Evaluation effects of menorrhagia in coagulation profile (PT, INR, PTT, and platelets count) in Sudanese females

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Abstract:

Background: Menorrhagia is a common health problem in women. It is direct cause of a significant health care burden for women, their families, and society as a whole. In addition menorrhagia is one of the most common manifestations of an inherited bleeding disorder so cause changes in coagulation profiles.

Objectives: The purpose of this study was to evaluate the coagulation profile (PT, INR, PTT, and platelets count) in females with menorrhagia and compare to healthy normal females, In addition

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*to evaluate the effects of family history, previous patients history of
excessive bleeding, regulatory of occurrence of menorrhagia, duration
of menorrhagia/day (severity of menorrhagia), frequency of
menorrhagia/year, clinical history (signs and symptoms) and
treatment history on the previous coagulation profiles.*

*Materials and Methods: a case control study was included
100 samples. A total of 50 non marriage females with menorrhagia
between the ages of 17 and 39 years with mean (22.4 ± 3.9) years and
median 22 years, also 50 normal healthy females from Gazeira state -
Sudan. A questionnaire that contained all elements of the 6-question
screening tool was administered. Prothrombin time (PT), international
normalize ratio (INR), and partial thrombin time (PTT) measured by
Coagulometer, and platelets count determined by Sysmex XP 300 N
automated analyzer. The data were then analyzed using SPSS
software.*

*Results: An average of PT level in control group was (12.55 ±
0.64 second, while the average of PT level in cases group was (13.32 ±
1.12 second), which is statistically much higher significant in relation
to control group (P = 0.001). in addition the average INR level in cases
group was (1.11 ± 0.15), while the average of INR level in control group
was (1.02 ± 0.05), which is statistically much lower significant in
relation to cases group (P = 0.002). furthermore the average PTT level
in control group was (33.25 ± 2.95 second), while the average of PTT
level in cases group was (31.82 ± 3.74 second), which is statistically
much lower significant in relation to control group (P = 0.012). and
finally the average platelets count in cases group was (301.5 ± 100.2 ×
10^9/L), while the average of platelets count in control group was (315.8
± 83 × 10^9/L), which is statistically no significant difference in relation
to control group (P = 0.436).*

*The study result showed highly significant difference of mean
of PT in cases with previous history of bleeding (P = 0.009). Also highly
significant difference of mean of INR in cases with duration of
menorrhagia between 11 – 14 days and others (P = 0.007).*

*Conclusion: the study results showed that coagulation profile
can be affected by menorrhagia. In conclusion, awareness of abnormal
menstrual bleeding amongst physician and midwives, Adolescents
female's leads to early diagnosis, improves quality of life. In addition,*

the multidisciplinary approach is required to diagnose and treat patients with menorrhagia amongst hematologists and gynecologists.

Key words: Menorrhagia, Menstrual cycle, Coagulation profile, Platelets count, Questionnaire, Female, Sudan.

INTRODUCTION:

Menstrual cycle disorder is an irregular or regular condition in a woman's menstrual cycle and it is classified into firstly disorders of ovulation (Oligoovulation and Anovulation), then disorders of cycle length (Polymenorrhea, amenorrhea, Oligomenorrhea) and finally disorders of flow includes (hypo menorrhea, menorrhagia, dysmenorrhea) (1, 2).

Menstrual disorders are a common indication for medical visits among women of reproductive age; these complaints may significantly affect quality of life (3).

Menorrhagia is a gynecological condition which concern with excessive uterine bleeding occurring at regular or irregular intervals, or prolonged bleeding more than seven days (4), it is a most common clinical problem among adolescent population, and heavy menstrual bleeding is experienced by 12.1% to 37% of adolescents (3, 5, 6), frequently results in hemostatic impairment (7, 8).

Menorrhagia or Abnormal bleeding intensity, or intracyclic bleeding, or abnormal uterine bleeding is one of the most common manifestations of an inherited bleeding disorder (3, 9), substantially decrease women´s quality of life (3, 4, 7, 10-13) , social awareness, anemia, sexual problems (13-15), and time off work (3, 16).

