International Journal of Psychosocial Rehabilitation, Vol. 23, Issue 6, 2019
ISSN: 1475-7192

PREVALENCE OF GINGIVAL HYPERPIGMENTATION AMONG OLDER INDIVIDUALS MORE THAN 40 YEARS OF AGE

T.Santhosh, Dr[1]. Kaarthikeyan .G[2], Dr. Sankari malaiappan[3]

Abstract

Hyperpigmentation of the gingiva is caused by excessive melanin deposition by the melanocytes mainly located in the basal and suprabasal cell layers of the epithelium. It can also be caused by some systemic disorders. Sometimes pigmentations are due to the skin tone of the particular individual. The prevalence of gingival hyperpigmentation among older individuals still remains an area of study where it should be fully investigated. The main purpose of this study is to evaluate the prevalence of gingival hyperpigmentation among individuals more than 40 years of age. Data retrieved from saveetha dental college. Diagnostic photographs both intra oral frontal and intra oral lateral photographs of 100 patients were retrieved and assessed with the help of SPSS software. The findings of this study shows that there is no age and gender correlation with pigmentation. Thus our study concludes that there is moderate to severe gingival pigmentation among older individuals and it has become one of the esthetic concerns among people. With the emergence of depigmentation treatment as one of the important aray of periodontal therapy..

Keywords: *Esthetics; Gingival Hyperpigmentation; Melanin pigmentation.*

Introduction

A smile expresses a feeling of joy, success, sensuality, affection and courtesy, and can express one's self confidence and kindness. Harmony of the smile not only depends on shape, colour and position of the teeth, but also influenced by gingival tissues. Health and appearance of gingival tissues plays a major role in an esthetic smile [1]. The gingiva is the most commonly pigmented tissue of the oral cavity. Esthetics in dentistry means not only to get whiter teeth, but to create a Pink Gingiva, is always a daunting task for the treating Periodontist. Normal colour of gingiva is coral pink [2,3]. Esthetics of the intra oral soft tissue has become a significant aspect of dentistry and clinicians are faced with achieving acceptable and good gingival esthetics. On the

[1] Saveetha Dental College and hospitals, Saveetha Institute of Medical and Technical Sciences(SIMATS), Saveetha university, Chennai - 600 077, Tamilnadu, India, 151301093.sdc@savaatha.com.

[2] Corresponding author : Professor, Department of periodontics, Saveetha Dental College and hospitals, Saveetha Institute of Medical and Technical Sciences(SIMATS), Saveetha university, Chennai - 600 077, Tamilnadu, India, kaarthikeyan@saveetha.com

[3]Professor, Department of periodontics, Saveetha Dental College and hospitals, Saveetha Institute of Medical and Technical Sciences(SIMATS), Saveetha university, Chennai - 600 077, Tamilnadu, India, sankari@saveetha.com.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

increasing demand of esthetics, numerous procedures have been performed such as gingivectomy, gingivoplasty, connective tissue grafting, and guided tissue regeneration to improve gingival esthetics [4]. Although the color of the gingiva plays an important role in overall esthetics, the principles and the techniques of the management of the problems associated with gingival melanin pigmentation (GMP) are still not established [5]. Gingival hyperpigmentation is a condition in which part or whole of the gingiva is darkly pigmented in contrast to the pink or coral pink pigmentation [6]. It is caused by excessive deposition of melanin in the basal and suprabasal cell layers of the epithelium [7]. These melanocytes are dendritic unattached to the surrounding epithelial cells. These melanocytes when becomes active convert tyrosine to melanin protein which is then transferred to the basal and prickle cell layers [8].

Hyperpigmentation can be caused due to a variety of local and systemic factors. Some of the Systemic conditions are endocrine disturbance, Albright's syndrome, malignant melanoma, antimalarial therapy, Peutz-Jeghers syndrome, trauma, hemochromatosis, chronic pulmonary disease [9]. Mucosal diseases in particular lichen planus can cause mucosal pigmentation which is clinically seen as multiple brown–black-pigmented areas adjacent to reticular or erosive lesions of lichen planus [10]. Although gingival melanin pigmentation does not represent a pathological problem, patients with a gummy smile or excessive gingival display usually complain of a "black gum" and request cosmetic therapy [11].

Skin tone is also a known cause of oral melanin pigmentation. High levels of oral melanin pigmentation are seen normally in individuals of African, East Asian, or Hispanic ethnicity [12]. In general, individuals with fair skin will not demonstrate overt tissue pigmentation, although comparable numbers of melanocytes are present within their gingival epithelium [13]. Smoking has been found to be associated with the provocation of the melanocytes to produce melanin [14]. This happens upon stimulation by polycyclic amines like nicotine and benzopyrenes that happen to be present in the tobacco, which are known to penetrate into the oral mucosa and bind to melanin [2]. The term ''smoker's melanosis'' has been used to describe a benign focal melanin pigmentation usually present in the attached gingiva among tobacco smokers, which was described in previous literature [15]. This condition is not associated with any form of genetic factors, medical conditions, or the use of therapeutic medications [16].

Classification of gingival pigmentation according to Dummett et al ranges from no pigmentation through to mild and moderate pigmentation to severe form of gingival hyperpigmentation [17]. Clinically, the hyperpigmentation can appear as a bilateral, well demarcated, ribbon-like, or dark brown band. Mucosal colour can range from light to dark brown [18]. The attached gingiva is the most common intraoral site for melanin pigmentation and usually the marginal gingiva seems to be not affected. The buccal mucosa, hard palate, lips and tongue may also be affected [19]. The hyperpigmentation has been noted to be more in the incisor regions and decreases posteriorly. There are several management modalities for gingival pigmentation unknown to the public and dental practitioners and they comprises of gingivectomy with free gingival autografting, surgical depigmentation, electrosurgery, cryotherapy, and with the help of some lasers Nd:YAG lasers, diode laser, argon laser, CO2 laser [20].

There is insufficient knowledge on prevalence of gingival hyperpigmentation in tamilnadu.

Particularly prevalence of gingival hyperpigmentation among older individuals still remains to be fully investigated. The findings from this study can help dentists to gain knowledge about gingival pigmentation.

MATERIALS AND METHOD:

The case records of 86000 patients visiting Saveetha Dental College were analysed and a total of 100 patients with

gingival pigmentation were analysed. All the data of 100 patients who visited saveetha dental college were retrieved retrospectively. Ethical clearance: Ethical clearance was obtained from the research ethical board of saveetha dental college prior to the study.Sample size was estimated to be 100 patients who visited saveetha dental college between june 2019 to april 2020 were selected for review. The case sheets were analysed for the following variables of age, gender, diagnostic photographs were analysed. In case of doubts or discordance of Data, the patients were contacted over the phone or asked to report back to the College to confirm the findings.

