

EVALUATION OF NON-VITAL TEETH WITH VARIOUS ENDODONTIC PATHOLOGIES-A RETROSPECTIVE STUDY

¹Prashaanthi. N, ²Iffat Nasim, ³Shantha sundari .K.K,

¹Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India, Mail id:151501023.sdc@saveetha.com

²Professor, Department of Conservative and Endodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India. Mail id: iffatnasim@saveetha.com

³Professor , Department of Orthodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India. Mail id: shanthasundari@saveetha.com

Article Info

Volume 82

Page Number: 17135 - 17142

Publication Issue:

January - February 2020

Article History

Article Received: 18 October 2019

Revised: 14 November 2019

Accepted: 22 December 2019

Publication: 29 February 2020

Abstract:

Most of the time non-vital teeth are associated with various pathologies. The early intervention would save the teeth from its loss. Depending on the etiology and the duration, the pathology differs among the non-vital teeth. The aim of this study was to evaluate non-vital teeth with various endodontic pathologies. This retrospective study included patients who were diagnosed with non-vital teeth from July 2019 to March 2020 in a dental hospital. The case records of all patients were retrieved which included the clinical , radiographic examination and treatment done for the patients. Variables such as age, gender, any associated endodontic pathologies were retrieved from the case sheets. Data was tabulated and was subjected to statistical package IBM SPSS version 20.0.Around 80,000 patients were reviewed and 238 patients met the inclusion criteria.Out of 238 patients, 71.8% were males and 28.2% were females.On analysing the prevalence of non vital teeth among different age groups, 21-30 years age group (32.8%) were more affected. On comparing the non vital teeth with endodontic pathology ,non-vital teeth without periapical lesion (74.4%) were found to be in a higher prevalence. Among non-vital teeth with endodontic pathology, periapical abscess (14.3%) was found to have higher prevalence followed by periapical cyst (2.9%) and calcified canal (2.9%).On analysing the prevalence of non vital teeth among gender , males (71.8%) were more affected. No statistically significant association was found between age, gender and non vital teeth. ($p>0.05$).Within the limitation of the study, the prevalence of non-vital teeth without periapical lesion were found to be higher. Among non-vital teeth with endodontic pathology, the most common pathology was chronic periapical abscess.Males were more affected with non vital teeth and had higher prevalence among the 21-30 years age group.

Keywords: Abscess, Cyst, Granuloma, Internal resorption, Sinus tract.

I. INTRODUCTION:

Non-vital teeth are teeth with a necrotic pulp. Initially it starts as a carious lesion or consequence preceding trauma. Over the time, bacteria in the root canal induces inflammation resulting in the formation of an apical granuloma or cyst.(Hossain

et al., 2015; Carmen et al., 2017).If not treated, they may progress into a sinus tract or fistula. In cases of trauma, there is presence of internal resorption with abscess formation.(Akbar, 2015).Trauma to the anterior teeth with the underlying esthetic, psychosocial, functional, and therapeutic problems

adversely affect an individual's quality of life.(Andreasen, Andreasen and Andersson, 2018) Diagnosis for a non vital tooth is done by clinical and radiographic examination. There are various advanced tests for assessing the pulp vitality.(Janani, Palanivelu and Sandhya, 2020) Pulp necrosis is suspected when a tooth does not react to thermal, electric or mechanical stimulation but the definite diagnosis is established only after inspection and probing of the pulp chamber and the root canal.(Beer, Baumann and Kielbassa, 2006; Mobeen, 2015).

Treatment of a non-vital tooth involves the treatment of an infectious disease process.(Bhagwat and Mehta, 2013)The objective of treating a non-vital tooth is to remove the necrotic tissue and tissue breakdown products from the root canal, eliminate infection, seal the root canal and thereby establish a functioning tooth in a healthy periodontium.(Kojima et al., 2004)2004)

Periapical lesion affecting the periodontium may be treated successfully by a surgical- endodontic approach in which the apical granulation tissue which is infected is curetted out or surgically removed.(Vanka et al., 2010). In cases of non vital young permanent teeth and when the non vital teeth are not associated with any periapical pathology ,they are treated by non surgical management.(Carmen et al., 2017). Recall and review is done to assess the status of the tooth at regular intervals so that appropriate treatment measures can be carried out when it is required.

