Original Research Article

Study of incidence of anemia, hypocalcemia; Type II diabetes mellitus and ECG changes in healthy women staff at tertiary care hospital in western Maharashtra

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Abstract

Background: In this study, we have screened the healthy women staff in tertiary care hospital for deficiencies of haemoglobin, serum calcium levels, raised blood sugar levels and ECG changes which gets unnoticed in day to day life of a women due to various factors. So an approach is done to screen all healthy females staff. **Materials and Methods:** 500 healthy females staff from different department (clinical, non clinical, nursing, dental and others) are done with routine investigations in KIMS Hospital Karad on the occasion of women's day in 2017. 100 women staff from each department are taken for study. **Results:** Out of all the females, anemia is found as a major deficiency which is followed by hypocalcemia then newly diagnosed diabetes mellitus and few ischemic ECG changes. **Conclusion:** Out of 500 females, 20 females from the clinical staff are having anemia which is 20%, from non clinical 7 are found to be anemic which is 7%, from dental staff 5 are anemic which is 5%, and from nursing staff 55 are found to be anemic which is 55% and from others 18 are anemic which is 18%. It is also seen that hypocalcemia also has a major impact from clinical dept 21 females are having decreased calcium levels, from non clinical 9 females are there, from dental 05 females are there and from nursing 55 females are there and from other 22 females are having hypocalcemia. There is also newly diagnosed diabetes type 2, from clinical dept 1 female is having raised blood sugars, from dental one female, from nursing 1 female and from others 3 females are having raised blood sugars. ECG are also recorded and ischaemic ECG changes are present, from clinical 1 female and from others 3 females are having ECG changes.

Key Words: anemia, hypocalcemia, Type II diabetes mellitus, ECG.

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INTRODUCTION

Anemia is a decrease in the total amount of red blood cells (RBCs) or hemoglobin in the blood,[3,4] or a lowered ability of the blood to carry oxygen.[5] When anemia comes on slowly, the symptoms are often vague and may include feeling tired, weakness, shortness of breath or a poor ability to exercise.[1] Anemia that comes on quickly often has greater symptoms, which may include confusion, feeling like one is going to pass out, loss of consciousness, or increased thirst.[1] Anemia must be significant before a person becomes noticeably pale.[1] Additional symptoms may occur depending on the underlying cause.[1] Anemia goes undetected in many people and symptoms can be minor. The patient may have symptoms related to this, such as palpitations, angina (if pre-existing heart disease is present), intermittent claudication of the legs, and symptoms of heart failure. On examination, the signs exhibited may include pallor (pale skin, lining mucosa, conjunctiva and nail beds), but this is not a

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reliable sign. There may be signs of specific causes of anemia, e.g., koilonychia (in iron deficiency), jaundice(when anemia results from abnormal break down of red blood cells-in haemolytic anemia), bone deformities (found in thalassemia major) or leg ulcers (seen in sickle-cell disease). In severe anemia, there may be signs of a hyperdynamic circulation: tachycardia (a fast heart rate), bounding pulse, flow murmurs, and cardiac ventricular hypertrophy (enlargement). There may be signs of heart failure. Pica, the consumption of non-food items such as ice, but also paper, wax, or grass, and even hair or dirt, may be a symptom of iron deficiency, although it occurs often in those who have normal levels of hemoglobin. Chronic anemia may result in behavioral disturbances in children as a direct result of impaired neurological development in infants, and reduced academic performance in children of school age. Restless legs syndrome is more common in those with iron-deficiency anemia.[13] Calcium is the fifth most abundant element in the human body and the most abundant metal. Calcium ions play a vital role in the physiology and biochemistry of organisms and the cell as electrolytes. They play an important role in signal transduction pathways, where they act as a second messenger, in neurotransmitter release from neurons, in contraction of all muscle cell types, and in fertilization. Many enzymes require calcium ions as a cofactor. Calcium ions outside cells are also important for maintaining the potential differenceacross excitable cell membranes, as well as proper bone formation. Diabetes is a chronic and potentially fatal disease, marked by High level of blood sugar. According to American Diabetic Association (ADA) diabetes impacts 23.6 million[1] adult Americans and approximately 284 million[2] people live with this illness. Diabetes Mellitus is a combination of impaired Beta cell function with marked increase in the peripheral insulin resistance at receptor and post receptor level and increase in hepatic glucose output production. Type 2 Diabetes mellitus leads to microvascular and macrovascular complications, like Diabetic Nephropathy, Neuropathy and Retinopathy. lectrocardiography (ECG or EKG[a]) is the process of recording the electrical activity of the heart over a period of time using electrodes placed on the skin. These electrodes detect the tiny electrical changes on the skin that arise from the heart muscle's electrophysiologic pattern of depolarizing and repolarizing during each heartbeat. It is a very commonly performed cardiology test. In a conventional 12-lead ECG, ten electrodes are placed on the patient's limbs and on the surface of the chest. The overall magnitude of the heart's electrical potential is then measured from twelve different angles ("leads") and is recorded over a period of time (usually ten seconds). In this way, the overall magnitude and direction of the heart's electrical depolarization is captured at each moment throughout the cardiac cycle.[4] The graph of voltage versus time produced by this noninvasive medical procedure is referred to as an electrocardiogram. During each heartbeat, a healthy heart has an orderly progression of depolarization that starts with pacemaker cells in the sinoatrial node, spreads out through the atrium, passes through the atrioventricular node down into the bundle of His and into the Purkinje fibers, spreading down and to the left throughout the ventricles. This orderly pattern of depolarization gives rise to the characteristic ECG tracing. To the trained clinician, an ECG conveys a large amount of information about the structure of the heart and the function of its electrical conduction system.[5] Among other things, an ECG can be used to measure the rate and rhythm of heartbeats, the size and position of the heart chambers, the presence of any damage to the heart's muscle cells or conduction system, the effects of cardiac drugs, and the function of implanted pacemakers.[6]