Inclusion criteria:

- Patients above 40 years of age
- Proper diagnostic photographs with proper lighting

Exclusion criteria:

- Patient with other oral lesions.
- Patients below the age of 40 years.

All the statistics and analysis were done using SPSS software (version 2019). All the descriptive analysis such as mean standard deviation and percentages were used to present the number of male and female subjects and demographic variables. Chi square test was used to establish correlation between categorical variables. P (<0.05) was set to be statistically significant.

The internal validity of the study was established as the data was collected from a verifiable and standardised database. The external validity is established as the data is from a clinical setup which is duplicatable.

RESULTS:

Among all the 100 subjects. More number of subjects were found to be in the range between 41 to 50 years of age with 48% (Figure 1). No of males (n=57) and females (n=43) (Figure 2). Qualitative analysis of pigmentation: 100 subjects were evaluated and indexed using dummett et al classification and found patients above 40 year of age have a high prevalence of gingival hyperpigmentation. Mild, moderate and severe accounts (n=74) of total 100 subjects evaluated. Only 26 subjects had no gingival pigmentation (Figure 3)(4,5,6,7). Gender predilection of pigmentation: Both male and female showed equal percentages of cases with no, mild, moderate, severe pigmentation, however male had more numbers of moderate pigmentation (19%). Pearson chi square test was done p-0.233 (>0.05) not statistically significant. No gender predominance is found in the prevalence of gingival hyperpigmentation (Figure 8). Association between age and gingival pigmentation: shows that the age group of 41-50 have more number of cases with severe pigmentation (16%). Association was assessed by chi square test; p-0.117 (>0.05), not statistically significant.

DISCUSSION:

Melanin pigmentation often occurs in the gingiva as a result of an abnormal or increased deposition of melanin [21]. Brown or dark pigmentation and discoloration of gingival tissue, whether of a physiologic or pathologic nature, can be caused by a variety of local and systemic factors. This type of pigmentation is symmetric and it is found to be persistent, and it does not alter normal structures of gingiva. This pigmentation may be seen across all races and at any age, and has no gender predilection [22]. Dummett proposed that the degree of pigmentation is directly related to the mechanical, chemical, physiologic stimulators of melanocytes. Fair skinned and dark skinned people have the same levels of melanocytes but, the difference depends upon the activity of melanocytes [23]. It has been reported

that gingiva is the most commonly pigmented site in the oral cavity and children are less affected than adults. Pigmentation is caused by physiologic pigmentation and it causes an esthetic concern for the adults leading to formation of "Black Gingiva". Pigmentation can be seen due to drugs, smoking, heavy metals, bronze diabetes, HIV infection and other diseases.In this study we analysed the gingival pigmentation in 100 patients from 40 to 90 years of age. We found (n=51) half of the study subjects belongs to the age group of 41-50 years of age. (n=27) belongs to the age group of 51-60 years of age. And fewer number of subjects from the rest of the age groups.Gingival pigmentation is seen as a genetic trait in some populations [24]. The prevalence of melanin pigmentation varies between 0% to 89%. Secondary influences can be smoking [18].

Among the same ethinic people or race the pigmentation depends on megaloblastic activity [25]. Melanin, eumelanin, pheomelanin, and neuromelanin are the common types. In general people who lived for longer periods have more pigmentation [7].The distribution of gingival pigmentation is unique in south indians. In this study we observed patients above 40 years of age have moderate to severe pigmentation [26]. A Particular age range of (41-50) years shows severe pigmentation which contradicts the previous studies.This study also shows there is no particular difference between male and female gender which is similar to the previous studies [27]. In this present study age is correlated with pigmentation generally and there was no specific correlation seen. These findings could be attributed that there is no variation within a specific ethnic group. Small sample size and no direct patient evaluation were found to be the limitations of this study.

CONCLUSION:

Gingival pigmentation has become one of the concerns among people. With the emergence of depigmentation treatment as one of the important aray of periodontal therapy. The findings of this study conclude that there is no age and gender correlation with pigmentation.More studies with larger patients samples needed to be done in future including skin tone, smoking habits in this specific ethinic group.

AUTHOR CONTRIBUTIONS:

Santosh had contributed to the design of the study, data collection, analysis of data, results tabulation, manuscript preparation.

Kaarthikeyan had contributed to the design of the study, analysis of data, results, manuscript preparation.

Sankari had contributed to the design of the study, manuscript preparation, proofreading of the manuscript.

CONFLICT OF INTEREST:

This research project is self funded and is not sponsored or aided by any third party.There is no conflict of interest.

REFERENCES:

1. Priyanka S, Kaarthikeyan G, Nadathur JD, Mohanraj A, Kavarthapu A. Detection of cytomegalovirus, Epstein-Barr virus, and Torque Teno virus in subgingival and atheromatous plaques of cardiac patients with chronic periodontitis. J Indian Soc Periodontol [Internet]. 2017 Nov;21(6):456–60. Available from: http://dx.doi.org/10.4103/jisp.jisp_205_17

2. Hedin CA, Axéll T. Oral melanin pigmentation in 467 Thai and Malaysian people with special emphasis on smoker's melanosis. J Oral Pathol Med [Internet]. 1991 Jan;20(1):8–12. Available from: http://dx.doi.org/10.1111/j.1600-0714.1991.tb00879.x

3. Hedin CA, Pindborg JJ, Axéll T. Disappearance of smoker's melanosis after reducing smoking. J Oral Pathol Med [Internet]. 1993 May;22(5):228–30. Available from: http://dx.doi.org/10.1111/j.1600-0714.1993.tb01061.x

4. Tamizí M, Taheri M. Treatment of severe physiologic gingival pigmentation with free gingival autograft. Quintessence Int [Internet]. 1996;27(8). Available from: http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=00336572&AN=38506436&h=FvDGOpcezA5%2FW%2B0JXL254OXl9GX%2FmlyKaF8%2BqH8kpPIAFdHw8B5TChm621Ejfh8xxau8%2BHIHIK%2B8Cy6aNi9qYg%3D%3D&crl=c

5. Ramesh A, Vellayappan R, Ravi S, Gurumoorthy K. Esthetic lip repositioning: A cosmetic approach for correction of gummy smile - A case series. J Indian Soc Periodontol [Internet]. 2019 May;23(3):290–4. Available from: http://dx.doi.org/10.4103/jisp.jisp_548_18

