European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 07, Issue 01, 2020

Cheiloscopy as A Potential Tool in the Prediction of Periodontal Diseases - A Cross Sectional Study

Madhushriee V[1]*, Manovijay B [2], Saranyan R[3], Sayee Ganesh N[4], Priya K[5], Venkatesh T[6]

[1]Post graduate, Department of Periodontology, Vinayaka Missions Sankarachariyar Dental College, Vinayaka Mission's Research Foundation [Deemed To Be University]
[2]Associate Professor, Department of Periodontology, Vinayaka Missions Sankarachariyar Dental College, Vinayaka Mission's Research Foundation [Deemed To Be University]
[3]Professor & HOD, Department of Periodontology, Vinayaka Missions Sankarachariyar Dental College, Vinayaka Mission's Research Foundation [Deemed To Be University]
[4] Professor, Department of Periodontology, Vinayaka Missions Sankarachariyar Dental College, Vinayaka Mission's Research Foundation [Deemed To Be University]
[5] Associate Professor, Department of Periodontology, Vinayaka Missions Sankarachariyar Dental College, Vinayaka Mission's Research Foundation [Deemed To Be University]
[6]Post graduate, Department of Periodontology, Vinayaka Missions Sankarachariyar Dental College, Vinayaka Mission's Research Foundation [Deemed To Be University]

Abstract: Periodontitis is a common oral disease causing destruction of the periodontal tissues prevailing in the population. Early diagnosis and preventive measures can be taken to prevent the severity of the disease. The aetiology varies from exogenous factors such as environment, various local factors or inherited genetic aberrations. Early detection of the disease is essential to prevent tooth loss and also to decrease the chances of the patient's morbidity. In recent years, demands for non – invasive and in-expensive adjunctive diagnostic techniques are increasing for early detection. With this in view, cheiloscopy, the study of lip patterns have been proved to be considerably efficient as an early diagnostic tool. The technique has proven valuable for screening and monitoring periodontal disease. Awareness should be created in public in employing screening methods that are non-invasive, robust and economic thereby it would enhance early detection of periodontitis which gives a positive impact on patient's well being. The cross sectional study was an attempt to correlate the occurrence Periodontitis in an individual, with their lip print to assess whether these investigation tools can be used to predict the occurrence of these diseases at an early by considering it as a genetic marker.

Keywords: cheiloscopy, periodontal disease, genetic marker, diagnostic tool.

1. INTRODUCTION:

Cheiloscopy can be defined "as a method of identification of a person based on characteristic arrangements of lines appearing on the red part of lips or as a science dealing with lines appearing on red part of the lips" [1]. The word "cheiloscopy" is derived from Greek words, "cheilos" which means lips and "skopein" which means "to see" [2]. The mucosal part called as the Klein zone is the region that contains the characteristic lip groove patterns, which is unique to each individual as it is genetically determined [3]. This unique pattern of cheiloscopy for an individual has established its importance in forensics to identify an individual [3,4].

Periodontitis is a multifactorial disease that causes destruction of periodontal tissues. Host, pathogens and environment plays an important role in the progression of periodontal tissues. Irrespective of the exposure to common environment and same pathogen exposure, some individuals are more susceptible to periodontitis. This is where genetics come into the frame, where the etiological heterogeneity and genetic heterogeneity acts as an important predisposing factor in causing periodontitis. [5,6]

There is a very strong correlation between the genetic makeup of the individual and the occurrence of periodontitis. Studying about genetic constitution of the individual will help us to solve various unanswerable questions regarding the varied susceptibility of individuals to this disease. Extracting genetic information from chromosomes is not only expensive but is also an invasive procedure. [7]

The lips and the facial skeleton begins to develop at the 6^{th}-7^{th} week of intrauterine life. This is also the time when the tooth formation begins [8]. The epithelium of the lips and the tooth develops at the same time of intra uterine life. This provides us with the information that there is an indirect relationship where similar genome expression plays an important role in the development of periodontal tissues and the pattern of the lips [9].

Considering this as the basis of the study, we are trying to bridge the gap between the technology and us by considering cheiloscopy as a genetic marker for periodontitis and considering their role in predicting an individual's susceptibility to this common oral disease. Hence the aim of this study is to analyze the role of cheiloscopy as predictive factor in periodontal disease in an institutional population.

