Impact of heavy menstrual bleeding on quality of life and its association with anemia

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Abstract

Heavy menstrual bleeding (HMB) is a common gynecologic problem among the reproductive age women across the world that can lead to severe pathophysiological conditions such as anemia. This study was designed to find the prevalence of HMB among the reproductive age females of Gujranwala Division, Pakistan with the aim to assess possible relationship of HMB with anemia and its impact on health related quality of life. A cross-sectional study was conducted on 504 reproductive age women of Gujranwala Division, Pakistan. Data was collected by the questionnaire including questions about demographic information, menstrual features as well as SF-36 Quality of Life Scale and Fatigue Severity Scale. Blood samples were collected through venipuncture from 64 consented patients and 20 controls for further biochemical analysis. Statistical analysis was performed by using Graph Pad Prism (Version-8.0.1). During this study we identified that QoL status was statistically poor in women with HMB women as compared to women with normal menstruation. Biochemical analysis declared that iron status among HMB women was significantly below the normal values recommended by World Health Organization (WHO) as compared to women without HMB ($P<0.001$). Briefly HMB imparts negative impact on QoL by increasing fatigue and anemic risks. Measures are needed to aware the population about pathophysiological consequences of HMB and to address the health problems related to HMB.

KEYWORDS: Heavy menstrual bleeding, Quality of life, Hemoglobin, Hematocrit, Dysmenorrhea.

Introduction

Heavy menstrual bleeding (HMB) was defined as the menstrual blood loss of 80 mL or more per cycle in 1960. The Federation of Gynecology and Obstetrics describes HMB as a woman's perception of extremely heavy periods with the passage of large clots, regardless of regularity, frequency or duration [1, 2]. Afterwards, National Institute for Health and Clinical Excellence (NICE) in UK defined HMB as 80 mL or more menstrual blood loss that socially, physically, and emotionally interfere with woman's quality of life, and occur alone or along with some other symptoms [3, 4].

Signs or symptoms of HMB includes bleeding for more than a week, use of double sanitary protection, passage of large clots, changing soaked pads during night, restriction in daily life routine, fatigue and shortness of breath. HMB can be caused by irregular ovulation, adenomyosis, anti-inflammatory and hormonal drugs, bleeding disorders, polyps and uterine fibroids etc. [5, 6].

It's a common gynecological problem among reproductive age women across the world leading to severe pathophysiological conditions. In 2009, a systematic review presented the worldwide epidemiology of HMB between 4 to 52% [7]. In American population, approximately 70% women on anticoagulation and 90% women with bleeding disorder suffer from HMB [8]. Menstrual cycle related problems are very common in exercising women and almost 18.8% exercising women of USA complaint for HMB [9]. A study on HMB prevalence in five different regions of Europe reported a prevalence rate of 27.2% [10]. HMB was reported in 15.2% women of Iran and 34-36% of reproductive age Chinese women [11, 12].

Due to excessive blood loss during menstruation, HMB may result in reduction of iron level and hemoglobin level that lead to serious physical health problems such as iron deficiency anemia (IDA) and fatigue [13]. Each women with HMB experience anemic conditions at some point but only small portion of HMB women visit hospital for medical help annually [10, 14]**.**

HMB also impart significant impact on health related quality of life (QoL) and cause restrictions for women at work and school that can be problematic in academic success [15, 16]. The primary purpose of HMB treatment is to improve the quality of life in terms of blood hemoglobin or iron level [17]. Menorrhagia not only cause negative impact on iron level and QoL in physical, emotional and social terms in women but also cause fatigue. Correlation among fatigue and HMB is a famous clinical event [18, 19].

In Pakistan, females usually don't report problems related to menstruation because it is a stigma even to talk about this issue because they considered it a private matter. It's very important to highlight issues related to females which can affect their physical and mental health. This study is designed to

find prevalence of HMB in females of Gujranwala division Pakistan and its association with iron deficiency anemia. Furthermore, this study will be helpful to investigate the impact of HMB on women's quality of life. It would encourage females to report and seek the treatment of HMB and help to identify the females who are at higher risk of iron deficiency and anemia.

Materials and Methods

Study Design: This study was divided into two parts, data collection and laboratory biochemical analysis. For data collection, a questionnaire was developed with the help of gynecologist and statistician. The questionnaire was consisting of socio-demographic variables, HMB diagnostic criteria and scales to identify effect on quality of life.