6. Varghese SS, Thomas H, Jayakumar ND, Sankari M, Lakshmanan R. Estimation of salivary tumor necrosis factor-alpha in chronic and aggressive periodontitis patients. Contemp Clin Dent [Internet]. 2015 Sep;6(Suppl 1):S152–6. Available from: http://dx.doi.org/10.4103/0976-237X.166816

7. Ramesh A, Varghese SS, Jayakumar ND, Malaiappan S. Chronic obstructive pulmonary disease and periodontitis--unwinding their linking mechanisms. J Oral Biosci [Internet]. 2016;58(1):23–6. Available from: https://www.sciencedirect.com/science/article/pii/S1349007915001103

8. Ramesh A, Varghese SS, Doraiswamy JN, Malaiappan S. Herbs as an antioxidant arsenal for periodontal diseases. J Intercult Ethnopharmacol [Internet]. 2016 Jan;5(1):92–6. Available from: http://dx.doi.org/10.5455/jice.20160122065556

9. Ramamurthy J, Mg V. COMPARISON OF EFFECT OF HIORA MOUTHWASH VERSUS CHLORHEXIDINE MOUTHWASH IN GINGIVITIS PATIENTS: A CLINICAL TRIAL. Asian J Pharm Clin Res [Internet]. 2018;11(7):84–8. Available from: https://pdfs.semanticscholar.org/1c22/6e98fc99e9fb99bc749ae5d553024fa93052.pdf

10. Kavarthapu A, Thamaraiselvan M. Assessing the variation in course and position of inferior alveolar nerve among south Indian population: A cone beam computed tomographic study. Indian J Dent Res [Internet]. 2018 Jul;29(4):405–9. Available from: http://dx.doi.org/10.4103/ijdr.IJDR_418_17

11. Khalid W, Vargheese SS, Lakshmanan R, Sankari M, Jayakumar ND. Role of endothelin-1 in periodontal diseases: A structured review. Indian J Dent Res [Internet]. 2016 May;27(3):323–33. Available from: http://dx.doi.org/10.4103/0970-9290.186247

12. Khalid W, Varghese SS, Sankari M, Jayakumar ND. Comparison of Serum Levels of Endothelin-1 in Chronic Periodontitis Patients Before and After Treatment. J Clin Diagn Res [Internet]. 2017 Apr;11(4):ZC78–81. Available from: http://dx.doi.org/10.7860/JCDR/2017/24518.9698

13. Schroeder HE. Melanin containing organelles in cells of the human gingiva I. Epithelial Melanocytes. J Periodontal Res [Internet]. 1969 Feb;4(1):1–18. Available from: http://doi.wiley.com/10.1111/j.1600-0765.1969.tb01940.x

14. Ravi S, Malaiappan S, Varghese S, Jayakumar ND, Prakasam G. Additive Effect of Plasma Rich in Growth Factors With Guided Tissue Regeneration in Treatment of Intrabony Defects in Patients With Chronic Periodontitis: A Split-Mouth Randomized Controlled Clinical Trial. J Periodontol [Internet]. 2017 Sep;88(9):839–45. Available from: http://dx.doi.org/10.1902/jop.2017.160824

15. Mootha A, Malaiappan S, Jayakumar ND, Varghese SS, Toby Thomas J. The Effect of Periodontitis on Expression of Interleukin-21: A Systematic Review. Int J Inflam [Internet]. 2016 Feb 22 [cited 2020 Jun 6];2016. Available from: https://www.hindawi.com/journals/iji/2016/3507503/abs/

16. Panda S, Jayakumar ND, Sankari M, Varghese SS, Kumar DS. Platelet rich fibrin and xenograft in treatment of intrabony defect. Contemp Clin Dent [Internet]. 2014 Oct;5(4):550–4. Available from: http://dx.doi.org/10.4103/0976-237X.142830

17. Avinash K, Malaippan S, Dooraiswamy JN. Methods of Isolation and Characterization of Stem Cells from Different Regions of Oral Cavity Using Markers: A Systematic Review. Int J Stem Cells [Internet]. 2017 May 30;10(1):12–20. Available from: http://dx.doi.org/10.15283/ijsc17010

18. Dummett CO, Barens G. Oromucosal pigmentation: an updated literary review. J Periodontol [Internet]. 1971 Nov;42(11):726–36. Available from: http://dx.doi.org/10.1902/jop.1971.42.11.726

19. Çiçek Y, Ertaş U. The normal and pathological pigmentation of oral mucous membrane: a review. J Contemp Dent Pract [Internet]. 2003 Aug 15;4(3):76–86. Available from: https://www.ncbi.nlm.nih.gov/pubmed/12937598

20. Moravej-Salehi E, Moravej-Salehi E, Hajifattahi F. Relationship of Gingival Pigmentation with Passive Smoking in Women. Tanaffos [Internet]. 2015;14(2):107–14. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26528364

21. Ramesh A, Ravi S, Kaarthikeyan G. Comprehensive rehabilitation using dental implants in generalized aggressive periodontitis. J Indian Soc Periodontol [Internet]. 2017 Mar;21(2):160–3. Available from: http://dx.doi.org/10.4103/jisp.jisp_213_17

22. Thamaraiselvan M, Elavarasu S, Thangakumaran S, Gadagi JS, Arthie T. Comparative clinical evaluation of coronally advanced flap with or without platelet rich fibrin membrane in the treatment of isolated gingival recession. J Indian Soc Periodontol [Internet]. 2015 Jan;19(1):66–71. Available from: http://dx.doi.org/10.4103/0972-124X.145790

23. Haresaku S, Hanioka T, Tsutsui A, Watanabe T. Association of lip pigmentation with smoking and gingival melanin pigmentation. Oral Dis [Internet]. 2007 Jan;13(1):71–6. Available from: http://dx.doi.org/10.1111/j.1601-0825.2006.01249.x

24. Rosa DSA, Aranha ACC, de Paula Eduardo C, Aoki A. Esthetic treatment of gingival melanin hyperpigmentation with Er: YAG laser: Short-term clinical observations and patient follow-up. J Periodontol [Internet]. 2007;78(10):2018–25. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1902/jop.2007.070041

25. Prasad SS, Agrawal N, Reddy NR. Gingival depigmentation: A case report. People's J Sci Res [Internet]. 2010;3(1):27–9. Available from: https://www.pjsr.org/abstract-PDF/Dr.%20Neeraj%20Agrawal.pdf

26. Prasad D, Sunil S, Mishra R, Sheshadri. Treatment of gingival pigmentation : A case series. Indian J Dent Res [Internet]. 2005 Oct 1 [cited 2020 Jun 6];16(4):171. Available from: http://www.ijdr.in/article.asp?issn=0970-9290;year=2005;volume=16;issue=4;spage=171;epage=176;aulast=Prasad

