

Short communication

A study on anemia among the reproductive age group women using a rapid diagnostic test (RDT) kitJayaprakash Shetty K.¹, Nanjesh Kumar S.², Shrisharath K.², Chandrika Rao¹¹Department of Pathology, ²Department of Community Medicine, K. S. Hegde Medical Academy, NITTE Deemed to be University, Mangalore, Karnataka, India

(Received: February 2023 Revised: March 2023 Accepted: April 2023)

Corresponding author: **Nanjesh Kumar S.** Email: kumarnanjesh@gmail.com**ABSTRACT**

Introduction: Iron deficiency is the commonest nutritional disorder in the world. The common prevalent type of anemia is caused by nutritional factors, and it is particularly prevalent in women of childbearing age, pregnant women, and nursing mothers. Anemia is indicative of poor intake of nutrition and leads to ill health. The present study aims to estimate anemia among women of the childbearing age group at the field level using an RDT kit.

Methodology: A community-based cross-sectional study was conducted among reproductive age group women to estimate the hemoglobin using an RDT kit at the field level in the coastal area of Dakshina Kannada and Udupi districts.

Results: Out of 663 subjects, 17.3% participants were from the age group 35-39 and 40-44 years each. Based on the educational status, graduates and postgraduates accounted for 32.3%. Among the study subjects 63.34% were pregnant and lactating. 77.2% of the subjects were Hindus. Among the study subjects 59.57% had hemoglobin above 12 g/dl. 40.42% had <12 g/dl hemoglobin levels.

Conclusion: The Hemocue 301 RDT kit can be used at the field levels for the estimation of hemoglobin by gross route health care works.

Keywords: Reproductive women; anemia; iron deficiency; reproductive age group; Karnataka.

INTRODUCTION

Anaemia was defined by the World Health Organisation as "a condition in which the hemoglobin concentration in the blood is below a defined level, resulting in a reduced oxygen-carrying capacity of red blood cells." (1). The prevalent type of anemia is caused by nutritional deficiency, and it is particularly prevalent in women of childbearing age, pregnant women, and nursing mothers. (2). Anemia is one of the important public health nutritional problems of India (3). It affects 57% of women of reproductive age group and 52.2% of pregnant and lactating women (4). Anaemia detection is critical for effective management. There are numerous methods for diagnosing anemia, particularly in the village level sub centres, but lab facilities are not available in some centres. Many instruments have been tested in different field levels with varying degrees of accuracy (5-8). The present study is carried out to estimate anemia among women of reproductive age group at the field level using an RDT kit.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted. The study was carried over one year in the coastal part of Karnataka, consisting of Dakshina Kannada and Udupi districts. The Institutional ethical committee approval was taken before the study was conducted.

Study subjects

The study included women of child-bearing age groups (including pregnant and lactating women).

Study Setting

Households with women of reproductive age, under rural Health Centers of K S Hegde Medical Academy at Natekal and Nitte villages.

Study instrument

Information was collected using a prestructured questionnaire. The questionnaire was used to collect data on socio-demographic characteristics. The hemoglobin estimation was done using the Hemocue 301 RDT kit at the field level.

Sample Size

The total sample size for the study was 663 subjects.

Sampling method

Probability proportionate sampling technique method was used in the present study.

Method of data collection

Eligible and consented subjects from selected coastal areas were recruited for the study. The data was captured using a pre-structured questionnaire. Socio-demographic characteristics were collected using the questionnaire. The blood samples were collected and tested with Hemocue 301 RDT kit at the field level.

Statistical analysis

The data were analyzed using the SPSS software version 23. The descriptive statistics were analyzed, and a summary was presented in the form of frequency and percentage. Inferential statistics was done to find the association of age and income with anemia by using the chi-square test. The level of significance was taken as 5%.

RESULTS

Total of 663 subjects had participated by giving consent in the present study. Table 1 depicts the socio-

demographic profile of the subjects. The participants in the age group 35-39 years and 40-44 years were the highest and accounted for 17.3% each and the lowest was seen in the age group 45-49 years (9.8%). Based on the educational status, graduates and postgraduates were highest with 33.3% and PUC was the lowest with 17%. Based on the religion majority were Hindus (77.2%) and others (0.5%) were the least. Based on the marital status of the subjects 420 (63.34%) were married and were pregnant and lactating.