Study Design: Hospital based cross sectional study.

Study Setting: Dept of Medicine KIMS hospital

MATERIALS AND METHODS

500 healthy females staff from different department (clinical, non clinical, nursing,dental and others) are done with routine investigations in KIMS hospital karad on the occasion of womens day in 2017. 100 women staff from each department are taken for study.

Inclusion Criteria: All the healthy females are taken into study

Females more than 18 years are taken into study.(Includes menstruating and post menopausal women)

Exclusion Criteria: Females who are previously diagnosed as anemia, hypertension, myocardial infarction, diabetes mellitus, and any other comorbidities are excluded from this study.

Methodology

All the healthy females from different departments (clinical, non clinical, dental, nursing and others) are done routine investigations. Proper consent and all related information is explained to the females before the study.

Investigations which are done are

1. Complete blood count
2. Electrocardiograph
3. Serum calcium levels
4. Fasting blood sugars and glycosylated haemoglobin

According to WHO criteria, Fasting Blood sugar >126mg/dl (7mmol/l) and Postprandial Blood sugar >200mg/dl (11.1mmol/l) Glycosylated Haemoglobin

(HbA1C) >6.4% Referred as type 2 Diabetes Mellitus. (Fasting is defined as no caloric intake for at least 8 hours)

OBSERVATIONS AND RESULTS

There are 500 females which are examined on the womens day in Krishna hospital in 2017. The females are divided into 100from each department, each into clinical, non clinical, dental, nursing, others staff. Result is given in tables and chart listed below

Table 1:

Features	clinical	Non clinical	Dental	Nursing	Others
Anemic	20	07	05	55	18
Non anemic	80	83	95	45	72
Total n=100					

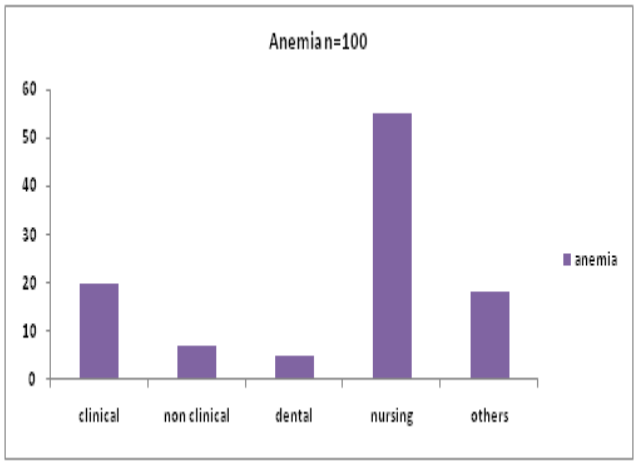

Figure 1:

Out of 100 females in clinical department, 20 females are having anemia (low haemoglobin concentration) which is 20%of the total staff. Out of 100 females in non clinical department, 7 are found to be anemic which is 7%. Out of 100 females in dental department, 5 areanemic which is 5%. Out of 100 females in nursing department, 55 are found to be anemic which is 55%. Out of 100 females from others, 18 areanemic which is 18%.

