Evaluating Dental Service Delivery in A Safe and Comfortable Environment among Dental Practitioners in Benin City: Ergonomics Consideration

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ABSTRACT

Background: Poor workplace ergonomics can compromise the health of dental practitioners, leading to musculoskeletal disorders, reduced productivity, early retirement, and career changes. A safe work environment requires appropriate equipment, adequate workspace, proper lighting, and correct positioning of instruments. This study assessed the magnitude of and factors associated with poor ergonomic practices among dental practitioners in Benin City.

Methods: A cross-sectional study was conducted among dental practitioners in public and private dental facilities in Benin City over six months. Data were collected anonymously using a pretested, structured Google Forms questionnaire after informed consent. The questionnaire assessed participants' demographics, knowledge, attitude, and practice (KAP) regarding dental ergonomics. Data were analyzed using SPSS version 26. Chi-square or Fisher's exact tests were used to determine associations, with statistical significance set at $p < 0.05$.

Results: Fifty-six dental practitioners participated, with 85.7% working in the public sector. Most participants were aware of ergonomics (85.7%) and the health consequences of poor ergonomics (83.9%), particularly musculoskeletal pain (72.3%). While 92.9% knew the causes of musculoskeletal disorders, knowledge of specific ergonomic principles, including stool height, lighting position, and recommended stretches, was limited. Good ergonomic practices such as maintaining proper foot position (91.1%) and using dental mirrors (87.5%) were common; however, correct operating field positioning, upright posture, and the use of dental loupes were suboptimal. Sector of practice was the only factor significantly associated with ergonomic practice ($p = 0.002$), with private practitioners demonstrating better ergonomic practices.

Conclusion: Dental practitioners demonstrated inadequate ergonomic knowledge despite generally positive attitudes and fair ergonomic practices. Sector of practice significantly influenced ergonomic practice. Strengthening ergonomics education during undergraduate dental training and promoting continuing professional development may improve ergonomic compliance and reduce work-related musculoskeletal disorders among dental practitioners.

Keywords: Dental ergonomics, dental practitioners, musculoskeletal disorders, occupational health, Benin City.

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INTRODUCTION

Hazards at the workplace are known to compromise workers' health. This constitutes major medical, social, and emotional burden.[1]

A safe and comfortable environment "is a workplace that is free from hazards and complaint with all occupational health and safety regulation".[2] This in general can result in increased productivity, improved health of the practitioner, improved psyche of practitioners, patient satisfaction, revenue for the dentist and improved years of active work.[3] These can be achieved where all the paraphernalia of equipment and materials are made available. The positioning of equipment as it affects accessibility and function, is key in this regard. Modern equipment, good lighting, adequate work space and appropriate placement help to boost professionalism in the work environment.[4]

The conditions of dental practice in a developing society such as in Benin city which is the location of the study are mainly sub optimal. The availability of electricity is epileptic, the dental surgery is usually ill equipped mostly because of the high cost of dental materials, especially for private dental practitioners. The dental chairs in some cases are old and often non-functional and as such pose a problem to the practice of proper ergonomics. Moreover, dental practice is experiencing advancing technology that aid accuracy and precision in treatment such as the use of loops, microscopes and CAD/CAM machines amongst many. These are not yet widely available and the use of outdated technology makes the practice more difficult requiring increased effort and time. All of these factors lead to lower productivity and job satisfaction, create uncomfortable working conditions and cause anxiety and stress. The lack of office space and relaxation areas further undermines practitioners morale, ultimately resulting in a negative attitude toward work and reduced overall productivity.[5] The signs of the effect of an inadequate work space are easy irritability, fatigability, absenteeism from work , loss of job satisfaction, early retirement which invariably affects income and productivity.[6] Studies have shown that effects of this compromise would lead to early retirement and even change of career due to a negative effect on the health of the caregiver.[7]

24.7% of workers have been reported to retire early due to work related hazard such as musculoskeletal disorders in the United Kingdom.[8] 2.7% has been reported to suffer bodily injury from the work place in the United States of America.[9]

Evidence shows that the level of safety attained in any work environment is affected by level of investment in safe work environment by the employers, employees and favorable government policies to ensure that every party play their own roles appropriately.[10]

