Effect of Web-Based Learning Guidelines on Knowledge and Anemia among Women with Heavy Menstrual Bleeding

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ABSTRACT

Background*:** Heavy menstrual bleeding is such a common health problem among women and that impacts women's lives and hemoglobin level. ***Aim of the study: Was to evaluate the effect of web-based learning guidelines on anemia among women with heavy menstrual bleeding. ***Study design:*** Quazi experimental design. ***Setting:*** The study was conducted in outpatient gynecology clinic at Kafr Sakr city general hospital at Sharkia governorate. **Study subjects:** A purposive sample of 110 women was included in the study. ***Tools of data collection:*** four tools were used; Structured interview Schedule, Modified assessment scale for heavy menstrual bleeding features among women, Women Knowledge Regarding Heavy Menstrual Bleeding and anemia, and Hemoglobin level measurement. ***Results:*** There was highly statistically significant difference p value was .0001 between knowledge about normal menstrual cycle, heavy menstrual bleeding and anemia after implementation of the web-based learning guidelines. There were highly statistically significant differences between pre and post intervention regarding level of anemia. 52.7% of studied women had moderate level of anemia pre intervention has become 30% post intervention. ***Conclusion:*** Highly statistically significant differences were found regarding total score of women knowledge and, anemia among women with heavy menstrual bleeding throughout study phases. ***Recommendations:*** Web based learning guidelines should be part of management plan of all women with heavy menstrual bleeding in all settings and Routine hemoglobin level measurement for all women diagnosed with heavy menstrual bleeding.

Keywords*:* Web-Based Learning Guidelines, Heavy menstrual bleeding & Anemia

1. INTRODUCTION

Heavy menstrual bleeding (HMB) is a common gynecological complaint with multiple etiologies and adverse pathophysiological origins. Heavy menstrual bleeding (HMB) is defined as excessive menstrual blood loss that interferes with a woman's physical, social, emotional, and/or material quality of life. It can occur alone or with other symptoms **(Perelló et al., 2021).** Heavy menstrual bleeding can be defined objectively as a total menstrual blood loss (MBL) exceeding 80mL per menstruation. Such definition is now only used in studies because the amount of blood loss does not always correlate with women's perception of their menstrual blood loss (MBL) or the impact of bleeding on their lives **(Warner et al., 2021).**

In Egypt 16% of women aged 15 to 44years were diagnosed with menorrhagia, and 25% of the women complained about long-frequent periods of bleeding or staining ***(Saad et al., 2023)***

HMB has been shown to have negative effects on the women quality of life. This excessive blood loss during the menstruation can also cause physical health problems such as iron deficiency anemia (IDA) **(Attia et al., 2023).**

The symptom of heavy menstrual bleeding (HMB) appears to be far more common than generally perceived. Too heavy or too long menstrual bleeding is a major contributor to the equally underestimated and highly prevalent condition of anemia in addition to its direct effect on the quality of life **(Munro, 2023).** Anemia is a significant public health problem, particularly among adult females due to heavy menstrual bleeding (HMB). Anemia is an abnormally low hemoglobin concentration, which is defined by the World Health Organization (WHO) defines as being below 12 g/dL in no gestational, reproductive-aged women. Iron deficiency accounts for approximately 75% of all anemia cases that is recognized as the most common micronutrient deficiency worldwide. These interrelated disorders often have adverse impacts on the quality of life of women **(Mansour et al., 2021).**

Anemia is a condition in which the body lacks enough red blood cells to deliver oxygen to tissues. Hemoglobin is a protein in red blood cells that carries oxygen to tissues throughout the body. Iron deficiency anemia occurs due to loss of red blood cells during heavy menstrual bleeding. The body uses iron stores to make more hemoglobin as a compensatory mechanism to bleeding so that enough oxygen can be carried to tissues. Heavy menstrual bleeding may make iron levels too low. This may result in iron deficiency anemia **(Paul,et al., 2021)**.

The chronic blood loss that women experience with HMB is a major contributor to the development of ID and is the most common cause of IDA. Consequently, understanding relationship between HMB & iron deficiency (ID) and their impact on the lives of women of reproductive age is an essential precursor to understand the steps that will be necessary to successfully address these issues, both on all perspectives including healthcare delivery to individuals and healthcare policy **(Munro, 2023).**

Web-based teaching materials are a subset of computer-based training or electronic learning (eLearning) that use to the World Wide Web (www) for the delivery to eduuctional materials **(Miyanda, 2021).** As the advantages of web-based learning (WBL) in higher education includes overcoming barriers of distance and time, economies also of scale, and novel instructional methods. Educational interventions significantly improve knowledge, attitudes, and practices regarding iron deficiency anemia among females, leading to better prevention and management of anemia. **(Abu-Baker et al., 2021).**

Research found that education is important to promote awareness for prevention of anemia that help women to adopt positive attitude toward anemia prevention. Low levels of knowledge and unfavorable attitudes towards anemia prevention have been associated with increased anemia risk. This highlights the importance of implementing knowledge transfer and attitude **(Munira & Viwattanakulvanid, 2021).**