2. MATERIALS AND METHODOLOGY:

A cross-sectional study was carried out on 200 patients reporting to the Department Of Periodontology.

Materials used for collection of lip prints: Tissue wipes, Dark colored lipstick, Cotton swab, cellophane tape, scissors, magnifying glass (10x) and case record forms for transferring the recorded prints.

Inclusion Criteria

- Age 18-55 years.
- Patients reporting to the OPD of Department Of Periodontology having more than 8 teeth per arch

Exclusion Criteria

- Individuals having less than 8 teeth per arch or having any form of inflammation, trauma, surgical scars, congenital anomalies or active lesions of the lips.
- Smokers
- Pregnant females
- On antibiotics or other medications
- Oral prophylaxis done within past 6 months

Case history is recorded where gingival index and probing pocket depth are noted.

Oral examination is carried out using a Dental mirror, Straight probe, and Williams Periodontal Probe to record Gingival Index (1963) and Probing Pocket Depth.

Procedure for recording lip prints: The patients were screened and informed consent form was obtained. Their lips were cleaned using a gauze piece dipped in saline. A dark colored lip color was applied onto the lips with the help of a swab. In a completely relaxed position of the lips, cellophane tape is placed on the lips and the lip prints are recorded, which were subsequently transferred to the case record form [Fig.1].

Analysis of the prints: In most of the cases only the central 10 mm of the lower lip remained intact, without much distortion and was used for analysis.

In 1967, Suzuki did a detailed forensic study on the lip print patterns and devised their own classification on lip prints in 1971 (Fig 2). [3]

Fig 1: (a) materials needed for taking lip prints; (b) lip prints are wiped with saline before taking lip prints; (c) dark colored lip color is applied over the lips; (d) the lips are in relaxed position; (e) cellophane tape is placed over the lips; (f) the recorded lip prints are transferred to the record form without distortion.

Suzuki and Tsuchihashi classification (1974)

Type I: A clear-cut groove running vertically across the lip.

Type I′: Partial-length groove of Type I.

Type II: A Branched groove.

Type III: An intersected groove.

Type IV: A Reticular pattern

Type V: Other patterns

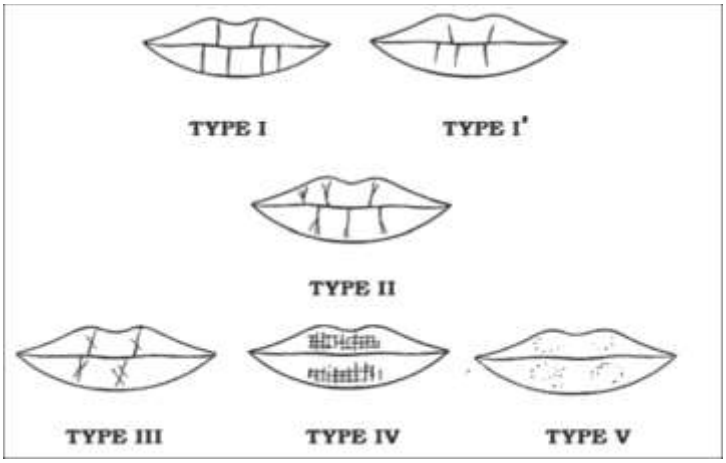


Fig 2: Diagrammatic representation of the lip print patterns [18]

3. STATISTICAL ANALYSIS:

The lip prints were collected and analyzed by two trained observers with equal experience. They shared equal knowledge about lip prints. A few cases were examined by the observers and the results were compared to check inter-observer variability.