The role of workplace health and safety is to ensure workers carry out their duties effectively in a way that prevents harm [11] as well as vast investment in workplace safety, Government policies as well as monitoring of employes.[10]

Many countries have regulatory bodies in place to ensure workplace safety and reduction of work place hazard. In the United State of America for example, Occupational Safety and Health Administration (OSHA) is the health and safety regulatory body responsible for workplace safety in most industries.[2]

Research has shown that optimal working conditions like quiet environment, comfortable temperature, good office furniture and good lighting conditions which prevents fatigue, anxiety and eye strain etc. have positive impact on the employees satisfaction and productivity. Similar findings were reported in a Nigerian hospital.[12]

51% and 53% of employees change jobs in order to get a more flexible work routine and work-life balance respectively. [13]

A clean work environment helps to boost the morale of the employee and gives a sense of duty. A study reports that a dirty office environment can be a put off for clients and prospective employees .[14]

Ergonomics contributes significantly to safe and comfortable environment. It can be defined as an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely.[4] Ergonomics in dentistry seeks to maintain the dentist's health. It involves maintaining the right posture during dental procedures. The postures of interest are the dentist's position, patient's position and the assistant's position.[15] Direct and indirect lighting and magnification, and achieving warm dental environment, improving efficacy of treatment, achieving treatment accuracy, adequate work space and environment, getting the right working instruments are other ergonomic considerations.[15]

Posture

The common practice during conventional dental treatment is that the dentist bends over the patient during such treatment procedures. However, this posture often negatively impacts on the dentist's health.[15]

In a normal posture, all aspects of the body should be well positioned. The head should be inclined slightly forward, oriented over the shoulders. The inter pupillary line is aligned horizontally not more than 15 to 20 degrees.[17] The torso promotes the natural curves of the spine – cervical lordosis, thoracic kyphosis, lumbar lordosis and therefore should be upright longitudinally.

Arms and wrists should be relaxed with the elbows at rest and the forearm in front of the body. The fingers and fingertips should be held at the point of treatment, at a convenient height that gives a clear vision of the procedure being performed.[17] To further foster good posture the use of headrest which prevent neck strain, relieve jaw pressure and ensure safety during procedures is needed. A good headrest should be adjustable, made up of durable materials that do not tear or brake easily with proper cushion effect for comfort. [17]

The seating height should be at knee level with the hips slightly higher than the knees the legs in a vertical and the feet flat on the floor. tilt the operator stool slightly downward and the dental chair should back rest that supports the torso in the upright position. [17]

There are three key main factors that make up the "Fire Triangle" of ergonomics these are posture, frequency and force.

Posture[16,17] refers to "non-neutral positions, where the body is not in its natural, relaxed alignment". When poor posture is assumed, it can lead to pain and discomfort over time due to excessive strain on muscles, tendons, and ligaments. In order to obviate this proper positioning of the dentist chair and the dental unit is advocated. [17]

Force refers to "excessive weight, grip, or pressure applied to the body during work tasks".[18] This can lead to muscle discomfort, especially in the hands, wrists, and arms. Frequent breaks in between activities help to prevent these untoward effects.

Frequency[18] refers to "how often the operator is exposed to performing a task". Repetitive motions or tasks can lead to musculoskeletal disorders over time. Frequent breaks and varying of tasks, is advised to minimize the risk of injury. It has been documented those good ergonomic practices help to minimize the adverse effects of musculoskeletal disorders. Deliberate positioning of the patient should be carried out to suit the dentist's natural posture. This along with intermittent movement throughout the day is important, in order to achieve best performance without any physical burden.

The dental assistants' seat should be about 4-6 inches higher than the operator's so as to have maximum access and visibility.[19] The proper positioning of the arm rest should be in front of the dental assistant. This serves as a prompt to prevent leaning forward. [19]

To enhance adequate VISION loupes or microscopes can also be used. • loupes and microscopes are used at an optimal distance between the dentist's eyes and the patient's mouth to ensure ideal posture, clear vision and focus.[20] Enhancing adequate vision is not substitute for correct posture as adverse effect may follow bad posture even with the use of loupes.

As regards instrumentation, proper placement of instruments that enable constant vision of the treatment field and proximity to the instrument tray must be done.

