Prevalence of Anaemia Among Patients Visiting a Private Dental Hospital in Chennai - an Institutional Study

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Abstract

Introduction: Among the several types of anaemia commonly prevalent among patients visiting private hospitals, many studies say that women are seen to have higher prevalence of anaemia than males and the causes are multifactorial. It has more recently been recognised that functional iron deficiency and absolute iron deficiency anemia stays relevant to the diagnosis as a comorbidity. Aim: To determine and assess the prevalence of anaemia among patients visiting a private dental hospital in chennai. Materials and methods: The study was conducted among the outpatients visiting a private dental hospital. The data was reviewed and analysed from the n=200 patients between June 5, 2019, to February 5, 2021, who fulfilled the inclusion and exclusion criteria The collected data was statistically analysed using SPSS software. Correlation was made between the prevalence of anaemia among males and females along with the ages, types of diagnosed anaemia and with respect to the haemoglobin values of each subject. Results and discussion: Our results based on affected gender depicts that 62.75% of the patients affected with anaemia were females and 37.25, % ($p<0.013$) patients affected with anaemia were males suggestive of higher prevalence of anaemia among females than males. The correlation also emphasised on the average value of haemoglobin counts with respect to each type of anaemia and showed that the highest prevalent hemoglobin value is seen in iron deficiency anaemia with a percentage of 20.63% indicating count between 9-10mg/dl and the least prevalent hemoglobin value is seen in pernicious anaemia with a percentage of 1.59% indicating a count ranging from 8-11mg/dl. P value was set at 0.05. It was found that p value = 0.0621 ($p>0.05$) in the association of anaemia with haemoglobin levels was however statistically insignificant. Conclusion: From the study we observed that anaemia is prevalent among the patients visiting private dental hospitals in chennai majorly among women than males and the hemoglobin values have been relatively low when compared to the average which alerts several haemoglobinopathies. This raises the concern of the nutritional status of people in chennai and it must be addressed in order to improve the general public health.

Keywords: Iron deficiency anaemia, outpatients, prevalence, novel study, innovative

1. Introduction

Anemia is defined as the level below the normal red blood cell count or hemoglobin count per unit volume in our peripheral blood circulation. Generally, anaemia affecting populations of patients with other health conditions such as human immunodeficiency virus, has an effect on survival, morbidity, progression of disease and transfusion requirements. Recently, for patients with such conditions, high use of antiretroviral therapy is conducted so as to provide a significant increase in hemoglobin concentrations (1).

The prevalence of anemia was found to be 25% in a particular study population that consisted of outpatients that were elderly and 30.5% of these patients with anemia had iron deficiency. From this we can deduce that there is an observed rapid fall in the prevalence of anaemia that is diagnosed using lower thresholds such as 110 g/L. This suggests that in most cases the anaemia is mild (1,2). Although, the presence of anaemia in older people is associated with below par outcomes as older people (above 75) with anaemia suffers a higher rate of mortality than those without anaemia (3).

Children who are diagnosed with anemia are also considered as a common public health problem worldwide (4). Data from World Health Organization (WHO) showed that the anemia prevalence among children aged 5–59 months was 42.6% globally in 2011 and seen to prominently grow in Africa (62.3%) and Southeast Asia (53.8%). The prevalence of anaemia in children in China was seen to be least and it varied from place to place as it was observed as higher in rural areas when compared to urban areas (5).

The causes of anemia are known to be multifactorial and results mainly from deficiencies of iron, folic acid, vitamin A or B12 resulting in the shortage of such hematopoietic materials, which indirectly puts

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forward a susceptible ground to other infectious diseases such as malaria and inherited hemoglobin diseases (6). Iron deficiency is a common cause of anemia in children and is associated with 86–93% of anemia caused in children as covered in various research contributions (6,7). It is indicated that preterm birth, low birth weight, and maternal anemia could be the leading independent factors causing anaemia in children (8).

Besides anaemia, iron deficiency (ID) has more recently been recognized as a separate clinically relevant co-morbid entity (7). It is also seen to occur in relation to patients with heart failure and other cardiovascular diseases along with serious consequences for the patient's well-being (8,9). The major importance of iron is dependent on its essential role in oxygen transport and its central role in processes that help in maintaining cellular energy in demanding tissues like cardiac muscles in the human body (10).

