Original Article

Prevalence of Anemia in Females with Diabetes Mellitus Type-II and Menopausal Females of Hyderabad, Sindh

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ABSTRACT

OBJECTIVE: To determine the prevalence of anemia, in menstruating normal, menstruating diabetic, menopausal normal, menopausal diabetic female.

METHODOLOGY: A comparative cross sectional study performed at the department of Physiology, Sindh University Jamshoro, from April-September 2019 in collaboration with Liaquat University Hospital Jamshoro/ Hyderabad. The diabetic females recruited from Liaquat medical hospital (LUH) Jamshoro/ Hyderabad and menopausal women of society after approval from the research ethical committee of institute. Random sampling technique was chosen for the study. After observing inclusion and exclusion criteria, total 200 females were included in this study. After explaining the purpose of study, verbal and written consent taken, complete blood picture (CBC) performed from all participants. Data was entered in excel sheet and in SPSS 21.0 version. Chi-square test applied.

RESULTS: The prevalence of anemia in menstruating normal, menstruating diabetics, menopausal normal, menopausal diabetic was reported 50.00%, 51.67%, 52.00% and 70.00% respectively. The highest prevalence was reported in menopausal diabetic female (70%).

CONCLUSION: The study concludes that the prevalence of anemia in menopausal diabetic is more pronounced than in the other three study groups that are normal menstruating, diabetic menstruating and normal menopausal females. This is suggestive that cessation of menstruation added with diabeties is high risk factor for anemia.

KEY WORDS: Diabetes Mellitus, Menopause and Anemia.

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INTRODUCTION

Anemia is a clinical condition which is detected either by less number of erythrocytes(<4.2 million /mm^3) or less hemoglobin level (<12g/dl)[1]. Anemia is highly prevalent in developing countries like Pakistan; in children[2], university students[3] in pregnant female[4]. Anemia is more common in women as compared to men[5]. The prevalence of anemia in young female was reported 80.37%[6]. However, neglected female's groups like diabetic menstruating female or menopausal diabetic group the prevalence of anemia is not carried out yet.

Diabetes Mellitus (DM) is the main cause of mortality and morbidity in established as well as in developing countries[7]. According to the World Health Organization (WHO), DM will be the seventh leading cause of mortality by the year 2030[8]. The Diabetes Mellitus Type-II (T2DM) is caused by destruction of pancreatic *β*-cells and declined the secretion of insulin. The insulin resistance and reduced synthesis of insulin associated with obesity[9]. Insulin resistance decreases the glucose tolerance in peripheral tissues, muscle cells, results in hyperglycemia. The pro-inflammatory cytokines and interleukin-6 effects on progenitor to erythropoiesis phases by the erythroid growth factor and apoptosis of immature erythrocytes[10]. The prevalence of anemia and diabetes after menopause was increased; Menopause is an important stage in the life and amenorrhea consecutively at least for 12 months. Interestingly, decrease number of red cell indices is reported in menopausal women[11].

The complications of diabetes has always been linked with menopause in women; An earlier menopause is a main complication of type I diabetes while the early menopause has been linked with the risk of Diabetes Mellitus Type-II diabetes[12]. Conclusively the connection between anemia, diabetes and menopause is obvious; hence the main objective of the work was to carry out the prevalence of anemia in menstruating normal, menstruating diabetics, menopausal normal, menopausal diabetic female.