Socio-demographic information included variables of age, residential area, educational level and marital status. According to gynecologist consulted diagnostic criteria, symptoms of HMB included passage of large clots, duration of menstruation > 7 days, frequent replacement of pads, less than 21 days of menstrual cycle, 12 or more pads used in one cycle and 4 or more days of heavy bleeding. Questions about anemic history were also asked from the participants having HMB according to criteria.

Next part of the questionnaire was comprising of SF-36 scale and fatigue severity scale (FSS) to analyze the impact of HMB on quality of life of sufferers. The SF-36 is a general scale for health related quality of life developed by Ware in 1987 [20], was adopted and modified in such a way that main health related features were used and rated according to positive scoring with '0' being not at all, '1' as slight effect, '2' as moderate effect and '3' for extreme or severe effect on QoL. According to modified scale, as the score increases, the HMB impact on quality of life also increases.

The impact of HMB on fatigue level was evaluated using the Fatigue severity scale (FSS) developed by Krupp, Muir-Nash, LaRocca, and Steinberg in 1989 [21]. This scale was adopted and modified in such a way that nine items were rated on the basis of 2z-score. It is also called fatigue measure that evaluates fatigue associated functional outcomes instead of fatigue itself.

Study Population: The study was conducted in the area of Gujranwala Division, Pakistan. Study population included 504 females of reproductive age among 15-49 years who visit to different hospitals, maternity homes, schools, colleges and universities. Both women complaining of HMB and women having normal menstruation were included in the study. All the pregnant women and those having fatigue related chronic illness such as chronic fatigue syndrome, eating disorders, and autoimmune diseases were excluded. Informed consent was taken from each participant and an identification number was assigned to ensure anonymity.

Sample Collection and Laboratory Procedures: After the completion of questionnaire, data was analyzed and blood samples were collected by 84 consented participants with 64 as HMB cases and 20 as non HMB control samples that were analyzed in biochemistry laboratory of University of Gujrat. From each consented participant, blood sample was drawn by venipuncture, placed in K_2EDTA anticoagulant containing CBC vial and stored at 4°C. The blood hemoglobin and hematocrit levels were measured through Sahli's hemoglobinometer and Microhaematocrit centrifuge (Hawksley haematospin 1300 model) respectively. According to World Health Organization, the study participants with hemoglobin level below 12.0 g/dL and hematocrit level below 36%, were regarded as under anemic conditions in this research [22].

Statistical Analysis: The collected data was evaluated by using SPSS IBM software (Version 21) and Graph Pad Prism (Version 8.0.1). Different statistical tools such as independent sample t-test (to check the impact of HMB on iron biomarkers), Man Whitney U test (to assess the impact of HMB on QoL) and chi-square test (for menstrual features) were utilized. A P value smaller than 0.05 was considered as significant.

Results

There were 504 females who participated in this study but only 84 participants agreed to undergo venipuncture for further laboratory procedures. Over 25.59% females itself reported that they were suffering from HMB while the remainder were having normal menstruation. Among these HMB women, 67.64% were belonging to urban area. Majority of HMB patients belong to age group of 15-24 years was 80.88%. According to educational status, there were 13.23% HMB women with primary, 23.52% with secondary and 63.23% with higher education. Almost 83.82% HMB women were unmarried as described in Table 1.

Table 1: Demographic information about reproductive age women of Gujranwala Division, Pakistan

Demographic Measures	Number (%)
Area	
Rural	66(32.35)
Urban	138(67.64)
Age	
15-24	165(80.88)
25-34	12(5.8)
35-44	8(3.92)
>44	19(9.31)
Educational Status	
Primary	27(13.23)
Secondary	48(23.52)
Higher	129(63.23)
Marital Status	
Unmarried	171(83.82)
Married	33(16.17)

Data collected about different menstrual features explained that 6% HMB females and 5% non HMB females were having age at menarche ≤ 11 years. Over 51.4% HMB and only 1% non HMB females were experiencing menstrual duration of ≥ 8 days. The number of females with menstrual cycle <21 days was higher in HMB group (51.4%) as compared to non HMB group (22%). There were 73.52% HMB females reported using ≥ 12 pads in one cycle. In case of heavy bleeding days, there were 51.47% HMB participants as compared to 3% non HMB participants with ≥ 4 heavy bleeding days. Almost all the HMB females and 20% to 36% non HMB females reported about frequent replacement of pads and the passage of large clots (Table 2).