Menorrhagia is a common health problem for women and because it can have a significant negative impact on women's lives, all nurses should be knowledgeable about the pathophysiology underlying menorrhagia and be skilled in the initial assessment of any woman with menorrhagia. The role of the nurse in the care of the woman with menorrhagia will vary, depending on the education, clinical experience, and knowledge of the woman (**Guelcher, et al., 2021).**

Significance of the study:

In Egypt 16% of women aged 15 to 44years were diagnosed with menorrhagia, and 25% of the women complained about long-frequent periods of bleeding or staining **(Saad et al., 2023).** In study conducted at Zagazig University, 24 % of women were diagnosed with menorrhagia. menorrhagia can be associated anemia in 49% of women with iron deficiency, both of which can have a negative effect on women's health. Although rare, women with menorrhagia can experience acute hemorrhage, which can be life threatening **(Saad, et al., 2023).**

Web-based learning offers huge opportunities for learning and access to a vast amount of knowledge and information. Discussion forums via email, videoconferencing, and live lectures (video streaming) are all possible through the web. Web based courses may also provide static pages such as printed course materials. Web-based learning in medical education includes overcoming barriers of distance and time, economies of scale, and novel instructional methods **(Kasirye, et al, 2023).** To date there have been limited studies about web-based learning regarding anemia among women with heavy menstrual bleeding. So, this study was conducted to evaluate the effect of web-based learning guidelines on anemia among women with heavy menstrual bleeding.

Aim of the study:

The present study aimed to evaluate the effect of web-based learning guidelines on anemia among women with heavy menstrual bleeding.

Research hypothesis:

A significant improvement in degree of anemia will be noticed among women with heavy menstrual bleeding who had received web-based learning guidelines.

Subjects and Methods:

Research design:

Quazi experimental design (pre & posttest) was used to investigate the effect of web-based learning guidelines on anemia among women with heavy menstrual bleeding.

Study Setting:

The study was conducted in outpatient gynecology clinic at Kafr Sakr city general hospital at Sharkia governorate. The location of this clinic is in the first floor in outpatient department. The unit was beside the family planning clinic and consists of two rooms, first one for history taking from the mother and second one well equipped for examination. It cis opened daily from 8 am to 2 pm except Friday.

Study Subjects and sampling:

A purposive sample of 110 women with heavy menstrual bleeding was used in recruiting study according to the eligibility criteria in the above-mentioned setting

Inclusion criteria:

- Educated women in the age group of 18-49 years.
- Have smart phone connect to the internet and accept to participate in the study.
- Have regular menstrual periods and free from any organic lesion except small fibroids that will not require surgical management.
- Women diagnosed by physician as a case of heavy menstrual bleeding.

Sample size calculation:

Assuming the mean HB level was 12.66+_0.97 vs. 13+_0.82 pre vs. post intervention **(Moradi et al., 2017)** At 80% power and 95% Confidence level, the estimated sample was 110 women. The sample size was calculated by using software Epi Info package version 6-04.

Tools for data collection:

Four tools were used to collect the necessary data:

Tool I: A structured interviewing Schedule.

This questionnaire was designed by the researcher in simple Arabic language to collect the necessary data for achieving the study objectives after reviewing the related literature **(Kocaoz et al., 2019) and (Eswi et al., 2012)** and was composed of five parts:

Section 1: Socio-demographic characteristics

For collecting data pertaining demographic characteristics of the studied women, it composed of 5 questions as age, level of education, residence, occupation & family income level

Section 2: Menstrual characteristics

The second part was concerned with Menstrual characteristics of study subjects it included questions about age at menarche, duration of menstruation, menstrual cycle Interval, the number of days of heavy menstruation, large clot passage during menstruation, number of pads used in one cycle, use of double pads during menstruation, frequent replacement of pads for heavy menstruation

Tool II: Modified assessment scale for heavy menstrual bleeding features among women

This scale adapted from **(Gokyildiz, et al, 2013)** and modified by the researcher in a simple Arabic language. It was used to collect the necessary data about the menstruation characteristics of women with heavy menstrual bleeding It includes 6 items that measures severity of heavy menstrual bleeding. It included questions about intermittent

bleeding, how long have the subject had heavy menstrual bleeding, severity of menstrual bleeding as perceived by women and also asking the woman about some situations that she may had experienced such as getting dirty on the under wears, getting dirty on the clothes, getting dirty on the bed linens, getting dirty on the furniture. Then, if there is dysmenorrhea what is the level (mild, moderate or severe) as perceived by woman. And if the woman knows any woman (mother, sister, or other) in her family has or has had HMB

Tool III: Women Knowledge Regarding Heavy Menstrual Bleeding

It was developed by the researcher in a simple Arabic language guided by available literature consist of closed ended and multiple-choice questions, **(Eswi, et al, 2012) (Balaji, et al, 2022)** to collect necessary data for assessing the women knowledge about normal menstrual cycle as; definition, age of menarche, normal interval between menstrual cycles, normal duration of menstruation, associated symptoms with menstruation & information source regarding menstruation. Also it included questions about heavy menstrual bleeding such as definition, causes, diagnosis, complication and management.

Scoring system of women knowledge:

The total score was ranged from 0-24 grades for all knowledge items and was assigned: a score (1) was given when the answer was correct and a score (0) was given when the answer was incorrect or don't know.

