WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL RESEARCH

Research Article

2025
Volume: 02
Issue: 02
Page: 17- 33

ANEMIC PREVALENCE OF MALES – A CROSS SECTIONAL DESCRIPTIVE STUDY

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Received: 09 December 2024 **Revised: 29 December 2024** **Accepted: 19 January 2025**

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ABSTRACT

Anemia has emerged as a serious global health concern. Although anemia affects people everywhere, especially developing countries have the highest prevalence of the condition. In order to evaluate the prevalence of anemia among males in the Maskeliya area, the study was planned. The data were collected from the selected laboratories for a period of one year. The relevant parameters to the study title, such as HB, RBC, MCV, and MCHC, were recorded and statistical analysis was performed via SPSS. It showed that 15.36% of anemic males were identified, and it was on a decreasing trend compared to previous years. The 61-70 male age categories have a high anemic prevalence. Among them, 21.9% were found at the mild anemic level, while 2.1% and 1% were found at the moderate and severe anemic levels, respectively. The age categories of 21–30 and 31–40 had the lowest number in all stages of anemia. Tamils were found to have a high (85.4%) prevalence of anemia compared to other ethnic groups, while Muslims were low in prevalence (3.1%). May showed the highest prevalence of anemia among males, while July and October showed the lowest prevalence of anemia. Further, the anemic trend was increasing in pattern from January to May, and from June to December, it was declining. According to the present findings, the anemic males had high, normal, and low levels of RBC, MCV, MCHC, and MCH, and the reason for the differences should be investigated further. The prevalence of anemia was considerable among males in the Maskeliya area, based on investigation reports performed in 2023. There were significant correlations found between the age category, ethnicity, and season.

KEYWORDS: Anemia, Nutritional status, RBC indices, Estate sector.

1. INTRODUCTION

Globally, 1.92 billion people suffered from anemia in 2021. In the last three decades, there has been a rise of 420 million cases (Shaziya Allarakha 2021). Across all age groups, the prevalence of anemia worldwide in 2021 was 24·3%, or 1·92 billion prevalent cases. Significant differences in the prevalence of anemia were noted according to age, sex, and geographic location, children under the age of five, and nations in sub-Saharan Africa and South Asia were the most afflicted. Males were less likely than females to have anemia at all ages. The prevalence across all age groups in 2021 was 17·5% for males (Lancet Haematol 2023). One of the most common medical disorders in Sri Lanka is anemia. A number of recent studies have shown that anemia affects over 25% of Sri Lankans (Jayathissa 2009). In Sri Lanka, anemia is present in 29% of cases, according to the World Health Organization (Fathima A Sheriff 2021).

In India, the fourth round of National Family Health Survey (NFHS-4) reported that 22.7% of the males in the age group 15–49 years had anemia. The prevalence of anemia among males of Haryana in this age group had shown an increase from 17.6% in 2005–2006 to 20.1% in 2015–2016 (Aditya Singh 2022).

The odds of anemia among men from the east region of the country were 47% higher than those from the central region. Men belonging to the north, west and north-east regions were 27%, 28%, and 24% more likely to suffer from anemia. However, the odds of anemia among men were lower by 19% in the south region. Men who were underweight had 36% more likelihood of being anemic whereas obese men were 23% less likely to suffer from anemia as compared to men with normal BMI. The risk of anemia among men using smokeless tobacco was more than those not using the same (Singh *et al.*, 2021).

In Sri Lanka, the estate sector suffers from the nation's highest and deepest levels of poverty. The percentage of children with anemia varies per district, ranging from 51 to 15%. The Ampara region has the highest rate of anemic children (approximately 51%), followed by Gampaha (43%) and Batticaloa (46%) (Ann 2019).