Table 1: The Socio-demographic profile of the study subjects

Socio-demographic profile of the subjects (n=663)		
Age group (in years)	Frequency	Percentage
15-19	84	12.7
20-24	94	14.2
25-29	97	14.6
30-34	93	14
35-39	115	17.3
40-44	115	17.3
45-49	65	9.8
Educational status		
Primary	140	21.1
Secondary	196	29.6
PUC	113	17
Graduate & Postgraduate	214	32.3
Religion		
Hindu	512	77.2
Muslim	123	18.6
Christian	25	3.8
Other	3	0.5
Marital Status		
Adolescent girls and newly married	243	36.65
Pregnant and lactating	420	63.34

Table 2: The levels of hemoglobin among the study participants (n=663)

Variables	Frequency	Percentage
Participants with normal Hemoglobin (>12 g/dl)	395	59.57
Participants with low Hemoglobin (<12 g/dl)	268	40.42
Total	663	100

Table 3: Association of demographic variables with anemia among the study participants (n=663)

Demographic character	Group	Anemic (<12 g/dl)		Non-anemic (>12 g/dl)		Results
		Frequency	Percentage	Frequency	Percentage	
Age (years)	15-30	120	40.70	175	59.30	p>0.05
	Above 30	148	40.20	220	59.80	
Income (Rs.)	≤15000	91	53.80	78	46.20	p<0.001
	>15000	194	39.30	300	60.70	

Table 2 shows the hemoglobin levels among the study participants. Among 663 subjects, 395 (59.57%) had >12 g/dl and 268 (40.42%) had <12 g/dl hemoglobin levels. Table 3 shows an association of anemia among the age and income of the study participants. The analysis shows there is no significant association

between age and anemia. Chi square=0.014 with p>0.05. The analysis also showed no significant association between income and anemia. Hence anemia is significantly associated with the lower-income group. Chi square=10.914 with p<0.001.

DISCUSSION

A total of 663 subjects consented and participated in the present study. The majority of the subjects were married (63.34%). A study done by Osborn *et al.* shows that the prevalence of anemia was 64.8% (9). A study done by Ganapathi and Kumar in rural areas of Tamil Nādu showed that 53.3% of anemia among women of reproductive age (10). In the present study 40.42% of subjects had hemoglobin levels less than 12 g/dl. The anemia in the present study is comparatively low in the reproductive age group women due to better health care facilities in this part of Karnataka.

In the present study, the Hemocue 301 (RDT) kit used at the field level for the estimation of hemoglobin was found to be reliable and cost-effective. Neogi *et al.*, in a study on the cost-effectiveness of devices at field or point of care for anemia detection, the detection by Hemocue was found to be the most cost-effective (11).

CONCLUSION

The Hemocue 301 RDT kit can be used where access to health care facilities is difficult to reach and in the field levels for the estimation of hemoglobin by gross route health care works. The RDT kit results are reliable as well as cost-effective.

ACKNOWLEDGEMENT

The authors gratefully acknowledge ICMR for the ad hoc funding.

CONFLICT OF INTEREST

No conflicts of interest.

REFERENCES

1. Nutritional anemias. Report of a WHO group of experts. World Health Organ Tech Rep Ser. 1972; 503:1-29.
2. WHO. The Work of WHO, 1980-81. Biennial Report; 1982.
3. Didzun, O., De Neve, J.W., Awasthi, A., *et al.* Anaemia among men in India: a nationally representative cross-sectional study. Lancet Global Health.2019; 7(12):e1685-e1694.
4. IIPS: National Family Health Survey 5. in: India Fact Sheet. India: Sciences IloP. Mumbai; 2019-21.
5. Chaudhary, R., Dubey, A., Sonker, A. Techniques used for the screening of hemoglobin levels in blood donors: current insights and future directions. Hematol Res Rev. 2017;8:75-88.
6. Dubey, A., Murti, S. Validation of a hemoglobinometer for use in outdoor blood donation camps. Asian J Transfus Sci. 2016;10(2).
7. Neogi, S.B., Negandhi, H., Kar, R., Bhattacharya, M., Sen, R., Varma, N., *et al.* Diagnostic accuracy of haemoglobin colour strip (HCS-HLL), a digital haemoglobinometer (TrueHb) and a non-invasive device (TouchHb) for screening patients with anaemia. J Clin Pathol. 2016; 69(2):164-170.
8. Parker, M., Han, Z., Abu-Haydar, E., Matsiko, E., Iyakaremaye, D., Tuyisenge, L., *et al.*, An evaluation of hemoglobin measurement tools and their accuracy and reliability when screening for child anemia in Rwanda: A randomized study. PLoS One. 2018; 13(1). e0187663.
9. Osborn, A.J., Muhammad, G.M., Ravishankar, S.L., Mathew, A.C. Prevalence, and correlates of anemia among women in the reproductive age (15–49 years) in a rural area of Tamil

Nadu: An exploratory study. J Edu Health Promot 2021;10:355.

10. Ganapathi, K.C., Kumar, K.S. A cross sectional study of anemia among women of reproductive age group (15-49 years) in a rural population of Tamil Nadu. Int J Med Sci Public Health 2017;6(3):524-529.
11. Neogi, S.B., John, D., Sharma, J., Kar, R., Kar, S.S., Bhattacharya, M., *et al.*, Cost-effectiveness of point-of-care devices for detection of anemia in community settings in India. Clin Epidemiol Glob Health. 2022;14:100995.