International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 05, 2020
ISSN: 1475-7192

Association between Oral Potentially Malignant Disorders and ABO Blood Groups

Dr.S.R. Ashwinirani, Dr. Girish Suragimath* and
Dr. Divyanee Doshi

Abstract--- Introduction: *World Health Organization (WHO) defined the term "potentially malignant disorders" (PMD) as the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date. Clinically PMD appear as white or red patch with or without symptoms. The aim of the present study was to analyze the association between ABO blood groups and oral PMD.*

Materials and methods: *Hundred patients with clinically diagnosed with PMD were included in the study. Patients who were not willing to give their blood sample for estimations of blood group were excluded from the study. ABO blood grouping was carried out using Eryscreen plus Kit.*

Statistical analysis: *The data collected was entered in Excel sheet and descriptive statistics (frequency and percentage) was calculated using SPSS software version 21.0.*

Results: *Out of 100 PMD patients, 65% were males and 35% were females. Majority of patients were in the age group of 30-39 (30 %). Majority of lesions were oral sub mucous fibrosis accounting for 48%, followed by lichen planus 27%, leukoplakia 22%, erythroplakia 2% and discoid lupus erthyomatosa 1%. Association of ABO blood groups with PMD showed majority of lesions in blood group B (38%), followed by group A (33%), group O (19%), and group AB (10%).*

Conclusion: *Blood group B patients were more prone to develop PMD in our study. Blood group screening in patients with history of tobacco and alcohol consumption, helps in early detection of PMD and prevention of malignancies.*

Keywords--- *ABO Blood Group, Leukoplakia, Lichen Planus, Oral Submucous Fibrosis.*

I. INTRODUCTION

Cancer is the leading cause for human mortality even though rapid advances have been made in early diagnosis and treatment of cancer in the field of medicine and surgery. Cancer of oral cavity accounts for approximately 3% of all malignancies and annually found in 270000 patients worldwide.[1] Oral squamous cell carcinoma comprises 92-95% of all oral cancers .[2] Majority of oral cancer are preceded by oral potentially malignant disorders (PMD). Clinically PMD appear as white or red patch with or without symptoms. Lack of knowledge about the risk factors, signs, symptoms, delay in diagnosis and treatment planning leads to progression of these PMD to oral cancer.

Dr.S.R. Ashwinirani, MDS, Reader, Dept. of Oral Medicine and Radiology, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Satara, Maharashtra, India.
Dr. Girish Suragimath, MDS, Professor & HOD, Dept. of Periodontology, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Satara, Maharashtra, India.*
Dr. Divyanee Doshi, MDS, Post Graduate, Dept. of Periodontology, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Satara, Maharashtra, India.

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

Prevention and early detection of PMD decreases the incidence of oral cancer and improves the survival rate of patients.

The ABO system is the most investigated erythrocyte antigen system.[3] In several studies blood groups have been used as a genetic markers. The association between blood groups and diabetes mellitus, heart diseases, genetic disorders, various cancers, dental caries and periodontal diseases have been studied previously in the literature.[4-6]

Association between ABO blood groups and malignancy was first described by Alexzender in 1921. Later on various studies were carried out to establish this correlation. In Indian population Tyagi et al,[7] Jaleel and Nagarajappa,[8] showed that patients with blood group A have predisposition for oral cancer. Bhateja and Arora[9] study showed blood group A was most common in premaliganicies, but still there is sparse data available regarding association of blood groups with PMD. With this background the present study was designed to analyse the association between ABO blood groups and oral PMD.

II. METHODOLOGY

This study was conducted in the Department of Oral Medicine and Radiology, School of Dental Sciences, Krishna Institute of Medical sciences, Karad. The Ethical clearance was obtained before commencement of study (Protocol number 2016-2017/185) from Krishna Institute of Medical sciences (KIMSDU), Deemed to be university. Informed consent was obtained before enrolling the patients in the study. Convenient sampling technique was used for selecting study patients. Clinical examination of patients with oral PMD were carried out. A total of 100 patients with clinically diagnosed PMD like leukoplakia, oral submucos fibrosis, eryhtroplakia, lichen planus, discoid lupus erthyromatosa were included in the study. Suspicious cases were subjected to biopsy and histopathological examination to confirm diagnosis. Patients who are not willing to give their blood sample for estimations of blood groups were excluded from the study. Clinical informations including name, age, gender, habits smoking or smokeless form of tobacco, pan masala chewing, areca nut chewing, alcohol were recorded. The site and type of lesions were also recorded in clinical proforma.