Total knowledge regarding heavy menstrual bleeding and anemia based on the statistical analysis was calculated as:

Satisfactory knowledge > 60% of total scores

Unsatisfactory knowledge < 60% of total scores

Tool IV Hemoglobin level measurement:

A full blood count was needed to determine the degree of anemia. CBC was performed to all cases by referral of cases to the central laboratory in the hospital before and after the intervention to evaluate the effect of web based guidelines on the level of anemia as reflected by hemoglobin level. According to the WHO, anemia is defined as levels of hemoglobin level less than 12 g /dL and iron deficiency anemia is classified into mild, moderate and severe anemia as follow:

- Mild anemia 10 - < 12 g /dL
- Moderate anemia 7- < 10 g /dL
- Severe anemia < 7 g /dL .

Supportive material

An educational nursing guidelines booklet prepared for women with heavy menstrual bleeding.

It was developed by the researcher

From the recent related literature in simple Arabic language. The content of the educational booklet included information about normal menstrual cycle and heavy menstrual bleeding such as definition, prevalence, causes, diagnosis and

management of heavy menstrual bleeding. It also included information about anemia such as definition, prevalence, causes, diagnosis, management and dietary guidelines for anemia. Finally management strategies and some general guidelines for more healthy life as healthy balanced dietary habits, adequate sleeping hours, regular exercises, massage, and vitamin and mineral supplements.

Content Validity:

The tools were tested for content validity by jury of three experts, two professors of obstetrics and gynecological nursing department and one professor of community health nursing department faculty of nursing. These experts assessed the tools for clarity, relevance comprehensive, understanding, applicability, and easiness for administration. No modifications were required. Additionally, the researcher prepared a guide booklet for the studied subjects which covered all items related to normal menstrual cycle, heavy menstrual bleeding, anemia in view of recent literature. The same experts who validated the tools also revised and validated the guide booklet. All recommended modifications were done.

Content Reliability:

The reliability of the items of the tools were assessed using cronbach,s alpha test, its result was 0.704 for women knowledge about heavy menstrual bleeding and anemia and 0.93 for anemia which indicate an accepted reliability of tools.

Pilot study was done 10% to estimate reliability of study tools

Variables		
	Cronbach's Alpha	N of Items
Knowledge Questionnaire	0.704	21
Fatigue Questionnaire	0.93	9

Field work:

The data collection was done first using the interview questionnaire sheet after identifying the women who fulfilled the criteria of the study. They were asked to participate in the study. The researcher explained the aim of the study briefly to the woman and the method to contact them and their agreement to participate was obtained. The activity took place in the previously mentioned setting in the waiting area of the outpatient clinic. The questionnaire tools were filled by the researcher by asking the woman and the average time spent with each participant to be interviewed was 30-45 minutes. The study was for a period of five months, during the period from the beginning of October 2023 to the end of February 2024. Educational sessions were developed based on actual educational need assessment of studied subjects, to improve their knowledge and anemia level. It was developed by the researcher in the light of available research and literature. It was written in simple Arabic language to cover the

relevant theoretical and practical aspects of heavy menstrual bleeding, anemia management.

To fulfill the aim of the study, the following phases were adopted and carried out through: assessment phase, planning phase, implementation phase and evaluation phase.

Assessment phase:

This was the first phase that was achieved after taking the verbal agreement from the study participant in the study setting where knowledge needs, hemoglobin level were identified (pre-test) through collection and analysis of the baseline data from the filled tools and the result of blood sample analysis. After complete physical examination and history taking by physician, diagnosis is confirmed by physician as heavy menstrual bleeding.

Thus the development of the program was partially based on woman knowledge, and anemia level.

Planning phase:

Based on the result obtained from assessment phase, the researcher designed the intervention program and sessions content according to the identified woman needs and in view of related literature. Identified needs requirements and deficiencies in knowledge. Furthermore, the researcher prepared an educational booklet to help them follow the educational sessions and to serve as reference at home, it was sent online to them.

Description of the program (educational nursing guidelines)

The first step in developing this program was to determine the main aim and objectives. These objectives were derived from the assessed needs of the study women. These were categorized into specific objectives and tasks were ordered in sequential order consistent with teaching and learning process. The program was set in five sessions covering two sections of the educational booklet. The first is knowledge about heavy menstrual bleeding, the second is about anemia.

General objective of the educational program:

The educational program aimed to improve women level of knowledge about heavy menstrual bleeding and anemia.

Specific objectives of the program:

At the end of the educational sessions, women should be able to Identify normal characteristics of menstrual cycle, define heavy menstrual bleeding, list causes of heavy menstrual bleeding, mention symptoms of heavy menstrual bleeding, explain diagnostic test for heavy menstrual bleeding, acquire knowledge about management if heavy menstrual bleeding, define anemia, identify prevalence of anemia, list causes of anemia, mention symptoms and signs of anemia, explain management of anemia and acquire knowledge about dietary management of anemia and management strategies.