In an article published by Ania BJ, elaborated that iron deficiency can be classified into absolute ID and functional ID. Absolute iron deficiency reflects the depleted iron stores (11). Functional iron deficiency is where the iron delivery to target cells is disturbed despite normal or overly abundant iron stores. In healthy patients, iron deficiency is generally diagnosed using a serum ferritin cut-off level that is less than 30 µg/l for absolute ID (12). Since ferritin is also an acute phase reactant, this provides the diagnosis of ID to be much more difficult in diseases that are associated with chronic subclinical inflammation because pro-inflammatory activity increases its synthesis (13–15). A ferritin cut-off value less than 100 µg/l is currently considered as the diagnostic for ID in patients irrespective of transferrin saturation (TSAT). If the TSAT value is lesser then it means, there is less iron availability for metabolising cells (16).

Where studies use much lower concentrations of haemoglobin to define anaemia, some use Hematocrit values to define anaemia (17). The drawbacks were that patients with conditions like myocardial infarction cannot be included because the hematocrit threshold was the same in anaemic men and women hence the prevalence becomes difficult to interpret (18).

The aim of this study is to determine the prevalence of anaemia among patients visiting a private dental hospital in chennai.

2. Materials and Methods

It is a single centered retrospective study conducted in a private dental institution, Chennai. The data was collected from the dental hospital management system of saveetha dental college (DIAS). 4,35,951 patient details were analysed between June 5, 2019 to Feb 5 2021 out of which 200 anaemic patients who fulfilled the inclusion and exclusion criteria were included in this study.The data for the study was collected from the Dental Information Archiving System (DIAS) Of Saveetha Dental College. The data was transferred to excel, tabulated and analysed. Incomplete and censored data was excluded. The data was imported to SPSS. Analysis was done using SPSS version 19. Descriptive statistics and chi square test were used to compare the various correlations between the prevalence of anaemia among males and females along with the age of the patients, type of anaemia in diagnosis with respect to average hemoglobin levels that was obtained for each subject. The level of significance was set at 0.05.