27. Farhat Yaasmeen Sadique Basha, Rajeshkumar S, Lakshmi T, Anti-inflammatory activity of Myristica fragrans extract . Int. J. Res. Pharm. Sci., 2019 ;10(4), 3118-3120 DOI: https://doi.org/10.26452/ijrps.v10i4.1607

28. Araki S, Murata K, Ushio K, Sakai R. Dose-response relationship between tobacco consumption and melanin pigmentation in the attached gingiva. Arch Environ Health [Internet]. 1983 Nov;38(6):375–8. Available from: http://dx.doi.org/10.1080/00039896.1983.10545823

Tables and graphs:

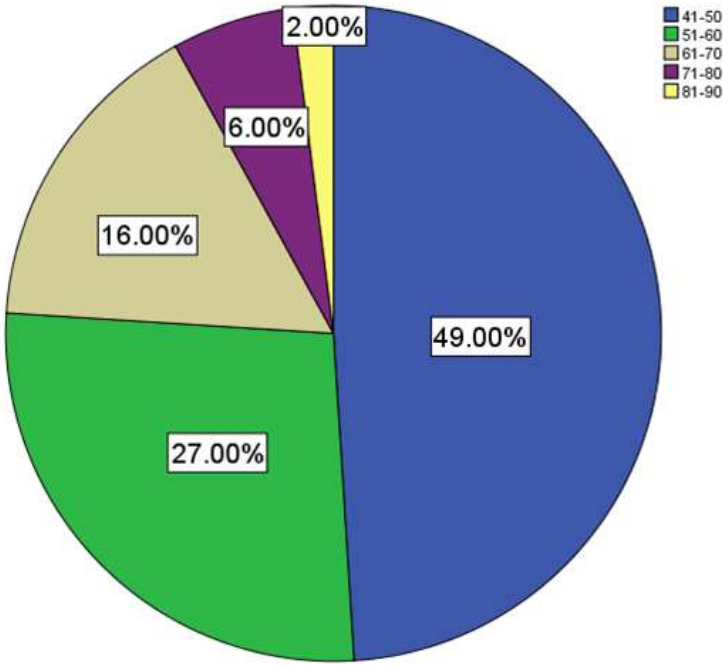

Figure 1: shows distribution of subjects among different age groups. Blue colour represents- 41-50years (49%); green represents- 51-60years (27%); sandal represents- 61-70years (16%); purple represents- 71-80years (6%); yellow represents- 81-90 (2%). Figure I inferred that the majority of the study subjects are from the age group of 41-50 years and least are from 81-90 years of age.

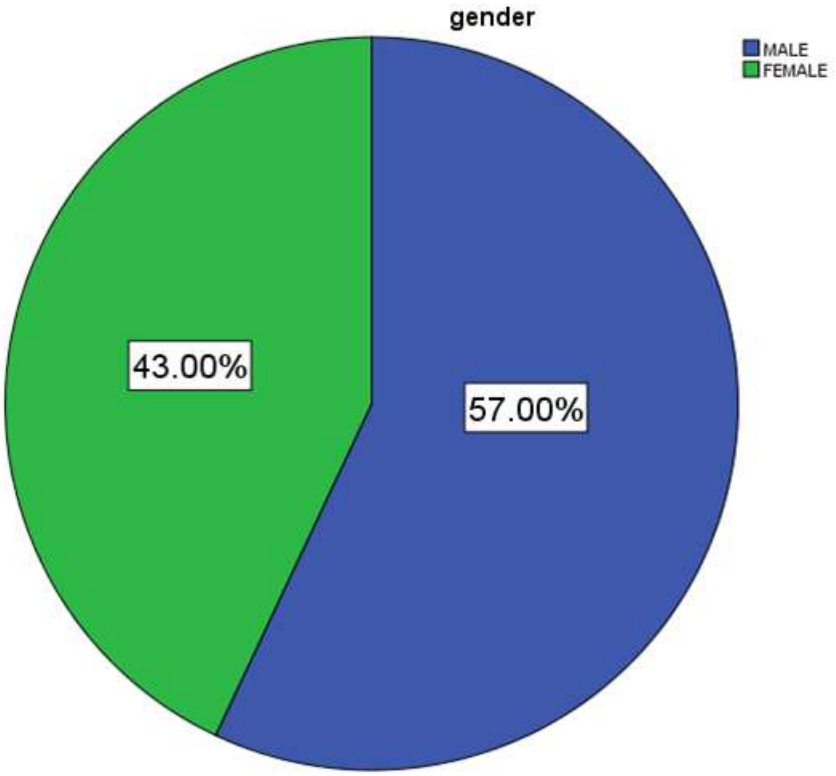

Figure 2: shows gender distribution of subjects. Blue colour represents- male (57%); green colour represents- female (43%). Figure II inferred that more numbers of male were included in this study than females.