The sessions were as follows:

Session1: Initial session was carried out for each individual woman in the waiting area in the clinic

while waiting for lab result that usually available after 12 pm so it was good chance for the researcher to introduce self to the woman, take consent, orient the woman about the problem using the educational booklet that contain photos and diagram for better understanding and illustration through brief orientation of the contents of the educational booklet to encourage the woman to attend subsequent sessions on what's app, messenger and google meeting application.

Session II: Focus on background and overview about normal menstrual cycle characteristics. google meeting sessions were used to illustrate the contents of the session. The educational booklet was especially prepared to facilitate understanding of the content.

Session III: This session is focusing on heavy menstrual bleeding background which includes definition, prevalence, causes, symptoms, diagnostic tests and management of heavy menstrual bleeding. Video call by messenger used as teaching method as well as Google meet. In addition to what's app chatting to answer any question.

Session IV: The objectives were to help studied subjects to acquire knowledge about anemia definition, prevalence, causes, diagnosis, complications, medical management of anemia and dietary management of anemia. Chatting on what's app and Google meet were used as teaching methods. Educational booklet pictures were used as media.

Session V: Last session include revision and reinforcing information given across previous sessions.

c- Implementation phase:

A group on what's app was established by the researcher with all sample women and the researcher started the program session daily for one week to cover all the content of the educational program. The contents based on a supportive booklet and photos prepared by the researcher based on literature review and available sources regarding dietary management of anemia, life style modification guidelines.

Sessions on Google meeting that were carried by the researcher using what's app chatting and voices through a group made by the researcher to allow interaction between researcher and the women that illustrate the educational contents of the program using screen shots of photos and diagrams from the booklet with each point illustrated. At the end of each session women were allowed to ask questions either on what's app in public group or on the personal account of the researcher on what's app or on phone call where the researcher call the women every week to ensure good adherence to medication regimen, iron supplementation, healthy diet and to remind women with date of follow up and post-test. Before termination of each session and telephone call feedback was obtained from the women to ensure understanding of the content. The total frequency of web-based learning session were 5 sessions including face to face initial session each

session last about 30-45 minutes and each telephone call last about 10-15 minutes.

Additionally, every woman received on basic conversation every week. The day and time of were determined according to available time for each woman separately. The content was based on the supportive booklet

d- Evaluation phase

In order to evaluate the effect of web-based learning guidelines, the posttest was administered immediately after implementation of the entire web based learning guidelines sessions at gynecological clinic where the women were reassessed by the physician and referred again for CBC test to evaluate the effect of web based learning guidelines on degree of anemia among women with heavy menstrual bleeding. The same tools used in pre-test were used in post-test.

Limitation of the study

The participants must pay for internet access.

Sometimes bad internet connection during sessions.

D. Ethical consideration:

Ethical approval was obtained from the scientific and ethics committee of the Faculty of Nursing at Zagazig University. The aim of the study was explained to each woman before applying the tools to gain her confidence and trust. A verbal agreement for participation was obtained from each woman who agrees to participate in the study after ensuring that data collected will be treated confidentially. Women were informed that they have the right to withdraw from the study at any time without giving any reason.

Administrative design

An official permission was obtained from the Dean of the faculty of Nursing at Zagazig University and from Managers of previously mentioned setting to carry out the study.

Statistical design:

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (Statistical Package for Social Sciences). Quantitative data was represented as mean +_ SD, median (range) and qualitative data were represented as absolute frequencies (number) and relative frequencies (percentage). Mc nemar test or marginal homogenety was used to compare between two dependent groups of categorical data. Percent of categorical variables were compared using Chi-square test. Multiple linear regression (stepwise) was also used to predict factors which affect total knowledge scores. Cronbach alpha coefficient was calculated to to assess the reliability of the scale through its internal consistency. P-value <0.05 was considered to be statistically significant. P-value <0.01 was considered to be highly statistically significant, and P-value >0.05 was considered to be statistically non-significant (NS)

Results:

Table 1 displays that 51.8% of studied women their age was ≥35 years and the mean of age was 34.6±7.5 years, as regards to the educational level it was obvious that 61.8% of studied women have

secondary school. The same table reveals that 66.4% of them resided in urban areas. Moreover; 54.5% of them were housewives and 82.7% has sufficient family income level.

Table 2 shows that 70% of the studied women started menstruation at the age of 12-14 year. It also showed that 45.5% of studied women have menstruation ≥8 days and menstrual cycle interval of 60% of them was 21-35 days. In same direction, it was found that 67.3% of studied women suffered from large clot passage during menstruation, that's why 65.5% of them use ≥12 pads every cycle. Moreover; 46.4% have double pads and 63.6% of them frequently replace pads due to heavy menstruation.

Table 3 reveals that 40.9% of studied women have intermittent bleeding and duration of HMB was 3 months and less for 41.8% of the studied women and 50.9% of studied women described their cycle as heavy and 53.6% of them get dirty on the under wears during HMB; Moreover 48.2% of studied women have getting dirty on the cloths and also revealed that 30% of them Getting dirty on the bed linens during HMB. Finally it was found that (30.9%) have family history of HMB.

Table 4 clarifies percentage of satisfactory knowledge about normal menstrual cycle, heavy menstrual bleeding and anemia increased to after implementation of the web based learning guidelines. The difference was highly statistically significant p value was .0001.