The real estate sector and other parts of the country currently diverge significantly in terms of socioeconomic status. The estate sector has a higher rate of malnutrition than other

communities in the country (Priyanka Jayawardena 2014). Low levels of education are also associated with a higher prevalence of anemia (Ann 2019). A number of major side effects are associated with anemia, including insufficient immunity and recurrent illnesses, heart conditions. Heart failure, arrhythmia (abnormal heart rhythm), and heart attacks can all result from the heart straining to work harder, problems with children's development etc (Shaziya Allarakha 2021).

The children under 2 years old are at high risk of anemia in these poor areas and that interventions are urgently required. The risk factors analysis indicates that breastfed infants whose mothers were anemic and young children with iron and vitamin B12 deficiency and lack of diversity in their diets are at greater risk for anemia (Wang. J *et al.,* 2015) (Getaneh *et al.,* 2017).

The prevalence of anemia also varies by geographic region. Sub-Saharan Africa, South Asia, the Caribbean, and Oceania had the highest anemia prevalence across all age groups and both sexes in 2010. At the country level, anemia among World Rehabilitation Alliance (WRA) and children under 5 years of age is a moderate-to-severe public health problem (20% or greater as defined by WHO) in the majority of WHO member states (Camila M. Chaparro *et al.,* 2019)**.** In Pakistan, the iron deficiency anemia is most prevalent of all types of anemia accounts for 83% of all anemia as reported (Khan MA and Jalil F 1985).

According to World Health Organization's estimates, globally 12.7% of the adult males suffer from anemia (WHO, 2010) The Global Nutrition Report, 2017 revealed that 12.7% of the global male population is affected by anemia (Global Nutrition Report, 2017). Anemia was prevalent in males of all age group, but highest incidence (23%) seen in 5^{th} decade (41-50 year age) with mean age of 43 years. Anemia was more prevalent in strict vegetarian males (67%) as compared to non-vegetarians (33%) (Mehul Kaliya *et al.,* 2023). The prevalence of anemia was higher among older men than younger men, and it was associated with older age and diabetes mellitus. Anemia among older men is at the level of moderate to severe public health significance. The likelihood of developing anemia increases among older men with diabetes compared to older men without diabetes (Maria Awaluddin *et al.,* 2019).

A Research conducted in Malawi indicated that men with a lower body mass index (BMI), specifically less than 18.5 kg/m^2, were more likely to exhibit mild anemia (Vartika Saxena *et al.,* 2023). Based on study of National Nutrition Monitoring Bureau in 2006 in rural areas of

9 states of the country with a much larger sample size reported a comparatively higher prevalence of anemia, (54.8%) among men aged 20 years or more (National Nutrition Monitoring Bureau 2006). National Family Health Survey -5 report, identified that an increasing trend in anemia prevalence among both men and adolescent boys in India. In India, the 4th round of National Family Health Survey (NFHS-4) reported that 22.7% of the males in the age group 15–49 years had anemia. It also reported anemia prevalence to be higher among people with lower educational status, smokers, and of a lower socioeconomic status (Shashi Kant *et al.*, 2019).

Another study that assessed anemia among adult males aged 15–45 years in the desert areas of Rajasthan, India reported anemia prevalence by way of clinical examination to be 43.9%. However, another study in rural Andhra Pradesh in the year 2007 reported the prevalence of anemia among adult males to be only 14.8% using Hemo Control photometer, which measures haemoglobin using a similar principle as Hemo Cue (Shashi Kant *et al.*, 2019). State-wise analysis of anemia among men reveals that Ladakh, West Bengal, and Jharkhand present higher rates of anemia in men (20% and above), while states like Nagaland, Manipur, and Goa demonstrate less prevalence (below 20%) (Vartika Saxena *et al.*, 2023). Anemia was observed to be more prevalent among males (42%) when compared to females (21%) about 59% of students had mild anemia (Hb of 10–<12 g%) and 41% had moderate anemia (Hb of 7–<10 g%). None of the students had severe anemia. Most students having anemia were of normal weight (BMI of 18.5–25) (Kanchana *et al.*, 2018) found anemia to be present among the students who were underweight compared to overweight students. The prevalence of anemia among underweight (BMI below 18.5) was 60%, and normal (BMI 18.5–24.99) of 27.5% and overweight (BMI >25) have a prevalence of 12.5%. This also suggests that anemia prevalence decreases as nutritional status of subject increases (Kanchana R et al; 2018). Iron deficiency anemia is the most common form of anemia all over the world. Among different types of anemia, iron deficiency anemia is very common in India. Medical students may suffer from anemia due to irregular eating habits due to the hectic study schedule (Kanchana R *et al.*, 2018).