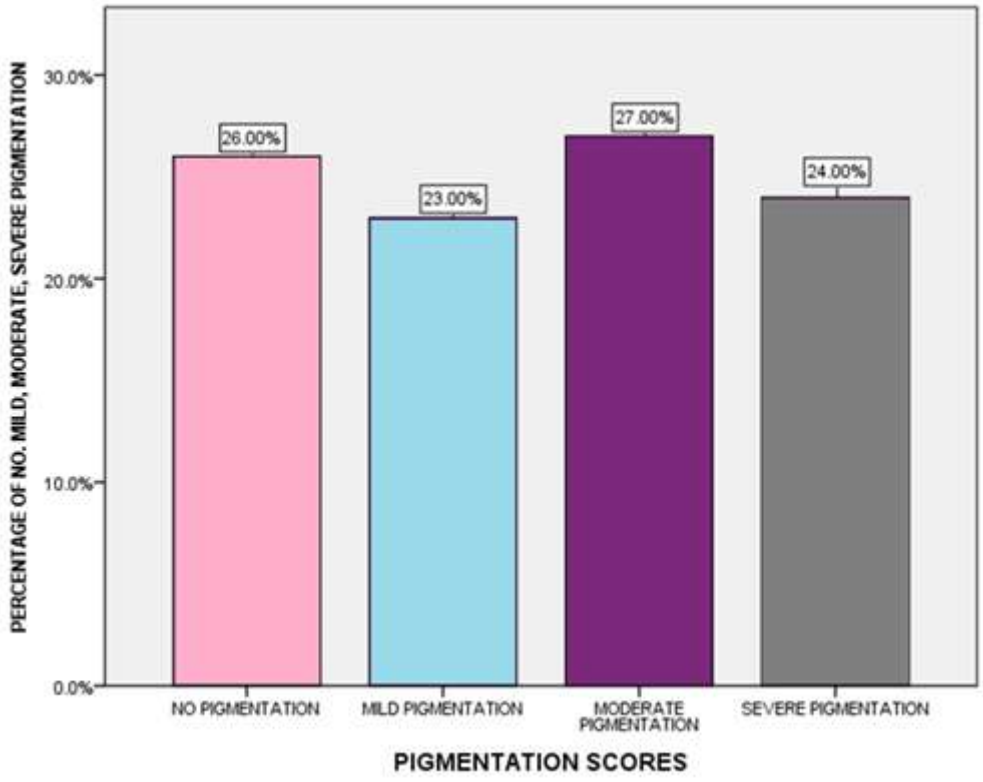

Figure 3: Bar chart shows different types of pigmentation. (X axis represents- different score os pigmentation; Y axis represents- number of cases). Pink colour represents- no pigmentation; blue represents- mild pigmentation; grey represents- moderate pigmentation; purple represents- severe pigmentation. Figure II inferred that the patients above 40 years of age had moderate gingival pigmentation in more numbers, followed by no pigmentation,severe, and mild pigmentation.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

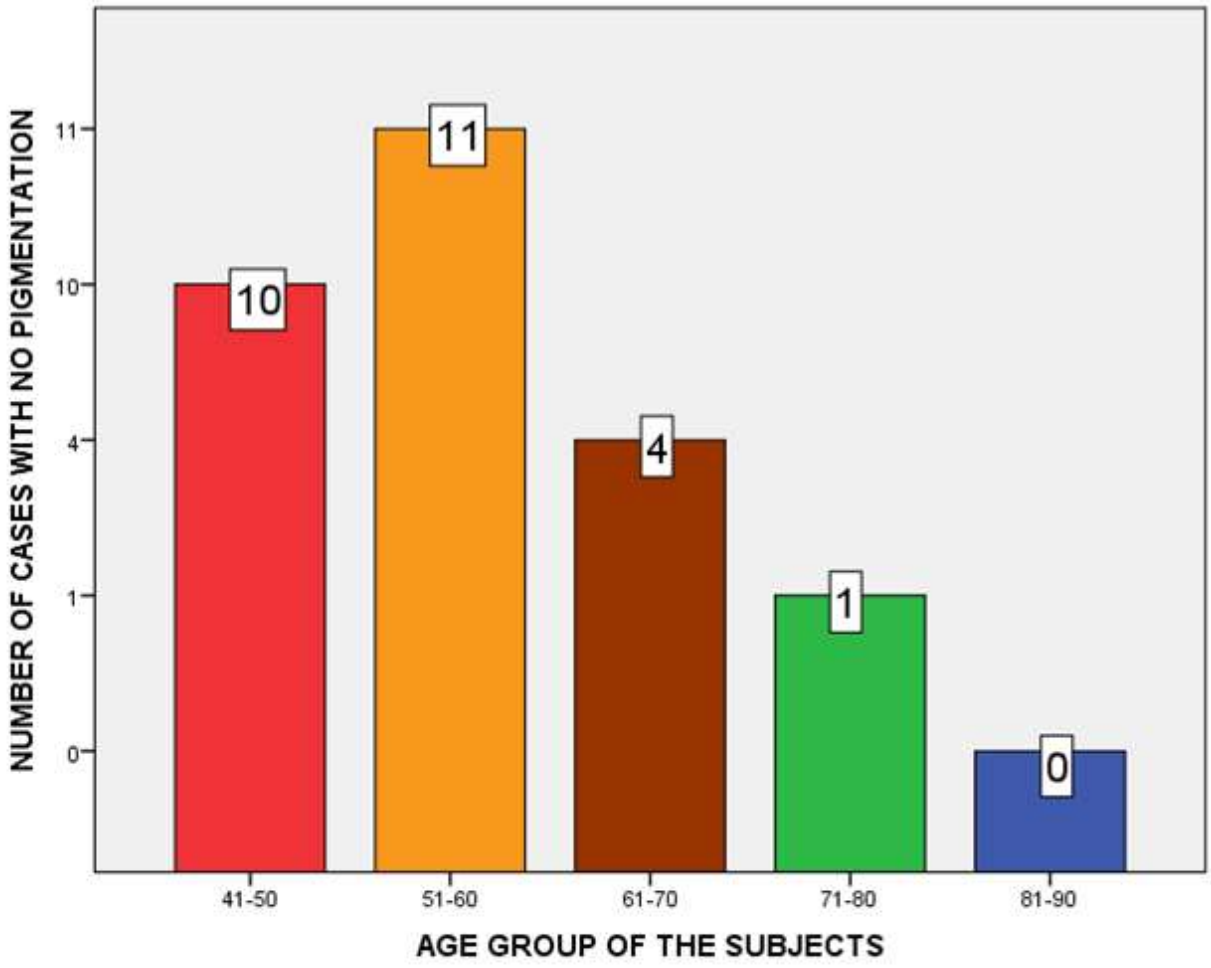

Figure 4: Bar chart shows number of cases with no pigmentation in each age group. (X axis represents- age group of the subjects; Y axis represents number of cases with no pigmentation) Figure IV infrared that more number of cases with no pigmentation are from 51-60 years of age.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

