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Knowledge of Work-related Musculoskeletal Disorders Associated with Dental Practice among Clinical Students of Federal University of Allied Health Sciences Enugu, Enugu State Nigeria

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Abstract

Musculoskeletal disorders are a group of diseases that affects the muscles, bones ,joints ,ligaments, cartilages and spinal discs. This study determined the knowledge of work-related musculoskeletal disorders (WMSDs) associated with dental practice among clinical students of Federal University of Allied Health Sciences Enugu. A cross sectional survey research design was adopted for the study. The population of the study comprised 140 undergraduate clinical students of Dental Therapy Department. An all inclusive sample was adopted for the study. This comprised of 46(32.9%) males and 94(67.1%) females. The instrument used for data collection was designed by the researchers. The instrument had three sections A, B and C. Section A was basically on demographic data, section B was based on knowledge of WMSDs while section C had items on knowledge of etiologic factors for WMSDs. Frequencies and percentages were used to answer the research questions. The results revealed that 48(34.08%) were knowledgeable on WMSDs while 92(65.92%) were not knowledgeable. Gender related distribution revealed that 30(66.58%) females were knowledgeable while 18(33.42%) males were knowledgeable. In addition the finding showed that 80(57.14%) were knowledgeable while 60(42.86%) were not knowledgeable. The authors recommended that WMSDs be incorporated into the curriculum for dental therapy undergraduate programmes to ensure adequate knowledge and prevention of WMSDs.

Keywords: Knowledge, Work-related, Musculoskeletal, Disorders

Introduction

The nature of work carried out by dental therapists exposes them to musculoskeletal disorders which is disturbing. Musculoskeletal disorders are defined as a group of diseases and that affects different structures of the musculoskeletal system. These include the nerves, tendons, muscles, joints, ligaments, bones, blood vessels and supporting structures such as intervertebral discs. Muscloskeletal disorder can occur from single or cumulative trauma and cause pain or sensory disturbance in various regions of the body like the back, neck or shoulders.(Gouri and Mohammed, 2020). They can develop either as acute or chronic

conditions; the latter are common representing 30% - 40% of all the chronic diseases. The etiology of work-related musculoskeletal disorders (WMSDs) ranges from forceful or repetitive movements to poor working postures or environments, and it affects any joint and muscle compartment in the body. Individuals affected with this condition most often complain of joint and muscle tenderness, aches, pain, stiffness and swelling. (Singh & Singh, 2018).

Consequently to prevent the occurrence of these disorders, it is necessary that ergonomic principles are infused in all aspects of medical practice. This would ensure better productivity and job satisfaction among the personnel (Balaji & Dhanraj, 2017). However, for effective application of the principles of work related musculoskeletal disorders; clinical students must have good knowledge of the risk factors implicated in their occurrence and how to apply preventive measures. Work related musculoskeletal disorder principles is an applied science involving processes, procedures, and product design which ensures work efficiency and the health and safety of the worker. It involves applying theory, principles, and design in an occupational environment to ensure optimal human well-being and overall system performance (Angeline & Joseph, 2017).

The goals for the application of preventive measures for work related musculoskeletal disorder in medical practice include reduced pain and morbidities associated with medical practice, decreased stress while working, improved musculoskeletal health and vigor, increased comfort at work, increased productivity while working, career span improvement as well as improved quality of life (Shipra et al., 2015). Practices encouraging the prevention of the occurrence of these disorders include ensuring that the working stool is fashioned to support the worker in neutral posture by being fully adjustable and having a broad base and a little forward tilt in order for easy achievability of optimal access, clear visibility, and comfort while working. Others include good use of the backrest to ensure optimum lumbar support of the trunk, avoiding flexed back positions, alternating working postures to allow for muscle recovery as well as exercising including head rotations in the four (4) different planes of movement. More of these practices include looking away from work area and focusing eyes at the ceiling for some seconds, shoulder shrugging, clasping of fingers behind the occipital region of the head, interlacing fingers and turning the palms outwards etc. The use of an extra pair of hands while working which is provided by technical assistants, ensuring ergonomic considerations involving equipment/instrument design during their purchase as well as working in a well-illuminated environment with the temperature well -adjusted to promote adequate muscular blood circulation are all effective practices that could encourage the prevention of these disorders (Shipra et al., 2015).

The WMSDs are described as a wide range of degenerative and inflammatory conditions that affect the supporting blood vessels, peripheral nerves, joints, ligaments, tendons, and muscles. Such conditions could result in impairment and pain which are widely experienced at the upper extremities and the neck. At the workplace, the causes of musculoskeletal disorders (MSDs) are diverse but poorly understood.

Orhan et al. (2019) stated that biomechanical factors such as repetitive motion, strenuous efforts, extreme joint postures, and/or psychosocial factors establish the key role in work-related musculoskeletal disorders. It is functional provided that certain psychological factors are associated with musculoskeletal discomfort and may eventually provide one way to intervene to reduce MSDs. WMSDs may cause pain, slow responses, increased probabilities of accidents, reduced quality of life, and working ability. Therefore, both the individuals and the organizations should accept the fact that they are under a constant risk, and they should get ergonomic training in which they should apply at every step of their lives to be protected from WMSDs.