Figure I illustrate that only16.4% of the studied women had satisfactory level of knowledge regarding heavy menstrual bleeding pre intervention which improved to 80.9% post intervention.

Table 5 shows that there were highly statistically significant differences between pre and post intervention regarding level of anemia. Pre intervention percent of women with normal hemoglobin level was 10% that increased to 20% post intervention while mild anemia before implementation of web based learning guidelines were 37.3%. In addition moderate anemia levels were 52.7% before implementation of web based learning guidelines which decreased to 30.0% after implementation of web based learning guidelines with highly statistically significant difference 0001**

Table 6 shows that there was highly statistically significant relationship between women anemia level, income and medical problems ($p<0.01$) while there was no statistically significant relationship between women anemia level, age, education, residence occupation and surgical History ($p>0.05$) in pre intervention phase.

Table (1): Distribution of Demographic characteristics of the Studied Women with Heavy Menstrual Bleeding (n=110):

Variables	No.	%

Age group		
• 18 - ≤ 34 years	53	48.2
• ≥35 years	57	51.8
• Mean± SD • Median(range)	34.6±7.5 35(18-47)	
Education		
• Secondary school	68	61.8
• University	42	38.2
Residence		
• Urban	73	66.4
• Rural	37	33.6
Occupation		
• Working	50	45.5
• Housewife	60	54.5
Family Income Level		
• In sufficient	6	5.5
• Sufficient	91	82.7
• Sufficient and save	13	11.8

Table (2): Distribution of the Studied Women with Heavy Menstrual Bleeding According to their Menstrual characteristics (n=110):

Variables	No.	%
Age at menarche\years		
• ≤11	4	3.6
• 12-14 years	77	70.0
• ≥ 15 years	29	26.4
Duration of menstruation\days		
• ≤ 4 days	13	11.8
• 5-7 days	47	42.7
• ≥8 days	50	45.5
Menstrual cycle Interval\days		
• <21 days	42	38.2
• 21-35 days	66	60.0
• >35 days	2	1.8
The number of days of heavy menstruation		
• 1-3 days	61	55.6
• ≥ 4 days	49	44.5
Large clot passage during menstruation		
• Yes	74	67.3
• No	36	32.7
Number of pads used in one cycle		
• ≤11 pads	38	34.5
• ≥12 pads	72	65.5
Double pads		
• Yes	51	46.4
• No	59	53.6
Frequent replacement of pads for heavy menstruation\day		
• Yes	70	63.6

• No	40	36.4

Table (3): Distribution of the Studied Women with Heavy Menstrual Bleeding According to their Heavy Menstrual Bleeding Features (n=110):

Feature items	No.	%
Intermittent Bleeding		
• Yes	45	40.9
• No	65	59.1
Duration of HMB		
• 3 months and less	46	41.8
• 4–11 months	29	26.4
• 1-2 years	27	24.5
• >2 years	8	7.3
Severity of menstrual bleeding		
• Moderate	40	36.4
• Heavy	56	50.9
• Very heavy	14	12.7
Getting dirty on the under wears	82	74.5
• Before HMB	4	3.6
• During HMB	59	53.6
• Before and during HMB	19	17.3
Getting dirty on the cloths	68	61.8
• During HMB	53	48.2
• Before and During HMB	15	13.6
Getting dirty on the bed linens	46	41.8
• During HMB	33	30.0
• Before and during HMB	13	11.8
Getting dirty on the furniture	29	27.3
• During HMB	19	17.3
• Before and during HMB	11	10.0
Family history of HMB		
• Yes	34	30.9
• No	76	69.1

Table (4): Distribution of Studied Women Regarding Their Knowledge about Normal Menstrual Cycle, Heavy Cycles and Anemia (n=110):

		Women' knowledge level				χ^2	M p-value
		Pre intervention		Post intervention			
		No.	%	No.	%		
Know about normal menstrual cycle	Satisfactory	56	50.9	105	95.5	13.789	
	unsatisfactory	54	49.1	5	4.5		0.0001**
	Mean ± SD	3.23±0.94		4.85±0.47			
Know about heavy menstrual bleeding	satisfactory	7	6.4	87	79.1	12.337	
	unsatisfactory	103	93.6	23	20.9		0.0001
	Mean ± SD	1.44±0.88		4.34±1.39			
Know about anemia	satisfactory	28	25.5	95	86.4	102.235	
	unsatisfactory	82	74.5	15	13.6		0.0001
	Mean ± SD	6.46±1.84		10.17±1.89			

Mcnemar test * P value significant at P<0.05, ** P value highly significant <0.05