Though clinical success of a root canal treatment is achieved by careful and thorough debridement, preparation and obturation of the root canals, the major concern for the patient is the post-operative pain. They can be reduced by medical management or by incorporating proper technique and protocol during the root canal treatment.

Previously our institution has done numerous clinical studies(Ramamoorthi, Nivedhitha and Divyanand, 2015; Ramanathan and Solete, 2015; Hussainy, Nasim and Thomas, 2018; Nandakumar

and Nasim, 2018; Ravinthar, 2018; Teja, Ramesh and Priya, 2018; Rajendran et al., 2019; Siddique and Sureshbabu, 2019; Teja and Ramesh, 2019; Janani, Palanivelu and Sandhya, 2020) , systematic reviews(Noor, S Syed Shihaab and Pradeep, 2016; Kumar and Antony, 2018; Rajakeerthi and Ms, 2019) and surveys(Manohar and Sharma, 2018; Jose, P. and Subbaiyan, 2020).Now we are focussing on retrospective studies. Thus , the aim of this study was to evaluate non-vital teeth with endodontic pathologies.

II. MATERIALS AND METHODS:

Study setting and study design:

In this retrospective study, we reviewed the case records of the patients who reported to a dental hospital from July 2019 to March 2020 among which 238 patients diagnosed with non vital teeth were included in the study. Consecutive sampling method was used for the study. The study was approved by the scientific review board and ethical clearance was obtained from the Institutional Ethical Committee.. The ethical clearance number was SDC/SIHEC/2020/DIASDATA/0619-0320.

Data collection:

Patients of 11- 80 age groups , both males and females were included in the study. All types of endodontic pathology associated with non vital teeth were taken into consideration and the digital case records with clinical , radiographic examination and the treatment done to the patients were retrieved. Intra oral photographs and IOPA were used to cross verify the data.Variables such as age , gender and the associated endodontic pathology were retrieved from the case records. Patients with incomplete or censored data were excluded from the study.

Statistical analysis:

The data was collected , tabulated and exported to IBM SPSS version 20.0 Statistical analysis. Variables were defined. Both descriptive (Frequency) and inferential statistics were employed.Chi square analysis was performed to

analyse the association between age , gender and non vital teeth with the significance set at $p < 0.05$.

III. RESULT AND DISCUSSION:

In the present study, among 238 patients with non vital teeth, the higher prevalence was found to be among 21 - 30 years age groups(32.8%) followed by 31- 40 years. (23.5%).The least prevalence of non vital teeth was found among the 71-80 years age group(0.4%). [Table 1,Figure 1]

On comparing the prevalence of non vital teeth among gender, the higher prevalence was found among males (71.8%) than females.(28.2%).[Table 2, Figure 2]

On analysing the prevalence of non vital teeth among patients, the higher prevalence was found to be non-vital teeth without periapical lesion (74.4%). On analysing the non vital teeth with endodontic pathologies (25.6%); 2.5% reported with chronic pulpitis; 0.4% reported internal resorption; 4.3% reported with periapical abscess; 0.8% reported with sinus tract; 2.9% reported with periapical cyst; 2.9% reported with calcified canal; 0.8% reported with Elis VI and 0.8% reported with Elis VII.[Table 3, Figure 3]

On analysing the association between non vital teeth and different age groups it was found that the non vital teeth with endodontic pathology (9.24%)and without periapical lesion (23.53%) were seen in higher prevalence among the 21-30 years age group. There was no statistically significant association between the age and the non vital teeth.(p value-0.546)[Table 4, Figure 4]

On analysing the association of gender and non vital teeth. The non-vital teeth without periapical lesions was more prevalent among males (55.04%) and non vital teeth with endodontic pathology were more common in males(16.81%).There was no statistically significant association between gender and the non vital teeth. (p value-0.195)[Table 5, Figure 5]

In the present study, males had higher prevalence of non vital teeth than females. The prevalence of

non-vital teeth without periapical lesion was the highest. On comparing the prevalence of non-vital teeth with endodontic pathology, the most common was periapical abscess. On analysing the age group, the higher prevalence of non vital teeth was among 21-30years age group.

In the present study the prevalence of non vital teeth was found among 11-80 years and the higher prevalence was found among younger adults. Previous studies have compared the colour differences among vital and non vital teeth and have involved the age group from 11 - 70 which is in accordance to our study. (Greta et al., 2018). Our findings are in accordance with the previous study.