Anemia can be classified as mild, moderate or severe based on haemoglobin concentration in the blood, according to the classification developed by the World Health Organization (WHO 1968).

A national level study indicated that the prevalence of iron deficiency in children between 6-59 months was 30% and anemia was reported as 15.1%. In Sri Lanka, anemia has continued to be an important public health problem and there is a prevalence of anemia in primary schoolchildren (Renuka Jayatissa *et al.,* 2020).

In Galle, prevalence of iron deficiency anemia to be 40% among adolescents aged 12 to 16 years (Hettiarachchi et al; 2006). A study conducted by De Silva (2003) says "Iron deficiency is the major cause of anemia in Sri Lanka (Ministry of Health, Sri Lanka, Policy Document 2000)". The prevalence of Anemia was high in adolescent students in Jaffna Zonal Schools. Anemia is a moderate public health problem among GCE (A/L) students in Jalina zone (32.6%). (Allen A *et al.,* 2017).

A program to supply multiple micronutrient (MMN) powder sachets (containing 15 vitamins and minerals, including iron, zinc, and vitamin A) for at-home fortification of supplemental foods was started in 2009 in 12 vulnerable districts with the goal of preventing and controlling iron deficiency anemia in children aged 6 to 23 months. Only 45.2% of participants in the program received the multiple micronutrient powder throughout its 2009–2012 evaluation, which suggests that coverage needs to be increased by twofold (Senarath *et al.,* 2015).

Consuming powdered multiple micronutrients was linked to a notable decrease in the incidence of anemia. The government has been implementing a weekly iron folate supplementation (WIFS) program with a nutrition education component for all school-age children since 2013 (Dias-de-Lanerolle *et al.,* 2012).

The Ministry of Health has commenced a weekly iron-Folic acid Supplementation (WIFS) program in schools for children in grades 1-13 with the objective of ensuring a satisfactory iron and folate status among children. The WHO recommendation for intermittent iron supplementation for children 5-12 years 45 mg of elemental iron tablets/capsules, One supplement per week for 3 months. and the Sri Lankan recommendation for all school children is given $FeSO_4$: 200 mg (60 mg elemental iron) + Folic acid 1 mg + Ascorbic acid 100 mg tablets, Once a week for 6 months per annum continuously (Jayatissa and Piyasena *et al.,* 1999).

2. METHODOLOGY

Study area was selected based on the previous research findings related to nutritional status of the estate sector and the advice of the supervisor. Laboratories were selected to collect the investigation reports based on the willingness of the Managing Directors of the laboratories to conduct the research. The verbal concern from the Managing Directors of the selected laboratories was obtained prior to study. The reports were collected (full blood count reports) from the selected laboratories to the period of one year from 1st of January 2023 to 31 of December 2023. All the research group members carefully went through the reports, and the relevant parameters to the study title, such as HB, RBC, MCV, and MCHC, were recorded. The demographic data, such as age, gender, and ethnicity, of the patients were also recorded. All the data were entered into the MS Office Excel work sheet. The re-entry and the abnormal values were carefully checked, and such values were removed from the entered list. All the data were filtered according to what the researcher needed in Excel, and the statistical analysis was performed via SPSS (23), after transforming the data from the Excel sheet to SPSS to identify the correlation between the variables.

3. RESUTS

Table 4.1 shows that the number of males was filtered from the total study population for analysis. Among the 1772 total study populations, 534 (30.13%) were males.

Table 4.1: The percentage of male general (anemic and non-anemic) population among the total population.