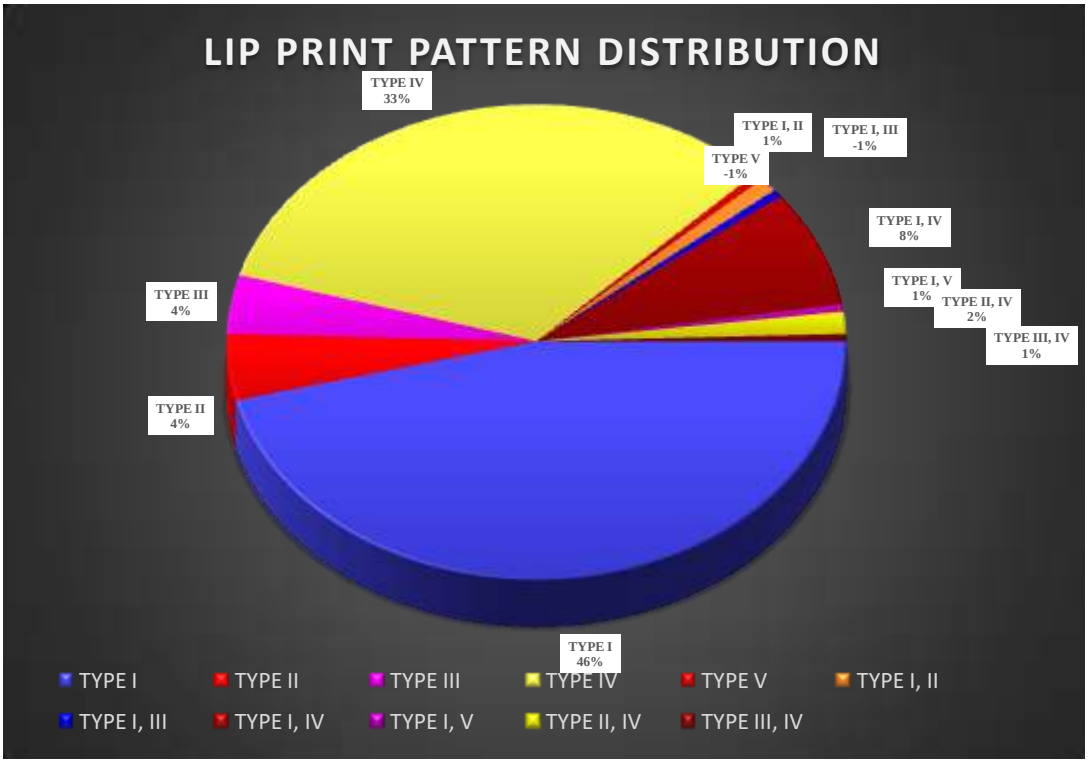
Frequency distribution and percentages were calculated for different types of lip patterns and thumbprints. Chi-square test was used to compare types of lip pattern between the different experimental groups. P value less than 0.05 was considered statistically significant.

4. RESULTS:

Out of the 200 subjects that were included in the study. The frequency distribution of the lip pattern was that, Type I lip print pattern (46%) was most commonly found in the study subjects followed by Type IV lip pattern (33%) (Table 1).

Type I lip pattern was more commonly seen in gingivitis patients (61.3%) and Type IV lip pattern was more commonly seen in periodontitis patients (71%) (Table 3). There was significant association between the oral health status of the individual and the lip pattern.