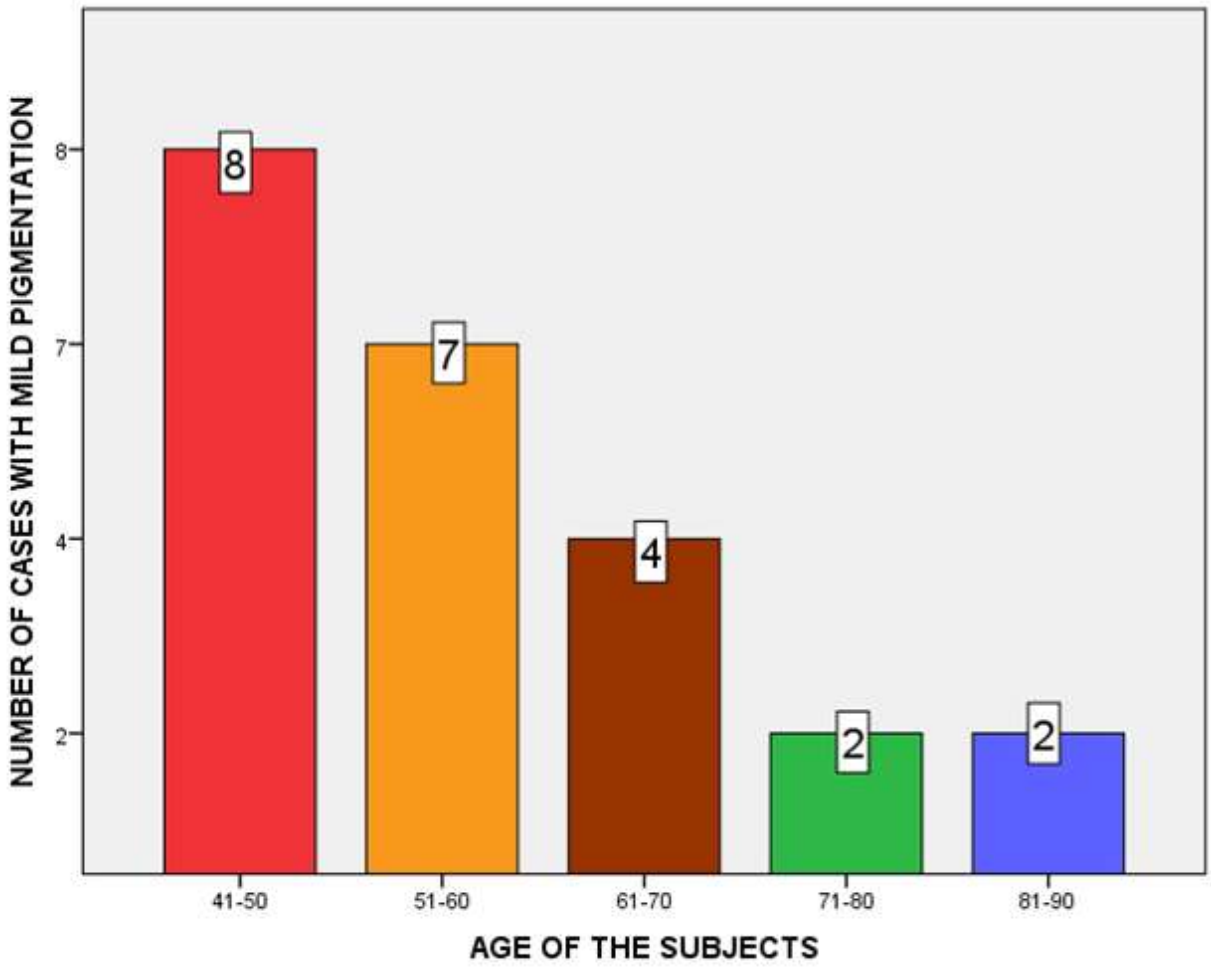

Figure 5: Bar chart shows number of cases with mid pigmentation in each age group. (X axis represents- age group of the subjects; Y axis represents number of cases with mild pigmentation) Figure IV infrared that more number of cases with mild pigmentation are from 41-50 years of age.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

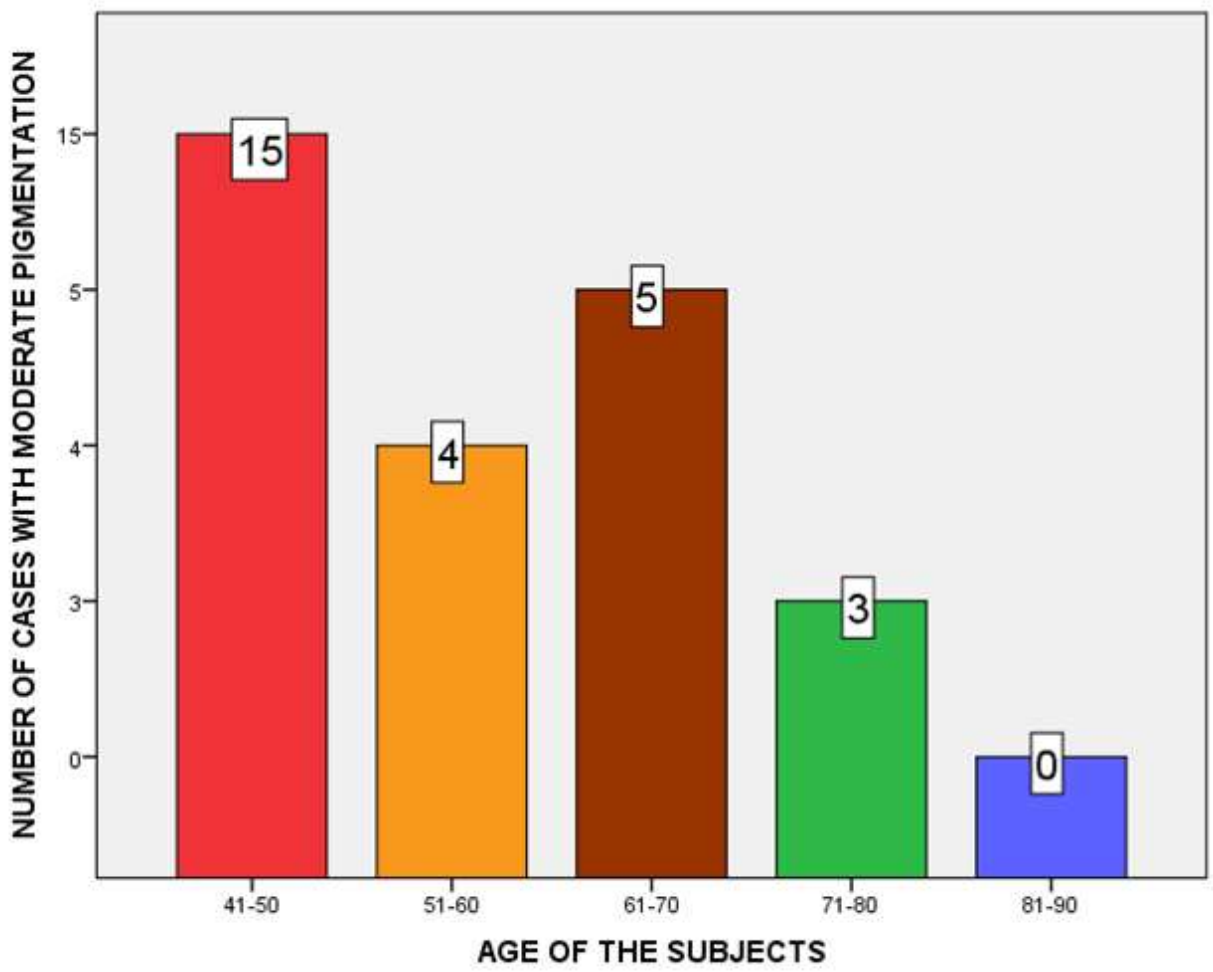

Figure 6: Bar chart shows number of cases with moderate pigmentation in each age group. (X axis represents- age group of the subjects; Y axis represents number of cases with moderate pigmentation) Figure IV infrared that more number of cases with moderate pigmentation are from 41-50 years of age. Out of 6 total subjects in the age group of 71-80years were found with moderate pigmentation.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