The dental light should be perpendicular to the working dental arch and should be placed as far above the patients head as possible while within the easy reach of the clinician.[21]

The ideal dimension of the dental clinic work space should be between 300 to 400 square feet. This would allow dentists to incorporate breaks and stretching exercises in between patient visits. This helps to prevent body pain, alleviate tension and reduce the risk of injury during work.

Studies have reported that dental ergonomics should be incorporated into the dental curriculum and continuing medical education.[22,23] This aid in ensuring better and productive practice throughout a dental practitioner's career.

The objective of the study was to evaluate the dental service delivery in a safe and comfortable environment among dental practitioners in Benin City. This study also assessed the consequences of poor ergonomic practice among dentists in Benin City.

MATERIALS AND METHODS

This cross-sectional study was carried out among dental practitioners both in private and public dental

facilities in Benin city, Edo state over a 6- month period.

A structured online questionnaire created using google forms was used to collect data anonymously from willing participants. Informed consent was duly obtained. the questionnaire was pretested before the final draft. The questionnaire elicited information on demographic characteristics, place, sector and duration of practice.

Sections were divided into Knowledge of the Dental practitioners towards dental ergonomics, Attitude of the dental practitioners towards dental ergonomics, Practice of the dental practitioners towards dental ergonomics.

Data was analyzed using SPSS 26 for frequency distribution and cross tabulation. Test of statistical significance was done using chi square statistics or Fischer exact test. Statistical significance was set at $P<0.05$. The protocol for this study was reviewed and approval granted by the Edo Specialist Hospital Ethics and Research Committee.

RESULTS

Demographic Characteristics of the Study Participants

The table 1 below highlights the demographic characteristics of the 56 study participants. Most of the participants, n = 25 (44.64%) were between the ages of 46 - 55 years, followed by 36 - 45 years, n = 21 (37.50%) while two participants (3.57%) were above 55 years.

There were 25 females (44.64%) and 31 males (55.36%). Most of the participants (82.14%) were married while the rest 17.86% were single.

The most common duration of practice was between 11 - 20 years, n = 23 (41.07%) while tertiary health care was the most common place of practice, n = 32 (57.14%). Family dentistry, n = 21 (37.50%) was the most common specialty followed by restorative dentistry, n = 14 (25%) among the participants while oral pathology, community dentistry were the least common specialties. Majority, 48 people (85.72%) of the participants worked in the public sector, 6 people (10.71%) worked in the private sector, while 2 people (3.57%) worked in both sectors.

Knowledge of the Dental Practitioners Towards Dental Ergonomics

Most of the participants, n = 48 (85.71%) said they knew what was meant by ergonomics in dentistry (Table 2). The most common response, n = 32 (66.67%) among these participants was that ergonomics in dentistry was about getting satisfactory patient outcome efficiently as a result of an optimized clinical setting.

Most of the participants, n = 47 (83.93%) said they knew the health impact of non-ergonomic environment. Musculoskeletal pains was the most common (72.34%) among the participants who knew about the health impact of a non-ergonomic environment. 52 (92.86%) of the participants said they knew the cause of musculoskeletal disorder while 38 (73.08%) of these participants knew that the surgical position mostly implicated as the cause of musculoskeletal disorders was bending and twisting.

Concerning the ideal distance from the floor to the sitting position of the dentist stool, 21 participants (37.50%) claimed they knew. Among them, 9 people (42.86%) mentioned between 9 - 17 inches while 7 people (33.33%) said between 5 - 8 inches.

Twenty (35.71%) participants claimed they knew the degree of the sight line and the light-line when attending to patients. Among them, 13 people (65.00%) mentioned that the light beam of the operating light must be perpendicular to the working mandibular/maxillary plane.

Twenty-two (39.29%) participants also said they knew the exercise that should be done between patient's appointments. Among these, 15 (68.18%) people mentioned hip flexor stretch while 3 (13.64%) mentioned both hip flexor stretch and chest stretch

Attitude of the Dental Practitioners Towards Dental Ergonomics

Most of the participants (76.79%) were of the opinion that dentists should change between sitting and standing position while seeing a patient (table 3). Similarly, 83.93% of the participants also agreed that dentists should change between sitting and standing position between patient appointments. All participants (100%) agreed that continuing dental education should be incorporated into dental school curriculum and that ergonomics should be a part of the dental curriculum. They all also agreed that the arrangement dental chair and instruments contribute to the comfort of the dentist in routine dental practice.