Menorrhagia associated with many hemostatic abnormalities which include decreased von Willebrand factor (VWF) (von Willebrand disease), platelet dysfunction

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(thrombocytopathy), and decreased coagulation factors (coagulopathy) (17-21).

Evolution of menorrhagia comprises combination of PT, PTT, INR, and CBC including platelets count (8, 22, 23). Also needing for a further in-depth coagulation investigation is determined by a thorough history a history of heavy bleeding starting at menarche, a history of postpartum hemorrhage or hemorrhage with dental extraction, evidence of other bleeding problems (Patient history), or a family history suggesting a coagulation disorder (although lack of this should not exclude a diagnosis of an inherited disorder) (3, 18, 24).

In cases of life-threatening bleeding in menorrhagia, it is often sufficient to stabilize bleeding rather than achieve complete cessation, using the international normalized ratio (INR), prothrombin time (PT) and activated partial thromboplastin time (APTT) as a guide of managements (4).

The study aimed to develop an easy and practical method for estimating many risk factors of menstrual blood loss from a questionnaire and to validate it by several coagulation profiles and hematological parameters in women of childbearing age.

MATERIALS AND METHODS:

Subjects:
Volunteers were recruited by visiting university campus (Gazeira University) many times.

Females with menorrhagia aged between 17–39 years with mean 21 years, Sudanese, nonsmoker, non-marriage and non-suffering from hemostatic disorders were recruited. Exclusion criteria were as follows: normal menstrual cycle, amenorrhea (lack of menstruation in the 3 months prior to the study), age above 50 years, uses hormonal therapy, blood transfusion in less than three month, anticoagulant therapy

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(heparin or warfarin), and bleeding disorders (coagulation or platelets or vascular disorder).

This study is part of a wider investigation comprising health questionnaires, hematological parameters (complete blood count). A total of 50 women with menorrhagia contacted the research group to receive information and 50 controls. Women who did not meet the inclusion criteria or were excluded.

All study procedures were approved by the Ethics Committees of faculty of medical laboratory sciences – Gazeira University – Medani - Sudan. All subjects signed informed consent.

Gynecological questionnaires:
The questionnaires consisted of the volunteer´s general information and general menstrual characteristics: age, family history, previous patient's history of bleeding, regulatory of occurrence of menorrhagia (regular or irregular), duration of menorrhagia/day (severity of menorrhagia), frequency of menorrhagia/year, clinical history and treatment history.

Screening tool:
A screening tool was constructed as previous studies done in United States (17, 25) and Madrid – Spain (7) , The screening tool contains 7 questions in the following: [1] family history of a diagnosed bleeding disorder (A positive family history required the presence of a known diagnosed bleeding disorder in family members), [2] previous patients history of excessive bleeding after specific challenges, [3] regulatory of occurrence of menorrhagia (regular or irregular), [4] duration of menorrhagia/day (severity of menorrhagia) (defined by duration of menses of $\geq$ 7 days), [5] frequency of menorrhagia/year (defined by duration of menses of $\geq$ 5 times/year), [6] clinical history (signs and symptoms of anemia and history of

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hemostatic abnormalities), [7] treatment history (uses of
medication). All elements of the screening tool were contained
in the questionnaire that was administered prospectively to the
study participants.

Blood sampling and coagulation profiles measurements:
1.8 ml blood samples were collected by clean venipuncture in tri
sodium citrate anticoagulant and 2.5ml in $K_3EDTA$for all
volunteers. Platelets poor plasma (PPP) was obtained
immediately after blood collection by centrifugation blood
samples at 2000 g for 15 minutes. Prothrombin time (PT),
partial thrombin time (PTT) were measured using the
Coagulometer (name, country). Platelets were determined using
the Sysmex XP 300 N automated hematology analyzer (Sysmex,
Kobe, Japan). All measurements were subjected to quality
control of devices.

Statistical analysis:
Data are presented as means with their standard deviations.
The means and standard deviations for the age of participants,
PT, INR, PTT and platelets count. Comparison of parameters
between cases and controls done by Independent samples T
test. In addition to one way ANOVA to association between
factors and parameters. A p value of <0.05 was considered
statistically significant. The IBM SPSS statistical package for
Windows (version 20.0) was used to analyze the data.