The WMSDs are a group of painful disorders of muscles, tendons, and nerves. Carpal tunnel syndrome, tendonitis, thoracic outlet syndrome, and tension neck syndrome are examples. For the purpose of developing injury prevention strategies, many health and safety agencies include only disorders that develop gradually and are caused by the overuse of the above constituents of the musculoskeletal system. The traumatic injuries of the muscles, tendons and nerves due to accidents are not considered to be WMSDs or are considered separately. However, there are organizations, such as the European Agency for Safety and Health at Work, that include acute traumas and fractures within the WMSDs group. (CCOHS, 2024)

Almost all work requires the use of the arms and hands. Therefore, most WMSD affect the hands, wrists, elbows, neck, and shoulders. Work using the legs can lead to WMSD of the legs, hips, ankles, and feet. Some back problems also result from repetitive activities.

Musculoskeletal disorders (MSDs) are injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs. WMSDs are conditions in which the work environment and performance of work contribute significantly to the condition; and/or the condition is made worse or persists longer due to work conditions.

In 2017, the Centers for Disease Control and Prevention's (CDC) and National Institute for Occupational Safety and Health (NIOSH) released a review of evidence for work-related MSDs. Examples of work conditions that may lead to WMSD include routine lifting of heavy objects, daily exposure to whole body vibration, routine overhead work, work with the neck in chronic flexion position, or performing repetitive forceful tasks. This report identified positive evidence for relationships between work conditions and MSDs of the neck, shoulder, elbow, hand and wrist, and back.

The Bureau of Labor Statistics of the Department of Labor defines MSDs as musculoskeletal system and connective tissue diseases and disorders when the event or exposure leading to the case is bodily reaction (e.g., bending, climbing, crawling, reaching, twisting), overexertion, or repetitive motion. MSDs do not include disorders caused by slips, trips, falls, or similar incidents. Examples of MSDs include: sprains, strains, and tears back pain, carpal tunnel syndrome and hernia (Center for Diseases Control and Prevention [CDC], 2020).

During treatment sessions, clinical students are exposed to hazards related to a strained posture which exerts a destabilizing effect on the osteoarticular system of the body, thus invariably having negative effects on the affected muscles and joints and resulting in musculoskeletal system disorders. These disorders have the propensity of adversely affecting the health and practice of those affected (Ayanniyi et al., 2016).

Studies have shown that WMSDs are related to genetic and environmental factors. This pain can be attributed to numerous risk factors including prolonged static postures, poor positioning, age, physical condition and repetitive movement. Clinical students are predisposed to pain or injury in slightly different areas of the body, depending on their tasks and positioning in relation to the patients. Most complain of these pains at the early onset of clinical practice as observed by the researchers.

In view of this, there is need to investigate the knowledge of various work – related musculoskeletal disorders that clinical students can be exposed to due to some of the etiologic factors established. The general objective of this study was to examine the knowledge of work-related musculoskeletal disorders (WMSDs) associated with dental practice among clinical students of Federal University of Allied Health Sciences Enugu. Specifically the study aimed to: determine the level of knowledge on WMSDs among the clinical studnts of Federal University of Allied Health Sciences Enugu; identify the gender with higher knowledge of WMSDs; identify their knowledge of etiologic factors for WMSDs. This research was limited to clinical students of the Department of Dental Therapy of Federal University of Allied Health Sciences Enugu.

Methods

A descriptive survey research design was adopted for this study. The population for the study comprised 140 clinical students of Dental Therapy Department of Federal University of Allied Health Sciences Enugu. The respondents comprised of 94 females and 46 males. An all-inclusive sampling technique was adopted because of the small number of the participants. The instrument used for data collection was a researcher's-developed research questionnaire on WMSDs with three sections: A, B, and C. The instrument was administered to the participants to provide their responses to all the questions on the questionnaire. The entire instrument was retrieved immediately after. The instrument for data collection was carefully scrutinized by three experts in the field to ensure face and content validity. The reliability of the instrument was established using data collected from 30 clinical students of Dental Technology Department of the University. The internal consistency of the instrument was computed using Cronbach alpha. The process yielded an overall reliability coefficient of 0.795. The data collected were categorized and analyzed according to knowledge types WMSDs, gender related knowledge on types of WMSDs and etiologic factors for WMSDs using simple frequency table and calculation of percentages. The data was also presented in an essay form for better understanding.