Practice of the Dental Practitioners Towards Dental Ergonomics

Cumulatively, 31 (55.36%) participants were of the opinion that they rarely or never oriented the operating field above the elbow level of their working hand. While 23 (41.07%) participants claimed they often oriented the operating field above the elbow level of their working hand (table 4).

Cumulatively, 51 (91.07%) participants often or always worked with their legs/ feet slightly apart and their feet flat on the floor.

Majority of the participants, n = 27 (48.21%) also often worked in the upright position and with their spine resting on the back of their stools while 21 (37.50%) rarely did so.

Four (7.14%) participants often used dental loupes during dental procedures. Two (3.57%) always used it while the rest (majority) never, n = 33 (58.93%) or rarely, n = 17 (30.36%) used dental loupes during dental procedures.

Also, many of the participants, n = 29 (51.79%) often used the dental mirror when examining maxillary teeth in order to maintain a neutral posture while working. Twenty (35.71%) always used it while a few, n = 7 (12.50%) rarely used it.

Table 1: Demographic Characteristics of the Study Participants

Characteristics	N = 56[1]
Age (years)	
25 – 35	8 (14.29%)
36 – 45	21 (37.50%)
46 – 55	25 (44.64%)
>55	2 (3.57%)
Gender	
Female	25 (44.64%)
Male	31 (55.36%)
Marital Status	
Married	46 (82.14%)
Single	10 (17.86%)
Years of practice	
1 – 10	12 (21.43%)
11 – 20	23 (41.07%)
21 – 30	19 (33.93%)
Above 30 years	2 (3.57%)
Place of Practice	
Primary health care	2 (3.57%)
Secondary health care	22 (39.29%)
Tertiary health care	32 (57.14%)
Specialty	
Family Dentistry	21 (37.50%)
Restorative dentistry	14 (25.00%)
Periodontics	7 (12.50%)
Others**	10 (17.86%)
Sector of Practice	48 (85.72%)
Public	6 (10.71%)
Private	2 (3.57%)
Both Public and Private	

[1]n (%); **Includes paediatric dentistry, oral surgery, oral medicine, orthodontics, oral pathology (1.79%), community dentistry

Level of Knowledge, Attitude and Practice (KAP) Towards Dental Ergonomics

The average knowledge score among the study participants was 2.80 ± 1.57. This implied that on average, there was a low knowledge among the participants toward dental ergonomics.

The average attitude score was 4.61 ± 0.59. This implied that the participants demonstrated a very good attitude towards dental ergonomics.

The average practice score was 4.09 ± 1.84. This indicated that the practice of the participants towards dental ergonomics had more room for improvement.

Relationship Between KAP and Demographic Characteristics Using Multiple Linear Regression

None of the demographic characteristics was related to knowledge of dental ergonomics (table 6). Also, no demographic characteristics was related to the attitude towards dental ergonomics (table 7).

With respect to practice and dental ergonomics (table 8), only the sector of practice was significantly

associated with practice of dental ergonomics (p = 0.002). Specifically, it appeared that those in the public sector were 2.6 times more likely to perform poorly relative to those in the private sector.

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Table 2: Knowledge of the Dental Practitioners Towards Dental Ergonomics