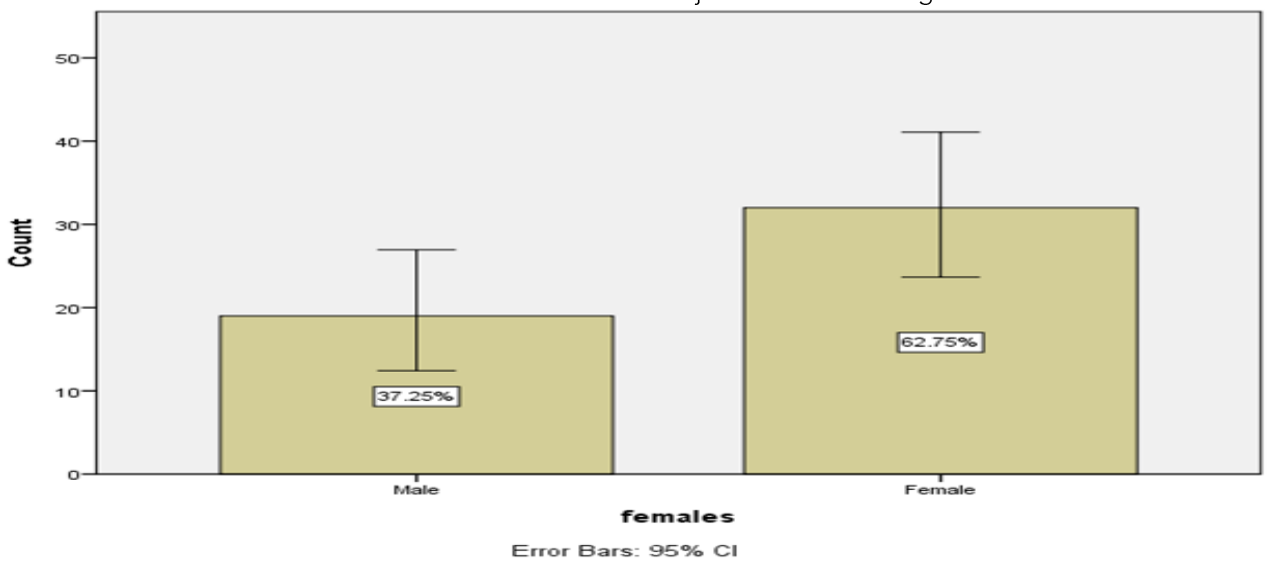

Figure 1. Bar chart depicts that prevalence of anaemia in relation to the sex of the patients. It shows that the prevalence was seen in 37.25% of the males and 62.75% of females. From the graph we can interpret that anaemia was more prevalent among females than males in the outpatient population.

3. Results

This study was conducted to assess the prevalence of anaemia among the patients visiting private dental hospitals. Out of the n=200 patients who were diagnosed with anaemia 62% were females in majority than 36.25% males. According to the present study, 1.96% males and 11.76% females were diagnosed with folic acid deficiency, 35.29% males and 49.02% females were diagnosed with iron

deficiency anaemia and the rest 1.96% females were diagnosed with pernicious anaemia. Association between age and gender affected with anaemia (Figure 2) revealed that there is a significant association between them (p value = 0.043 where p<0.05). Association between gender and types of anaemia the patients were affected (Figure 3) which revealed that there is significant association between the parameters (p value = 0.022 where p<0.05). Association between age and types of anaemia among the affected patients (Figure 4) which revealed that there is significant association between the parameters (p value = 0.037 where p<0.05). Association between haemoglobin count and gender of the affected patients (Figure 5) revealed that there is significant association between them (p value = 0.027 where p<0.05). Association between types of anaemia and haemoglobin count (Figure 6) revealed that there is no significant association between the parameters (p value = 0.621where p>0.05).

