Evaluation of dental pain (Evaluation and grading of pain level assessment) (EGPA), a new system for evaluation

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Abstract

Back ground

Pain is unpleasant sensation, dental pain due to irritation or trauma to the teeth and or surrounding structures, it could be measured by, electric stimuli and measuring the response or by measuring the outcome signs& symptoms. This research is a trial for measuring the dental pain clinically by grading and evaluation of the intensity of pain by a new system (EGPA), Evaluation of dental pain by grading, and loading the signs& symptoms.

Methodology: the questionnaire form of (EGPA) was filled by the students, after explaining what is the purpose for the questions to determine the level of pain? The questionnaire form involves many types of question about the symptoms and signs of the pain and accordingly was weighted in number. .The sum of the highest dental pain level was 15 and the lowest was 1.

Results: The relation between the dental pain level and gender, age, level of academic achievement, location of the tooth that caused the pain, the location of segment involved in the pain, and the relation of dental pain according to the pathological changes that caused the pain were studded.

The relation between the pathological changes and the level of pain was highly significant, acute pulpitis is the most painful pathological changes.

The relation between the level of pain and the segments was highly significant, the anterior teeth was the most painful in the upper teeth while the molars was the most painful in the lower teeth.

Conclusion: There is a clear connection between the pathological changes of the tooth caries sequel and the pain level. Good oral hygiene and interruption the sequel of teeth decayed is the answer.

Key wards : EGPA, Dental pain, Evaluation and grading

Pain is one of the most common complaints that patients present with at hospital [1]. Pain has several definitions that depend on the aim or scope. It is unpleasant, complex experience, that influence by many factors as past experiences, cultural behaviors and emotional and medical states [2]. It is also defined as an unpleasant sensory and emotional experience with actual or potential tissue damage or described in terms of such damage [3].

Pain is also influenced by numerous intrinsic and extrinsic factors, and that multiple aspects of pain was assessed in different ways [4]. The intensity of pain depending on the patients' perception should be assessed for effective pain management [5].

The pain experience has physiological and psychological aspects, the physiological aspect s involve many processes, transduction, transmission, and modulation [2].

The psychological factors are playing an important role in dentist daily work that there are different pain responses to the same work. Psychological influences are particularly important in determining perceived pain intensity and patient response to pain [2]. Various tools have been developed for different types and subtypes of chronic pain conditions so that the effect of chronic pain on quality of life and the patient's function can be gaged [6]. The accuracy of pain assessment is very important to evaluate the appropriate treatment. Pain intensity is the initial factor that point to its sensation and function. Therefore, pain measurement tools are used to help assess pain intensity, and monitor the effectiveness of and response to treatment decisions [7].

In dental oral and maxillofacial researches, the use of the VAS (Visual Analogue scale) is more common because it is more reliable, valid, sensitive, and appropriate. Other scales used for example Wang-Baker faces Pain rating Scale(WBS), which was used to evaluate the acute pain in children and elderly, other used NRS(Numerical Rating Scale) which is used widely in adults.

 Dentist is frequently called upon to determine the etiology of pain in the oral and maxillofacial region, although oral pain is most frequently of odontogenic origin, many facial pain arise from other sources as eye, ears, salivary glands, muscles, joints, facial sinuses, and intracranial blood vessels [2].

The importance of the studies about pain comes from the dental pain diminishes the quality of life and disturbs the daily life of affected individual [8,9].

The dentists are required to definitely treat teeth problems and pain that accompanies with them [10,11].

 The pain experience has physiological and psychological aspects, the physiological aspect s involve many processes, transduction, transmission, and modulation [2].

Transduction related to activation of A-delta and c-fibers which are involved in transmission of information to the trigeminal nucleus. The primary neuro chemicals involved in transmission pathway are glutamate and substance [2] .

 The psychological factors are playing an important role in dentist daily work that there is different pain responses to the same work . Psychological influences are particularly important in determining perceived pain intensity and patient response to pain [12].

Classification of orofacial pain: it classified to primary somatic, neuropathic, and psychological.

Somatic pain arises from skeletomuscular, or visceral structures. Example of skeletomuscular is periodontal pain and TMJ, while pulpitis or salivary gland pain origin.

Pain assessment is important because pain is a subjective phenomenon that is present when the individual experiencing it says it is and the individual is the most reliable source of information about location, quality, intensity, onset, and relieving, precipitating or aggravating factors of pain [6,13].