RESULTS:

A case control study was included 100 samples. A total of 50
normal healthy females, also a total of 50 non marriage
females with menorrhagia between the ages of 17 and 39 years
with mean (22.4 ± 3.9) years and median 22 years from Gazeira
state – Sudan as shown in table (2)**.**

Among females with menorrhagia, the most cases were found to have not family history 37 (74%) while 13 (26 %) were found to have family history, the cases were found to have previous patients history of excessive bleeding after specific challenges about 26 (52 %) which was approximately equal to cases were found to have not previous history of bleeding 24 (48 %). cases were found to have irregular occurrence of menorrhagia 28 (56 %) more than cases were found to have regular occurrence of menorrhagia 22 (44b%), most cases were found to have duration of menorrhagia/day between 7-10 days about 43 (86 %) while the others between 11 – 14 days about 3 (6 %) or more than 15 days about 4 (8 %). On other hand the results showed the most cases were found to have more than 10 times of menorrhagia (frequency) /year about 31 (62 %), while cases were found to have 1 – 5 times of menorrhagia (frequency) /year about 10 (20 %) and cases were found to have 6 – 10 times of menorrhagia (frequency) /year about 9 (18 %). Also cases were found to have previous clinical history of anemia or others hemostatic disorders about 11 (22 %) are less than cases without clinical history of anemia or others hemostatic disorders 39 (78 %). Finally most cases were found to have no previous treatment history of menorrhagia about 30 (60 %) while 20 (40 %) were found to have previous treatment history as shown in tables (1).

Table 1: Demographic characteristics of study participants (n _ 50)

Screening factors	Number
Family history	
Yes	13 (26 %)
No	37 (74 %)
Patients history (bleeding)	
Yes	26 (52 %)
No	24 (48 %)
Regularity of occurrences	
Regular	22 (44 %)
Irregular	28 (56 %)
Duration of menorrhagia /day	
7-10 days	43 (86 %)
11 – 14days	3 (6 %)

More than 15 days	4 (8 %)
Frequency (times)/ year	
1 – 5 times/ year	10 (20 %)
6 – 10 times/ year	9 (18 %)
More than 10 times/year	31 (62%)
History of other disorders	
Yes	11 (22 %)
No	39 (78 %)
History of treatment	
Yes	20 (40 %)
No	30 (60 %)

The ranges of prothrombin time (PT) of cases between 11.4 – 16.1 second, with mean (13.32 ± 1.12 second) and median 13.5 second, PT was found to be normal in all the cases. While the ranges of international normalize ratio (INR) between 0.8 – 1.7 and mean (1.10 ± 0.15) with median 1.09. In addition the ranges of partial thrombin time (PTT) between 24 – 39.6 second with mean (31.76 ± 3.7 second) and median 31.9 second, PTT was found to be abnormal in 3 (6 %) patients.. And finally the platelets count ranges between 135 – 625 × 10^9/L and mean (301 ± 100 × 10^9/L) and median 282 × 10^9/L, one case was found to have thrombocytopenia (135 × 10^9/L) and three cases were found to have thrombocytosis (6 %) (Ranged from 537 – 625 × 10^9/L) as shown in table (2).

Table 2: Characteristics of results of coagulation profile of cases

	Mean ± SD	Median	Range
Age/year	22.4 ± 3.9	22	17 – 33
PT/ second	13.32 ± 1.12	13.5	11.4 – 16.1
INR/	1.11 ± 0.15	1.09	0.8 – 1.7
PTT/ second	31.82 ± 3.74	31.9	24 – 39.6
PLTs count × 10^9/L	301.5 ± 100.2	282	135 – 652

