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The Effect of Utilization of Menstrual Tracking Application on Knowledge, Practice and Attitude among Young Females

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Abstract

Background: Menstrual tracking applications (MTA) are useful tools facilitate observation and analysis of menstrual cycle. **Aim**: the current study aimed to evaluate the effect of utilization of (MTA) on knowledge, practice and attitude among young females. **Research Design:** A quasi-experimental research design was used to achieve the aim of the study. **Setting:** The study was conducted at faculty of nursing at Matrouh University, Egypt. **Sample:** A purposive sample of 150 young female (one group pre and post) selected according to inclusion criteria. **Tools:** Four tools were used; **Tool (I):** Structured interviewing questionnaire, **Tool (II):** assessment of young females knowledge regarding (menstrual cycle, menstrual tracking application), **Tool (III):** assessment of young females practice regarding menstrual tracking application, **Tool (IV):** assessment of young females attitude regarding menstrual tracking application. **Results:** The finding of this study showed that more than two third (72.7%) of the studied young females had satisfactory level of knowledge about menstrual cycle and (MTA), more than two third (68.0%) of the studied young females had adequate level of practice about (MTA) and the majority (80.7%) of the studied young females had positive level of attitude about (MTA) post study. **Conclusion:** The finding of this study showed that the utilization of (MTA) had positive effect on knowledge, practice and attitude among young females. Statistically significant positive Correlation between total level of knowledge, practice and attitude pre and post utilization of (MTA) among the studied young females. **Recommendations:** Study the effect of menstrual tracking application on reproductive health among large scale of adolescent females.

Key words: Attitude, Knowledge, Menstrual tracking application, Practice, Young females.

Introduction

Menstruation constitutes the cyclical uterine hemorrhage that commences approximately 14 days subsequent to ovulation. This physiological process is regulated by a feedback mechanism encompassing three interrelated cycles: the endometrial cycle, the hypothalamic-pituitary axis, and ovulation. The mean duration of a menstrual cycle is typically 28 days. The average length of menstrual flow spans 5 days (with a variability of 3 to 6 days), while the mean volume of blood loss is approximately 50 ml (ranging from 20 to 80 ml), although significant variations are observed. **(Perry et al., 2022).**

Menstrual tracking applications (MTAs) are smartphone or tablet apps that allow users to log their menstrual cycle data. These apps collect a plethora of intimate data, including menstrual related symptoms, mood, medications, and user's sexual activity. With this information, the apps use an algorithm to predict the user's future menstruation and ovulation dates. Menstrual cycle tracking apps promise to empower users by enhancing their self-knowledge, vesting them with control of their reproductive bodies. (**Hammond & Burdon., 2024).**

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Significance of the study:

Menstrual disorders are physical or emotional problem which affect the normal menstrual cycle resulting in pain, unusually heavy or light bleeding and lack of menstruation. Menstrual disorders are one of the most occurring gynecologic issues that affect women of child bearing age with a global prevalence of 30-70 % among young females and it is one of the frequent reasons women consult physician all over the world **(Igbokwe &Udoka Carol.,2021).**

An estimated 200 million people use menstrual tracking applications (MTAs) on a monthly basis worldwide. Menstrual tracking applications (MTAs) help women detect irregularities or abnormalities in their menstrual cycles and provide management for abnormalities like premenstrual syndrome (PMS). This includes the best exercises, appropriate diets, and appropriate medications that help reduce physical pain perception and improve mood. MTAs also help women identify false information about their menstrual cycles and improve awareness and orientation about menstrual health. **(Karasneh et al., 2020**).