Material

Total number of patients inter the questioner was: 1331, 600 were female, 731 were male

Methodology

Locker and **Anderson** developed a model for measuring the association of toothache pain with quality of life and social wellbeing [14-16] and behavioral model of health services utilization developed by Anderson [10,17].

Although many authors discussed the role of medical practitioners in relation with oral health problems, but little trials for scaling of the main discomforting problem which is the severity of pain. In this study we neither use developing questionnaire about the income or race or ethnic status, nor a qualitative results as a base. We used our collecting data in the department for about 3 years .The outpatient clinic received a lot of patients for their dental problems but we focus upon the patients with dental and surrounding tissues pain.

In this report we study the pain from many faces, we ask about the severity of pain and we gave a degree by weighting so we give 3 for severe pain and 2 for moderate pain and 1 for mild pain depending upon their previous experience with pain including oral or non-oral pain. The question about pain intensity to rate the worst level of pain the patient feels.

The pathological causes of pain was studded and listed in the table (2):

Periodontal problems: range from sore gum which starts as a simple redness (inflamed, erythematous gingiva) to ulceration, exudate or abscess with severe pain.

Impaction; The pain of the an un erupted or partially erupted wisdom teeth is similar to the pain from the periodontal pain in its causative agent, the patient may presents with mild simple inflammation or infection and swelling to the degree of trismus [18].

Accident: that cause fracture level just in the enamel, cause mild and sometimes little sensitivity, if the fracture reach the dentin high sensitivity of the tooth will appears and some time is severe, while if the fracture reach to the pulp a severe pain could the patient feels as a result of exposed dentin and pulp irritation with development of pulpitis [18,19].

Badly carious tooth; the pain start simple as sensitivity to cold or hot application and some foods or sweets. The problem increase when the caries reach the dentin then the pulp as it reach the pulp the pain start to increase as the pulp nearly exposed at this stage, the pain increases as the pulp not reached to the level of acute pulpitis which is called the reversible pulpitis [18].

When pulpitis start as in its acute face the pain is severe, throbbing, and or pulsating, continuous, make the patient sleepless and weakling him from sleep seeking for help. Analgesia likes ponstan 500mg or paracetamol 500 mg relief the pain temporally and the pain restart severe [17,18].

Chronic pulpitis: the severity of pain is less, not throbbing or pulsating with interval of relief (not continuous) , the analgesia could relief the pain [18].

Retained roots; the pain from necrotic pulp could be mild to moderate, with or without tenderness, while the periapical changes is more severe since there is internal pressure on the surrounding tissues. There are sometimes swelling of one or the two cortices of the bone but the pain is less [18,20,21].

Table1. Pain Level Questionnaire Form

The details of the pain level estimation:	degree
The severity of pain : one mild, two for moderate, three for severe	3
If the pain is throbbing or pulsating	2
The duration 3days and more (2) less than that =1	2
If the pain is continuous =2 degrees, if the pain is intermittent =1	2
If the pain relieved by one tablet of analgesia for 6 hours =1, if two tablets of analgesia relieved the pain for 3-4 hours and restart =2	2
If the involved tooth is tender and or increase at night	1
If the pain initiated by any stimulus like hot or cold fluids or sweets or any food	1

If the pain was referred to another tooth or region like apposing teeth, the ear, the adjacent tooth or teeth.	2
The total degrees for these scales is:	**15**

Statistical analysis

The data was analysed using Graph Pad Prism 9.2.0 software. Chi-square test was used to determine if there is a significant association between the variables. *P* values of <0.05 were considered significant.

Results

There is no significant relation between the academic achievement and level of pain in table (6)

There is no significant relation between the location of the teeth in the oral cavity and severity of pain. Table (7)

The relation of the segments of teeth and severity of pain is highly significant. Table (8)

The relation between the pathological changes and severity of pain is highly significant. Table (9)

The relation between pain level and age groups is not significant. Table (2)

The relation between pain level and age groups and gender is not significant .Table (3) and (4)

The relation between pain level and gender is not significant. Table (5)

The relation between level of pain and academic achievement is not significant. Table