1. Frequency distribution of different types of lip pattern



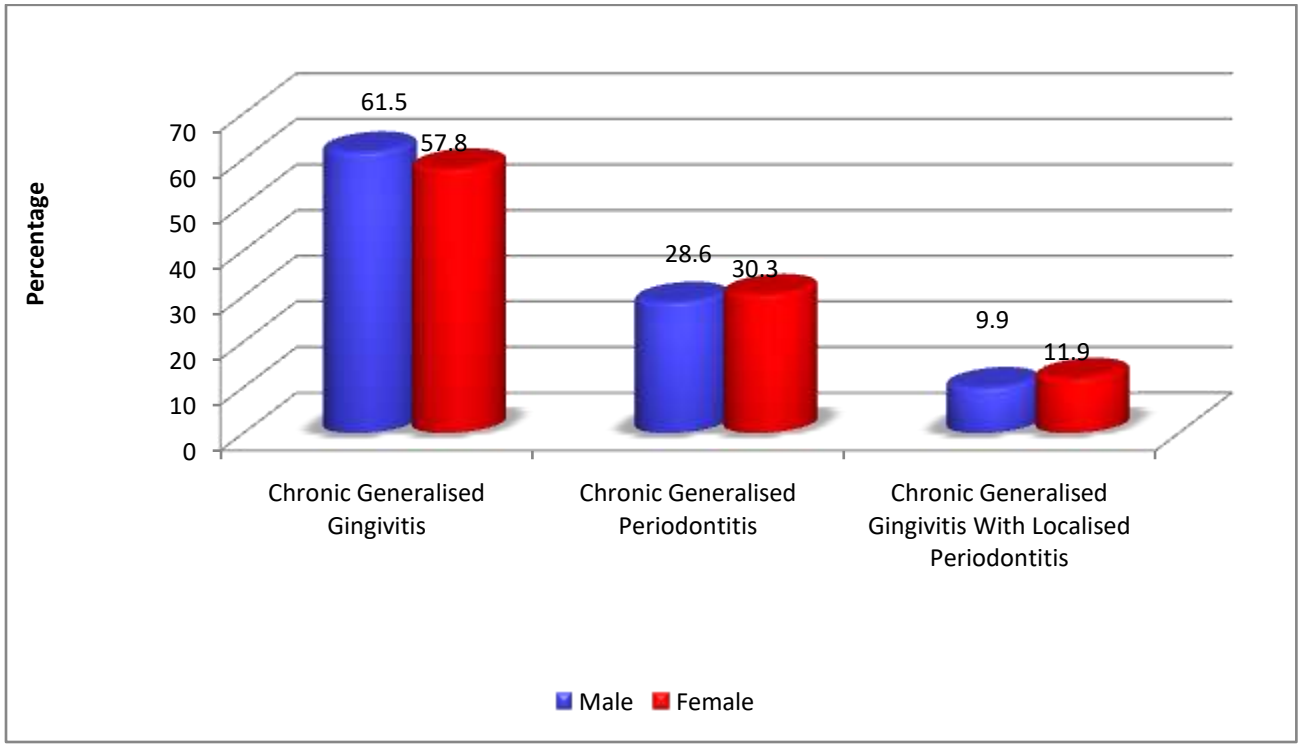
Lip Print Pattern	Frequency	Percentage
Type I	92	46.0
Type II	9	4.5
Type III	8	4.0
Type IV	66	33.0
Type V	1	0.5
Type I,II	2	1.0
Type I,III	1	0.5
Type I,IV	16	8.0
Type I,V	1	0.5
Type II,IV	3	1.5
Type III,IV	1	0.5
Total	200	100.0

Table 1: Distribution of different types of lip patterns

2. Prevalence of periodontal health status.

Diagnosis	Male		Female		Total	%	Chi square	p
	N	%	N	%				
Chronic Generalised Gingivitis	56	61.5	63	57.8	119	59.5	0.352	0.838
Chronic Generalised Periodontitis	26	28.6	33	30.3	59	29.5		
Chronic Generalised Gingivitis With Localised Periodontitis	9	9.9	13	11.9	22	11.0		
Total	91	100.0	109	100.0	200	100.0		

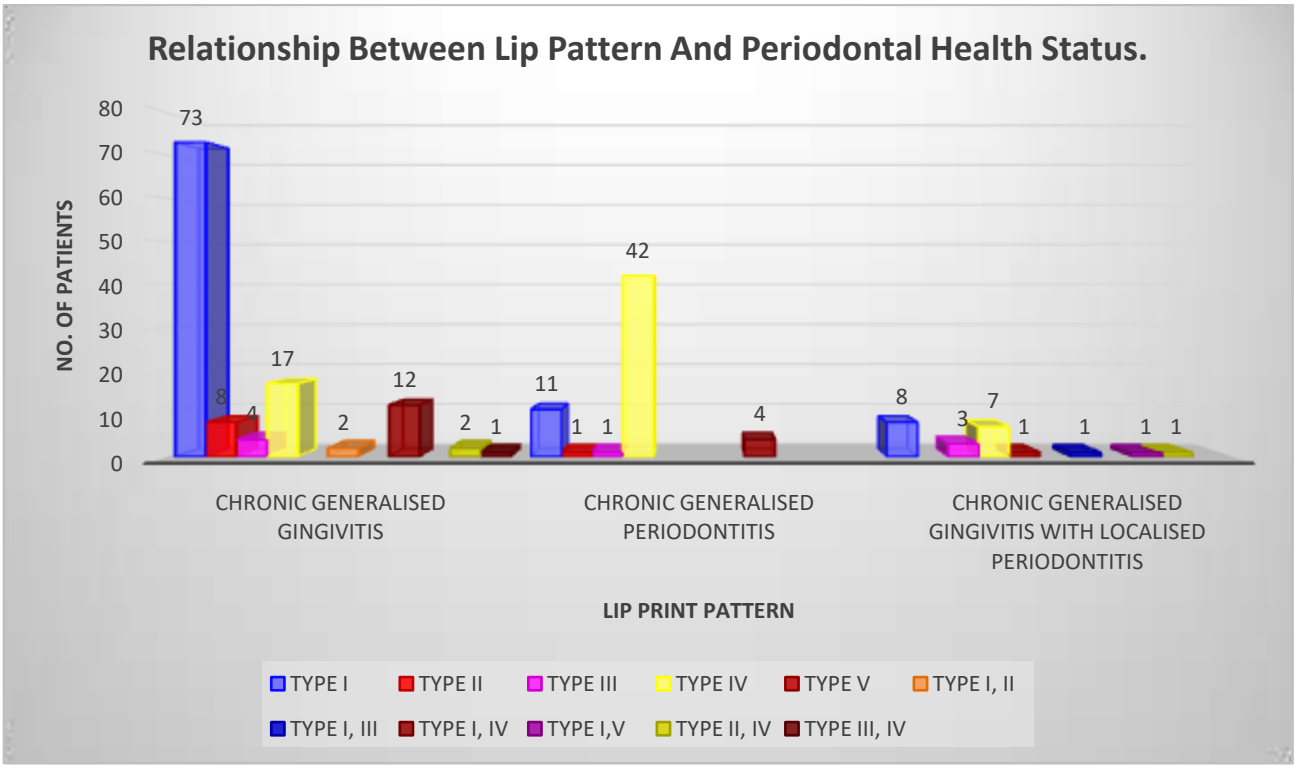
Table 2: Prevalence of various periodontal health status