With over 500 million downloads globally, period monitoring programs rank among the most widely used in the health category **(Rampazzo et al., 2021).** (MTA) improved self-awareness of one's health and successful health behavior modification. It is extremely helpful for self-management and health monitoring. Greater self-awareness can help young women take more proactive measures to seek the right care, which can result in better control over health concerns. Women who are more self-aware are more empowered to take control of their health and well-being, which lessens the load on the healthcare system. **(Friedlander.,2023)**

Aim of the Study

The current study aimed to: Evaluate the effect of utilization of menstrual tracking application on knowledge, practice and attitude among young females .This aim will be achieved through the following objectives:

-Assess knowledge of young females regarding menstrual cycle &menstrual tracking application.
-Assess practice of young females regarding menstrual tracking application.
-Assess attitude of young females regarding menstrual tracking application.
-Apply menstrual tracking application among young females.
-Evaluate the effect of using menstrual tracking application on knowledge, practice and attitude among young females.

Research hypothesis:

The current study hypothesized that:

The utilization of menstrual tracking application will improved knowledge, practice and attitude among young females.

Research design: A quasi-experimental research design aimed to establish cause and effect relationship between independent and dependent variables and was used to achieve the aim of the study including one group pre & post test. **(Janssen & Kollar, 2021).**

Setting:

The study was conducted at faculty of nursing at Matrouh University, Egypt.

Sampling:

Sample type: A purposive sample was used.

Sample size: 150 young female were collected during 3 months for data collection.

Sampling Technique: data was collected from first and second academic year females at faculty of nursing at Matrouh University through second semester in academic year 2023-2024.

Tools for data collection:

Four tools were used to collect data of this study as follow:

Tool (I): Structured interviewing questionnaire:

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Structured interviewing questionnaire: It was adapted from **(Levy.,2019)** and modified by the researcher and was written in simple clear Arabic language.

It divided into two parts as follow:

Part I: Socio-demographic data:

This part was used to assess socio-demographic characteristic of the studied young female contain five items such as: (Age, telephone number, residence, etc…).

Part II: menstrual cycle characteristics:

This part was used to assess menstrual cycle characteristic of the studied young female contain ten items such as (age at menarche, rhythm, interval, duration, amount, associated symptoms, etc…).

Tool (II): Assessment of young female knowledge:

It divided into two parts as follow:

Part I: Assessment of young female knowledge regarding menstrual cycle:

This part was adapted from **Perry et al. (2022)** and was modified by the researcher and was written in simple clear Arabic language. The questionnaire contained eight items such as: (definition of menstrual cycle, phases, normal associated symptoms, normal age at menarche, normal interval, normal duration, patterns, causes of disturbances).

Scoring system: Concerning young females' knowledge about menstrual cycle, the questionnaire contained eight knowledge items each was 2 points liker scale (0-2) as (0) for don't know, (1) for correct incomplete answer, (2) for correct complete answer.

The total score of each young female was categorized into: "Satisfactory" (>60%), and (<60%). "Unsatisfactory".

Part II: Assessment of young female knowledge regarding menstrual tracking application:

This part was adapted from **Schantz.,(2021)** and was modified by the researcher and was written in simple clear Arabic language to assess the studied young female. The questionnaire contained seven items such as:-(meaning of menstrual tracking application ,purpose of menstrual tracking application, advantage and disadvantage of menstrual tracking application ,examples of menstrual tracking application, optimal time to use menstrual tracking application, uses of menstrual tracking application at health field).

Scoring system: Concerning young females' knowledge about menstrual tracking application, the questionnaire contained seven knowledge items each was 2 points liker scale (0-2) as (0) for don't know, (1) for correct incomplete answer, (2) for correct complete answer.

The total score of each young female was categorized into: "Satisfactory" (>60%), and (<60%). "Unsatisfactory".

Tool (III): Assessment of young female practice regarding menstrual tracking application:

That tool was developed by the researcher and was written in simple clear Arabic language to assess the studied young female. The questionnaire contained fourteen items.

Scoring system: Concerning young females practice about menstrual tracking application. The questionnaire contained fourteen practice items: each was 2 points liker scale (0-1) as (0) for not done, (1) for done. The total score of each young female was categorized into: "Adequate" (>60%), and (<60%). "Inadequate".