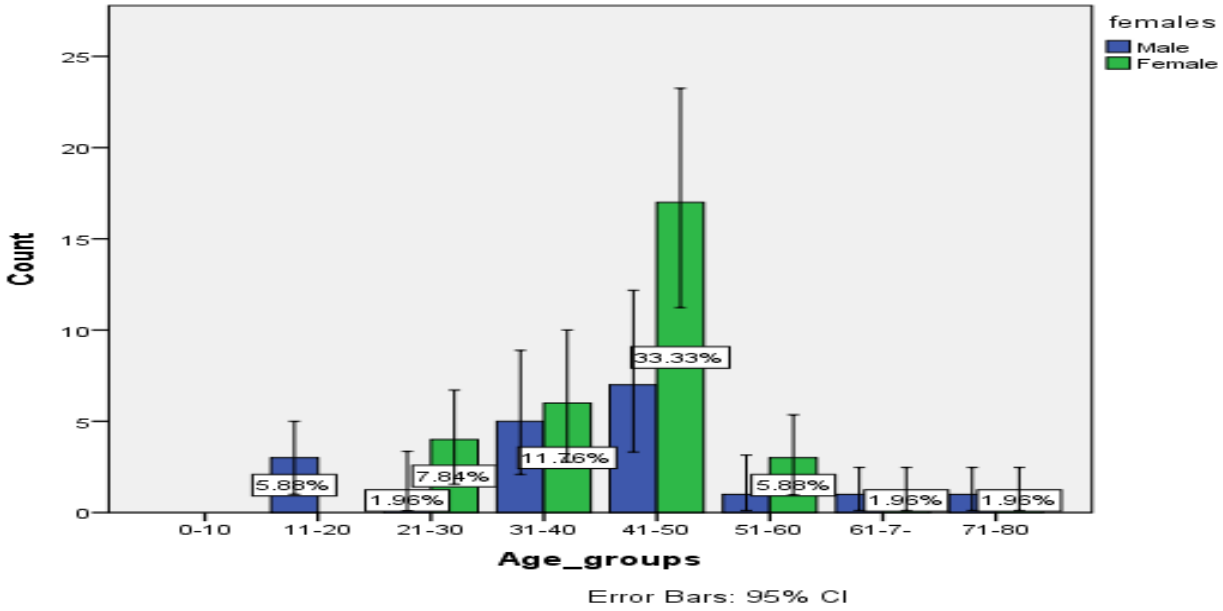

Figure 2. Bar chart represents prevalence of anaemia in association with the age group of the outpatients. X-axis represents the age groups and Y-axis represents the percentage of prevalence of anaemia among each gender. The colour green represents females and blue represents males. The highest prevalence was 33.33% of females and 13.73% males having anaemia within the age group of 41-50 among the outpatients and the least were among the age group 60 and above. Pearson's chi square value = 0.043 (P<0.05) which is statistically significant providing that the majority of females (33.3%) in the age group 41-50 are anaemic.

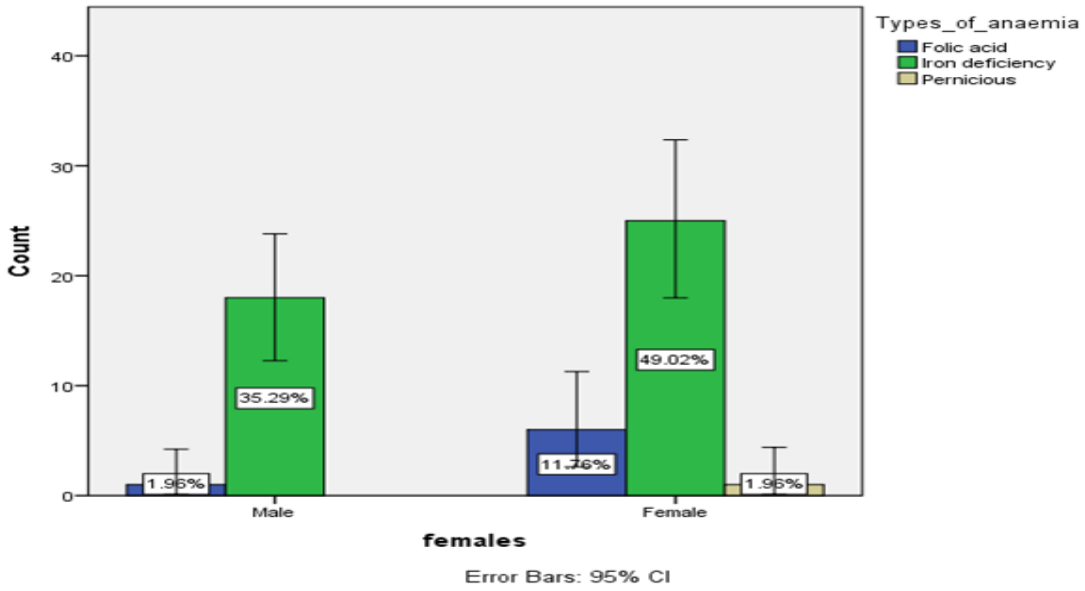

Figure 3. Bar chart represents the prevalence of anaemia among males and females in association with the type of anaemia that the patients were diagnosed with. X axis represents the gender and Y axis represents the percentage of patients affected with each type with respect to the gender. Blue represents folic acid deficiency; green represents iron deficiency anaemia and yellow represents pernicious anaemia. The results show that 35.29% of the males were diagnosed with iron deficiency anaemia in majority and 1.96% with folic acid deficiency whereas 49.02% of females were diagnosed with iron deficiency anaemia, 11.76% with folic acid deficiency and 1.96% of females were diagnosed with pernicious anaemia. Pearson's chi square value = 0.022 (P<0.05) which is statistically significant providing that the majority of anaemic females (49.02%) were diagnosed with iron deficiency anaemia.