METHODOLOGY

A comparative cross-sectional study was performed at the department of Physiology, Sindh University Jamshoro, from April-September 2019 in collaboration with Liaquat University Hospital Jamshoro/ Hyderabad. Random sampling technique was chosen for the study. According to the general formula of biostatistics the sample size stands out to be n=200. Participant include in present study was known diabetic menstruating and menopausal women, and

their counter control groups from Liaquat Medical Hospital Jamshoro / Hyderabad and from society of Hyderabad city. Apparently healthy females with normal menstrual cycles, known cases of diabetics and those who were on menopause with or without diabetics were recruited. Females with other co morbidities other than diabetes, with menopause of un -natural cause like surgical removal and on medication except for diabetes were excluded from the study. The known T2 diabetics, normal menstruating, menopausal T2 Diabetic and without T2 Diabetic females were included in present study. 5ml of blood drawn after all aseptic measures and was collected into EDTA test tubes. Complete blood picture (CBC) was performed by using CBC hematology analyzer Celltac Alpha MEK-6500 by Nihon Kohden Germany, in sterilized condition in Diagnostic Research laboratory LUMHS. The Data was entered in Excel sheet and also in SPSS version 21.0. Chi-square test applied and result shown as percentages and proportions.

RESULTS

The present study emphasizes on the prevalence of anemia in some novel groups. Anemia is determined on basis of WHO criterion[1] as shown in Table I. The prevalence of anemia in menstruating normal is 50% (mild 38%, moderate 12% and severe 00%). In menstruating diabetes is 51.67 (mild 20%, moderate 31.67% and severe 00%). In menopausal normal is 52% (mild 30%, moderate 22% and severe 00%) and in menopausal diabetes is 70% (mild 30%, moderate 40 % and severe 00%).

In menstruating normal female, the RBC count less than 4.2 (million/mm3) were 6% whereas 94% were having normal RBC count. In menstruating diabetic, the RBC count less than 4.2 (million/mm3) were 16.67% whereas 83.33% were having normal RBC count. In menopausal normal the RBC count less than 4.2(million/mm3) were 20% whereas 80% were having normal RBC count. In menopausal diabetic, the RBC count less than 4.2(million/mm3) were 21.67% whereas 78.33% were having normal RBC count.

Hematocrit less than 40% was found 94% in menstruating normal, (71.67%) in menstruating diabetic. (82%) in menopausal normal (80%) in menopausal diabetic respectively.

Whereas; microcytosis having MCV less than 80 was found in 18(36 %) in menstruating normal, 32(53.33 %) in menstruating diabetic, 15(30 %) in menopausal normal and 29 (48.33 %) in menopausal diabetic respectively. Table II.

TABLE II: FREQUENCY OF PARTICIPANTS HAVING ANEMIC INDICATORS (n= 200)

	Anemic	Non-anemic
Menstruating Normal	Hb<12.0(g/dl) = 25 (50.00%)	Hb≥12.0gm/dl= 25 (50.00%)
	RBC <4.2 (million/ mm^3) =03(6.00%)	RBC ≥4.2 (million/ mm^3) =47(94.00%)
	MCV <80 (μm^3) =18 (36.00%)	MCV ≥80 (μm^3) =32 (64.00%)
	Hematocrit <40% =47(94.00%)	Hematocrit ≥40% =03(6.00%)
Menstruating Diabetic	Hb<12.0gm/dl = 31 (51.67%)	Hb≥12.0gm/dl= 29 (48.33%)
	RBC <4.2 (million/ mm^3) =10(16.67%)	RBC ≥4.2 (million/ mm^3) =50(83.33%)
	MCV <80 (μm^3) =32 (53.33%)	MCV ≥80 (μm^3) =28 (46.67%)
	Hematocrit <40% =43(71.67%)	Hematocrit ≥40% =17(28.33%)
Menopausal Normal	Hb<12.0gm/dl = 26 ((52.00%)	Hb≥12.0gm/dl= 24 (48.00%)
	RBC <4.2 (million/ mm^3) =10(20.00%)	RBC ≥4.2 (million/ mm^3) =40(80.00%)
	MCV <80 (μm^3) =15 (30.00%)	MCV ≥80 (μm^3) =35 (70.00%)
	Hematocrit <40% =41(82.00%)	Hematocrit ≥40% =09(18.00%)
Menopausal Diabetic	Hb<12.0gm/dl = 42 (70.00%)	Hb≥12.0gm/dl= 18 (30.00%)
	RBC <4.2 (million/ mm^3) =13(21.67%)	RBC ≥4.2 (million/ mm^3) =47(78.33%)
	MCV <80 (μm^3) =29 (48.33%)	MCV ≥80 (μm^3) =31 (51.67%)
	Hematocrit <40% =48(80.00%)	Hematocrit ≥40% =12(20.00%)