An average of PT level in control group was (12.55 ± 0.64 second), the range of obtained values from 10.9 to 13.9 second, while the average of PT level in cases group was (13.32 ± 1.12 second), and the range of obtained value was 11.4 to 16.1 second, which is statistically much higher significant in relation

to control group (P = 0.001). in addition the average INR level in cases group was (1.11 ± 0.15), the range of obtained values from 0.8 to 1.7, while the average of INR level in control group was (1.02 ± 0.05), and the range of obtained value was 0.88 to 1.16, which is statistically much lower significant in relation to cases group (P = 0.002). and also the average PTT level in control group was (33.25 ± 2.95 second), the range of obtained values from 25 to 37.9 second, while the average of PTT level in cases group was (31.82 ± 3.74 second), and the range of obtained value was 24 to 39.6 second, which is statistically much lower significant in relation to control group (P = 0.012). finally the average platelets count in cases group was (301.5 ± 100.2 × 10⁹/L), the range of obtained values from 135 to 652 × 10⁹/L, while the average of platelets count in control group was (315.8 ± 83 × 10⁹/L), and the range of obtained value was 113 to 450 × 10⁹/L, which is statistically no significant difference in relation to control group (P = 0.436) as shown in table (3).

Table 3: Comparison of coagulation profile between cases and controls:

	Mean ± SD of cases	Mean ± SD of controls	P value
PT/ second	13.32 ± 1.12	12.55 ± 0.65	0.001
INR/	1.11 ± 0.15	1.02 ± 0.05	0.002
PTT/ second	31.82 ± 3.74	33.25 ± 2.95	0.012
PLTs count × 10⁹/L	301.5 ± 100.2	315.8 ± 83	0.436

The average of PT in cases with previous history of bleeding was (12.93 ± 1.09 second) higher than average in cases without history which is statistically highly significant difference (P = 0.009). While average of PT in others risk factors (family history, regularity of occurrences, frequency of menorrhagia per day, duration (number) of menorrhagia per years, history of other disorders, and history of treatment) was statistically no significant differences (P= 0.083, 0.618, 0.519, 0.528, 0.847, and 0.076 respectively) as shown in table (4).

Table 4: Effects of risk factors of menorrhagia in PT:

	Number	PT (Mean ± SD)	P value
Family history			**0.083**
Yes	13 (26 %)	13.79 ± 1.08	
No	37 (74 %)	13.16 ± 1.10	
Patients history (bleeding)			**0.009**
Yes	26 (52 %)	12.93 ± 1.09	
No	24 (48 %)	13.74 ± 1.01	
Regularity of occurrences			**0.618**
Regular	22 (44 %)	13.23 ± 1.08	
Irregular	28 (56 %)	13.39 ± 1.16	
Duration of menorrhagia /day			**0.519**
7-10 days	43 (86 %)	13.26 ± 1.15	
11 – 14days	3 (6 %)	14 ± 1.25	
More than 15 days	4 (8 %)	13.5 ± 0.65	
Frequency (times)/ year			**0.528**
1 – 5 times/ year	10 (20 %)	13.53 ± 0.93	
6 – 10 times/ year	9 (18 %)	13.58 ± 1.15	
More than 10 times/year	31 (62 %)	13.18 ± 1.17	
History of other disorders			**0.847**
Yes	11 (22 %)	13.26 ± 1.16	
No	39 (78 %)	13.34 ± 1.12	
History of treatment			**0.076**
Yes	20 (40 %)	13.67 ± 1.22	
No	30 (60 %)	13.09 ± 0.99	

The average of INR in cases with duration of menorrhagia between 11 – 14 days was (1.37 ± 0.30) higher than cases with frequency of menorrhagia between 7 – 10 days (1.09 ± 0.13) and more than 15 days (1.10 ± 0.06) which are statistically highly significant difference (P = 0.007). While average of INR in others risk factors (family history, previous history of bleeding, regularity of occurrences, frequency (number) of menorrhagia per years, history of other disorders, and history of treatment) was statistically no significant differences (P= 0.223, 0.051, 0.315, 0.995, 0.920, and 0.229 respectively) as shown in table (5).