Results

Table 1: **Knowledge on WMSDs among the Respondents (n=140)**

Types of WMSDs	**Yes (%)**	**No Freq. (%)**
Tendonitis	70(50.00)	70(50.00)
Arthritis	40(28.57)	100(71.43)
Back pain	108(77.14)	32(22.86)
Knee Disorders	20(14.29)	120(85.71)
Fractures	10(7.14)	130(92.86)
Hip Disorders	42(30.00)	98(70.00)
Nerve Compression	44(31.43)	96(68.57)
Overall average	48(34.08)	92(65.92)

Table 1 presents the knowledge of WMSDs among the respondents. The overall average indicates that 46(34.08%) were knowledgeable while 92(65.92%) were not knowledgeable. The respondents knowledge was low as represented by 34.08%which is below 50%.

Table 2: **Gender-related knowledge of types of WMSDs (n=140)**

Types of WMSDs	Yes Males Freq.(%)	Females Freq.(%)	No Males Freq. (%)	Female Freq. (%)
Tendonitis	30(42.86)	40(57.14)	16(22.85)	54(77.14)
Arthritis	14(35.00)	26(65.00)	32(32.00)	68(68.00)
Back pain	40(37.04)	68(62.96)	6(18.75)	26(81.25)
Knee Disorders	4(20.00)	16(80.00)	42(35.00)	78(65.00)
Fractures	2(20.00)	8(80.00)	44(33.85)	86(66.15)
Hip Disorders	16(38.10)	26(61.90)	30(30.61)	68(69.39)
Nerve Compression	18(40.90)	26(59.10)	28(29.17)	68(70.83)
Overall average	18(33.42)	30(66.58)	28(28.89)	64(71.11)

Table 2 represents the gender-related knowledge on types of WMSDs among the respondents. 30(66.58%) females were knowledgeable as against 18(33.42%) males. On the other hand 64(71.11%) females were not knowledgeable as against 28(28.89%) males.

Table 3**: Knowledge on Etiologic Factors for WMSDs among the Respondents (n-140)**

Etiologic Factors for WMSDs	Yes Freq. (%)	Males Freq. (%)	Females Freq. (%)	No Freq. (%)	Males Freq. (%)	Female Freq. (%)
Continual repeatative movements	130(92.86)	40(30.77)	90(69.23)	10(7.14)	6(60.00)	4(40.00)
Fixed or constrained body positions	116(82.86)	36(31.03)	80(68.97)	24(17.14)	10(41.67)	14(58.33)
Force concentration on small parts of the body	70(50.00)	30(42.86)	40(57.14)	70(50.00)	16(22.86)	54(77.14)
Work place that doesn't allow sufficient recovery between movements	40(28.57)	10(25.00)	30(75.00)	100(71.43)	36(36.00)	64(64.00)
Vibrations	74(52.86)	30(40.54)	44(59.46)	66(47.14)	16(24.24)	50(75.76)
Poor equipment and workplace design	110(78.57)	42(38.14)	68(61.82)	30(21.43)	4(13.33)	26(86.67)
Work practices	20(14.29)	6(30.00)	14(70.00)	120(85.71)	40(33.33)	80(66.67)
Overall average	80(57.14)	28(34.05)	52(65.95)	60(42.86)	18(33.06)	42(66.94)

Table 3 represents the knowledge of etiologic factors for WMSDs among the respondents. The overall average indicates that 80(57.14%) comprising 28(34.05%) males and 52(65.95%) females were knowledgeable on the etiologic factors for WMSDs. While 60(42.86%) comprising 18(33.06%) males and 42(66.94%) females were not knowledgeable on the etiologic factors for WMSDs. This shows that respondents that have knowledge of these etiologic factors were higher and the female gender 52(65.95%) had a higher knowledge than the male gender with 28(34.05%).

Discussion

Findings from the study revealed that the knowledge of the students on WMSDs was low with lower percentage being knowledgeable and greater percentage not being knowledgeable. This result is in agreement with the findings of Benson et al. (2019). It has been shown that, when years of clinical experience are combined with informal training among practicing health personnel, there tends to be better knowledge and practice of ergonomics with an attendant low musculoskeletal system disorders' prevalence among this health personnel when compared with students. They discovered that the knowledge of WMSDs was high among practitioners .Years of experience in practice must have contributed to increase in the knowledge level.

This study revealed that the knowledge on etiologic factors for WMSDs was high with 80(57.14%) being knowledgeable and 60(42.86%) were not knowledgeable. This finding differs from the study by Wang and Zeng (2024) on the prevalence and risk factors of work related musculoskeletal disorders among nurses in China. Healthcare professionals carry out daily activities which may result in work related musculoskeletal disorders (WMSDs). The high exposure to WMSDs is directly related to their practice, which involves a variety of tasks and a high physical load. The lack of knowledge and application of ergonomics may be the cause of a high occurrence of WMSDs. They significantly affect the health of healthcare providers which have become more prevalent and a public health concern. So, working in the medical field has been identified as a major risk factor for WMSDs.

Conclusion

Conclusively, the clinical students' knowledge on WMSDs was not impressive but their knowledge on the etiologic factors for WMSDs was higher. This has established the need to fortify the students adequately with requisite knowledge on WMSDs. This will help them effectively perform their roles in healthcare delivery without painful experiences as a result of WMSDs in the course of practice.

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