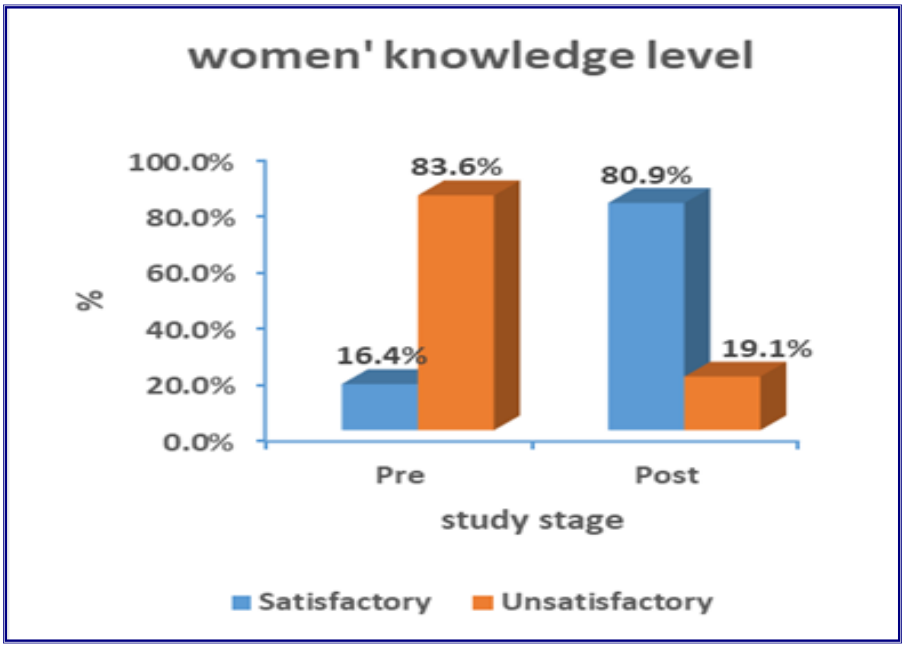

Fig. (I): Total Women Knowledge Score through the Intervention Phases (n=110).

Table (5): Distribution of Studied Women Regarding Their level of Anemia Reflected by Hemoglobin Level through the Intervention Phases (n=110):

		Participants' anemia				χ^2	Hp-value
		Pre intervention		Post intervention			
		No.	%	No.	%		
	Normal hemoglobin level	11	10.0	22	20.0	14.147	
Anemia level	Mild anemia	41	37.3	55	50.0		
	Moderate anemia	58	52.7	33	30.0		0.0001**
	Hemoglobin (g/ml) Mean ± SD	9.54±1.33		10.46±1.04			

H: Marginal homogeneity test *p<0.05 statistically significant **p>0.01 highly statistically insignificant

Table (6): Relation between Level of Anemia level as Reflected by Hemoglobin among Women with Heavy Menstrual Bleeding and their Demographic & Medical History in pre Intervention Phase (n= 110):

Variables	Anemia level among women pre intervention						n.	χ^2	p
	Normal hemoglobin level n.11		Mild anemia n.41		Moderate anemia n.58				
	No.	%	No.	%	No.	%			
Age group									
• ≤ 34 years	6	11.3	17	32.1	30	56.6	53	1.21	0.55
• ≥35 years	5	8.8	24	42.1	28	49.1	57		

Education									
• Secondary school	7	10.3	24	35.3	37	54.4	68	0.298	0.86
• University	4	9.5	17	40.5	21	50.0	42		
Residence									
• Urban	6	8.2	27	37.0	40	54.8	73	0.87	0.65
• Rural	5	13.5	14	37.8	18	48.6	37		
Occupation									
• Working	5	10.0	17	34.0	28	56.0	50	0.45	0.799
• Housewife	6	10.0	24	40.0	30	50.0	60		
Income									
• Insufficient	4	66.7	2	33.3	0	.0	6		
• Sufficient	3	3.3	31	34.1	57	62.6	91	41.15	0.0001*
• Sufficient and save	4	30.8	8	61.5	1	7.7	13		
Medical Problems									
• Present	1	2.7	6	16.2	30	81.1	37	18.10	0.0001*
• Absent	10	13.7	35	47.9	28	38.4	73		
Surgical History									
• Yes	10	12.2	31	37.8	41	50.0	82	2.03	0.36
• No	1	3.6	10	35.7	17	60.7	28		

χ 2:Chisquare test, * p:<0.05 significant, p:>0.05 non-significant

Discussion:

According to **National Institute of Health and Care Excellence, (2022),** heavy menstrual bleeding is menstrual blood loss that is of sufficient volume to adversely impact a woman's physical, emotional, social, and/or material quality of life (QoL). It is one of the symptoms that comprise abnormal uterine bleeding (AUB) in nonpregnant, reproductive-aged women.

AUB accounts for 18% to 30% of all gynecologic visits and leads to more than half of the 600,000 hysterectomies performed annually for benign disorders in the United States **(Cohen et al., 2019).**

The lack of awareness of normal vs heavy bleeding can lead to acceptance and normalization of HMB symptoms by HCPs and reproductive-aged women, including adolescents and their parents, instead of being recognized as excessive or at least problematic **(Henry et al., 2021).**

This study was framed in the light of study hypothesis: A significant improvement degree of anemia will be noticed among women with heavy menstrual bleeding who had received web-based learning guidelines.

Regarding age, the current Study revealed that, the mean age of the studied women is (34.6±7.5), this could be due to the mean age of reproductivity. This result come in agreement with **(Kocaoz, Cirpan & Degirmencioglu, 2019)** who studied "The prevalence and impacts heavy menstrual bleeding on anemia, fatigue and quality of life in women of reproductive age" and

stated that the mean age of the women was 30.8±9.7.