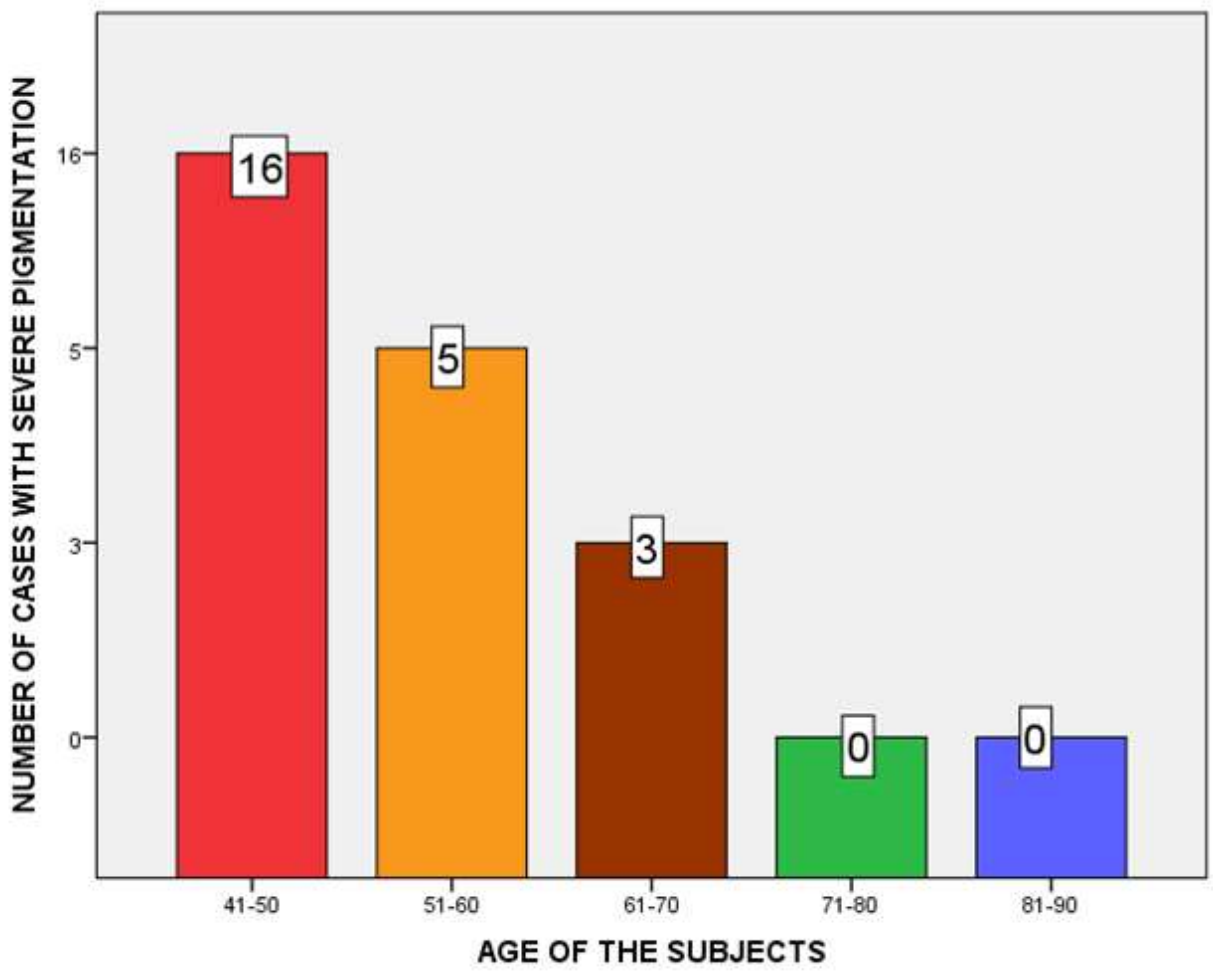

Figure 7: Bar chart shows number of cases with severe pigmentation in each age group. (X axis represents- age group of the subjects; Y axis represents number of cases with severe pigmentation) Figure IV infrared that more number of cases with severe pigmentation are from 41-50 years of age.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