Characteristics	N = 56[1]
Do you know what is meant by ergonomics in dentistry?**	48(85.71%)
Getting satisfactory patient outcome and thereafter manage the consequential effects arising from the clinical setting	3 (6.25%)
Getting satisfactory patient outcome despite inadequacies in the clinical setting.	2(4.17%)
Getting satisfactory patient outcome efficiently as a result of an optimized clinical setting	32(66.67%)
Getting satisfactory patient outcome with improvisation of the standard clinical setting	4(8.33%)
Missing Response	7 (14.58%)
Do you know what are the health impact of a non-ergonomic environment?**	47 (83.93%)
Feeling of frustration	6(12.77%)
Musculo-skeletal pains	34 (72.34%)
Missing Response	7 (14.89%)
Do you know the popular operating posture that may cause musculo-skeletal Disorders?	
I dont know	1 (1.79%)
No	3 (5.36%)
Yes	52(92.86%)
Adequate lumbar support	3 (5.77%)
Bending and twisting	38(73.08%)
Poor lighting	1 (1.92%)
Missing Response	10 (19.23%)
Do you know the ideal distance from the floor to the sitting position of the dentist stool ?	
I don't know	9 (16.07%)
No	26(46.43%)
Yes	21 (37.50%)
Above 20mm	4 (19.05%)
Between 5 – 8 inches high	7 (33.33%)
Between 9 – 17 inches	9 (42.86%)
Missing Response	1 (4.76%)
Do you know the degree of the sight line and the light-line when attending to patients?	
I don't know	8 (14.29%)
No	28(50.00%)
Yes	20 (35.71%)
The light beam of the operating light must be oblique to the working mandibular / maxillary plane	6 (30.00)
The light beam of the operating light must be perpendicular to the working mandibular/maxillary plane	13 (65.00%)
Missing Response	1 (5.00%)
Do you know the exercise that should be done between patient's appointments?	
I dont know	14(25.00%)
No	20 (35.71%)
Yes	22(39.29%)
Chest stretch	1 (4.55%)
Hip flexor stretch	15(68.18%)
Hip flexor stretch & chest stretch	3 (13.64%)
Hip flexor stretch, chest stretch & jumping jacks	1 (4.55%)
Jumping jacks	1(4.55%)
Missing Response	1 (4.55%)

[1]n (%); **The options underneath applies to only the yes responses.

Table 3: Attitude of the Dental Practitioners Towards Dental Ergonomics.

Characteristics	Yes, N = 56[1]
Should dentists change between sitting and standing position while seeing a patient?	43 (76.79%)
Should dentists change between sitting and standing position between patient appointments?	47 (83.93%)
Should continuing dental education be incorporated into dental school curriculum?	56 (100%)
Does the arrangement dental chair and instruments contribute to the comfort of the dentist in routine dental practice?	56 (100%)
Do you think ergonomics should be a part of the dental curriculum?	56 (100%)

[1]n (%)

Table 4: Practice of the Dental Practitioners Towards Dental Ergonomics

Characteristics	N = 56[1]
Do you often orient the operating field above the elbow level of your working hand?	
Never	7 (12.50%)
Rarely	24 (42.86%)
Often	23 (41.07%)
Always	2 (3.57%)
Do you often work with your legs/ feet slightly apart and your feet flat on the floor?	
Rarely	5 (8.93%)
Often	27 (48.21%)
Always	24 (42.86%)
Do you often work in the upright position and with your spine resting on the back of your stool?	
Never	2 (3.57%)
Rarely	21 (37.50%)
Often	27 (48.21%)
Always	6 (10.71%)
Do you use dental loupes during dental procedures?	
Never	33 (58.93%)
Rarely	17 (30.36%)
Often	4 (7.14%)
Always	2 (3.57%)
Do you often use the dental mirror when examining maxillary teeth in order to maintain a neutral posture while working?	
Rarely	7 (12.50%)
Often	29 (51.79%)
Always	20 (35.71%)

[1]n (%)

Table 5: Level of KAP Towards Dental Ergonomics Among the Study Participants

Scores	n	min	max	mean	SD	Max attainable score
Knowledge	56	0	6	2.80	1.57	9
Attitude	56	3	5	4.61	0.59	5
Practice	56	1	10	4.09	1.84	10

Table 6: Relationship Between Knowledge of Dental Ergonomics and Demographics

Characteristics	Beta	95% CI[1]	p-value
Age (years)			
25 – 35	—	—	
36 – 45	-0.56	-2.6, 1.5	0.6
46 – 55	-0.78	-3.4, 1.8	0.6
Gender			
Female	—	—	
Male	-0.48	-1.4, 0.46	0.3
Marital Status			
Married	—	—	
Single	1.2	-0.75, 3.2	0.2
Years of practice			
1 – 10	—	—	
11 – 20	0.97	-1.0, 2.9	0.3
21 – 30	1.6	-0.83, 4.1	0.2
Place of practice			
Secondary health care	—	—	
Tertiary health care	-0.28	-1.3, 0.76	0.6
Specialty			
Family Dentistry	—	—	
Periodontics	1.1	-0.30, 2.5	0.12
Restorative dentistry	0.31	-0.87, 1.5	0.6
Other	-0.57	-1.7, 0.57	0.3
Sector of practice			
Private	—	—	
Public	-0.65	-2.1, 0.85	0.4