Table 5: Effects of risk factors of menorrhagia in INR:

	Number	INR (Mean ± SD)	P value
Family history			0.223
Yes	13 (26 %)	1.15 ± 0.12	
No	37 (74 %)	1.09 ± 0.16	
Patients history (bleeding)			0.051
Yes	26 (52 %)	1.07 ± 0.15	
No	24 (48 %)	1.15 ± 0.14	
Regularity of occurrences			0.315
Regular	22 (44 %)	1.13 ± 0.19	
Irregular	28 (56 %)	1.09 ± 0.11	
Duration of menorrhagia /day			0.007
7-10 days	43 (86 %)	1.09 ± 0.13	
11 – 14days	3 (6 %)	1.37 ± 0.30	
More than 15 days	4 (8 %)	1.10 ± 0.06	
Frequency (times)/ year			0.995
1 – 5 times/ year	10 (20 %)	1.11 ± 0.08	
6 – 10 times/ year	9 (18 %)	1.11 ± 0.10	
More than 10 times/year	31 (62 %)	1.11 ± 0.18	
History of other disorders			0.920
Yes	11 (22 %)	1.11 ± 0.14	
No	39 (78 %)	1.11 ± 0.16	
History of treatment			0.229
Yes	20 (40 %)	1.14 ± 0.18	
No	30 (60 %)	1.09 ± 0.13	

The average of PTT in risk factors (family history, previous history of bleeding, regularity of occurrences, duration of menorrhagia per day, frequency (number) of menorrhagia per years, history of other disorders, and history of treatment) was statistically no significant differences (P= 0.289, 0.828, 0.772, 0.534, 0.163, 0.125 and 0.451 respectively) as shown in table (6).

Table 6: Effects of risk factors of menorrhagia in PTT:

	Number	PTT(Mean ± SD)	P value
Family history			0.289
Yes	13 (26 %)	32.77 ± 3.13	
No	37 (74 %)	31.48 ± 3.91	
Patients history (bleeding)			0.828
Yes	26 (52 %)	31.70 ± 4.62	
No	24 (48 %)	31.94 ± 2.55	

Regularity of occurrences			**0.772**
Regular	22 (44 %)	31.64 ± 3.79	
Irregular	28 (56 %)	31.95 ± 3.75	
Duration of menorrhagia /day			**0.534**
7-10 days	43 (86 %)	31.69 ± 3.90	
11 – 14days	3 (6 %)	31 ± 0.89	
More than 15 days	4 (8 %)	33.78 ± 2.93	
Frequency (times)/ year			**0.163**
1 – 5 times/ year	10 (20 %)	33.22 ± 3.17	
6 – 10 times/ year	9 (18 %)	32.97 ± 2.84	
More than 10 times/year	31 (62 %)	31.03 ± 3.99	
History of other disorders			**0.125**
Yes	11 (22 %)	33.35 ± 3.72	
No	39 (78 %)	31.39 ± 3.67	
History of treatment			**0.451**
Yes	20 (40 %)	32.31 ± 3.43	
No	30 (60 %)	31.49 ± 3.95	

The average of platelets count in risk factors (family history, previous history of bleeding, regularity of occurrences, duration of menorrhagia per day, frequency (number) of menorrhagia per years, history of other disorders, and history of treatment) was statistically no significant differences (P= 0.756, 0.747, 0.346, 0.786, 0.082, 0.189 and 0.972 respectively) as shown in table (7).

Table 7: Effects of risk factors of menorrhagia in Platelets count:

	Number	PLT(Mean ± SD)	P value
Family history			**0.756**
Yes	13 (26 %)	293.9 ± 96	
No	37 (74 %)	304.1 ± 103.1	
Patients history (bleeding)			**0.747**
Yes	26 (52 %)	305.9 ± 102.8	
No	24 (48 %)	296.6 ± 99.2	
Regularity of occurrences			**0.346**
Regular	22 (44 %)	286.2 ± 70	
Irregular	28 (56 %)	313.4 ± 118.5	
Duration of menorrhagia /day			**0.786**
7-10 days	43 (86 %)	299.2 ± 92.6	
11 – 14days	3 (6 %)	341 ± 195.5	
More than 15 days	4 (8 %)	296.3 ± 129.5	
Frequency (times)/ year			**0.082**

1 – 5 times/ year	10 (20 %)	339 ± 132.3	
6 – 10 times/ year	9 (18 %)	344.6 ± 136.8	
More than 10 times/year	31 (62 %)	276.8 ± 67	
History of other disorders			0.189
Yes	39 (78 %)	266.2 ± 65.1	
No	11 (22 %)	311.4 ± 106.8	
History of treatment			0.972
Yes	20 (40 %)	300.9 ± 98.7	
No	30 (60 %)	301.9 ± 102.8	

DISCUSSION:

Menorrhagia is gynecological conditions which concern with excessive uterine bleeding occurring at regular or irregular intervals, or prolonged bleeding more than seven days, substantially decreases women´s quality of life, social awareness, anemia, sexual problems, and time off work.