ABO blood grouping was done in the Department of Oral pathology. Blood group estimation was done using blood samples from the antecubital fossa from all the patients. Blood grouping was carried out using Eryscreen Plus kit manufactured by Tulip Diagnostics (Private limited). Blood groups of all subjects were analyzed based on the slide method by placing a drop of blood on the slide and treated with anti-A and anti-B sera. Positive agglutination of the blood on treating with anti-A is considered as blood group A, positive reaction with anti-B is considered as blood group B, if no agglutination is produced, then the blood group is O and if agglutination is seen with both anti-sera, then blood group AB is considered.

Statistical Analysis: The data collected was entered in Excel sheet and descriptive statics (frequency and percentage) was calculated using SPSS software version 21.0.

III. RESULTS

A total of 100 patients with PMD were included in the study. Out of which 65 (65%) were males and 35(35%) were females. Majority of patients were in the age group of 30-39 (30 %) followed by 40-49 (23 %), 50-59(22 %),

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

20-29 years (13%) with a least percentage in the age group of 70 and above (5%). [Table 1]

Table 1: Age Distribution of Patients with PMD

Age	*Males*	*Females*	*Total*
20-29 years	8	5	13(13%)
30-39 years	22	8	30 (30%)
40-49 years	12	11	23(23%)
50-59 years	16	6	22(22%)
60-69 years	5	2	7(7%)
70 and above	2	3	5(5%)
Total	65	35	100 (100%)

Out of 100 PMD recorded, majority of lesions were oral submucos fibrosis accounting for 48% followed by lichen planus 27%, leukoplakia 22%, erythroplakia 2% and discoid lupus erthyomatosa1%. In case of oral submucos fibrosis and leukoplakia majority of lesions were present in males, in lichen planus majority of lesions were present in females where as erythroplakia and discoid lupus erythomatosa lesions were present only in males. Multiple site involvement was most common (52%), whereas Buccal mucosa was the most common site (15%) with single site involvement followed by lateral border of tongue (14%), labial mucosa (10%), gingiva (6%) and vestibule (3%) as depicted in [Table 2 & Table 3] and [Figure 1& 2].

Table 2: Gender Wise Distribution of PMD

Type of PMD	Males	Females	Total
Oral submucos fibrosis	37	11	48 (48%)
Lichen planus	10	17	27 (27%)
Leukoplakia	15	7	22(22%)
Erythroplakia	2	0	2(2%)
Discoid lupus erythomatous	1	0	1(1%)
Total	65	35	100(100%)

Table 3: Sitewise Distribution of PMD

Site of lesion	Number of patients (percentage)
Multiple site	52 (52%)
Buccal mucosa	15 (15%)
Lateral border of tongue	14 (14%)
Labial mucosa	10(10%)
Gingiva	6(6%)
Vesibule	3 (3%)

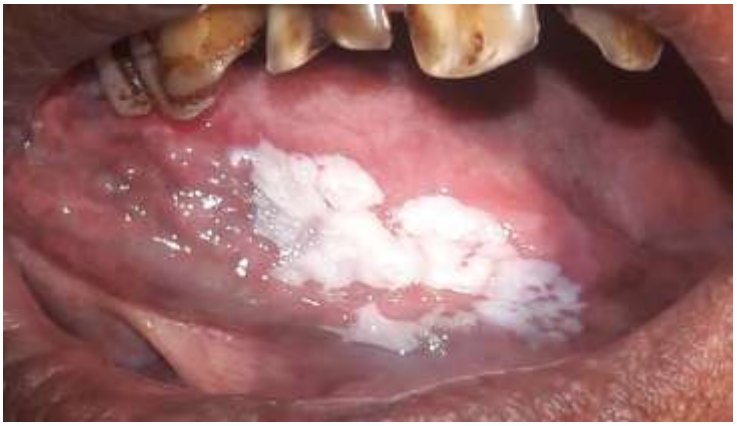

Figure 1: Clinical Picture Showing Homogenous Leukoplakia on Ventrolateral Surface of Tongue