Total No. of patients = 1331

Total No. of Female = 600

Total No. of Male = 731

Table 2   Pain level according to age groups regardless of gender

Age groups	Age group (18-30)		Age group (31-45) year		Age group ≥ 46	
Pain Level	No.	Percentage	No.	Percentage	No.	Percentage
Mild (3-6)	217	44%	271	55%	164	48%
Moderate (7-10)	243	49%	202	41%	155	46%
Severe (11-15)	36	7%	23	5%	20	6%

P value	0.6794
P value summary	ns
Statistical test	Chi-square

Table 3   Pain level according to age group and gender

Age groups	Age group (18-30)				Age group (31-45) year				Age group ≥ 46			
	Female		Male		Female		Male		Female		Male	
Pain Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mild (3-6)	97	46%	120	42%	130	56%	141	53%	72	46%	92	50%
Moderate (7-10)	109	48%	145	50%	90	39%	112	42%	76	49%	79	43%
Severe (11-15)	13	6%	23	8%	12	5%	11	4%	8	5%	12	7%

Age groups	Age group (18-30)	Age group (31-45) year	Age group ≥ 46
P value	0.7756	0.8608	0.6404
P value summary	ns	ns	Ns
Statistical test	Chi-square	Chi-square	Chi-square

Table 5   Pain level vs gender regardless the age

Gender	Female		Male	
Pain Level	No.	Percentage	No.	Percentage
Mild (3-6)	299	50%	353	48%
Moderate (7-10)	268	45%	332	46%
Severe (11-15)	33	5%	46	6%

Gender	
P value	0.9311
P value summary	ns
Statistical test	Chi-square

Table 6. Pain level according to academic achievement

Pain Level	Mild (3-6)				Moderate (7-10)				Severe (11-15)			
Educational qualification	Female		Male		Female		Male		Female		Male	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Can't read and write	38	13%	34	10%	36	13%	39	12%	3	9%	4	9%
Primary school	53	18%	47	13%	56	21%	57	17%	4	12%	6	13%
Secondary school class 1-3	55	18%	76	22%	53	20%	52	16%	11	33%	9	20%
Secondary school class 4-6	87	29%	103	29%	72	27%	115	34%	8	24%	14	30%
College	62	21%	82	23%	49	18%	66	20%	7	21%	13	28%
Postgraduate (MSc or PhD)	4	1%	12	3%	2	1%	3	1%	0	0%	0	0%

Educational qualification	Mild (3-6)	Moderate (7-10)	Severe (11-15)
P value	0.7479	0.8742	0.2987
P value summary	ns	ns	ns
Statistical test	Chi-square	Chi-square	Chi-square

Tooth location						
P value	0.3241					
P value summary	ns					
Statistical test	Chi-square					
UL	187	29%	166	28%	26	33%
LR	152	23%	125	21%	21	27%
LL	148	23%	144	24%	9	11%

able 7.   Pain level according to tooth location

Table 8   Pain level according to segments in both maxilla and mandible

Pain Level	Mild (3-6)		Moderate (7-10)		Severe (11-15)	
Segment/Maxilla	No.	Percentage	No.	Percentage	No.	Percentage
Segment 1	77	25%	76	32%	27	64%
Segment 2	127	41%	95	41%	9	21%
Segment 3	104	34%	64	28%	6	14%

Maxilla	
P value	<0.0001
P value summary	****
Statistical test	Chi-square

Pain Level	Mild (3-6)		Moderate (7-10)		Severe (11-15)	
Segment/Mandibular	No.	Percentage	No.	Percentage	No.	Percentage
Segment 1(anterior)	56	22%	58	33%	9	33%
Segment 2(premolars)	83	33%	40	23%	3	11%
Segment 3(molars)	113	45%	78	44%	15	56%

Mandibular	
P value	0.0039

P value summary	**
Statistical test	Chi-square

Table 9.   Pain level according to pathological lesion

Pain Level	Mild (3-6)		Moderate (7-10)		Severe (11-15)	
Pathological lesion	No.	Percentage	No.	Percentage	No.	Percentage
Advanced to acute pulpitis	23	4%	157	26%	1	0.01%
Impaction	29	4%	165	28%	6	8%
Chronic pulpitis	180	28%	45	8%	1	0.01%
Periapical lesion	81	13%	136	23%	3	4%
Reversible pulpitis	200	31%	6	1%	1	0.01%
Necrotic pulp	61	9%	14	2%	1	0.01%
Exposed pulp	1	0.001%	11	2%	21	16%
Exposed dentin	7	1%	2	0%	1	0.01%
Failure root canal filling	29	4%	14	2%	1	0.01%
Acute periodontitis	1	0.001%	29	5%	8	10%
Chronic periodontitis	39	6%	7	1%	1	0.01%
Acute Pulp	1	0.001%	7	1%	41	53%

Pathological lesion	
P value	<0.0001
P value summary	****
Statistical test	Chi-square

Discussion

The severity of pain in group age (18-30)y, has the most percentage than the other groups of age 7% in the mild level followed by the group age ≥ 46 Y while in number, the less

number of the patients who have the most severe pain in the group age of ≥ 20, that could explained by the previous multi experience for dental pain.