This study presents a comparison of coagulation profiles (PT, INR, PTT, and platelets count) between females with menorrhagia and normal healthy control females. In addition to evaluate the effects of family history, previous history of bleeding, regulatory of occurrence of menorrhagia, duration of menorrhagia/day (severity of menorrhagia), frequency of menorrhagia/year, clinical history of anemia or others bleeding disorders, and treatment history on the previous coagulation profiles.

Methods based on questionnaires for assessing general menorrhagia characteristics are reported to be in agreement with the studies done in Madrid – Spain (7), and United States (17, 25).

The age range of cases was from 17 and 39 years (mean 22.4 ± 3.9 years) and (median 22 years), the mean of age of cases was lower than mean of age of participant in studies done in Iran (32 ± 10.6 years) (13) and Egypt (36.49 years) (26), and India (39.92 ± 3.27 years) (27), and United state (36.83 ± 7.1 years) (17), and less difference in study in Turkey (20.68 ± 10.34) (28), and study done by Toxqui etal (25.3 ± 4.3) (7).

Among females with menorrhagia, about 3 fold of cases were found have not family history (74%) approximately similar to study done in Egypt (82.9 %) (26), Also more than half of cases were found have irregular occurrence of menorrhagia 28 (56 %) this finding in agreement with study done in India (51.61 %) (27), furthermore most cases were found have duration of menorrhagia/day between 7-10 days about 43 (86 %), in addition one fold of cases with previous clinical history of anemia or others hemostatic disorders about 11 (22 %), and also more than half of cases were found have no previous treatment history of menorrhagia about 30 (60 %) this finding was approximately similar to study done in Turkey (66.6 %) (28), on other hand half of cases were found have previous patients history of excessive bleeding after specific challenges (52 %), and finally results showed 2 folds of cases were found have more than 10 times of menorrhagia (frequency) /year about 31 (62 %). This finding might be due to delay of the detection because the mild clinical feature (severity) of menorrhagia so menorrhagia diagnostic by chance. Also finding might be due to lack of the awareness and knowledge concerning menstrual cycle and menorrhagia, in addition the menorrhagia influenced by cultural and social factors (26).

The study results were showed highly significant differences in mean of Prothrombin time (PT) (P = 0.001) this finding was in disagreement with study done in USA (P = 0.35) (29), International normalize ratio (INR) (P = 0.001), and significant difference in mean of partial thrombin time (PTT) (P = 0.012)) this finding was in disagreement with study done in USA (P = 0.82) (29). While no significant difference in mean of platelets count (P = 0.436) between cases and controls, this finding was in agreement with studies done in USA (P = 0.99) (29) and Thailand (P = 0.6) (30). This result suggests the most cases of menorrhagia due to bleeding disorders (other than platelet disorders).

The ranges of prothrombin time (PT) of cases between 11.4 – 16.1 second, with mean (13.32 ± 1.12 second) and median 13.5 second. The mean of PT was approximately similar to mean of PT in study done in Turkey (13.71 ± 1.26 second) (28), and was higher than mean of PT in study done in USA (12.2 ± 0.81 second) (29).

The ranges of international normalize ratio (INR) between 0.8 – 1.7 and mean (1.10 ± 0.15) with median 1.09.

The ranges of partial thrombin time (PTT) between 24 – 39.6 second with mean (31.76 ± 3.7 second) and median 31.9 second. The mean of PT was approximately similar to mean of PTT in study done in USA (31.8 ± 6.3 second) (29), and was higher than mean of PTT done in Turkey (29.89 ± 4.81 second) (28).

The platelets count ranges between $135 – 625 × 10^9/L$ with median $282 × 10^9/L$ and mean ($301.5 ± 100.2 × 10^9/L$). the mean of platelets was higher than mean of platelets count ($×10^9/L$) in studies done in Madrid – Spain (221.0 ± 44.2) (7) and USA ($284.0 ± 62.3 × 10^9/L$) (29), and Turkey ($282.89 ± 108.52 × 10^9/L$) (28), and was lower than mean of platelets count ($313.7 ± 157.3×10^9/L$) in study done in Thailand (30).