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

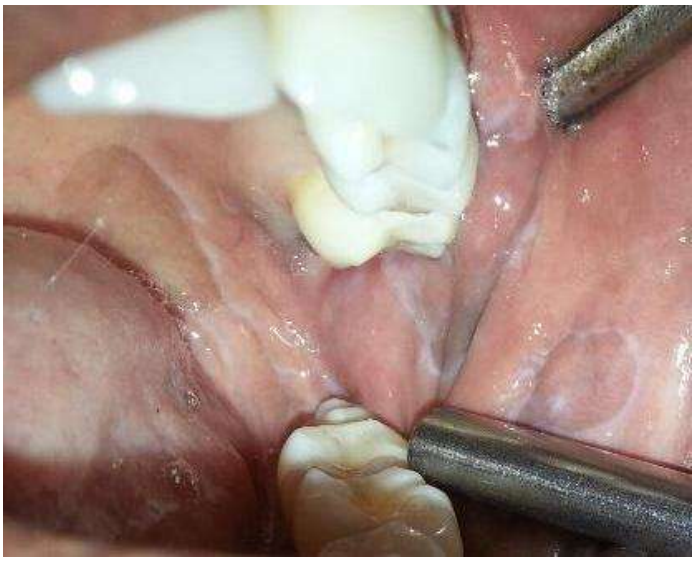

Figure 2: Clinical Picture Showing Reticular Lichen Planus in Left Buccal Mucosa with Brownish Pigmentation

Association of blood group with PMD showed majority of lesions were in blood group B constituting 38 cases (38%) followed by blood group A constituting 33 cases (33%) followed by blood group O constituting 19 cases (19%), and least number of lesions were found in blood group AB constituting 10 cases (10%) as shown in [Table 4].

When individual PMD were taken in to consideration, in Oral submucous fibrosis out of 48 cases majority of patients were with blood group B followed by group A, group O and group AB. In Patients with leukoplakia blood group B was most common followed by group A, group AB and blood group O. In Patients with lichen planus blood group A was most common followed by group O, group B and blood group AB, Where as in erythroplakia one patient was in blood group A and one was in blood group O, in Discoid lupus erythormatosa one patient was in blood group B as shown in [Table 4].

Table 4: Distribution of blood groups with PMD

Type of PMD	Blood group A	Blood group B	Blood group AB	Blood group O	Total
Oral submucous fibrosis	16	21	4	7	48
Lichen planus	10	7	2	8	27
Leukoplakia	6	9	4	3	22
Erythroplakia	1	0	0	1	2
Discoid lupus erythromatosa	0	1	0	0	1
Total	33 (33%)	38(38%)	10(10%)	19(19%)	100(100%)

IV. DISCUSSION

World Health Organization (WHO) defined the term "potentially malignant disorders" as the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date. PMD are classified into two subgroups by WHO a) precancerous lesion, a benign lesion with morphologically altered tissue, which has a greater than normal risk of transforming into malignancy. b) precancerous condition, a disease or

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

patients' habit that does not necessarily alter the clinical appearance of local tissues but is associated with a greater than normal risk of precancerous lesion or cancer development in that tissue.[1]

According to WHO disorders such as oral submucous fibrosis, oral lichen planus, leukoplakia, eryhtroplakia, palatal lesions of reverse cigar smoking, discoid lupus eryhtematosus were considered under the PMD. Various risk factors like tobacco (smoking or smokeless) areca nut chewing, dental abnormalities like sharp tooth, malocclusion, ill-fitting dentures, idiopathic and mishri are responsible for oral PMD and oral cancer.[10]

Patients with PMD may have history of burning sensation of oral mucosa, decreased mouth opening, pain and ulcerations of oral mucosa. Most common site for PMD are usually found on the buccal mucosa followed by gingiva, tongue and floor of the mouth.[11]

Regarding distributions of age group majority of PMD in our study were in 30-39 years age group (30%) followed by 40-49 years (23%), 50-59 years (22%) with least percentage in age of 70 and above (5%). The results were contradictory to results of Byakodi JR and Pushpanjali [12] study where they showed most common age group of 60-69 years followed by 50-59 years. Rai P et al study showed 64% lesions were in age group of below 30 years,16% were above 30 years.[13] Hosagadde et al [11] study in Maharashtra population also showed majority of lesions in the age group of 21-30 followed by 51-60 years and 41-50 years with least percentage in age group below 20 years (1.4%). Mehrotra et al [14] and Dietrich et al[15] studies showed highest incidence in sixth decades.