Total study population	Male
1772	534 (30.13%)

3.1. Total population categorized by different age group

Table 4.2 shows the distribution of the total study population by age category. The highest number (16.5%) of patients were recorded in the 61–70-year age category, followed by the 41–50-year age category, which was second highest (14.9%). The lowest number of patients were recorded in the 91–100-year-old age category (0.2%).

Table 4: 1 The distribution of study populations according to the different age category

Age category	Population
0-10	42 (7.2%)
11-20	58 (10.9%)
21-30	62 (11.6%)

31-40	73 (13.7%)
41-50	80 (14.9%)
51-60	67 (12.5%)
61-70	88 (16.5%)
71-80	60 (11.2%)
81-90	3 (0.6%)
91-100	1 (0.2%)

3.2. Total population categorized by ethnicity.

The table 4.3 shows that the distributions of study populations with different ethnicity. Tamils were found in higher number (81.1%) among the total study population while Muslims were low.

Table 4.3: The distribution of the population with ethnicity

Ethnicity	Population
Tamil	433 (81.1%)
Sinhala	79 (14.8%)
Muslim	22 (4.1%)

3.3. Total population categorized by month.

Table 4.4 shows the distribution of the study population in every month of the study duration. The highest percentage of the patients was recorded in May (15.4%), while the lowest percentage was recorded in November (4.3%).

Table 4.4: The distribution of the study population in every month of the study.

Month	Population
January	53 (9.9 %)
February	67 (12.5%)
March	63 (11.8%)
April	60 (11.2%)
May	82 (15.4%)
June	39 (7.3%)
July	27 (5.1%)
August	28 (5.2%)
September	35 (6.6%)
October	26 (4.9%)
November	23 (4.3%)
December	31 (5.8%)

3.4. Anemic population

Table 4.5 shows the number of anemic patients found among the total male population. Among the total males, 15.36% were anemic.

Table 4.5: The number of Anemic male population.

	Population
MALE	534
ANEMIA	96 (15.36%)

3.5. Anemic patients and their severity stage with different age categories

Table 4.6 shows the number of anemic patients and their severity stage in different age categories. The 80.3% of anemic patients were recorded in the mild anemic categories while only 3% were recorded in the severe anemic category. A higher number of anemic patients (21.9%) were found in the mild stage of anemia in the 61–70 years age category. A high number of moderate-anemic-level patients (5%) was observed in the 71–80-year-old age category. The severe anemic patients (1%) were found above 51 years-old age categories only.

Table 4.6: Anemic patients and their severity stage with different age categories

Age category	Hb status		
	Mild	Moderate	Severe
0-10	18 (18.8%)	0 (0.0%)	0 (0%)
11-20	5 (18.8%)	1 (1%)	0 (0%)
21-30	3 (3.1%)	0 (0.0%)	0 (0%)
31-40	3 (3.1%)	1 (0.0%)	0 (0%)
41-50	6 (6.3%)	2 (2.1%)	0 (0%)
51-60	8 (8.3%)	2 (2.1%)	1 (1%)
61-70	21 (21.9%)	2 (2.1%)	1 (1%)
71-80	16 (16.7%)	5 (5.2%)	1 (1%)

3.6. Distribution of anemic patients with study duration

Table 4.7 shows the distribution of anemic patients by study duration. In may month there were highest anemic patients (18.8%) were recorded. Low anemic patients (2.1%) were recorded in July and October.

Table 4.7: Distribution of anemic patients with study duration.

Month	Population
January	8 (8.3%)
February	11 (11.5%)
March	11 (11.5%)
April	10 (10.4%)
May	18 (18.8%)
June	9 (9.4%)
July	2 (2.1%)
August	4 (4.2%)
September	9 (9.4%)

October	2 (2.1%)
November	4 (4.2%)
December	8 (8.3%)

The figure 4.3 shows that the distribution of anemic males and non-anemic males with different age categories.