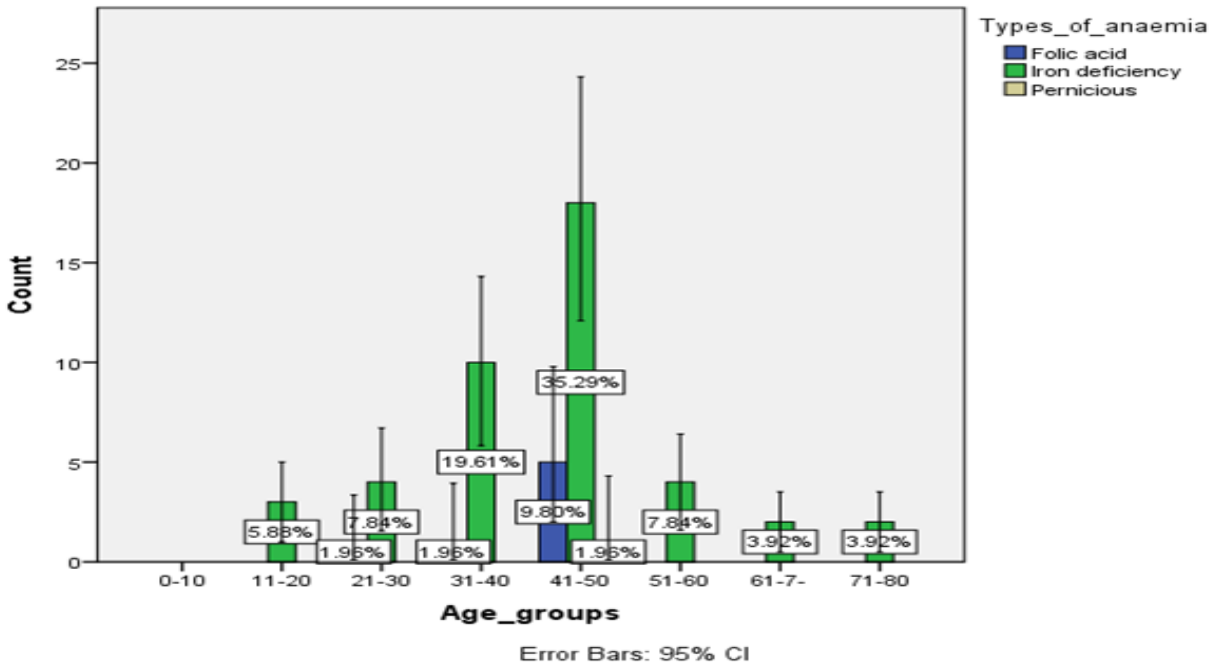

Figure 4. Bar chart represents the percentage of prevalence of each type of anaemia in association with the age groups it affected. X axis represents age groups and Y axis showed percentage prevalence of anaemia. Blue represents folic acid deficiency; green represents iron deficiency anaemia and yellow represents pernicious anaemia. The results show that the highest prevalence was 35.29% of iron deficiency anaemia among the age group 41-50 and the second highest was 9.80% of folic acid deficiency among the same age group. Pearson's chi square value = 0.037 (P<0.05) which is statistically significant proving that the majority of anaemic patients in the range 41-50 years of age have iron deficiency anaemia.

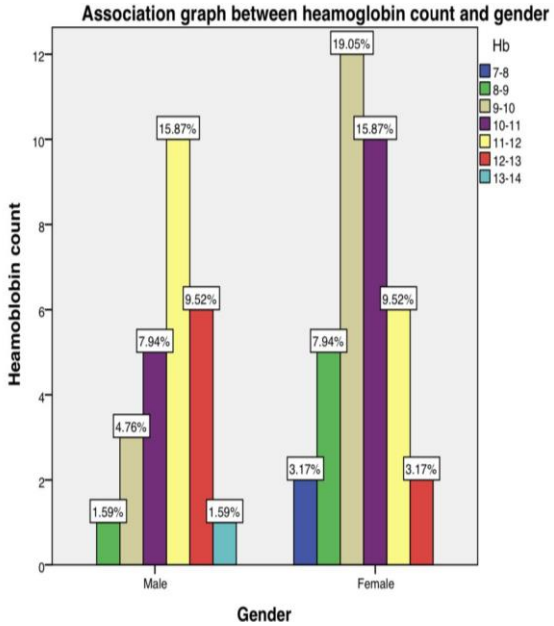

Figure 5. Bar chart represents the percentage of haemoglobin count in association with the gender of the subjects. X axis represents the gender of subjects and Y axis represents percentage haemoglobin count values. The colours blue, green, brown, purple, yellow, red, cyan stand for 7-8mg/dl, 8-9mh/dl, 9-10mg/dl, 10-11mg/dl, 11-12mg/dl, 12-13mg/dl and 13-14mg/dl hemoglobin values respectively. The results show that the highest prevalence of anaemia is seen in females with 19.05% hemoglobin value between 9-10mg/dl and the least is seen in males with a hemoglobin value 1.59% indicating Hb count between 13-14mg/dl. Pearson's chi square value = 0.027 (P<0.05) which is statistically significant providing that the majority of anaemic women have Hb in the range of 9-10mg/dl.