The study result showed highly significant difference of mean of PT in cases with previous history of bleeding (P = 0.009). Also highly significant difference of mean of INR in cases with duration of menorrhagia between 11 – 14 days and others (P = 0.007). While no significant differences in means of PT, INR, PTT, and platelets count in others factors (family history, previous history of bleeding, regularity of occurrences, Frequency of menorrhagia per day, frequency (number) of menorrhagia per years, history of other disorders, and history of treatment).

This observation reiterates the importance of coagulation profile, platelets count and Gynecological screening tools (family history, previous history of bleeding, regularity of

occurrences, Frequency of menorrhagia per day, frequency (number) of menorrhagia per years, history of other disorders, and history of treatment) in diagnosis and menorrhagia.

CONCLUSION & RECOMMENDATION:

We found significant differences in the prothrombin time (PT), international normalize ratio (INR), and partial thrombin time (PTT) between cases and controls, while no significant differences in platelets count between cases and controls.

In conclusion, awareness of abnormal menstrual bleeding amongst physician and midwives, Adolescents females leads to early diagnosis, improves quality of life and decreases anemia.

Multidisciplinary approach is required to diagnose and treat patients with menorrhagia amongst hematologists and gynecologists.

This Sudanese study was the first of its kind yet we did not consider some important data for example blood group, and hormones level, other coagulation profile (VWF screening, factor deficiency screening, and platelets function tests), So it is recommended for future (more and more) studies needed to be undertaken to have larger sample sizes and more emphasis from multiple health centers and communities and evaluate more variables (as there is inadequate data in the literature on this topic from the Sudan).

REFERENCES:

1.Livingstone M, Fraser IS. Mechanism abnormal uterine bleeding. Human Reproduction Update. 2002;8(1):60-7.

2.Kippley JF, Kippley SK. The Art of Natural Family Planning. 4th ed , Couple to Couple League; 1996.

3.Singh S, Best C, Dunn S, Leyland N, Wolfman WL. Abnormal Uterine Bleeding in Pre-Menopausal Women. J Obstet Gynaecol Can. 2013;35(5 eSuppl):S1–S28.

4.James AH, Andra H. James a, Kouides PA, Abdul-Kadir R, Dietrich JE, Edlund M, et al. Evaluation and management of acute menorrhagia in women with and without underlying bleeding disorders: consensus from an international expert panel. Eur J Obstet Gynecol. 2011.

doi:10.1016/ j.ejogrb.2011.04.025

5.Friberg B, Orno AK, Lindgren A, Lethagen S. Bleeding disorders among young women: a population-based prevalence study. Acta Obstet Gynecol Scand. 2006;85:200–6.

6.Chan SS, Yiu KW, Yuen PM, Sahota DS, Chung TK. Menstrual problems and health-seeking behaviour in Hong Kong Chinese girls. Hong Kong Med J. 2009;15:18-23.

7.Toxqui L, Granados AMP, Rojo RB, Wright I, Vaquero MP. A simple and feasible questionnaire to estimate menstrual blood loss: relationship with hematological and gynecological parameters in young women. BMC Women's Health. 2014;14(71).

8.Apgar BS, Kaufman AH, George-Nwogu U, Kittendorf A. Treatment of menorrhagia. Am Fam Physician. 2007;75(12):1813–9.

9.Kirtava A, Crudder S, Dilley A, Lally C, Evatt B. Trends in the clinical management of women with von Willebrand disease: a survey of 75 women enrolled in haemophilia treatment centres in the United States. Haemophilia. 2004;10:158–61.

10.Dasharathy SS, Mumford SL, Pollack AZ, Perkins NJ, Mattison DR, Wactawski-Wende J, et al. Menstrual bleeding patterns among regularly menstruating women. Am J Epidemiol. 2012;175(6):536–45.