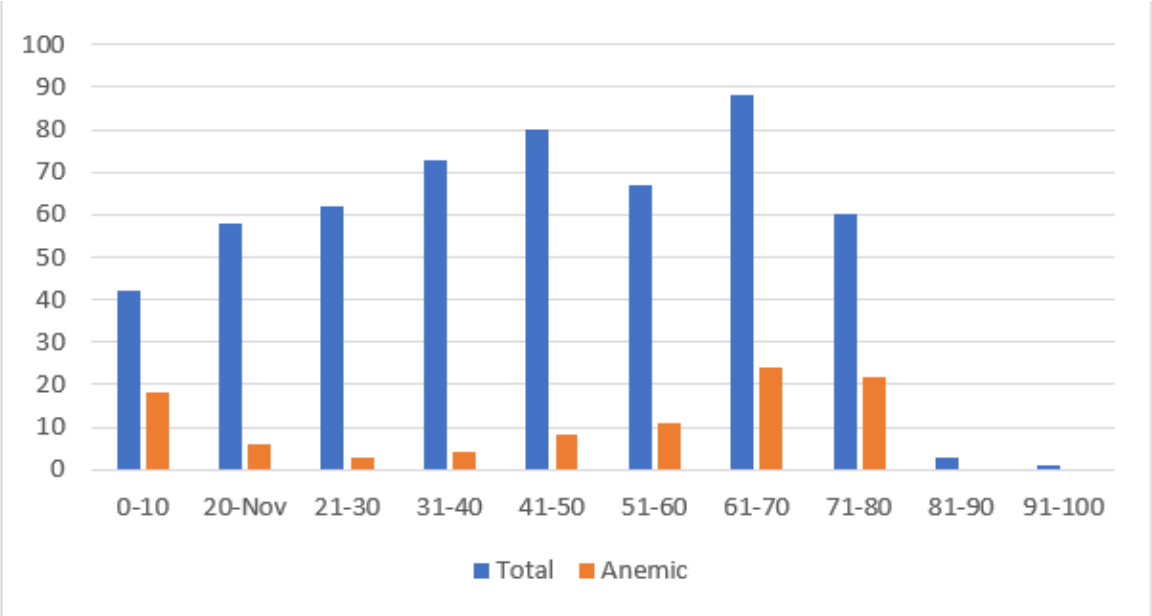

Figure 4.3: Distribution of anemic and non-anemic male with different age categories.

3.7. Anemic patients' distribution with ethnicity

Table 4.8 shows the distribution of anemic patients by their ethnicity. According to Table 4.8, Tamils had a higher anemic prevalence (85.4%) than the other ethnic groups. Muslims were low (3.1%) in anemic prevalence.

Table 4.*8*: Anemic patients' distribution with ethnicity

	Ethnicity			Total
	Tamil	Sinhala	Muslim	
Total	82 (85.4%)	11 (11.5%)	3 (3.1%)	96 (100.0%)

3.8. Anemic population categorized by blood indices

Table 4.9 shows the relations between the anemic patients with their blood indices. Among the anemic patients 87.5%, 32.2%, 58.3%, 16.6% had low RBC, MCV, MCHC, and MCH values respectively.

Table 4.9: The relations between the anemic patients with their blood indices

	RBC	MCV	MCHC	MCH
Low	84 (87.5%)	31 (32.2%)	56 (58.3%)	16 (16.6%)
Normal	12 (12.5%)	55 (57.3%)	38 (39.6%)	64 (66.7%)
High	0	10 (11.5%)	02 (2.1%)	16 (16.7%)

The figure 4.4 shows the distribution of anemic males with their blood indices. According to the figure 4.4 among the anemic patients most of the patients had low RBC value.