The majority of patients with acute or chronic dental conditions fall in the group of moderate pain (7-10). 49% according to our scale and this result agree with the result of Emeka Danielson Odai et all 2015 who use the mean (VAS) and (FCT) for the assessment of pain among the patients. But still the relation between the age and level of pain still not significant [22].

The level of pain when distributed according to the groups of age and gender there is no significant relationship, so the gender of the patient has no relation with pain intensityand this result agree with Rilley et all 2002 [16], and dis agree with Kiruthika Patturaja et al. [23], in that research the relation between gender and anxiety and pain was 40%, female has high level of dental anxiety while male suspected to dental pain because he correlated the emotion as a factor accompanied with pain.in the table (3), and table (4) the moderate level of pain (7-10) has no significant relationship between the sex and pain level. In the level mild pain (1-6), the percentage of female is slightly more than male, 46% for female, 42% for male but the relationship is still not significant. In group age ≥46, the percentage of male is more 50%, 46% subsequently in mild level of pain.

In moderate pain, the percentage of males more than females in group age 31-45 Yand, 42%, and 39% subsequently and in the group age ≥46, the female percentage was more 49%, 43% subsequently. In the severe level of pain, in the group age 18-30, ≥46, the percentages of males are more than the percentages of females but in the group 31-45, the percentage of female was slightly more, but the relationship is still not significant P-value =0.5018 for age group 18-30, p-value for group age 31-45Y 0.66 and 0.5616 for group age ≥ 46Y. In the severe pain there is increase in the percentage of male the that means that the pain threshold is equal for both sexes but in the severe level, pain tolerance males slightly less for males but this relationship still not significant.

The relation between the level of academic achievement and pain level: there is no significant relationship.

In the group of patients that they can't read or write, in the mild pain, there is no big difference in percentage between male and female 13%, 10% subsequently.in the moderate pain 13%, 12% subsequently, in severe pain 9% for both sexes .So all the percentages are close to each other.

In primary school, the percentage of the mild pain has 18% for female and 13% for male, in the moderate pain the percentage for female is 21% and for male is 17% and also for severe pain 12% for female, 13% for male.

In the secondary school class 1-3 and class 4-6 and the same in group collage and in the group of high academic achievement the percentage is close to each other. The absence of any patient in the group of high academic achievement in the severe pain level ensure that this group of patients has better oral health than the others. But in this study, the severe pain level percentage increases as the level of academic achievement increases except of that for high academic level since 9%, female and male percentage in the severe pain, in the group (can't read or write), increases to 12%, 13%, female, male percentages in primary school, and 33%, 20% and 24%, 30% subsequently in secondary group class 1-3 and class 4-6 and collage group 21%, 28% female and male percentages subsequently and this could be explained by increasing the level of anxiety and fear from dental work increases with that level .The relation between the academic achievement and pain level is not significant in general (figures 26-34).

The relation between teeth location according to the quadrants (location) is not significant (table 7)

In (table 8) the relation between the pain level and the segments of teeth like upper anterior or upper bicuspid left and right or molar segment which include the 1 rst and second molars, according to this scale of level of pain, the most painful segment in the upper jaw was the anterior segment, 64%, No=27 followed by bicuspid segment 21%, No=9 and finally the molar segment (14%, No=6). While the least level of pain in the bicuspid segment 41%, N=127, followed by the molar segment34%, No=104, followed by the anterior segment 25%, No=77. So, the most painful and least percentage of mild pain is the anterior segment in the maxillary teeth. P=< 0.0001, while in the mandibular segments, the most painful that the more percentage of severe pain of level was the posterior segment 56%, N0==15, followed by the anterior segment 33%, No=9 and the least pain level fall in the premolar segment 11%, No=3. The most segment that falls in the mild level of pain in the lower teeth was the molar segment 45%, No=113, followed by premolar segment33%, No=83 and least percentage in the mild level of pain was the anterior segment p=0.003(significant)(figures 39-46).