In the present study ,there was male predominance of non vital teeth with periapical abscess. Males have a higher prevalence of non vital teeth when compared to females ; males are more often involved in accidents/trauma. They do not consider aesthetics as superior as females and so after a trauma or injury the non vital teeth progresses to a periapical pathology and they report only when there is a pain or an emergency. (Vanka et al., 2010; Pigg et al., 2016) . Our findings are in accordance with the present study.

In the present study , on comparing the prevalence of non vital teeth among different age groups, higher prevalence was found among 21-30 years age groups. Due to changes in the diet and the modern lifestyle, younger adults are more prone for caries and infections. This could be considered as an important factor for disease progression and prevalence among younger adults. (Amaral et al., 2005; Vanka et al., 2010). Our findings are in accordance with the present study.

In the present study, when comparing the different endodontic pathologies associated with non vital teeth ,the most common pathology was periapical abscess. During acute pulpitis , there is pain during mastication. When progressed to chronic pulpitis , the pain subsides and there is merely mild or no pain. This could be a contributing factor for the progression to periapical lesion. In cases of trauma,

the pulp response differs among individuals and based on the severity of the trauma there may be a progression to a periapical lesion.(Özbaş, Aşçı and Aydın, 2011; Hossain et al., 2015; Mobeen, 2015) Future research should be based on the various treatment modalities for non vital teeth and about the advancements in the diagnosis and treatment of the endodontic pathologies. The limitation of the study was that it was a retrospective study and data was collected from online digital case records. The case records were retrieved and were analysed by a single calibrated examiner to avoid subject variation. The sample size was not generalized to the entire population . So multicentric study with large sample size should be conducted.

IV. CONCLUSION:

Within the limitation of the study, the prevalence of non-vital teeth without periapical lesion were found to be higher. Among non-vital teeth with endodontic pathology, the most common pathology was chronic periapical abscess. Males were more affected with non vital teeth and had higher prevalence among the 21-30 years age group.

AUTHORS CONTRIBUTION:

Prashaanthi.N contributed acquisition of data, analysis, literature collection and also in drafting the article and revising it critically for important intellectual content. Iffat Nasim contributed in conception, the study design, interpretation of data, formatting, manuscript preparation, supervision and guidance. Shantha Sundari.K.K contributed in editing, supervision and final approval of the submitted version of the manuscript.

ACKNOWLEDGEMENT:

We take pleasure to acknowledge our University for granting permission to utilize the patient records for data collection

CONFLICT OF INTEREST:

The authors declare that there is no conflict of interest

V. REFERENCES:

- [1] Akbar, I. (2015) 'Efficacy of prophylactic use of antibiotics to avoid flare up during root canal treatment of nonvital teeth: A randomized clinical trial', Journal of clinical and diagnostic research: JCDR. ncbi.nlm.nih.gov. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4413145/>.
- [2] Amaral, M. A. et al. (2005) 'Dental caries in young male adults: prevalence, severity and associated factors', Brazilian oral research, 19(4), pp. 249–255.
- [3] Andreasen, J. O., Andreasen, F. M. and Andersson, L. (2018) Textbook and Color Atlas of Traumatic Injuries to the Teeth. John Wiley & Sons.
- [4] Beer, R., Baumann, M. A. and Kielbassa, A. M. (2006) 'Pocket atlas of endodontics'. thuvienso.vanlanguni.edu.vn. Available at: http://thuvienso.vanlanguni.edu.vn/handle/Vanlang_TV/13634.
- [5] Bhagwat, S. and Mehta, D. (2013) 'Incidence of post-operative pain following single visit endodontics in vital and non-vital teeth: An in vivo study', Contemporary clinical dentistry, 4(3), pp. 295–302.
- [6] Carmen, L. et al. (2017) 'Revascularization in Immature Permanent Teeth with Necrotic Pulp and Apical Pathology: Case Series', Case reports in dentistry, 2017, p. 3540159.
- [7] Greta, D. C. et al. (2018) 'Color comparison between non-vital and vital teeth', The journal of advanced prosthodontics, 10(3), pp. 218–226.
- [8] Hossain, M. I. et al. (2015) 'Non-surgical management of non-vital teeth with periapical pathosis by conventional root canal treatment: A clinical and radiological

