence of shoulder pains among sonographers in Lagos State, Nigeria. Hence, this study with the following specific objectives: To determine;

1. The prevalence of shoulder pains among ultrasound practitioners in Lagos State.
2. The relationship between age group and shoulder pain among ultrasound practitioners in Lagos State.
3. The relationship between workload and shoulder pain among ultrasound practitioners in Lagos State.
4. Whether length of time in practice is related to shoulder pain among ultrasound practitioners in Lagos State.

Materials and Methods

This is a cross-sectional survey study with study populations consisted of ultrasound practitioners in Lagos state from different professional backgrounds across all the local government areas and in both private and public health institutions. Sample sizes of 147 respondents were selected using simple random sampling technique based on the study inclusion criteria which include; only qualified health professionals who were duly registered with their professional bodies and who were in the practice of medical ultrasound in their respective institutions and are from the age limit of 21 years and above. All those that do not meet the inclusion criteria were excluded from the study. An ethical approval was obtained from the study centers, and procedure of the study was fully explained to the participants and their consent properly sought. The study used a self-administered, semi-structured questionnaire to collect data from ultrasound practitioners. McMillan and Schumacher [15], recommended a questionnaire if the researcher knows that the respondents will be in position to answer the questionnaire. Out of 300 questionnaires that were given to the respondents, only 151 were retrieved with 4 questionnaires excluded due to missing information. Thereafter, a total of 147 questionnaires were used in this study. All data obtained were treated with high level of confidentiality and used only for the purpose of this study. Data were processed and analyzed using both Excel version 2013 and Statistical Package for Social Sciences (SPSS) version 17. Statistical analyses were done using both descriptive and inferential (Chi-square) statistical tools with statistical significance set at $p<0.05$.

Results

In this cross-sectional survey study, one hundred and forty seven [147] participants met the inclusion criteria set for this study. The male to female ratio was 5.7:1 with 87.4% (n=125) male and 15.3% (n=22) female. Out of 147 subjects studied, those that had shoulder pains due to their practice were 64.3% (n=95) (Table 1).

Out of 64.3% (n=95) of the subjects that experienced shoulder pains due to their job, those within age groups 26-30 years and 36-40 years were highest 14.30% (n=21) respectively and the least were within age group 21-25 years which is 2.04% (n=3) (Table2). Chi-Square value (X^2) = 33.028, degree of freedom =7, p=0.000 was noted when evaluating the relationship between age group and shoulder pains occurrence among the participants which shows that there is a statistical significant relationship between the variables studied (Table 2).

With regard to the workload and shoulder pains occurrence among participants, those that says they attended to 1-50 patients were highest 32% (n=47) and the least were those that attend to 101-150 patients and 151 patients and above respectively, which is 3.90% (n=6) (Table 3). The same table 3 also revealed that Chi-Square value (X^2) = 8.580, degree of freedom =3, p=0.035, which shows that there is statistically significant relationship between the two variables evaluated.

Considering the length of time in practice and shoulder pains occurrence among participants, those with 1-5 years practicing experience had the highest cases of shoulder pains which was 39.5% (n=58) and the least were those that have been practicing ultrasound scan from 16 years and above 2.04%(n=3) (Table 4). Table 4 also shows that there is statistically significant relationship between the length of time of practice of ultrasound scan and the occurrence of shoulder pains among participants with Chi-Square value (X^2) =17.851, degree of freedom =3 p=0.000.

Table 1: Frequency and percentage distribution of occurrence of shoulder pains among participants

Responses	Frequency	Percentage (%)
Yes	95	64.3
No	52	35.7
Total	147	100.0

Table 2: Relationship between Age group And Shoulder pains among Ultrasound practitioners

Age Group In Years	Experiencing Shoulder Pains						
	Yes n (%)	No n (%)	Total	X^2	d-f	P-value	Remark
21-25 years	3 (2.04)	4 (2.72)	7	33.028	7	0.000	Significant
26-30 years	21 (14.30)	3 (2.04)	24				
31-35 years	14 (9.17)	11 (7.48)	25				
36-40 years	21 (14.30)	12 (8.33)	33				
41-45 years	18 (12.25)	12 (8.33)	30				
46-50 years	9 (6.12)	10 (6.80)	19				
51-55 years	5 (3.40)	0 (0.0)	5				
56-60 years	4 (2.72)	0 (0.0)	4				
Total	95 (64.3)	52 (35.7)	147				