Table No (9) shows the relation between the level of pain and the type of pathology of the tooth involved in the pain. There is highly significant relationship between those variables P

=0.0001. In the advanced pathology towards the acute pulpitis the main level of pain falls in the moderate level 26%, N0=157, while in the severe pain level only 0.0 1%, N0=1 and the number of mild pains that fall in the group of advanced pain to acute pulpitis was N0= 23, percentage =4%.

In the impaction group, the main group of pain fall in the moderate group28%, No=165, while in the same group, the percentage of mild level of pain was 4%, No=29, and the severe pain was 8%, N0=6 and the rest in the moderate level of pain.

In the group of chronic pulpitis, the main percentage of pain fall in the mild group No =180, percentage =28%, followed by the moderate pain. N0=45 percentage 8%, followed by the severe pain No =1 percentage =0.01%.

Periapical lesion, the main percentage of level of pain fall in the moderate level 23%, No=136, then the mild level 13%, No= 81, followed by4%, No=3

Reversible pulpitis has the main percentage of pain level fall in mild level 31%, No=200, followed by moderate level 1%, No=6, followed by severe pain level 0.01%, No=1.

Necrotic pulp: the main percentage of this group fall in the mild level of pain 9%, No=61, followed by moderate level 2%, No=14, followed by severe pain 0.0 1%, No=1

Exposed pulp: The main percentage of level of pain was the severe pain 16%, No=21 followed by moderate group of pain 2%, No=11, followed by mild pain 0.01%, No=1.

Exposed dentin: the main level of pain was the mild 1%, No=7, followed by the moderate 0.02%, No=2, followed by severe level of pain0.0 1%, No=1.

Failure root canal filling treatment: The main group of pain fall in the mild pain 4%, No= 29, followed by moderate pain 2%, N=14, then the severe pain 0.01%, No=1.

I acute periodontitis: The main group of pain was in the moderate group of pain level 5%, No=29, followed by severe level of pain 10%, No=8, followed by the mild level (0.001%, No=1.

Chronic periodontitis: The main group of pain fall in the mild group 6%, No=39, followed by 1%, No=7 in the moderate group followed by severe pain 0.01%, N0= 1.

Acute pulpitis: The main group of pain fall in the severe level of pain 53, No=41, followed by moderate 1%, No=7, followed by mild 0.001%, No=1.

So according to the results, the most severe or painful pathology is the acute pulpitis followed by the pain caused by impacted wisdom teeth.(figures 47-50)

Abbreviations:

UR: Upper right, U L : upper left , LR: lower right, LL: lower left

Segment1: anterior segment, segment 2: premolar segments (left and right), segment 3 (molar segments, left and right)

(EGPA) : Evaluation and grading pain level assessment

Conclusion

The most painful pathological changes in dental pain, is acute pulpitis followed by impacted wisdom teeth. The most painful segment is the anterior segment in the upper jaw and the lower molar segments in the lower jaw.

REFERENCES

1-Todd KH, Sloan EP, Chen C, Eder S, Wamstad K. Survey of pain etiology, management practices and patient satisfaction in two urban emergency departments. CJEM. 2002 Jul;4(4):252-6. doi: 10.1017/s1481803500007478. PMID: 17608987.

2-James R.Hupp et al Con temporary oral and Maxillofacial surgery(Text book) page 618

3-McAloon C, O'Connor PC, Boyer M. Patient's perception of pain on admission and discharge from the emergency department. N J Nurse. 2003 Nov;33(8):7. PMID: 14692389.

4-Briggs M, Closs JS. A descriptive study of the use of visual analogue scales and verbal rating scales for the assessment of postoperative pain in orthopedic patients. J Pain Symptom Manage. 1999 Dec;18(6):438-46. doi: 10.1016/s0885-3924(99)00092-5. PMID: 10641470.

5- Closs SJ, Gardiner E, Briggs M. Outcomes of a nursing intervention to improve postoperative pain at night. *Acute Pain: Int J Acute Pain Manag*. 1998; 1:22–31. [Google Scholar]

6-Breivik H, Borchgrevink PC, Allen SM, Rosseland LA, Romundstad L, Hals EK, Kvarstein G, Stubhaug A. Assessment of pain. Br J Anaesth. 2008 Jul;101(1):17-24. doi: 10.1093/bja/aen103. Epub 2008 May 16. PMID: 18487245.