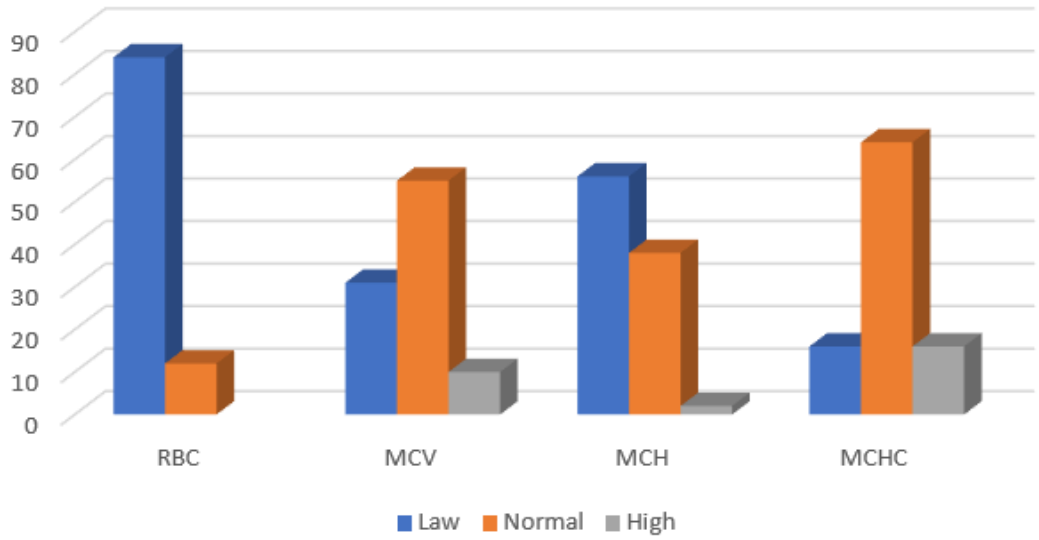

Figure 4.4: The distribution of anemic males by their blood indices

3.9. Corelation between Hb category and age category

Table 4.10 shows the corelation between the Hb categories and age categories. There were significant corelation ($p < 0.05$) observed between the variables.

Table 4.10: Corelation between age category and Hb category

	Hb category	Age category
Chi-Square	787.554	150.345
df	4	9
Sig	<0.001	<0.001

3.10. Corelation between Hb category throughout year

Table 4.11 shows the corelation between Hb category and the study period. The Hb category was significantly corelate ($p < 0.05$) with the study period.

Table 4.11 Significance between Hb category and study period.

	Hb Category	Month
Chi-Square	787.554[a]	95.573[b]
df	4	11
Asymp. Sig.	<.001	<.001

3.11. Corelation between Hb category and ethnicity

Table 4.12 shows the corelation between Hb category and ethnicity. There were significant corelation ($p < 0.05$) between Hb category and ethnicity.

Table 4.12: Corelation between Hb category and ethnicity.

	Hb category	Ethnicity
Chi-Square	787.554	557.090
df	4	2
Sig	<0.01	<0.01

3.12. Corelation between Hb and RBC and MCV

Table 4.13 shows the corelation between Hb category and RBC and MCV values. There were significant corelation ($p < 0.05$) observed among Hb category, RBC, and MCV

Table 4.13: Corelation between Hb category, RBC, and MCV.

	Hb category	RBC	MCV
Chi-Square	309.146	738.135	298.846
df	104	203	184
Sig	0.001	0.001	0.001

4. DISCUSSION

Anemia is a serious global public health problem that affects children and adult males. This study focusses to identify the prevalence of anemia among males in the Maskeliya area. Totally, 1772 patient's records were analysed and among them 534 (30.13%) were males (table 4.1, figure 4.1). Among the males 96 (15.36%) were found as anemic.

Selavaratnam R.R. *et al.*, (2003) stated in their research article published in the Sri Lanka Medical Journal that most of the tea pluckers in the five divisions of Hatton Estate had chronic energy deficiency and anemia. Dietary inadequacy of iron is a much more important causative factor than hookworm infection. The present data analysis was also performed based on the reports collected from the Maskeliya area, which also falls under the estate sector. The present study findings also positively showed the findings that indicate a considerable anemic population among males.