Table 3: Relationship between workload and shoulder pains among Ultrasound practitioners

Workload	Experiencing Shoulder Pains						
	Yes n (%)	No n (%)	Total	X^2	d-f	P-value	Remark
1-50 patients	47 (32)	32 (21.80)	79	8.580	3	.035	Significant
51-100 patients	36 (24.5)	17 (11.86)	53				
101-150 patients	6 (3.90)	3 (2.04)	9				
151 and above atients	6 (3.90)	0 (0.0)	6				
Total	95 (64.3)	52 (35.7)	147				

Table 4: Relationships between length of time in practice and shoulder pains among Ultrasound practitioners

Length of time in Practice (Years)	Experiencing Shoulder Pains						
	Yes n (%)	No n (%)	Total	X^2	d-f	P-value	Remark
1-5 years	58 (39.5)	34 (23.1)	92	17.851	3	.000	Significant
6-10 years	25 (16.66)	12 (8.52)	37				
11-15 years	9 (6.10)	0 (0.0)	9				
16 years and above	3 (2.04)	6 (4.08)	9				
Total	95 (64.3)	52 (35.7)	147				

Discussion

The prevalence of shoulder pains among ultrasound practitioners in Lagos state was high as over 60% experienced shoulder pains during scanning. This is in keeping with the studies conducted by Chapman-Jones [7], Murphy and Russo [3], Canadian Society of Diagnostics Medical Sonographers [16], Gregory [17] and Magnavita *et al*. [18], Baker, [19], Feather [20], Society of Radiographers [21]. Chapman-Jones [7] documented 93.3 per cent of sonographers in West Midland who experienced shoulder pain, and over 75 percent of sonographers who experienced shoulder pains in Canada, Australian and Italy were also recounted by [16-18]. Baker [19], recounted that in every ten sonographers, eight performed ultrasound scan in pains, in which one out of five end-up with severe career injuries. This high prevalence of shoulder pains among sonographers has been ascribed to several ergonomic factors which include poor equipment design and workstation layout, poor administrative control and inadequate training and education among sonographers [3]. According to the aforementioned researchers, they advocated for change in equipment components and work practices as some sonographic outfits are too small for the staff to operate due to inappropriate available space to maneouvre both scanning and reporting system and this further worsens the akward body movement which is unfriendly to the sonographer's condition. There slight differences in our findings could be attributed to the different sample sizes studied and the geographical variations.

Young adults were more involved in the ultrasound practice in Lagos State, and majority of them experienced shoulder pains than the older ones, which might be attributed to their frequent involvement in ultrasound scan practice. The relationship between age group of participants and shoulder pains occurrence was evaluated using Chi-square and the result shows that there was a statistical significant relationship between the two variables. This is in agreement with the finding of the study conducted by, Cassou *et al*. [22]. According to them, ageing of the workforce appears to contribute to the widespread concern about chronic neck/shoulder pain and a better understanding of work activity regulation of older workers can open up new preventive prospects.

With regards to the workload and occurrence of shoulder pains among sonographers, our result showed that there is statistical significant relationship between the sonographer's workload and the occurrence of shoulder pains. This is in agreement with finding of the study conducted by Arrowsmith (6). Arrowsmith (6) established pevalence of shoulder pains among sonographers which he attributed it to intensive workload, poor equipment design, and lack of training and awareness among staff and employers.

The result of our study showed that there is statistical significant relationship between length of time of practice of ultrasound and the occurrence of shoulder pains among sonographers. This is in keeping with finding of similar study conducted in Canada by the Canadian Society of Diagnostic Medical Sonographers [16]. Their study revealed that majority of the sonographers experienced shoulder pain at one time or the other within a 4 year time of their career.

Conclusion

There was high prevalence of shoulder pains among sonographers in Lagos State as identified in this study. Male preponderance was noted. There was a statistical significant relationship between the age group of participants and the occurrence of shoulder pains in this study. There was statistical significant relationship between workload and the occurrence of shoulder pains among ultrasound practitioners in this study. The duration of practice of ultrasound scan by the participants also showed a statistical significant relationship with shoulder pains occurrence in this study.

Conflict of interest: None declared.

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