Gender distribution in our study showed male predominance (65%) compared to females (35%). The results of our study with respect to male predominance were in accordance with previous literature by Hosagadde et al[11], Byakodi JR and Pushpanjali K[12] Kamble K et al[16] Mehrotra et al,[14] Patil et al, [17] Castellanos et al,[18] The high prevalence of PMD in males is due to the higher use of tobacco and its products. The results of our study were contradictory to Mujica et al study where they showed 67% of female predominance.[19]

Site wise Distribution showed buccal mucosa as most common site involved in single site lesions in our study followed by lateral border of tongue, labial mucosa, gingiva and vestibule. Buccal mucosa was most common site since majority of lesions were oral submucous fibrosis. The results of our study were in accordance with Hosagadde et al,[11] but in contradictory to Liu et al [20] study where they showed tongue as most common site for PMD.

Studies done by Hosagadde et al [11] in Maharasthra population and Roy and Varshney [21] in Dehradun population had shown 0.29% of incidence rate of oral PMD per year.

In our study majority of PMD were oral submucous fibrosis 48 % followed by lichen planus 27 %, leukoplakia 22%, erythroplakia 2% and discoid lupus eryhtromatosa 1%. Our results were in accordance with Kamble et al,[16] Hosagadde et al [11] studies in Maharasthra population. In a study done by Rai P, [15] where they included both control and cases of PMD, out of 45 cases of PMD 24 were Oral Submucous Fibrosis, 13 were oral lichen planus and 8 were leukoplakia.

In the study conducted by Byakodi JR and Pushpanjali K [12] in Karnataka population for a period of 1 year showed 154 cases of PMD, out of which majority of lesions were leukoplakia 54.5% followed by oral submucous

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

fibrosis 34.4%, multiple oral premaligant lesion 9.7% with least common lesion of erythroplakia 1.3%. Whereas the percentage of Oral Submucous Fibrosis were less in their study than our study.

When individual PMD were taken, Oral submucous fibrosis was most common (48 patients), out of which 37 were males and 11 were females and majority of Oral submucous fibrosis were grade II and present with history of burning sensation. Lichen planus was the second most common type (27%) of PMD noted in our study. These lesions were more common in females and most common site was buccal musosa with reticular type as predominant type. Leukoplakia was the third most common lesion present in our study which accounts for 22%. The most common type of leukoplakia was homogenous and it was more common in males.

In the present study distribution of PMD were more in blood group B (38%) followed by group A (33%), group O (19%), and group AB (10%). The results of our study were in accordance with Byakodi J R study.[12] The results of our study were contradictory to Rai P[13] study where they showed 42% of PMD in blood group A followed by 29% in group O, 20% in group B, and 9% in group AB.

In the present study in OSMF and leukoplakia patients majority were in blood group B followed by Blood group A. The results were similar to Nikam et al [22] studies with respect to OSMF. Hallikeri et al [23] could not establish statistically siginificant relationship between ABO bold group and OSMF. Our study were contradictory with studies reported by Bhateja S,[8] Chordia TD [24] studies where they found blood group A was highly susceptible to OSMF and leukoplakia.