According to Lancet (2023), anemia is the most common blood disorder worldwide, estimated to affect nearly a quarter of people globally. Although this proportion is huge, new estimates from the Global Burden of Diseases, Injuries, and Risk Factors Study 2021 suggest that the global prevalence has decreased, from around 28% in 1990 to around 24% in 2021. Further, the study stated that 12.7% of adult males suffered from anemia in 2023 worldwide. Table 4.5 and figure 4.2 shows the anemic prevalence among the total males. 15.36% of anemic males were found among the total males. The present study showed that 15.36% of anemic males were identified, which reinforced the statement of Lancet (2023) since the anemic population is in a decreasing trend compared to previous years.

Table 4.2 shows the distribution of males among the different age categories. Accordingly, 61-70 years old age categories males found in large number. Among them, 21.9% were found at the mild anemic level, while 2.1% and 1% were found at the moderate and severe anemic levels, respectively (table 4.6). The age categories of 21–30 and 31–40 had the lowest number in all stages of anemia. A study conducted by Eun-Hee Naa *et al.,* (2020) found that while the prevalence of anemia increased monotonically with age in males, it was bimodal in females, with two peaks at 40–49 years and ≥80 years. The highest prevalence of anemia in females aged 40–49 years was attributed to microcytic anemia, while increases in anemia prevalence in males aged ≥50 years and females aged ≥70 years were attributed to macrocytic anemia. The study findings of Eun-Hee Naa were slightly contradictory to the present study since the prevalence of anemia was 61–70 years old in the present study. Further, the National Nutrition and Micronutrient Survey (NNMS) 2012 also indicated that the mild anemia is a common issue among males in Sri Lanka which also corobarates with the present findings.

Table 4.3 shows the distribution of males according to ethnicity. According to Table 4.3, Tamils were found more (81.1%) than the other ethnic groups. Table 4.8 shows the distribution of anemic males according to ethnicity. Tamils were found to have a to have a high (85.4%) prevalence of anemia compared to other ethnic groups, while Muslims were low in prevalence (3.1%). According to DHS (2016), a high prevalence of Tamil anemic patients may be observed among Indian Tamils due to socioeconomic challenges, including poverty and limited access to health services. Further, the low anemic prevalence of Muslim individuals may be due to certain cultural and religious practices that promote the consumption of iron-rich foods, particularly during religious observances and festivals. The extract of the DHS (2016) report corroborates the present study findings.

WHO also mentioned Adults have Noticeable prevalence of anemia. Journal of the American Geriatrics Society (JAGS) figured out same conclusion with that mild anemia is common in older adults and is associated with increased morbidity and mortality. The prevalence of mild anemia rises significantly in men over 65 years old and moderate anemia is highly prevalence among 71-80 age category it is correlated with National Nutrition and Micronutrient Survey (NNMS) 2012.

Moderate anemia is highly prevalent in the 71–80 age category. It shows 5 (5.2%) individuals in that category. It is near half of the moderately anemic population. Above 30-year-old male population and adults have been observed as moderate anemic patients. High prevalence of severe anemia shows above 50 years males. When overall values are figured out, mild anemia has shown significant numbers with 80 (80.3%). In the present study, it was observed that young adolescents and young age groups have a low prevalence of anemia. It is also supported by the Centers for Disease Control and Prevention (CDC) that data from the CDC indicates that anemia prevalence in young adult males is generally lower compared to other age groups but can be influenced by dietary habits, socioeconomic status, and underlying health conditions. The adult age group has shown a high prevalence of anemia. The Journal of the American Geriatrics Society also highlights that the prevalence of anemia is highest among older adults. This is due to factors such as chronic diseases, reduced absorption of nutrients, and the aging process itself. The present study has no anemic individual cases above 80 years old. It is derived from the Journal of the American Geriatrics Society, which states that approximately 17–20% of older adults are in this age group. The prevalence is higher in males due to factors like chronic kidney disease, gastrointestinal bleeding, and nutritional deficiencies (table 4.6).