11.Schumacher U, Schumacher J, Mellinger U, Gerlinger C, Wienke A, Endrikat J. Estimation of menstrual blood loss volume based on menstrual diary and laboratory data. BMC Womens Health. 2012;12(24).

12.Copher R, Le Nestour E, Zampaglione E, Prezioso AN, Pocoski J, Law AW. Heavy menstrual bleeding treatment patterns and associated health care utilization and costs. J Clin Outcomes Manage. 2012;19(9):402–13.

13.Rahbar N, Faranoush M, Ghorbani R, Alsadat BS. Screening of Von Willebrand Disease in Iranian Women With Menorrhagia. Iran Red Crescent Med J. 2015;17(1):e18244.

14.Sweet MGS-D, T.A, Weiss PM, Madsen KP. Evaluation and management of abnormal uterine bleeding in premenopausal women. Am Fam Physician. 2012;85(1):35–43.

15.Sadler JE. Von Willebrand disease type 1: a diagnosis in search of a disease. Blood. 2003;101(6):2089–93.

16.Cote I, Jacobs P, Cumming D. Work loss associated with increased menstrual loss in the United States. Obstet Gynecol. 2002;100:683–7.

17.Philipp CS, Faiz A, Heit JA, Kouides PA, Lukes A, Stein SF, et al. Evaluation of a screening tool for bleeding disorders in a US multisite cohort of women with menorrhagia. Am J Obstet Gynecol. 2011;204(209) e1-7.

18.Dilley A, Drews C, Miller C, Lally C, Austin H, Ramaswamy D. Von Willebrand disease and other inherited bleeding disorders among women diagnosed with menorrhagia. Obstet Gynecol. 2001;97:630–6.

19.Kadir RA, Economides DL, Sabin CA, Owens D, Lee CA. Frequency of inherited bleeding disorders in women with menorrhagia. Lancet. 1998;351:485-9.

20.Edlund M, Blomback M, von Schoultz B, Andersson O. On the value of menorrhagia as a predictor for coagulation disorders. Am J Hematol. 1996;53:234-8.

21.Philipp CS, Dilley A, Miller CH. Platelet functional defects in women with unexplained menorrhagia. J Thromb Haemost. 2003;1:477-84.

22.Lee CA. Women and inherited bleeding disorders: menstrual issues. Semin Hematol 1999;36:21-7.

23.James AH, Kouides PA, Abdul-Kadir R, Edlund M, Federici AB, Halimeh S. Von Willebrand disease and other bleeding disorders in women: consensus on diagnosis and management from an international expert panel. Am J Obstet Gynecol 2009;201(12):e1–8.

24.American-College-of-Obstetricians-and-Gynecologists-Committee-on-Adolescent-Health-Care. Von Willebrand disease in women. Obstet Gynecol. 2009;114:1439–43.

25.Philipp CS, Faiz A, Dowling NF, al e. Development of a screening tool for identifying women with menorrhagia for hemostatic evaluation. Am J Obstet Gynecol. 2008;198(163):e1-8.

26.Sherif N, Goubran H, Hassan A, Burnouf T, El-ekiaby M. An approach to outreach patiens with von Willebrand disease in Egypt by targeting women with heavy menstrual bleeding and/or bleeding symptoms. Haemophilia. 2014;20:238-43.

27.Taru G, Nupur G, Sangeeta G, Pushpa B, Jyoti J, Sushma K. Levonorgestrel Intrauterine System (LNG IUS) in Menorrahgia: A Follow-Up Study. Open Journal of Obstetrics and Gynecology. 2014;4:190-6.

28.Kılıç SÇ, Sarper N, Zengin E, Gelen SA. Screening Bleeding Disorders in Adolescents and Young Women with Menorrhagia. Turk J Hematol. 2013;30:168-76.

29.Amesse LS, Amesse TP, Gunning WT, Duffy N, French JA. Clinical and laboratory characteristics of adolescents with

platelet function disorders and heavy menstrual bleeding. Experimental Hematology & Oncology. 2013;2:3.

30.Hutspardol S, Sirachainan N, Soisamrong A, Atchararit N, O-Prasertsawat P, Chuansumrit A. Hemostatic Defects in Thai Adolescents with Menorrhagia. J Med Assoc Thai. 2010;93(4).