Additionally **(Ding et al., 2019)** who studied Heavy menstrual bleeding among women aged 18–50 years living in Beijing, China: prevalence, risk factors, and impact on daily life" and stated that the mean age of studied women was 32.6 years.

This result come with inconsistent with **(Said, El-sayed & Hassan, 2022)** who studied application of systematic nursing intervention on women with dysfunctional uterine bleeding in Egypt and stated that the mean age of studied women were 39.2 years. This may be attributed to difference in subjects and study settings .

Regarding educational level, the current study revealed that, about two thirds of studied women have secondary school this may be due to that most of women in rural areas take secondary school. This result comes in agreement with **(Leal Filho et al., 2023)** who stated that most of studied women were secondary school, while on the other hand This result comes with disagreement with **(Fraser et al., 2018)** who studied "Prevalence of heavy menstrual bleeding and experiences of affected women in a European patient survey" in Australia and revealed that most of studied women had university education. Additionally, **(Said, El-Sayed & Hassan, 2022)** revealed nearly half of women had universal education. This may be due to difference in demographic characteristics of each community.

Regarding residence, the current study revealed that, nearly two thirds of studied women coming from urban areas. This may be due to the governmental hospital isolated in city and near urban areas. This result come with agreement with **(Fraser et al., 2018)** who stated that, more than half of women in his study comes from urban areas. Additionally**, (Li et al., 2020)** revealed that most of studied participants were coming from urban areas. Meanwhile, this result comes in disagreement with **(Said, El-sayed & Hassan, 2022)** who stated that more than three quarters of studied women from rural residence. This may be attributed to difference in setting and study subjects.

In regard to the occupation, the current study revealed that, more than half of them were housewives. This may be due to decrease the chance of working and most of women preferred to take care of their children. This result comes with agreement with **(Fraser et al., 2018)** who stated that more than one third of women in their study were housewives. On the other hand, this result comes in disagreement with **(Ding et al., 2019)** who stated that most of studied women were business service personnel. That may be attributed to difference in study subjects.

Concerning income, the current study revealed that, more than three quarters of studied participants has sufficient family income. This may be due to large number of the family members. This result comes in agreement with **(Li et al., 2020**) who revealed that more than half

of study participants had sufficient family income. This result comes in disagreement with **(Said, El-Sayed & Hassan , 2022)** who studied women of high family income.

Regarding the age of menarche of the studied women, as evidence from this study, about two thirds of the studied women started menstruation at the age of 12-14 years the rational of that is this age is the mean age of menarche. This result comes in agreement with ***(Kocaoz, Cirpan & Degirmencioglu , 2019)*** who stated that the mean age of the women at menarche 13.4±1.4. Additionally, ***(Filho et al., 2021)*** revealed that the mean age of menarche in their study was 12.7 years. Moreover, this result comes with agreement with ***(Fraser et al., 2018)*** who revealed in their study the mean age of menarche was 12.9 years also ***(Said, El-sayed & Hassan, 2022)*** stated the mean age of menarche was 11.9 years.

Regarding duration of menstruation, the current study revealed that less than half of studied women had menstruation more ≥8 days and less than two thirds of the studied women have 21-35 days cycle that mean most of studied women have regular cycle but with menorrhagia. This comes in agreement with ***(Kocaoz, Cirpan & Degirmencioglu, 2019)*** who stated the menstruation duration was 5-7 days in more than two thirds of studied women and most of them have 21-35 days cycle. Additionally, ***(Su et al., 2020)*** stated that more than three quarter of studied women had normal cycle. This result comes in disagreement with ***(Ding et al., 2019)*** who reported that most of the women had heavy menstrual bleeding. Moreover, ***(Said, El-sayed & Hassan, 2022)*** stated one third of women in their study had menstruation more than 8 days.

The current study revealed that nearly two third of the studied women have large clot passage during menstruation that causing increase of blood loss during menstruation. This result comes in agreement with ***(Kocaoz, Cirpan & Degirmencioglu, 2019)*** who stated large clot passage during menstruation was present in about two thirds of studied women; Meanwhile, ***(Said, El-sayed & Hassan, 2022)*** stated that nearly one third of study participants had large clot passage during menstruation.

The current study revealed that about two thirds of studied women use ≥12 pads every cycle and nearly half have double pads and less than two thirds of them frequently replace pads due to heavy menstruation. This result come in agreement with ***(Kocaoz, Cirpan & Degirmencioglu, 2019)*** who stated were using more than half of studied womenuse ≥12 pads during one menstrual period.

Regarding the heavy menstrual bleeding features of the studied women, as evidence from that study, more than two fifth of studied women have intermittent bleeding, duration of HMB for more than two fifth of the studied women is 3 months, more than half of them described their cycle as heavy. Nearly three quarters of studied women get dirty on the under wears, less than two thirds

of studied women have getting dirty on the cloths and nearly half of them during HMB also more than two fifth of them Getting dirty on the bed linens. More than one quarter of them get dirty on the furniture. Moreover, one third of them have family history of HMB. The rational of that is the heavy menstruation affect woman quality of life. This result comes in agreement with **(Li et al., 2020)** who revealed most of study participants had intermittent bleeding, and sometimes had get dirty on the under wears; Meanwhile, This result comes in disagreement with **(Kocaoz, Cirpan & Degirmencioglu, 2019)** who stated only 8.2% of women in their study had intermittent bleeding also the prevalence of HMB was 37.9% in the female population. We found that nearly one quarter of the women perceived the bleeding they experienced during menstruation as heavy or very heavy .