Table 2: Differences in menstrual characteristics among HMB and non HMB women of Gujranwala Division, Pakistan

Characteristics	HMB Number (%)	non HMB Number (%)	P-Value
Age at Menarche			0.137
≤ 11 years	12(6)	15(5)	
12-14 years	132(65)	171(57)	
≥ 15 years	60(29)	114(38)	
Duration of Menstruation			<.001
≤ 4 days	0(0.0)	117(39)	
5-7 days	99(48.5)	180(60)	
≥ 8 days	105(51.4)	3(1)	
Menstrual Cycle Duration			<.001
<21 days	105(51.4)	66(22)	
21-35 days	96(47)	210(70)	
>35 days	3(1.47)	24(8)	
Number of Pads Used in One Cycle			<.001
≤ 11	54(26.47)	150(73.52)	
≥ 12	237(79)	63(21)	
Number of Heavy Bleeding Days			<.001
Never	0(0.00)	18(6)	
1 day	0(0.00)	66(22)	
2 days	3(1.47)	141(47)	
3 days	96(47.05)	66(22)	
≥ 4 days	105(51.47)	9(3)	
Passage of Large Clot	204(100)	108(36)	<.001
Use of Double Pads	84(41.17)	36(12)	<.001
Frequent Replacement of Pads	204(100)	60(20)	<.001
Intermittent Bleeding	90(44.11)	84(28)	<.001

*P-Value < 0.05 is considered as statistically significant.

According to gynecological developed criteria 40.47% females were suffering from HMB as shown in Figure 1.

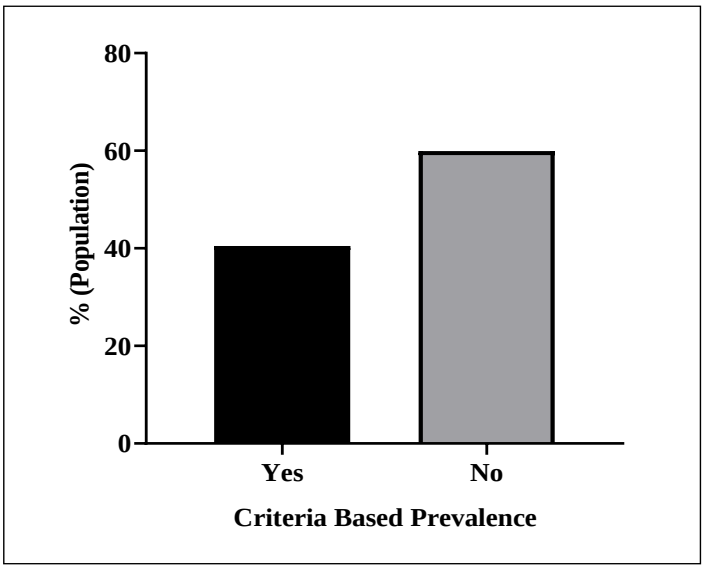

Figure 1: Criteria based prevalence of HMB among reproductive age women of Gujranwala Division, Pakistan.

Table 3 demonstrate that there were 35.30% HMB women participating in sports or daily physical activity as compared to 25% non HMB women. Almost 60% HMB women reported about dysmenorrhea while only 43% non HMB women complaint about dysmenorrhea. A statistically significant association was present between HMB and dysmenorrhea (P=0.016). The prevalence rate of anemia was found to be significantly higher in HMB women (70.60%) than non HMB women (33%) as P<0.001. There were 79% HMB women and 48% non HMB women having severe fatigue level during menstrual cycle. Fatigue level was found to be significantly higher in HMB women than non HMB (P<0.001).

Table 3: Association of HMB with different factors

Factors	HMB (%)	Non HMB (%)	P-Value
Physical Activity	35.30	25	0.123
Dysmenorrhea	60.29	43	0.016
Anemic History	70.60	33	<.001
Fatigue	79	48	<.001

*P-Value < 0.05 is considered as statistically significant.

While assessing QoL, a statistically significant difference was observed in each sub-dimension of SF-36 scale between HMB and non HMB group (P<0.0001) as shown in Table 4.