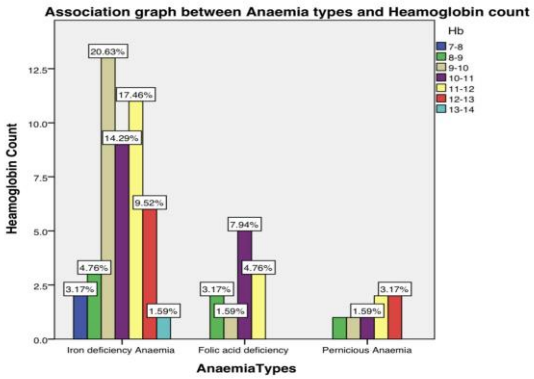

Figure 6. Bar chart represents the percentage of haemoglobin count in association with the types of anaemia diagnosed in subjects. X axis represents the types of anaemia diagnosed in subjects and Y axis represents percentage haemoglobin count values. The colours blue, green, brown, purple, yellow, red, cyan stand for 7-8mg/dl, 8-9mh/dl, 9-10mg/dl, 10-11mg/dl, 11-12mg/dl, 12-13mg/dl amd 13-14mg/dl hemoglobin values respectively. The results show that the highest prevalent hemoglobin value is seen in iron deficiency anaemia with a percentage of 20.63% indicating count between 9-10mg/dl and the least prevalent hemoglobin value is seen in pernicious anaemia with a percentage of 1.59% indicating a count ranging from 8-11mg/dl. Pearson's chi square value = 0.621(P>0.05) which is statistically insignificant, although the most common Hb count is in the range of 9-10 mg/dl in the majority of iron deficiency anemias (20.63%).

4. Discussion

Around 2% of the people in the general non-anaemic population, have a haemoglobin concentration lower than these criteria values (19). This does not

render the fact that individuals with a haemoglobin concentration above the given bar are necessarily normal(20). Some may also be anaemic even though there are racial differences in the control of haemoglobin concentration that could pose as an additional reason for caution (21). Despite the underestimation of the real situation, energy intakes are notoriously low leading to the global figures of prevalence in anaemia, given the implications of iron deficiency anaemia for the wellbeing, resistance to fatigue and to infectious diseases, and learning ability of affected individuals(22).

Our results based on gender and anemic patients depicted that 62.75% of the patients affected with anaemia were females and the 37.25% ($p<0.013$) patients affected with anaemia were males, suggesting higher prevalence of anaemia among females than males. In a similar study performed by Yu, et al, women who undergo more blood loss during their menstruation and have increased pregnancy demands are a leading cause of anaemia in majority. Along with women in rural areas who are neglected due to their lower socio-demographic backgrounds(23). However there are also a few reports wherein there is a slightly significant increase in the amount of males affected with anemia who belong to rural areas, consumes smokeless tobacco, is underweight and have smoking habits which is contrasting to our study with a minimised sample population(24).

As seen in our study association between age and gender of patients affected with anaemia shows that 33.33% of females were anaemic between the age group 41-50 who were in majority than the rest 13.73% males of the same age group affected with anaemia.

In a similar study, it was also found that the prevalence of anaemia was more among the women who were in their reproductive years between 26-40 years which is the major cause of maternal mortality and low birth weight in India(25).

The high-risk category are pregnant women who have Hb that is less than 8 g/dl. Although, even among educated families and the higher income group families anaemia is prevalent in moderate and severe levels hence it is inevitable in women above 26 years of age if they do not consume iron supplements to avoid anaemic symptoms such as dizziness, breathlessness, palpitations, etc (26).