In our study association of lichen planus with blood group showed majority of lesions in blood group A followed by group O, B and AB. The results were in accordance with Kumar et al [25] study where they found a significant relationship between blood group A and oral lichen planus, they showed blood group A had 1.28 times higher risk of developing oral lichen planus whereas relative risk was 1.06 blood group B, 1.17 for AB blood group and 0.76 blood group O. The results were in contradictory to Moshaverinia et al [26] study, where they showed blood group O as most common group, but with no stastistcally significant differences when compared with controls. Blood group A patients have greater tendency to develop OLP, which is due to blood group antigens presence on red blood cell membranes along with epithelial cells of various other tissues, including the oral mucosa. The relative down regulation of glycosyl transferase, which is involved in the biosynthesis of A and B antigens, is seen in association with tumor development [27] Partial or complete deletion of epithelial blood group antigens due to aberrations in their synthesis brings about changes in their cell surface as altered antigen pattern.

V. CONCLUSION

Majority of oral PMD are due to tobacco and its products. Prevention is the best way to deal with PMD. Regular camps regarding tobacco, alcohol counseling with awareness in health care workers, general practioners and self-examination by patients will reduce the chances of PMD. Government should strictly ban tobacco and alcohol to reduce PMD.

Source of funding - Nil

Conflict of interest - Nil

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

REFERENCES

[1] Amagasa T. Oral premalignant lesions. *Int Clin Oncol* 2011; 16: 1-4.
[2] George A, BSS, SS, Varghese SS, Thomas J, Gopakumar D, Mani V. Potentially Malignant disorders of oral cavity. *OMPJ* 2011; 2: 95-100.
[3] Cerovic R, Juretic M, Balen S. Examining the presence of ABO (H) antigens of blood types in the saliva of patients with oral cancer. *Coll Antropol* 2008; 32: 509-12.
[4] Guleria K, Singh HP, Kaur H, Sambyal V. ABO blood groups in gastrointestinal tract and breast carcinoma patients. *Anthropologist* 2005;7: 189-92.
[5] Tursen U, Tifik EN, Unal S, Gunduz O, Kaya TI, Camdeviren H. Relationship between ABO blood groups skin cancers. Dermatol Online J 2005; 11:44-9.
[6] Aminian A, Mirsharifi R, Alibakshi A, Khorgam Z, Dashti H, Hasani SM. Relationship between Esophageal Cancer and Blood Groups. World Appl Sci J 2010;8:503-8.
[7] Tyagi SP, Pradhan S, Agarwal SS. Blood groups in malignant diseases. *J Indian Med Assoc* 1965; 45:645-50.
[8] Jaleel BF, Nagarajappa R. Relationship between ABO blood groups and oral cancer. *Indian J Dent Res* 2012; 23: 7-10.
[9] Bhateja S, Arora G. ABO blood groups and oral premalignacies: A clinical study in selected Indian population. *Indian J Cancer* 2014; 51: 219-21
[10] Ajay PR, Ashwinirani SR, Nayak A, Suragimath G, Kamala KA, Sande A, *et al*. Oral cancer prevalence in Western population of Maharashtra, India, for a period of 5 years. *J Oral Res Rev* 2018; 10: 11-4.
[11] Hosagadde S, Dabholkar J,Virmani N. A clinocopatlogical study of oral potentially malignant disorders. *J Head Nech Physicians Surg* 2016; 4: 29-34.
[12] Byakodi R, Shipurkar A, Byakodi S, Marathe K. Prevalence of oral soft tissue lesions in Sangli, India. *J Community Health* 2011; 36: 756-9.
[13] Rai P, Acharya S, Hallikeri K. Assesment of ABO blood grouping & secretor status in the saliva of patients with oral potentially malignant disorders. *J Oral Maxillofac pathol* 2015; 19: 164-9.
[14] Mehrotra R, Thomas S, Nair P, Pandya S, Singh M, Nigam M. Prevalence of oral soft tissue lesions in Vidisha. *BMC Res Notes* 2010; 3: 23.
[15] Dietrich AT, Reicharta PA, Scheifelea C. Clinical rsik factors of oral leukoplakia in a representative sample of the US population. *Oral Oncology* 2004; 40: 158-63.
[16] Kamble KA, Guddad SS, Nayak AG, Suragimath A, Sanade AR. Prevalence of Oral Mucosal Lesions in Western Maharashtra: A Prospective Study. *J Indian Acad Oral Med Radiol* 2017; 29: 282-7.
[17] Patil S, Doni B, Sneha Maheshwari S. Prevalence and distribution of oral mucosal lesions in a geriatric Indian population. *Can Geriatr J* 2015;18:11-4.
[18] Castellanos JL, Diaz-Guzman L. Lesions of the oral mucosa: An epidemiological study of 23785 Mexican Patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008; 105: 79-85.
[19] Mujica V, Rivera H, Carrero M. Prevalence of oral soft tissue lesions in an elderly Venezuelan population. *Med Oral Patol Oral Cir Bucal* 2008; 13: 270-4.
[20] Liu W, Wang YF, Zhou HW, Shi P, Zhou ZT,T ang GY. Malignant transformation of oral leukoplakia. A retrospective cohort study of 218 Chinese patients. *Cancer* 2010; 10: 685.
[21] Roy, Varshney S. Oral Dermatological conditions: A Clinical study. *Indian Journal of Otolaryngology and Head & Neck Surgery.*2013; 65: 97-101.
[22] Nikam P, Bommanavar S, Malik S, Gugwad S,Badd R. Evaluation of ABO blood group system in patients suffering from oral submucous fibrosis. *Int J Curr Res* 2015; 7:13295-98.
[23] Hallikeri K, Udapa R, Guttal K, Nailmasur V. Analsysis of salivary secretor status in patients with oral submucous fibrosis: A case control study. *J Investig Clin Dent.* 2014; 5:1-6.
[24] Chordia TD, Vikey A, Chordiya D, Samdariya Y. Relationship of ABO Blood groups in patients with habit induced oral submucous fibrosis and oral cancer. 2015; 14: 96-99.
[25] Kumar T, Puri G, Laller S, Bansal T, Malik M. Association of ABO blood grouping with oral lichen planus. *Univ Res J Dent* 2014; 4: 93-6.
[26] Moshaverinia M, Rezazadeh F, Dalvand F, Moshaverinia S, Samani SS. The relationship between oral lichen planus abd blood group antigens. *World Journal of Medical Sciences;* 2014: 10: 103-105.
[27] Dabelsteen E, Gao S. ABO blood group antigens in oral cancer. *J Dent Res* 2004; 83: 21-8.