Regarding the effect of web-based learning guidelines on level of knowledge among women with heavy menstrual bleeding regarding normal menstrual cycle, heavy cycles and anemia, the present study revealed that, there were highly statistically significant differences between pre and post intervention regarding women level of Knowledge regarding normal menstrual cycle, heavy cycles and anemia. The rational of that is the various ways which the researcher used to improve women knowledge were effective and the researcher used simple ways to improve knowledge of women .

This result was in the same line with **(Armour, et al., 2019) & (Silva Filho et al., 2023)** stated that the women had low level of knowledge without intervention and there were statistically significant differences between pre and post intervention regarding women level of knowledge regarding normal menstrual cycle, heavy cycles.

Additionally, **(Su et al., 2020)** stated that more than half of studied women had adequate knowledge pre intervention but post intervention more than two third had adequate knowledge. Moreover, **(Said, El-sayed & Hassan, 2022)** stated that there was significant improvement in level of knowledge regarding abnormal uterine bleeding pre and post intervention. On the other side this result comes in disagreement with **(Ding et al., 2019)** who stated that most of studied women have good knowledge without any intervention .

Regarding the effect of web-based learning guidelines on level of knowledge among women with heavy menstrual bleeding regarding anemia, the present study revealed that, there were highly statistically significant differences between pre and post intervention regarding women level of knowledge regarding anemia.

This result come in agreement with **(Ernawati et al., 2022)** who studied "The effects of anemia education using web-based she smart to improve knowledge, attitudes, and practice in adolescent girls" in Indonesia and stated that there were differences in the knowledge of adolescent girls

before and after being given web-based anemia education and media. Additionally**, (Saraswati, Kartini & Agushybana, 2020)** who studied "The influence of the android application aneminfo on the knowledge and attitudes of adolescent girls related to iron deficiency anemia. Indonesian Journal of Health Promotion" in Indonesia and stated that the educational program based on is Web increased knowledge of iron deficiency anemia in adolescent girls and there was difference between pre and post intervention. It can be concluded that web-based anemia education media is significant in increasing the knowledge of adolescent girls

Regarding effect of web-based learning guidelines on level of anemia among women with heavy menstrual bleeding reflected by hemoglobin level, the present study revealed that, there were highly statistically significant differences between pre and post intervention among women with heavy menstrual bleeding regarding level of anemia. Pre intervention percent of women with normal hemoglobin level was 10% that increased to 20% post intervention. This result comes in agreement with **(Kocaoz, Cirpan & Degirmencioglu, 2019)** who stated that there was statistically significance difference between pre and pot intervention regarding level of anemia anaemia among the studied women**.**

Regarding women' level of anemia pre and post intervention, the present study revealed that there were highly statistically significant differences between pre and post intervention regarding level of anemia. The rational is that the intervention was effective and decreased anemia level. This result comes in agreement with (**Kocaoz, Cirpan & Degirmencioglu, 2019**) who stated that the level of anemia decreased after intervention among studied participants**.**

Regarding relationship between women' anemia level and their demographic & medical history in pre intervention phase the present study reflected that there was highly statistically significant relationship between women' anemia level, income and medical problems, while there was no statistically significant relationship between women' anemia level, age, education, residence occupation and surgical History. The rational of this is insufficient income is directly linked to quality of food which may cause anemia and also presence of medical problems affect the health and may affect level of hemoglobin **.**

This result come with agreement with (**Mansour, Hofmann & Gemzell-Danielsson, 2021**) who studied "A review of clinical guidelines on the management of iron deficiency and iron-deficiency anemia in women with heavy menstrual bleeding" in UK and stated that there was statistically significance relation between anemia level and medical history of women.

Conclusion:

In the light of current study and verified of the research hypothesis, it was concluded that highly statistically significant differences was found regarding total score of women knowledge, and anemia level among women with heavy

menstrual bleeding throughout study phases. The study concluded. Additionally, the study reflects direct correlation coefficient between fatigue score and hemoglobin value among women with HMB throughout study phases (r= -0.464) with statistically significant p (0.0001) pre intervention and (r= -0.330) with statistically significant p (0.0001) post intervention among women with heavy menstrual bleeding.

Recommendations:

In the light of the present study findings, it can be recommended that:

- Web based learning guidelines should be part of management plan of all women with heavy menstrual bleeding in all settings.
- Health education should include anemia.
- Modified assessment scale for heavy menstrual bleeding features among women should be routinely used to all menstruating women to diagnose heavy menstrual bleeding at early stage .
- To disseminate the results of this study to the decision makers in governmental and non-governmental organizations and to be put in their priorities to improve of the quality of services provided to women with heavy menstrual bleeding and include web base learning in all health sectors.

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