- evaluation'. Available at: <https://pdfs.semanticscholar.org/b7e9/45d032fef50b1e97d2ac9d4e197b64221710.pdf>.
- [9] Hussainy, S. N., Nasim, I. and Thomas, T. (2018) 'Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One ...', *Journal of conservative dentistry: JCD*. ncbi.nlm.nih.gov. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6161514/>.
- [10] Janani, K., Palanivelu, A. and Sandhya, R. (2020) 'Diagnostic accuracy of dental pulse oximeter with customized sensor holder, thermal test and electric pulp test for the evaluation of pulp vitality: an in vivo study', *Brazilian Dental Science*, 23(1), p. 8.
- [11] Jose, J., P., A. and Subbaiyan, H. (2020) 'Different Treatment Modalities followed by Dental Practitioners for Ellis Class 2 Fracture – A Questionnaire-based Survey', *The Open Dentistry Journal*, pp. 59–65. doi: 10.2174/1874210602014010059.
- [12] Kojima, K. et al. (2004) 'Success rate of endodontic treatment of teeth with vital and nonvital pulps. A meta-analysis', *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*, 97(1), pp. 95–99.
- [13] Kumar, D. and Antony, S. (2018) 'Calcified Canal and Negotiation-A Review', *Journal of pharmacy research*. indianjournals.com. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=11&issue=8&article=088>.
- [14] Manohar, M. P. and Sharma, S. (2018) 'A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists', *Indian journal of dental research: official publication of Indian Society for Dental Research*. Medknow Publications and Media Pvt. Ltd., 29(6), p. 716.
- [15] Mobeen, N. (2015) 'Incidence of Common Periapical Lesions-An Intra Oral Periapical Radiographic Study', *Research journal of pharmaceutical, biological and chemical sciences*. *Journal of Pharmaceutical Sciences and Research*, 7(8), p. 590.
- [16] Nandakumar, M. and Nasim, I. (2018) 'Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis', *Journal of conservative dentistry: JCD*, 21(5), pp. 516–520.
- [17] Noor, S. S. S. E., S Syed Shihaab and Pradeep (2016) 'Chlorhexidine: Its properties and effects', *Research Journal of Pharmacy and Technology*, p. 1755. doi: 10.5958/0974-360x.2016.00353.x.
- [18] Özbaş, H., Aşçı, S. and Aydın, Y. (2011) 'Examination of the prevalence of periapical lesions and technical quality of endodontic treatment in a Turkish subpopulation', *Oral surgery, oral medicine, and oral pathology*. Elsevier. Available at: <https://www.sciencedirect.com/science/article/pii/S107921041100014X>.
- [19] Pigg, M. et al. (2016) 'Validity of Preoperative Clinical Findings to Identify Dental Pulp Status: A National Dental Practice-Based Research Network Study', *Journal of endodontia*, 42(6), pp. 935–942.
- [20] Rajakeerthi, R. and Ms, N. (2019) 'Natural Product as the Storage medium for an avulsed tooth—A Systematic Review', *Cumhuriyet Dental Journal*. dergipark.org.tr. Available at: <https://dergipark.org.tr/en/pub/cumudj/issue/45584/525182>.
- [21] Rajendran, R. et al. (2019) 'Comparative Evaluation of Remineralizing Potential of a Paste Containing Bioactive Glass and a Topical Cream Containing Casein Phosphopeptide-Amorphous Calcium

Phosphate: An in Vitro Study’, Pesquisa Brasileira em Odontopediatria e Clínica Integrada, pp. 1–10. doi: 10.4034/pboci.2019.191.61.

[22] Ramamoorthi, S., Nivedhitha, M. S. and Divyanand, M. J. (2015) ‘Comparative evaluation of postoperative pain after using endodontic needle and EndoActivator during root canal irrigation: A randomised controlled trial’, Australian endodontic journal: the journal of the Australian Society of Endodontology Inc, 41(2), pp. 78–87.

[23] Ramanathan, S. and Solete, P. (2015) ‘Cone-beam Computed Tomography Evaluation of Root Canal Preparation using Various Rotary Instruments: An in vitro Study’, The journal of contemporary dental practice, 16(11), pp. 869–872.

[24] Ravinthar, K. (2018) ‘Recent Advancements in Laminates and Veneers in Dentistry’, Research Journal of Pharmacy and Technology. indianjournals.com. Available at: <http://www.indianjournals.com/ijor.aspx?target=ijor:rjpt&volume=11&issue=2&article=070>.