3. Relationship Between Lip Pattern And Periodontal Health Status.

Lip Print Pattern	Diagnosis						Total	Chi square	p
	Chronic Generalised Gingivitis		Chronic Generalised Periodontitis		Chronic Generalised Gingivitis With Localised Periodontitis				
	N	%	N	%	N	%			
Type I	73	79.3	11	11.96	8	8.70	92	95.29	0.001**
Type II	8	88.9	1	11.11			9		
Type III	4	50.0	1	12.50	3	37.50	8		
Type IV	17	25.8	42	63.64	7	10.61	66		
Type V					1	100.00	1		
Type I,II	2	100.0					2		
Type I,III					1	100.00	1		
Type I,IV	12	75.0	4	25.00			16		
Type I,V					1	100.00	1		
Type II,IV	2	66.7			1	33.33	3		
Type III,IV	1	100.0					1		
Total	119	59.5	59	29.5	22	11.0	200		

Table 3: Relationship Between Lip Pattern And Periodontal Health Status.



5. DISCUSSION

Periodontal disease is one of the most prevalent infectious diseases, affecting thousands of people across the globe. It occurs due to a complex interaction between the host immune system and the plaque micro-organisms. This leads to an irreversible destruction of the tissues surrounding the tooth. Numerous risk factors have been implicated in the occurrence and progression of periodontitis. One of which is Genetics. The role of which, had been an enigma, till recent years, when it was found that genome plays a significant role in influencing the inflammatory and immune responses in periodontitis. [10]

Lip print pattern is unique to an individual and the anatomical character of the human lips may be useful in identification and diagnosis of congenital diseases and anomalies [11]. Various facial structures like the lip, alveolus, teethand palate are formed from the same embryonic tissues. Any changes in the genetic makeup of the individual which might increase individual's susceptibility to periodontitis will reflect on other organs such as lips that develop at the same time as that of periodontal tissues. And also the uniqueness of the lip patterns was that no two lip patterns of the individuals were similar [12, 13,14].

TsuchihashiY studied lip prints of individuals by recording them routinely once a month for three years for comparative study. No change was observed during this time [15].

The Type I (vertical) lip pattern was most prevalent (46%) followed by Type IV (reticular) among the individuals. Among the patients who were diagnosed with generalized chronic gingivitis, 61% of the patients had Type I lip pattern and 71% of the patients who were diagnosed with generalized chronic periodontitis had reticular type of lip pattern.

Although we have significant results that provide us information regarding the indirect correlation between lip patterns and periodontal status of the individual, there are no proven evidences to substantiate the direct relationship.

There are very few studies on relationship between cheiloscopy and periodontal health status. In a study conducted by Freny et al, they tried to predict the role of cheiloscopy as genetic markers in periodontitis and dental caries. They concluded that the incidence of reticular lip pattern was higher in periodontitis patients [7].