TABLE I: FREQUENCY DISTRIBUTION OF PARTICIPANTS BASED ON DIFFERENT CATEGORIES

Categories	Non-Anemic	Anemic			
		Overall	Mild (Hb<12)	Moderate (Hb<11)	Severe (Hb<8)
Menstruating Normal	25(50.00%)	25(50.00%)	19(38.00%)	06(12.00%)	00(00%)
Menstruating Diabetic	29((48.33%)	31(51.67%)	12(20.00%)	19(31.67%)	00(00%)
Menopausal Normal	24((48.00%)	26((52.00%)	15(30.00%)	11(22.00%)	00(00%)
Menopausal Diabetic	18(30.00%)	42(70.00%)	18(30.00%)	24(40.00%)	00(00%)

DISCUSSION

The overall prevalence of anemia in menstruating normal, menstruating diabetics, menopausal normal, menopausal T2 diabetic were reported 50.00%, 51.67%, 52.00% and 70.00% respectively. The trend of anemia in all categories was Menopausal diabetics >Menopausal Normal >menstruating diabetics >menstruating normal.

The iron deficiency anemia in reproductive age female of Korea is 11.5%[13], anemia among the female students of University of Sharjah was 26.7%[14] and in Pakistan among the young girls is 80.37% which is the highest in area[6]. In this study the menstruating normal group is showing 50.00% prevalence which is higher than the rest of the world , however less than the prevalence which was shown in comparatively young normal menstruating females[6.] The recent research suggest that the diabetes mellitus could possibly be a strong risk factor for anemia, the prevalence of anemia in diabetic female (35.8%) is reported higher than male (21.3%) in a study carried out at Dasman diabetes Institute Kuwait[15]. According to another study high prevalence of anemia was found in type II diabetes patients in male as well as in female[16]. On the contrary, the prevalence anemia is reported similar in diabetic or non-diabetic individuals[17]. To this end, no any significant difference wasfound in both groups. Additionally; whether or not the menopausal status of the women could affect the anemic condition or not was also observed in diabetic type II or normal female. The prevalence of anemia in pre-menopausal women (aged between 45-55) is 86% and in post-menopausal women is 81%[18], moreover according to Russian study, anemia is inversely and strongly associated with menopausal status of women[19]. However, no any concluding research is available indicating the association of menopause with anemia. To this end the prevalence of anemia was reported not only in menopausal women but also the diabetic menopausal versus normal menopausal women in order to confirm whether the diabetic condition could influence the menopausal status (or vice versa) with reference to hemoglobin level or/and other anemic indicators. Till to date, no any datum is available pinpointing on the prevalence of anemia (and/or it comparison) in aforementioned categories. The same study with similar groups is suggested with different nationalities and mega sample size in order to confirm the existing prevalence in some novel groups. Hematocrit less than 40% was found 94%in menstruating normal. (71.67%) in menstruating diabetic. (82%) in menopausal normal (80%) in menopausal diabetic respectively.

Kannan S et al.[20] revealed that Hematocrit, MCV, MCHC, and Hb have proved to be a reliable indicator of discordance in menstruating and menopausal diabetic females. Present study results have the similar findings.

The current study will provide the awareness about iron status and anemia peculiarly in a target group of female (diabetic mellitus and/or menopause), it will also be helpful to make the public health policy in a particular group of women.

CONCLUSION:

The study concludes that the prevalence of anemia in menopausal diabetic is more pronounced than in the other three study groups that are normal menstruating, diabetic menstruating and normal menopausal females. This is suggestive that cessation of menstruation added with diabeties is high risk factor for anemia.

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