[1]CI = Confidence Interval

Table 7: Relationship Between Attitude Towards Dental Ergonomics and Demographics

Characteristics	Beta	95% CI[1]	p-value
Age (years)			
25 – 35	—	—	
36 – 45	0.02	-0.81, 0.85	1.000
46 – 55	0.19	-0.89, 1.3	0.7
Gender			
Female	—	—	
Male	0.14	-0.25, 0.53	0.5
Marital Status			
Married	—	—	
Single	0.61	-0.20, 1.4	0.14
Years of practice			
1 – 10	—	—	
11 – 20	0.80	-0.01, 1.6	0.053
21 – 30	0.78	-0.23, 1.8	0.13
Place of practice			
Secondary health care	—	—	
Tertiary health care	0.18	-0.25, 0.60	0.4
Specialty			
Family Dentistry	—	—	
Periodontics	0.02	-0.55, 0.59	1.000
Restorative dentistry	0.27	-0.21, 0.75	0.3
Other	0.06	-0.40, 0.53	0.8
Sector of practice			
Private	—	—	
Public	0.10	-0.51, 0.71	0.7

[1]CI = Confidence Interval

Table 8: Relationship Between Practice of Dental Ergonomics and Demographics

Characteristics	Beta	95% CI[1]	p-value
Age (years)			
25 – 35	—	—	
36 – 45	0.81	-1.4, 3.0	0.5
46 – 55	1.0	-1.8, 3.9	0.5
Gender			
Female	—	—	
Male	-0.43	-1.5, 0.59	0.4
Marital Status			
Married	—	—	
Single	-1.9	-4.0, 0.30	0.090
Years of practice			
1 – 10	—	—	
11 – 20	-1.8	-4.0, 0.30	0.091
21 – 30	-0.80	-3.5, 1.9	0.5
Place of practice			
Secondary health care	—	—	
Tertiary health care	-0.12	-1.3, 1.0	0.8
Specialty			
Family Dentistry	—	—	
Periodontics	0.05	-1.5, 1.6	1.000
Restorative dentistry	-0.98	-2.3, 0.29	0.13
Other	0.52	-0.72, 1.7	0.4
Sector of practice			
Private	—	—	
Public	-2.6	-4.2, -0.97	**0.002**

[1]CI = Confidence Interval

DISCUSSION

This study has the set objectives to assess the consequences of poor ergonomic practice among dental practitioners in Benin city. It was hinged on the notion that dental practice should be practiced in a comfortable and safe environment with ergonomic considerations being a top priority to avoid untoward effects later on in the practitioner's life. The dental practitioners involved span across all specialties as well as the public and private sectors. Most of the participants were between 36 to 55 years of age which is a reflection of the active years of public servants in Nigeria.[24] The years of practice of most of the practitioners was between 11- 30 years which is in consonance which is the age range of active dental practice and also reflects the time of either conformity or non-conformity to proper ergonomic practices.

This study found that most of the participants knew what was meant by ergonomics in dentistry and in deed their response showed that their knowledge of ergonomics in dentistry was accurate. This finding may be related to the fact that most practitioners had good knowledge from the beginning of their training as dental students as well as during continuous education sessions in the course of their practice over the years. This is consistent with other studies that show similar results [26, 27]

Poor ergonomics and stress are serious challenges faced by dentists which can be properly managed with adequate attention and knowledge. The pros of implementing proper ergonomics are a reduction in mental and physical stress as well as improving the long-term health and job satisfaction for practitioners.[3]

Majority of the respondents (72.34%) acknowledged Musculo skeletal pain as one of the health impacts of non-ergonomic environment. This may be due to the fact that participants in a developing society such as the study area, where optimum conditions for practice are not provided often experience musculoskeletal symptoms such as hypomobile joints, neck and shoulder injury, spinal disc herniation, degeneration and carpal tunnel

syndrome. [18] This is consistent with another study that show similar results. [28]

More than two thirds of the respondents rightly identified bending and twisting as bad operating posture that could cause musculoskeletal disorder. This is in tandem with previous studies. [18] This is consistent with another study that show similar results [28]