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020

[28] Igbeneghu, Christopher, and Japhet Madu Olisekodiaka. "Associations between ABO Blood group, secretor status and malaria infection in Osogbo, Southwestern Nigeria." *International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)* 2.5 (2014): 17-24.

[29] George, Rosamma, and Kavya Shree. "Lip Prints and Blood Groups, among Two South Indian Population-an In-Vivo Study." *International Journal of Dental Research & Development (IJDRD)* 7.4 (2017):1-8

[30] Kaur, Tejinder, et al. "Multiple Variants of Lichen Planus in a Single Patient: A Rare Case Report." *International Journal of General Medicine and Pharmacy (IJGMP)* 4.1 (2015):1-4

[31] Ahmed, Luma, and Ghufran Aial. "Effect of Using Contraceptions on Candidiasis Distribution Among Women." *International Journal of Medicine and Pharmaceutical Science (IJMPS) 6.3* (2016): 85-90.

[32] Suchitra, R., et al. "Location Based Online Blood Bank System." *International Journal of Management, Information Technology and Engineering (BEST: IJMITE)* 3.4 (2015):1-4

[33] Undi, Rambabu, Ravinder Kandi, and Prathibha Reddy Tummala. "Cord Blood Banking: Current Developments and Future Regenerative Transplant Medicine." *International Journal of General Medicine and Pharmacy (IJGMP)* 1.1 (2012):36-52

[34] Saidunnisa, Begum, Chudasama Meghna, and Raidullah Emadullah. "Blood Transfusion in Trauma Patients in Ras Al Khaimah, United Arab Emirates." *International Journal of Medicine and Pharmaceutical Sciences (IJMPS)* 3.4 (2013):29-36

[35] Fadil, Adil Ghalib. "Knowledge and Practice Regarding Infection Control among Dental Students at Basra University College of Dentistry, Iraq." *International Journal of General Medicine and Pharmacy (IJGMP)* 5.6(2016): 35-46.

DOI: 10.37200/IJPR/V24I5/PR201863
Received: 18 Feb 2020 | Revised: 12 Mar 2020 | Accepted: 23 Mar 2020