[25] Siddique, R. and Sureshbabu, N. M. (2019) ‘Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi’, Journal of. ncbi.nlm.nih.gov. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6385576/>.

[26] Teja, K. V. and Ramesh, S. (2019) ‘Shape optimal and clean more’, Saudi Endodontic Journal. Medknow Publications and Media Pvt. Ltd., 9(3), p. 235.

[27] Teja, K. V., Ramesh, S. and Priya, V. (2018) ‘Regulation of matrix metalloproteinase-3 gene expression in inflammation: A molecular study’, Journal of conservative dentistry: JCD, 21(6), pp. 592–596.

[28] Vanka, A. et al. (2010) ‘Analysis of Reporting Pattern in Children Aged 7 to 14 Years with Traumatic Injuries to Permanent Teeth’, International journal of clinical pediatric dentistry, 3(1), pp. 15–19.

TABLES AND FIGURES:

AGE	FREQUENCY	PERCENTAGE
11-20	31	13
21-30	78	32.8
31-40	56	23.5
41-50	35	14.7
51-60	25	10.5
61-70	12	5.0
71-80	1	0.4
TOTAL	238	100

Table 1 : The frequency and percentage distribution of non vital teeth among different age groups

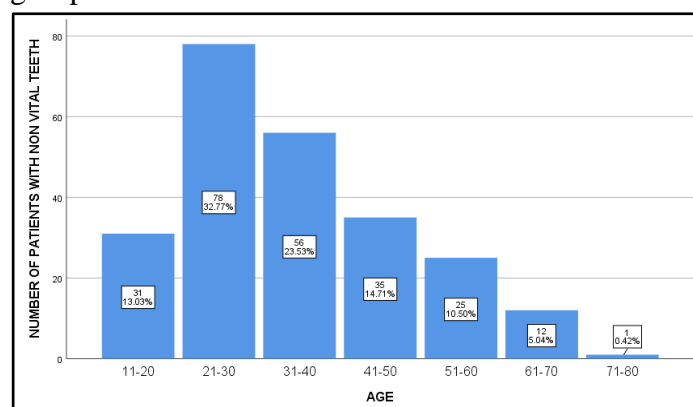


Figure 1: Bar graph showing the age wise distribution of patients with non vital teeth. X axis - age in years ; Y axis - number of patients with non vital teeth. Descriptive analysis showed there is higher distribution percentage of non vital teeth among 21-30 years (32.77%) and least prevalence of non vital teeth among 71-80 years.(0.42%)

GENDER	FREQUENCY	PERCENTAGE
MALE	171	71.8
FEMALES	67	28.2
TOTAL	238	100

Table 2: The frequency and percentage distribution of non vital teeth among males and females

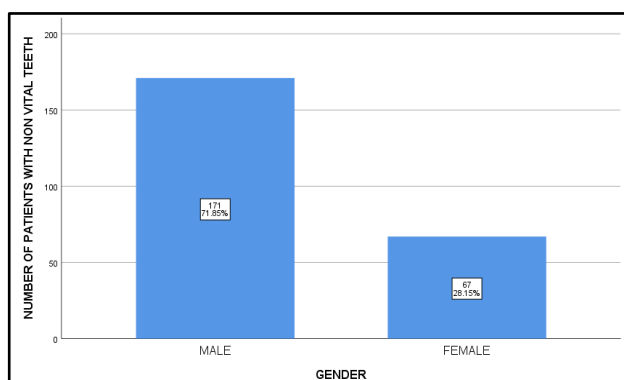


Figure 2 : Bar graph showing the percentage distribution of non vital teeth among gender. X axis- gender (males/females) ; Y axis - number of patients with non vital teeth. Descriptive analysis showed there is higher distribution percentage of non vital teeth among males (71.85%) than females.(28.15%)

NON VITAL TEETH	FREQUENCY	DISTRIBUTION
WITHOUT PERIAPICAL LESION	177	74.4
CHRONIC PULPITIS	6	2.5
INTERNAL RESORPTION	1	0.4
PERIAPICAL ABSCESS	34	14.3
SINUS TRACT	2	0.8
PERIAPICAL CYST	7	2.9
CALCIFIED CANAL	7	2.9
ELLIS VI	2	0.8
ELLIS VII	2	0.8
TOTAL	238	100