Table 2:

Features	Clinical	Nonclinical	Dental	Nursing	Others
Hypocalcemia	21	09	05	55	22
Total n=100					

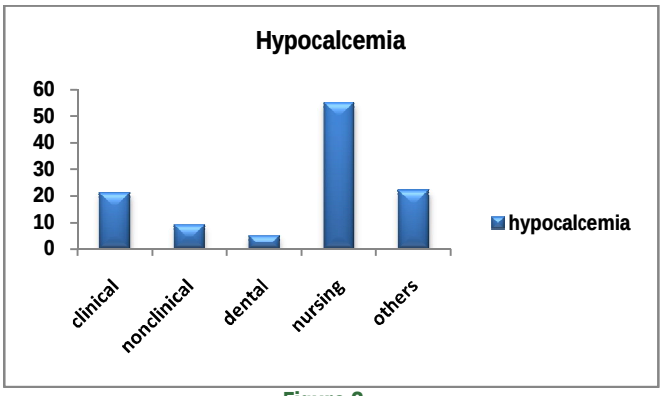

Figure 2:

It is also seen that hypocalecemia(low serum calcium levels) also has a major impact. Out of 100 females from the clinical department, 21 females are having decreased calcium levels which are 21%. Out of 100 females from non clinicaldepartment, 9 females are having hypocalcemiawhich is 9%. Out of 100 females in dental department 05 females are having hypocalcemia which is 5%. Out of 100 females in nursing department, 55 females are having hypocalcemia which is 55%. Out of 100 females from others, 22 females are having hypocalcemia which is 22%.

Table 3:

Features	Clinical	nonclinical	Dental	Nursing	Others
Diabetes mellitus	01	00	01	01	03
Total n=100					

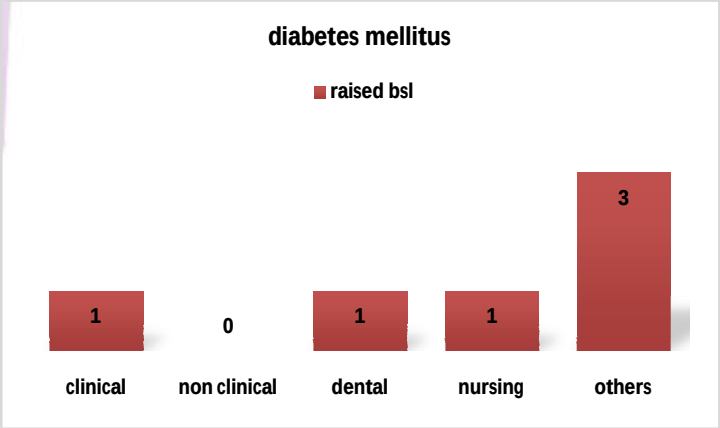

Figure 3:

The females are also diagnosed as newly detected type 2 diabetes mellitus. Fasting blood glucose levels and glycosalated Hba1c is done. The results are as follows Out of 100 females in clinical department, 1 female is diagnosed as diabetes mellitus type 2 which is 1%, Out of 100 females in dental department, 1 female is diagnosed as diabetes mellitus type 2 which is 1% Out of 100

females in nursing department, 1 female is diagnosed as diabetes mellitus type 2 which is 1% Out of 100 females in nursing department, 1 female is diagnosed as diabetes mellitus type 2 which is 1%. Out of 100 females from others, 3 females is diagnosed as diabetes mellitus type 2 which is 3%.

Table 4:

Features	Clinical	Non clinical	Dental	Nursing	Others
ECG changes	01	00	00	00	03

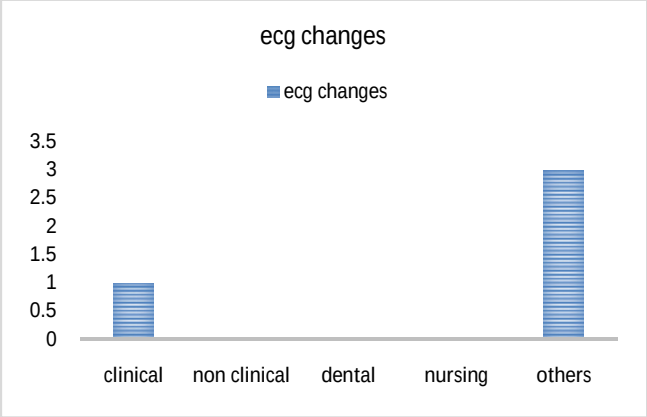

Figure 4:

ECGis taken of all the females and Ischaemic changes are noted. Out of 100 females in clinical department, 1 female is having ischaemic changes which is 1%. Out of 100 females in others, 3 females are having ischaemic changes which is 3%