Tool (IIII): Assessment of young female attitude regarding menstrual tracking application:

That tool was adapted from **Immons et al. (2018)** and was modified by the researcher and was written in simple clear Arabic language to assess the studied young females questionnaire contained nine items.

Scoring system: Concerning young females attitude about menstrual tracking application, the questionnaire contained nine items, each was 3 points liker scale (1-3) as (1) for disagree, (2) for neutral, (3) for agree.

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Validity:

Content validity was conducted to determine whether the content of the tools cover the aim of study, it was measured by jury of 3 experts, three lecturer of maternity and new-born health nursing at Faculty of Nursing, Helwan University. The expertise reviewed the tool for clarity of sentences, relevance, accuracy, comprehensiveness, simplicity and applicability and minor modification were done such as (complete the content of the tool). Finally, the final forms were developed.

Reliability:

Reliability of tools was applied by the researcher for testing the internal consistency of the tool, by using Cronbach's Alpha Test for knowledge tool=0.84, practice tool=0.88, attitude tool=0.93.

Ethical considerations:

An official permission to conduct the proposed study was obtained from the scientific research ethics committee at faculty of nursing Helwan University. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the Informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw from the study at any time and withdraw from the study not effect on the scores and marks, confidentiality of the information. Ethics, values, culture and beliefs were respected.

Pilot study:

A pilot study was conducted to test feasibility and applicability of the study tools. It was carried out on 10% of total study subjects (15). There were no modifications of tools and the young females included in the pilot study were included in the main study group.

Field work:

- The researcher introduced herself to the studied young females and briefly explained the nature and purpose of the study before the participation.
- Informed consent was taken after explaining the purpose and nature of the study.
- The researcher assessed knowledge, practice and attitude of the studied young females at break time or after finishing their daily sessions during assessment phase.
- The studied young females were told that the data will be collected during the analysis would be confidential and would only be used for research purposes.

Operational design:

Firstly, regarding young females, the data collection was carried out 5 steps as the following: (preparatory-assessment-planning-implementation- evaluation phase).

Preparatory phase:

- The preparatory phase was the first phase of the study, the researcher carried out through review of local and international related literature about the various aspects of the research. This guided the researchers to prepare the required data collection tools. The tool was distributed to three experts in the field, the aim was to test its appropriateness, comprehensiveness, clarity, importance and applicability. The jury recommended omissions of some items or addition which were done.
- The researcher divided studied young females into 4 subgroups (2 group contain 37 student and 2 group contain 38 student), and explain the aim of the study to the studied young females.
- The goal of the research was explained to the studied young females, and the application of (MTA) not encouraging by some of young female, but they were persuaded by the researcher by explaining the application, and that it is beneficial, and the application was persuaded and applied.
- The researcher was explained to the studied young females how to fill the self-administered questionnaire (pre & post).
- The researcher inform the young females that the mobile data must be available during the period of application.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/

b) Assessment

- This phase encompassed interviewing the young female students to collect baseline data, in the educational lecture hall at the faculty of nursing – Matrouh university, at the beginning of interview the researchers greeted each student, explained the purpose, duration, and activities of the study.
- Structured interviewing questionnaire was done to assess young female's socio-demographic characteristics, menstrual cycle characteristics and this assessment take about 10 minutes.
- The researcher was assessed young females' knowledge regarding menstrual cycle and (MTA) and this assessment take about 10 minutes.
- Then the researcher was assessed young females' practice regarding (MTA) and this assessment take about 10 minutes.
- After that the researcher assessed young females attitude regarding (MTA) and this assessment take about 10 minutes.
- The data obtained during this phase constituted the baseline for further comparison to evaluate the effect of utilization of (MTA) on studied young females.

c) Planning Phase:

- Based on baseline data obtained from assessment phase and relevant review of literature, the educational session was conducted by the researchers to improve the studied young female's knowledge, practice and attitude regarding menstrual tracking application.

d) Implementation phase:

During the first month of data collection period:

- The researcher was conducted educational session for each group of the studied young females about menstrual cycle (definition, phases, duration, amount, associated symptoms, interval, patterns, abnormalities etc…) and about menstrual tracking application (definition, aims, advantages, disadvantages, examples, optimal time of use and other uses in the health field etc...) by using power point presentation for (2) hours weekly.
- Then the researcher was at the side of each young female to teach how to download the menstrual tracking application (Wocute) from Google play store in the present of internet connection in smart phone.
- The researcher was explained to young females' importance of each icons and how to use all icons inside the menstrual tracking application.
- After that the researcher was encouraged the young females to apply menstrual tracking application by itself without any assistance to ensure optimal practice about menstrual tracking application.
- The researcher was discussed with the studied young females any questions about menstrual cycle and menstrual tracking application.

During the second and third month of data collection period:

- The researcher perform refreshment for each group of the studied young females by using the educational session.
- The researcher perform follow up for each young female to detect any menstrual abnormalities.
- The researcher help the studied young female to make appropriate referral and take appropriate management.

d) Evaluation:

At the end of the third month of data collection period:

- Evaluate knowledge about menstrual cycle and menstrual tracking application from the studied young females by using the same knowledge tool that used before application.
- Evaluate the studied young females practice regarding menstrual tracking application through tool of practice that used before application.
- Finally, had assessed studied young females attitude related to menstrual tracking application by the same attitude tool that used before application.

Statistical item:

- Recorded data were analyzed using the statistical package for social sciences, version (24).Quantitative data

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Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/

were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. The following tests were done:

- The Chi-square test was used to compare between qualitative data.
- Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: Probability (P-value) P-value ≤ 0.05 was considered significant, P-value > 0.05 was considered insignificant.
- MH test can be used for comparing two cultural groups when the observed item scores are dichotomous (correct-incorrect) and the sum score is used as a proxy for the latent variable.
- McNemar test is used to determine if there are differences on a dichotomous dependent variable between two Related group.

Results:

Table (1) shows that, more than half (53.3%) of the studied young females were in age of 18 years old with mean age 18.47±0.50 years and more than half (54.0%) of them were from urban residence. Also, more than two third (70.7%) of them were from families consisted of ≥5 members.

Table (2) shows that, the minority **(**1.3%) and the minority (4.0%) of the studied young females had correct knowledge regarding Normal Interval of menstrual cycle and Pattern of menstrual cycle respectively pre utilization of menstrual tracking application which improved to more than half (59.3%) and more than half (57.3%) of them post utilization of menstrual tracking application. Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding all items of Knowledge about menstrual cycle at P-value ≤0.05.

Table (3) shows that, the minority **(**13.3%) and the minority (14.7%) of the studied young females had correct knowledge regarding disadvantages of the menstrual tracking application and example of menstrual tracking application pre utilization of menstrual tracking application which improved to more than half (57.3%) and more than half (55.3%) of them post utilization of menstrual tracking application .Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding all items of Knowledge about menstrual tracking application at P-value ≤0.05.

Figure (1) illustrates that, about one third **(**31.3%) of the studied young females had satisfactory level of knowledge about menstrual tracking application pre utilization of menstrual tracking application which improved to more than two third (72.7%) of them post utilization of menstrual tracking application. Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding total level of knowledge about menstrual tracking application at P-value ≤0.05.

Table (4) shows that, record notes, symptoms and moods done by more than one third (39.3%) of the studied young females pre utilization of menstrual tracking application which improved to the majority (88.7%) of them post utilization of menstrual tracking application. Share or publish posts related to menstruation by clicking on the icon at the top left of the application done by more than one third (39.3%) of the studied young females pre utilization of menstrual tracking application which improved to the most (92.7%) of them post utilization of menstrual tracking application. Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding all items of young females practices regarding menstrual tracking application at P-value ≤0.05.