7-Li L, Liu X, Herr K. Postoperative pain intensity assessment: a comparison of four scales in Chinese adults. Pain Med. 2007 Apr;8(3):223-34. doi: 10.1111/j.1526-4637.2007.00296.x. PMID: 17371409.

8-Locker D, Grushka M. The impact of dental and facial pain. J Dent Res. 1987 Sep;66(9):1414-7. doi: 10.1177/00220345870660090101. PMID: 3476612.

9-Gilbert GH, Stoller EP, Duncan RP, Earls JL, Campbell AM. Dental self-care among dentate adults: contrasting problem-oriented dental attenders and regular dental attenders. Spec Care Dentist. 2000 Jul-Aug;20(4):155-63. doi: 10.1111/j.1754-4505.2000.tb01153.x. PMID: 11203892.

10-Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. Milbank Mem Fund Q Health Soc. 1973 Winter;51(1):95-124. PMID: 4198894.

11-Cohen LA, Harris SL, Bonito AJ, Manski RJ, Macek MD, Edwards RR, Cornelius LJ. Coping with toothache pain: a qualitative study of low-income persons and minorities. J Public Health Dent. 2007 Winter;67(1):28-35. doi: 10.1111/j.1752-7325.2007.00005.x. PMID: 17436976.

12-Green BL, Person S, Crowther M, Frison S, Shipp M, Lee P, Martin M. Demographic and geographic variations of oral health among African Americans based on NHANES III. Community Dent Health. 2003 Jun;20(2):117-22. PMID: 12828273.

13-Fink R. Pain assessment: the cornerstone to optimal pain management. Proc (Bayl Univ Med Cent). 2000 Jul;13(3):236-9. doi: 10.1080/08998280.2000.11927681. PMID: 16389388; PMCID: PMC1317046.

14-Baker EA, Metzler MM, Galea S. Addressing social determinants of health inequities: learning from doing. Am J Public Health. 2005 Apr;95(4):553-5. doi: 10.2105/AJPH.2005.061812. PMID: 15798106; PMCID: PMC1449217.

15-Locker D. Measuring oral health: a conceptual framework. Community Dent Health. 1988 Mar;5(1):3-18. PMID: 3285972.

16-Riley JL 3rd, Gilbert GH, Heft MW. Orofacial pain: racial and sex differences among older adults. J Public Health Dent. 2002 Summer;62(3):132-9. doi: 10.1111/j.1752-7325.2002.tb03434.x. PMID: 12180040.

17-Anderson R, Thomas DW. 'Toothache stories': a qualitative investigation of why and how people seek emergency dental care. Community Dent Health. 2003 Jun;20(2):106-11. PMID: 12828271.

18-Baker B. Emergency dental treatment for the family physician. Can Fam Physician. 1987 Jun;33:1521-4. PMID: 21263889; PMCID: PMC2218413.

19-Sindet-Pedersen S, Petersen JK, Götzsche PC. Incidence of pain conditions in dental practice in a Danish county. Community Dent Oral Epidemiol. 1985 Aug;13(4):244-6. doi: 10.1111/j.1600-0528.1985.tb01914.x. PMID: 3862509.

20-Gift HC, Atchison KA. Oral health, health, and health-related quality of life. Med Care. 1995 Nov;33(11 Suppl):NS57-77. doi: 10.1097/00005650-199511001-00008. PMID: 7475433.

21-Gibson GB, Blasberg B, Hill SJ. A prospective survey of hospital ambulatory dental emergencies. Part 1: Patient and emergency characteristics. Spec Care Dentist. 1993 Mar-Apr;13(2):61-5. doi: 10.1111/j.1754-4505.1993.tb01456.x. PMID: 8272985.

22-Odai ED, Ehizele AO, Enabulele JE. Assessment of pain among a group of Nigerian dental patients. BMC Res Notes. 2015 Jun 19;8:251. doi: 10.1186/s13104-015-1226-5. PMID: 26087661; PMCID: PMC4474451.

23-Kiruthika Patturaja et al: Sex response to dental anxiety and pain /J. Pharm. Sci. &

 Res. Vol. 8(6), 2016, 464-466