RESULTS

Out of 500 females, 20 females from the clinical staff are having anemia which is 20%, from non clinical 7 are found to be anemic which is 7%, from dental staff 5 areanemic which is 5%, and from nursing staff 55 are found to be anemic which is 55% and from others 18 areanemic which is 18%. It is also seen that hypocalcemia also has a major impact. from clinical dept 21 females are having decreased calcium levels which is 21%, from non clinical 9 females are there, from dental 05 females are there and from nursing 55 females are there and from other 22 females are having hypocalcemia. There is also newly diagnosed diabetes type 2, from clinical dept 1 female is having raised blood sugars, from dental one female, from nursing 1 female and from others 3 females are having raised blood sugars. ECGare also recorded and ischaemic ECG changes arepresent, from clinical 1 female and from others 3 females are having ECG changes.

DISCUSSION

Our study is compared with a study named Prevalence of iron deficiency and anemia among healthy women which was done in Nepal. In that half of the women were having anemia and in our study majority anemia is found to be a significant deficient factor. In one of the Framingham study, healthy womens are taken ECG and are found to be having ischaemic changes as the age advances**.** Similarly in our study there are few healthy womens found to have ischaemic ECG changes. In one of the studies it is found that hypocalcemia was indirectly associated with low vit d levels and is also associated with osteoporosis and other bone health disorders so in our study hypocalcemia was also a major factor of deficiency in healthy womens so we adviced all of them supplements of vitamin d**.**

CONCLUSION

As after the results, anemia is the major deficiency in todays women life which mostly is nutritional factor and irregular food habits, irregular timings of food due to different duty times, stress, more than 20 %from each group are found to be anemic. Above all the departments, nursing female staff are more affected because they have different duty timings, rotation, night shifts. Oral iron supplementation and iron rich foods are advised to them. Hypocalcemiais found to be another major deficiency which is found more in post menopausalwomen. They are advised oral calcium supplements and Vit D3 also. Due to high major impact of diabetes worldwide, some femalesare newly diagnosed diabetes mellitus and are unnoticed. They are treated accordingly. Some are having ischaemic ECG changes because of the stress and heavy duty shifts and lack of exercises and lifestyle modifications. So the two major deficiencies which noticed are anemia and hypocalcemia.

REFERENCES

1. Iron deficiency anaemia: assessment, prevention, and control. A guide for programme managers. Geneva, World Health Organization, 2001 (WHO/NHD/01.3).
2. De Benoist B et al., eds. Iodine status worldwide.WHO Global Database on Iodine Deficiency. Geneva, World Health Organization, 2004.
3. Global Prevalence of Vitamin A Deficiency. Micronutrient Deficiency Information System working paper No. 2. Geneva, World Health Organization, 1995 (WHO/ NUT/95.3.).
4. The World Health Report 2002: reducing risks, promoting healthy life: overview. Geneva, World Health Organization, 2002 (WHO/WHR/02.1).
5. Indicators for assessing vitamin A deficiency and their application in monitoring and evaluating intervention programmes. Geneva, World Health Organization, 1996 (WHO/NUT/96.10).
6. Roh JL, Park JY, Park CI. prevention of postoperative hypocalcemia with routine oral calcium and vitamin D supplements 2009; 115: 251-258

7. AncutaLeahu, Vanessa carroni, G.Bilotti, calcium level, a pedictive factor of hypocalcemia, JurnalulChirurgie, lasi, 2009, Vol5.Nr.2 (ISSN 1584-9341)
8. Last RJ. Anatomy: Regional and apllied, 5th ed. Baltimore: Williams and Wilkins 1972 p.602
9. Tandon OP, Katiyar BC. Ballistocardiographic study in severe anaemia. Circulation. 1961;23:195– 99.
10. Bailey D, Aude YW, Gordon P, Burtt D. ST segment elevation myocardial infarction, severe anaemia and non-obstructive coronary disease: case report and brief comment. Conn Med. 2003;67(1):3–5
11. Harvey N. Principles and practice of medicine. 22nd ed. New Delhi: Prentice-Hall International Inc; 1988. Anaemia. In: Jhons RJ, Harvey AM, McKusick VA, Owems AH, Ross RS editors; p. 311.
12. Friedberg CK. In: Diseases of the heart. 3rd ed. Philadelphia: W.B.Saunders; 1969. The heart and circulation in anaemia; pp. 1678–86.
13. Ellis LB, Faulker JM. The heart in anaemia. New Eng J Med.1939;220:943–5.
14. Sanghvi LM, Mishra SN, Banarji K. Electrocardiogram in chronic severe anaemia. Am Heart

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