Table3: The frequency and percentage distribution of non vital teeth with endodontic pathology

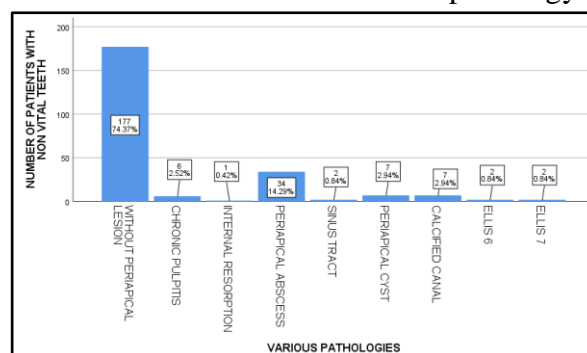


Figure 3: Bar graph showing the percentage distribution of non vital teeth with endodontic pathologies. X axis - various endodontic pathologies ; Y axis - number of patients with non vital teeth. Descriptive analysis showed there was higher prevalence among non vital teeth without

periapical lesion (74.37%). Among the prevalence of non vital teeth with periapical pathology , the higher prevalence was found to be periapical abscess.(14.29%) and the least prevalence was found to be internal resorption.(0.42%)

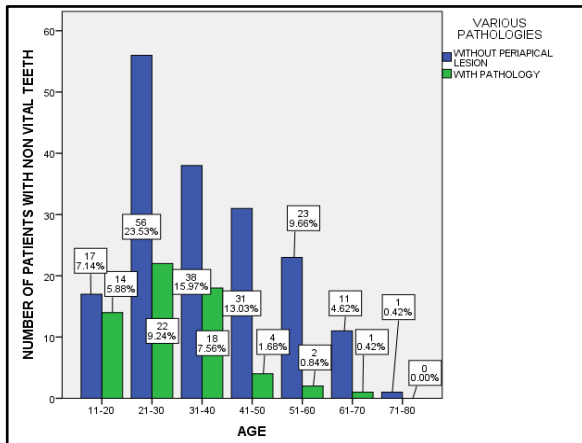


Figure 4: Bar graph showing the association of non vital teeth among different age groups. X axis - age in years and Y axis - number of patients with non vital teeth. The higher prevalence of non vital teeth without periapical lesion (blue) was seen among 21-30 years.(23.5%) and higher prevalence of non vital teeth with endodontic pathology (green) was seen among 21-30 years.(9.24%). Chi square analysis (pearson chi square - 46.209^a ;df :48 ;p = 0.546) , (p>0.05) showed there was no statistically significant association between age and non vital teeth.

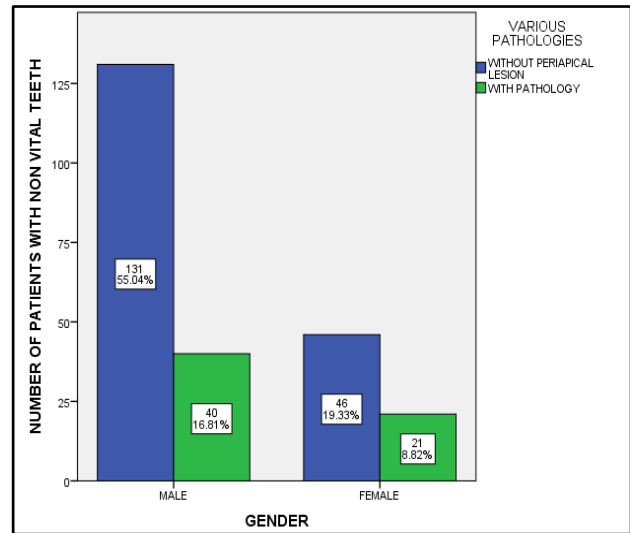


Figure 5: Bar graph showing the association of non vital among gender. X axis - gender (males/females) ; Y axis - number of patients with non vital teeth. The higher prevalence of non vital teeth without periapical lesion (blue) was seen among males (55.04%) and the higher prevalence of non vital teeth with endodontic pathology (green) was seen among males (16.81%). Chi square analysis (Pearson chi square - 11.112^a ;df :8 ; p value- 0.195), (p>0.05) showed there was no statistically significant association between gender and non vital teeth.