Table 4.4 shows the distribution of total males monthly throughout the year. Table 4.7 shows the distribution of anemic patients month-wise throughout the year. May showed the highest prevalence of anemia among males, while July and October showed the lowest prevalence of anemia. Further, the anemic trend was increasing in pattern from January to May, and from June to December, it was declining (table 4.7). Godfreg Egby *et al.,* (2021) stated in their study that the participants had 40.9% and 32.3% prevalence of anemia, 30.1% and 19.4% prevalence of low vitamin A, 12.9% and 10.8% level of wasting, and 63.4% and 94.6% level of adequate iron intake in the dry and wet seasons, respectively. The cohort of anemic participants had mean hemoglobin concentrations of 10.6 (1.7) ug/dl and 11.4 (91.1) ug/dl in

the dry and wet seasons, respectively, and were significantly different at p = 0.001. The prevalence of anemia among them declined from 100.0% in the dry season to 79.0% in the wet season. Anemia was associated significantly with dry season's (<11.5 g/dl) (OR:0.302, p = 0.034) among the participants. The present study also showed an increase in the anemic population in the dry season and a decrease in the rainy season, which follows the findings of Godfreg Egby *et al.*, (2021).

Red cell indices are valuable in the morphologic classification of anemias. Since different etiologic factors result in characteristically different red cell morphology, the clinician can properly plan the management of a patient with an anemia if he can interpret the blood counts and peripheral blood smear well (Walker H.A. et al., 1990). According to Michel. J (2017), originally, 3 of the red cell indices were derived or calculated. MCV, mean corpuscular hemoglobin concentration (MCHC), and mean corpuscular hemoglobin (MCH). On most new analyzers MCV, hemoglobin, and red cell count are directly measured and MCHC and MCH are calculated. Because the MCHC and MCH tend to trend with the MCV, these indices are rarely used anymore. Tables 4.9 and figure 4.4 show the relationships between the anemic males and their blood indices. 87.5% of anemic males had low RBC levels too, which indicated the reason for low HB/anemia would be some other causes like B12 deficiency, certain drugs, etc. Likewise, 32.2% of anemic males had low MCV, which indicated that they had suffered from iron deficiency anemia. However, anemic males were also noted with normal RBC, MCV, MCHC, and MCH of 12.5%, 57.3%, 39.6%, and 66.7%, respectively. Likewise, there were anemic males found with high MCV, MCHC, and MCH of 11.5%, 2.1%, and 16.7%, respectively. Defective hemoglobin synthesis results in small cells (low MCV) with or without anisocytosis. In iron deficiency, anisocytosis (increased RDW) may be the first laboratory abnormality, even before anemia and microcytosis are seen.

In abnormalities involving nuclear maturation, hemoglobin production proceeds normally, while cell division lags behind, ultimately leading to a larger than normal cell. In contrast, when there is defective and delayed synthesis of hemoglobin, the continued cell division leads to microcytosis. Anemias are classified, according to the size of the red cell, as being normocytic (normal MCV), macrocytic (increased MCV), or microcytic (decreased MCV). Microcytic anemias were also often described as being hypochromic based on peripheral smear examination and MCHC when this value was determined manually. MCHC as measured by the electronic machines is mostly normal in microcytic anemias, however, and

the value of MCH closely parallels the value of MCV. The optical properties of the small, thin microcytes make them appear hypochromic on the blood smear, while the hemoglobin concentration remains in the normal range (microcytic, normochromic anemias). There are no hyperchromic anemias. In spherocytosis, the MCHC is increased due to loss of membrane and the consequent spherical shape assumed by the cell. According to the present findings the anemic males had high, normal and low level of RBC, MCV, MCHC, and MCH and the reason for the differences should be investigated further.

5. CONCLUSION

The prevalence of anemia was considerable among males in the Maskeliya area, based on investigation reports performed in 2023. There were significant correlations found between the age category, ethnicity, and season.

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