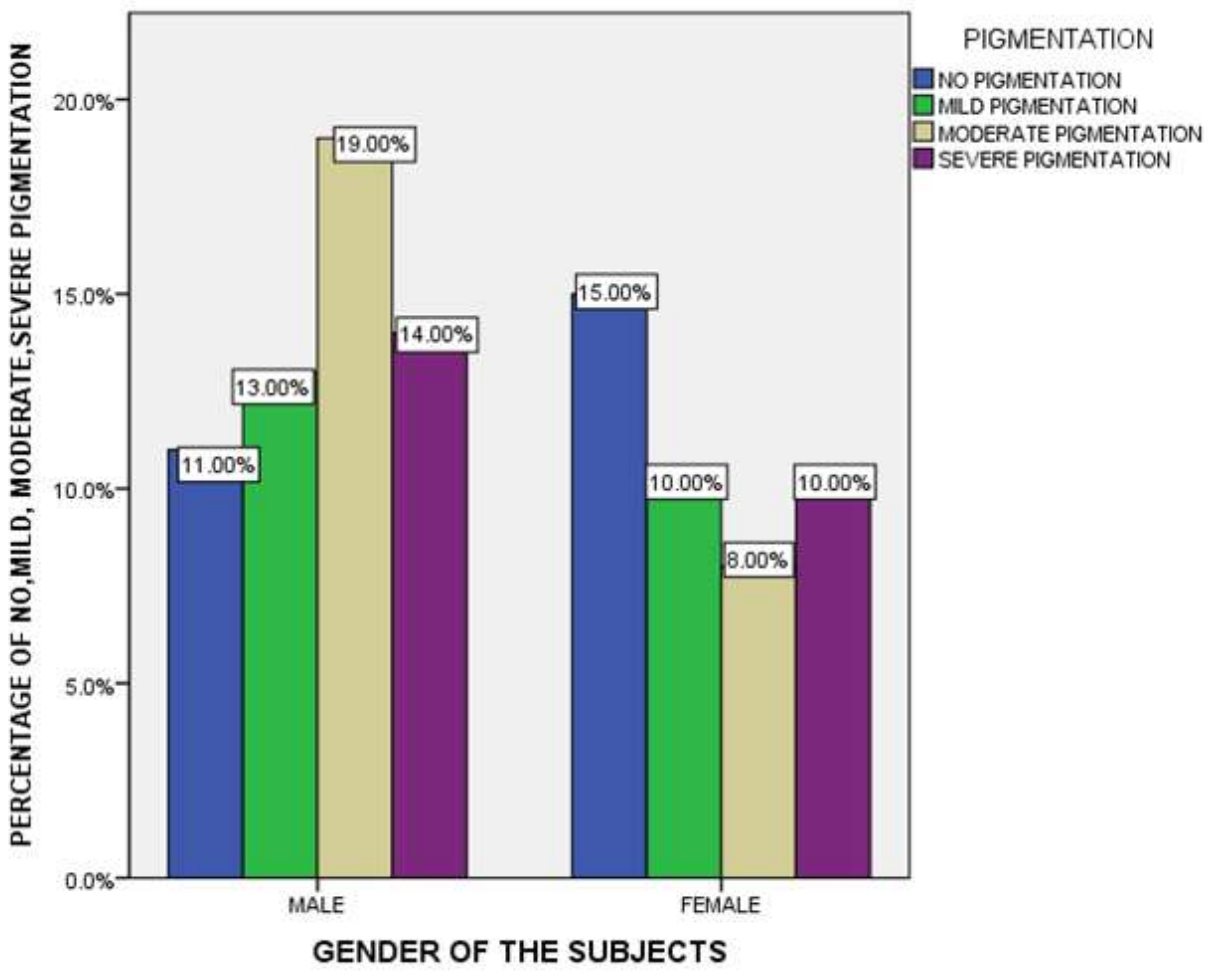

Figure 8: Bar chart shows association between gender and gingival pigmentation. (X axis represents- gender of the subjects; Y axis represents percentage of cases) Both male and female showed equal percentages of cases with no, mild, moderate, severe pigmentation, however male had more numbers of moderate pigmentation (19%). Chi square test shows no significant association between gender and gingival pigmentation ,Pearson chi square test was done p-0.233 (>0.05) not statistically significant.

Received:20 Sep 2019 | Revised: 15 Oct 2019| Accepted: 25 Nov 2019

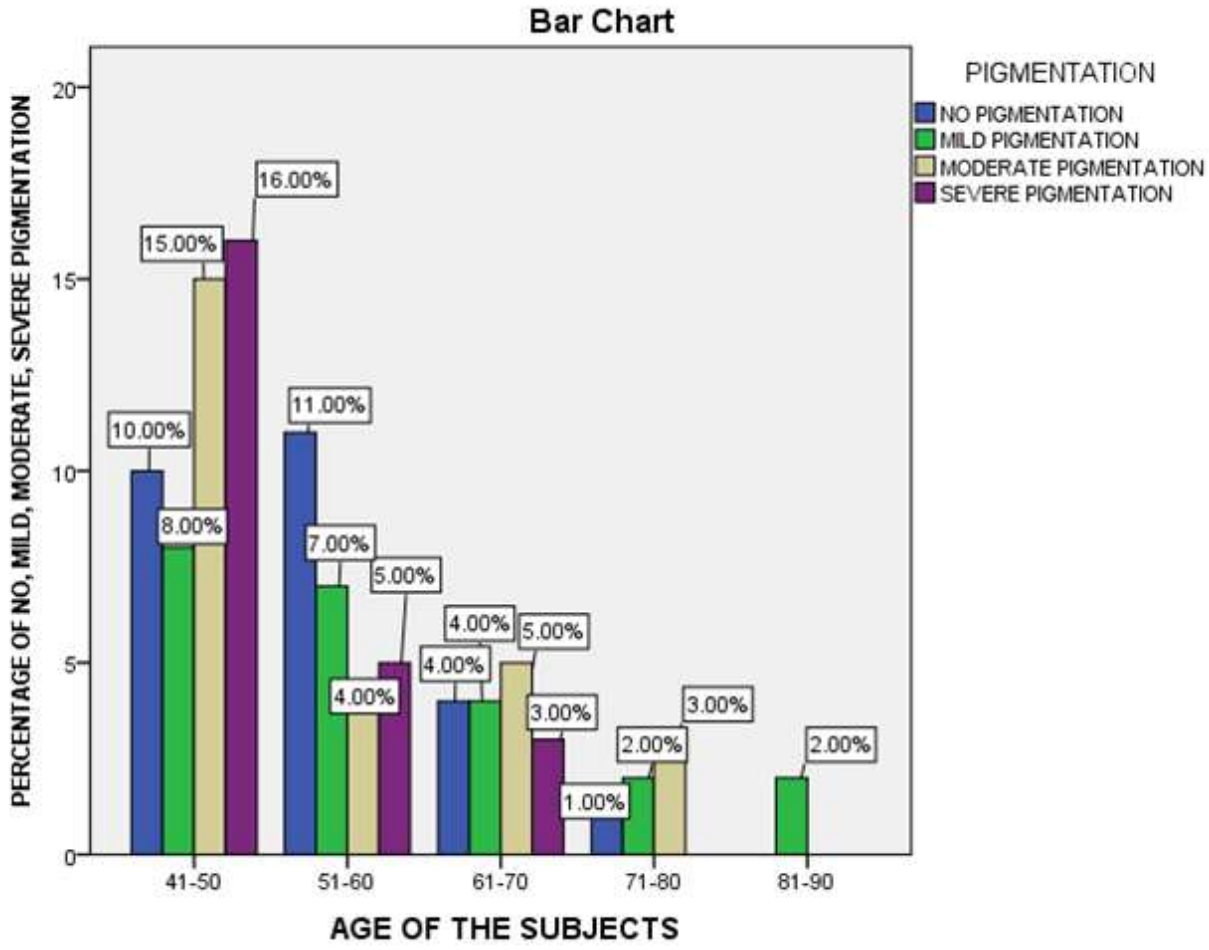

Figure 9: Bar graph represents association between age and gingival pigmentation. (X axis represents- age of the subjects; Y axis represents percentage of cases) subjects from the age group of 41-50 have more number of cases with severe pigmentation (16%, purple colour), subjects from the age group of 51-60 had more number of cases with no pigmentation (11%, blue colour). Chi square test shows no significant association between gender and gingival pigmentation ,Pearson chi square test was done p-0.117 (>0.05) not statistically significant.

Received: 12 Feb 2019 | Revised: 18 March 2020 | Accepted: 15 April 2020