Iron deficiency anaemia was more prevalent in 49.03% of the female patients and 35.29% of the male patients because it occurs when there is not enough mineral iron in the body. Pernicious anaemia was least prevalent in 2.96% of females in our results. Pernicious anemia reports for 20%–50% of the documented cases of vitamin B12 (cobalamin) deficiency in adults according to recent scientific progression (27). In the Indian population, the prevalence of pernicious anaemia is 0.1% among patients who are over the age of 60 (28). This is the major threat posed by diagnostic and therapeutic complications faced by the practitioner.

On studying the association between type of anaemia and age group shows that 35.29% of patients between the age group 41-50 had higher prevalence of iron deficiency anaemia, 9.80% of patients between the same age group had folic acid deficiency and 1.96% of the same age group had pernicious anaemia since at older age it is complex and ranges from bone marrow failure syndromes to chronic kidney disease and from nutritional deficiencies to inflammatory processes.

Decreasing haemoglobin count identified among a large group of old aged individuals are found to be at a risk of adverse outcomes such a deteriorating cognitive function and this would not be identified using the criteria for anaemia by WHO, however, in a contrasting study consisting of a larger group of subjects by Smith DL, it was shown that the most common type of anaemia was anemia of chronic disorders seen in the subjects who was above 50 years old (29).

The association between hemoglobin count values and gender of the subjects show that prevalent anaemic women had the highest Hb value of 19.05% with an Hb count ranging from 9-10mg/dl and the least 3.17% indicating range from 7-8mg/dl.

In a similar study, methods such as cyanmethemoglobin and the HemoCue® were used in their surveys to determine the prevalence of anaemia in a particular population and it was found that 62.3% women who were in their second or third trimester of pregnancy had low levels of Hb and maternal complications despite increasing demand of iron during that period (30). This could be because in generally healthy and iron-sufficient females, haemoglobin concentrations can change drastically during pregnancy to compensate and accommodate the increasing maternal blood volume and the iron requirements of the growing foetus(31).

The association between hemoglobin values and type of anaemia that was diagnosed in the subjects show that iron deficiency, being the most prevalent, had the highest value of 20.63% with Hb count ranging from 9-10mg/dl and the least prevalent among the cases being pernicious anaemia, showed the least value of 1.59% with a Hb count ranging from 8-11mg/dl.

Low haemoglobin in females with iron deficiency anaemia were part of the results in a study by Miller MF et al, that indicated this as a risk factor to postpartum depression as there was a negative correlation between Hb concentration on postpartum and depressive symptoms (32).

Antony et al, found that his study revealed that a higher HbA1c was associated with lower haemoglobin levels among people who were anaemic suggesting that different types of anaemia affects HbA1c differently(3).Since it is important for maintaining Hb stability in anaemia management, it is necessary to continue to determine and refine target Hb ranges and to develop probable systematic methodologies for deciding doses of erythrocyte stimulating agents (33).

Studies have shown that severe anaemic patients who need to undergo elective major surgery should have their anemia diagnosed and managed before the surgery as they have a chance of high-risk bleeding and may require blood transfusions. In a case report by Peisker A, a patient with severe fanconi anaemia with pancytopenia was diagnosed before the dental extraction surgery. She was treated with tranexamic acid and local hemostatic measures were taken to manage her anaemic condition before undergoing dental extraction procedure so as to avoid postoperative haemorrhage(34).

Early detection of anaemia is necessary so as to reduce the incidence of this condition among the general public as it could pose a challenge to dental practitioners as well due to its implications in oral health such as increased risks of infections due to their symptoms of anemia such as pallor, periodontal diseases, glossitis, ulcers, etc(35). Hence, dental treatment must be carried only after proper diagnosis and management of any anemic patient so as to avoid emergencies in dental practice.

5. Conclusion

From the study we found that anaemia was prevalent among the patients visiting private dental hospitals in chennai among women. This raises the concern of the nutritional status of people in chennai and it must be looked upon in order to improve the general public health and avoid medical emergencies during medical and particularly dental treatments as the ramifications of anaemic patients must be considered before the treatment is initiated.

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7. Conflict Of Interest

The author declares no conflict of interest.

8. Source Of Funding

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