Table 4: Comparison of QoL status between HMB and non HMB Group

Dimensions of SF-36 Scale	Cases (Mean±SD)	Control (Mean±SD)	Z_{MWU}*	P-Value
Physical health	2.308±1.00	1.890±0.800	-4.605	0.000
Physical role	2.426±0.914	2.070±1.220	-5.209	0.000
Social relation	2.191±0.945	1.790±0.899	-4.811	0.000
Bodily Pain	2.985±0.868	2.460±0.954	-6.100	0.000
Mental Health	2.088±1.123	1.770±0.905	-2.855	0.004
Role Limitation	2.338±0.870	1.820±0.818	-6.820	0.000
Vitality	3.176±3.560	2.160±0.834	-6.920	0.000

Z_{mwu}[1] Man-Whitney U test
P-Value < 0.05 is considered as statistically significant.

Biochemical analysis of iron biomarkers declared mean hemoglobin values of 8.73 g/dL and 11.4 g/dL as well as mean hematocrit values of 27.5% and 37.6% for HMB group and non HMB group respectively. The hemoglobin and hematocrit levels of HMB group were significantly lower than non HMB group as P<0.001 (Table 5).

Table 5: Analysis of biochemical parameters among HMB and non HMB groups

Biochemical Parameters	Cases (Mean±SD)	Control (Mean±SD)	Mean Difference	P-Value*
Hemoglobin	8.73±1.14	11.4±0.77	2.63	<.001
Hematocrit	27.5±3.02	37.6±3.12	10.1	<.001

*P-Value < 0.05 is considered as statistically significant.

Discussion

In present study, menstrual features among HMB women were significantly different from non HMB women. These findings are in line with previous literature studies [23-25]. The prevalence rate of HMB in current study was 40.47% which is higher than the prevalence rate of Iranian and Swedish women reported as 15.2% and 32% respectively [5]. According to a study conducted on Turkish women of 15-49 year, almost 4 out of 10 female complaint about HMB [25]. In our study the criteria based prevalence of HMB was significantly higher than self-reported prevalence. It can be due to insufficient awareness about HMB in Pakistan. Being an under reported disease, it is not considered a serious health problem in our country.

The percentage of HMB is higher (35.3%) in physically active women similar to findings of Elite and non-Elite athletic women of United States [9]. Almost more than 50% of HMB women of Gujranwala division were suffered from dysmenorrhea represented a statistically significant association between HMB and dysmenorrhea (P=0.016). The results of our research were in compliance with a cross-sectional study on Canadian females with bleeding disorders [26].

Anemic prevalence was statistically significantly higher in HMB population of Gujranwala Division than non HMB (P<0.001). Moreover, mean Hb and Hct levels were below the reference value recommended by WHO in HMB group as compared to control group (P<0.001). Both anemic percentage and biochemical analysis of current study are supporting the hypothesis about HMB as main leading factor contributing to anemic conditions reported in studies among Turkish, Nigerian and American-African population [2, 25, 27].

QoL in each dimension of SF-36 scale was significantly more affected in HMB women of Pakistan as compared to women with normal menstruation especially in case of bodily pain and vitality. These findings are in accordance to previous studies of Karlsson et al, Barr et al and Gokyildiz et al [5, 28, 29]. Moreover, HMB also impart negative impact on social, personal, family and work life.

Due to limited factors, it cannot be confirmed that menstrual bleeding alone contributed to the high rates of anemia and iron deficiency. Finally, due to survey study the results are reliant on subjective responses participants.

Conclusions

This study helps us to identify the major risk factors for HMB so that these can be managed to reduce the incidence rate of HMB and HMB associated anemia. It also helps us to indicate the iron biomarkers for diagnosis and prognosis of HMB and iron deficiency anemia. In our diseased sample population, the low Hb, Hct levels can be due to unawareness about etiologies and consequences of HMB. There is dire need to create awareness and to take measures in order to alleviate the pathophysiology of HMB as well for the improvement of iron status.

Acknowledgement

Competing interests: None.

Funding: Department of biochemistry, University of Gujrat.

Ethical Approval: Ethical clearance certificate was approved from institutional review board (IRB) of University of Gujrat.

Contributions: KS and AR conceived and designed the study; AR, KS, ZF and AS collected the data and samples; AR, KS, SZ and MNR analysed and interpreted the data; AR and KS drafted the manuscript; all authors have discussed the results, critically reviewed the manuscript for important intellectual content and approved the final draft.

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