There have been various other studies which relate the association between cheiloscopy and forensics [16, 17] but not on association between cheiloscopy and periodontal health status.

In this study we tried to find out the relationship between periodontal health status and cheiloscopy by considering lip pattern as genetic markers.

6. CONCLUSION:

The causes of oral diseases have remained unsolved mystery for a very long time. Only the core matter, DNA can solve this puzzle. DNA analysis through other protocols remains expensive. Cheiloscopy can turn out be a non invasive and inexpensive as the primary investigation and for determination of oral diseases.

The major drawback of the investigations is that the patient may not agree for their lip prints to be recorded for study purpose as there is lack of awareness and knowledge among the population regarding the causative factors of oral disease, especially periodontitis. It is a challenging task to explain patients about the importance of genetics and its role in periodontal disease. It is also important to educate patients about how cheiloscopy can guide us in taking preventive measures against oral diseases. In the current scenario, both public awareness and extensive research has to be made in the field of cheiloscopy to establish its significance in dentistry.

7. REFERENCES

1. Kasprzak J. Possibilities of cheiloscopy. Forensic Sci Int1990;46:145-51.
2. Prabhu RV, Dinkar AD, Prabhu VD, Rao PK. Cheiloscopy: Revisited.J Forensic Dent Sci 2012;4:47-52.
3. Dineshshankar J, Ganapathi N, Yoithapprabhunath TR, Maheswaran T, Kumar MS, Aravindhan R. Lip prints: Role in forensic odontology. Journal of pharmacy &bioallied sciences. 2013 Jun;5(Suppl 1):S95.
4. Negi A, Negi A. The connecting link! Lip prints and fingerprints. Journal of forensic dental sciences. 2016 Sep;8(3):177.
5. Renuka P, Pushpanjali K, Sangeetha R. Review on "Influence of host genes on dental caries". IOSR J Dent Med Sci. 2013;4:86-92.
6. Sharma A, Kaur G, Sharma A. Genetics And Periodontitis-A Review.
7. Esha Mukherjee, Dr. Freny Karjodkar, Aumiyo Das, Dr. Kaustubh Sansare. Lips and Fingertips tell it all -Cheiloscopy and Dermatoglyphics as Predictive Factors for Dental Caries and Periodontitis. International Journal Dental and Medical Sciences Research (IJDMSR) ISSN: 2393-073X Volume 2, Issue 5 (May- 2018), PP 47-55.
8. Negi A, Negi A. The connecting link! Lip prints and fingerprints. Journal of forensic dental sciences. 2016 Sep;8(3):177.
9. Jiang R, Bush JO, Lidral AC. Development of the upper lip: morphogenetic and molecular mechanisms. Developmental Dynamics. 2006 May 1;235(5):1152-66.
10. Tarannum F, Faizuddin M. Effect of gene polymorphisms on periodontal diseases. Indian journal of human genetics. 2012 Jan;18(1):9.
11. Saujanya K, Prasad MG, Sushma B, Kumar JR, Reddy YS, Niranjani K. Cheiloscopy and dermatoglyphics as genetic markers in the transmission of cleft lip and palate: A case-control study. Journal of Indian Society of Pedodontics and Preventive Dentistry. 2016 Jan 1;34(1):48
12. Prabhu RV, Dinkar A, Prabhu V. Digital method for lip print analysis: A New approach. J Forensic Dent Sci 2013;5:96-105.
13. Suzuki K, Tsuchihashi Y. Personal Identification by Means of Lip Prints. J Forensic Med 1970;17:52-7.
14. Vahanwala SP, Parekh BK. Study of lip prints as an aid to forensic methodology. J Forensic Med Toxicol 2000;17:12-8
15. Tsuchihashi Y. Studies on Personal Identification by Means of Lip Prints. Forensic Sci 1974;3:233-48.
16. Prabhu RV, Dinkar AD, Prabhu VD, Rao PK. Cheiloscopy: Revisited. J Forensic Dent Sci 2012;4:47-52.

17. Vahanwala SP, Parekh BK. Study of lip prints as an aid to forensic methodology. JIDA 2000;71:268-71.
18. Verma K, Meenakshi SS. Lip print patterns among the students of MaharshiDayanand University (MDU) Rohtak, Haryana. Int J Pharm Biol Sci. 2014;4:210-17.