A number of respondents (62.50%) reported a lack of knowledge on the ideal distance from the floor to the sitting position of the dentists stool. This un awareness may be a contributory factor to the increasing prevalence of the adverse effects of poor ergonomics in Nigeria. This is consistent with another study that show similar results [26]

Most respondents erroneously believe that a high sitting position of the dentist stool is a good sitting distance from the floor (height) and this may be a contributing factor to discomfort among practitioners in active practice. And it has been shown in studies that ways of relieving these adverse effects of poor ergonomics is by adoption of proper posture and engagement in adequate exercises. These exercises include jumping jacks, hip flexor stretch, chest stretch etc.[25]

High sitting position can lead to increased muscle tension in the neck and shoulder region as well as problems with the hip joint due to shortening of the hip flexor muscle it can also cause problems with the spine especially when seated for a long period of time. Weak and dystrophic muscles are other consequences of poor posture. Exercises are known to strengthen muscle fibers tendons and joint ligament which can very significantly contribute to good muscular health. The commonest exercise identified by participants that could be carried out in between patient appointments are hip flexor stretch and chest stretch. However, it is advised that other form of exercise could be embarked upon outside the dental clinic to further correct and maintain posture and muscle tone.

This group of participants were less than 35% of the study group. This gives credence to the fact that dental practitioners like most Nigerians do not engage in exercise they rather are very sedentary.

Less than average number of participant (35.71) know the degree of sight line and light line when attending to patient. This is lower than similar studies. [29] This may be related to the fact that most dental units in the operatory don't have adequate lighting and therefore use natural light which is a poor ergonomic practice.

From the study, it is evident that even though most of the participants claim they had adequate knowledge of ergonomics in dentistry the participants had poor knowledge on the specific aspects of dental ergonomics made evident by their poor knowledge regarding sight line, sitting position of the dental stool and exercise.

The average knowledge score among the study participants was 2.80 ± 1.57. This implied that on average, there was a low knowledge among the participants toward dental ergonomics.

Majority of the dental practitioners had positive attitude towards dental ergonomics which was similar to other dental research in this area. This positive attitude was reflected in this study as 76.79% of participants who were of the opinion that dentists should change between sitting and standing position when seeing a patient and in between patient appointment. While all participants (100%) agreed that continuing dental education should be incorporated into dental education and that ergonomics should be part of the curriculum. All participants also agreed that the arrangement of dental chair and instrument contribute to the comfort of the dentist in routine practice. Positive attitude to dental ergonomics by the participants may be due to their desire to work in a comfortable and safe environment in their active practice years.

The average attitude score was 4.61 ± 0.59. This implied that the participants demonstrated a very good attitude towards dental ergonomics.

Less than half of the participants had good ergonomic practice identical to an earlier study [25]. This is reflected by their use of loupes, orientation of the operating fields above the elbow level of the working hand, by their working in the upright position and with the spine resting on the back of the stool. However, of all the positive ergonomic practices, the use of the dental mirror when examining maxillary teeth in order to maintain a neutral posture while working was the singular practice that practitioners engaged in the most which suggests more room for improvement in other areas. The average practice score was 4.09 ± 1.84. This improvement can be achieved by continuous education via attendance of seminars and conferences which will help broaden knowledge and enhance practice.

This study did not report any significant association between knowledge attitude and practice of dental ergonomics as well as demographics. There was however a significant relationship between KAP of

dental ergonomics and sector of practice (p=0.002). Specifically, it appeared that those in the public sector were 2.6 times more likely to perform poorly relative to those in the private sector. This may be due to the fact that in private practice practitioners have ample opportunity to design the practice and put in the necessary equipment as desired and needed.

LIMITATION

The study was limited by its cross-sectional nature and also the fact that results were based on self-reported assessment by respondents. Efforts were made to ensure accuracy in recollecting self-reported practices with a list of activities carried during clinical practice

CONCLUSION

Data from this study revealed that there was poor knowledge about ergonomic practices in dentistry but good attitude and fair practice among participants. There was a significant relationship between KAP of dental ergonomics and sector of practice. Those in the private sector were more likely to practice good dental ergonomics than those in private sector.

It is the researchers opinion that there is need for early inculcation of ergonomics in the training of dental students. It is also important that continuing education for dental practitioners be carried out so that practice in a safe environment is assured.

Source of Support

Nil.

Conflict of Interest

None declared

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