Figure (2) illustrates that, more than one third (39.3%) of the studied young females had adequate level of practice about menstrual tracking application pre utilization of menstrual tracking application which improved to more than two third (68.0%) of them post utilization of menstrual tracking application. Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding total level of practice about menstrual tracking application at P-value ≤0.

Table (5) shows that, the minority **(**9.3%) of the studied young females agreed regarding "Data taken from menstrual cycle tracking application can be used to diagnose a health condition" pre utilization of menstrual tracking application which improved to more than half (54.7%) of them post utilization of menstrual tracking application. the minority (10.0%) of the

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studied young females agreed regarding "The menstrual cycle tracking application help in relieve pain and menstrual disorders" pre utilization of menstrual tracking application which improved to about two third (62.7%) of them post utilization of menstrual tracking application. Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding all items of young females attitude regarding menstrual tracking application at P-value ≤0.05.

Figure (3) illustrates that, about one third (30.0%) of the studied young females had positive level of attitude about menstrual tracking application pre utilization of menstrual tracking application which improved to the majority (80.7%) of them post utilization of menstrual tracking application. Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding total level of attitude about menstrual tracking application at P-value ≤0.05.

Table (1): Distribution of the studied young females according to their socio-demographic data (n=150).

Socio-demographic data	N	%
Age (in years)		
18	80	**53.3**
19	70	46.7
Mean ±SD	**18.47±0.50**	
Residence		
Rural	69	46.0
Urban	81	**54.0**
Number of family member		
1-2	3	2.0
3-4	41	27.3
≥5	106	**70.7**

Table (2): Distribution of the studied young females according to their knowledge about menstrual cycle (n=150).

Knowledge about menstrual cycle	Pre						Post						MH test	P-value
	Correct		Incomplete correct		Incorrect		Correct		Incomplete correct		Incorrect			
	N	%	N	%	N	%	N	%	N	%	N	%		
Definition of menstrual cycle	40	26.7	102	66.0	8	5.3	132	88.0	18	12.0	0	0.0	116.009	**0.000***
Phases of menstrual cycle	11	7.3	122	81.3	17	11.3	87	58.0	61	40.7	2	1.3	91.114	**0.000***
Symptoms associated with menstrual cycle	44	29.3	105	70.0	1	0.7	132	88.0	18	12.0	0	0.0	106.537	**0.000***
Normal Age at menarche	3	2.0	140	93.3	7	4.7	67	44.7	83	55.3	0	0.0	80.098	**0.000***
Normal Duration of menstrual cycle	1	0.7	144	96.0	5	3.3	78	52.0	72	48.0	0	0.0	104.051	**0.000***
Normal Interval of menstrual cycle	2	**1.3**	140	93.3	8	5.3	89	**59.3**	61	40.7	0	0.0	122.226	**0.000***
Pattern of menstrual	6	**4.0**	139	92.7	5	3.3	86	**57.3**	64	42.7	0	0.0	102.257	**0.000***

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Helwan International Journal for Nursing Research and Pratctice
Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/

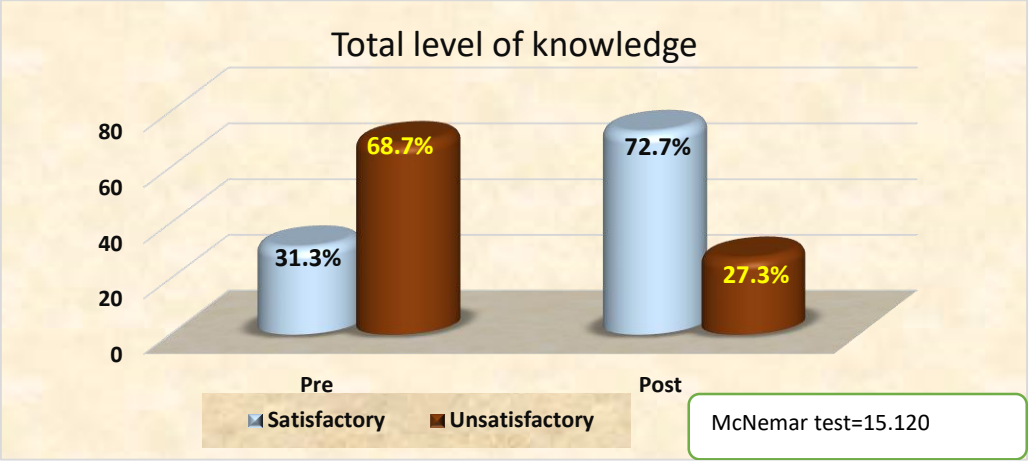
cycle														
Causes of menstrual disorders	36	24.0	88	58.7	26	17.3	116	77.3	31	20.7	3	2.0	87.649	**0.000***

MH test=Marginal homogeneity test ***P-value ≤ 0.05= Significant (S)**

Table (3): Distribution of the studied young females according to their knowledge regarding menstrual tracking application (n=150).

Knowledge about menstrual tracking application	**Pre**						**Post**						**MH test**	**P-value**
	Correct		**Incomplete correct**		**incorrect**		**Correct**		**Incomplete correct**		**incorrect**			
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**		
Meaning of menstrual tracking application	58	38.7	38	25.3	54	36.0	138	92.0	12	8.0	0	0.0	100.173	0.000*
The goal of the menstrual tracking application	55	36.7	36	24.0	59	39.3	137	91.3	13	8.7	0	0.0	104.817	0.000*
Advantages of the menstrual tracking application	45	30.0	46	30.7	59	39.3	120	80.0	30	20.0	0	0.0	96.459	0.000*
Disadvantages of the menstrual tracking application	20	13.3	45	30.0	85	56.7	86	57.3	61	40.7	3	2.0	119.919	0.000*
Example of menstrual tracking application	22	14.7	39	26.0	89	59.3	83	55.3	64	42.7	3	2.0	121.897	0.000*
The ideal time to use a menstrual tracking application	32	21.5	35	23.5	82	55.0	115	76.7	35	23.5	0	0.0	128.862	0.000*
Other uses of the menstrual tracking application are in the health field	34	22.7	30	20.0	86	57.3	106	70.7	43	28.7	1	0.7	122.390	0.000*

MH test=Marginal homogeneity test ***P-value ≤ 0.05= Significant (S)**



***P-value ≤ 0.05= Significant (S)**

Figure (1): Distribution of the studied young females according to their total level of knowledge pre and post utilization of menstrual tracking application (n=150).

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/

Table (4): Distribution of the studied young females according to their practice regarding menstrual tracking application (n=150).

Items	Pre				Post				McNemar Test	P-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Download the Wocute application from the Play Store.	75	50.0	75	50.0	147	98.0	3	2.0	89.813	**0.000***
Install the application the right way.	75	50.0	75	50.0	147	98.0	3	2.0	89.812	**0.000***
Open the application and select the appropriate language.	74	49.3	76	50.7	147	98.0	3	2.0	91.569	**0.000***
Agree to the Terms of Service and Privacy Policy.	71	47.3	79	52.7	145	96.7	5	3.3	90.542	**0.000***
Choose the method of logging in to the application via (Facebook -yahoo –Snap chat)	68	45.3	82	54.7	141	94.0	9	6.0	84.058	**0.000***
Determine the purpose of the application through choose track my cycle.	62	41.3	88	58.7	139	92.7	11	7.3	89.386	**0.000***
Determine the date of the last menstrual period or choose I don't remember.	62	41.3	88	58.7	139	92.7	11	7.3	89.386	**0.000***
Press Cycle Record to track the next menstrual cycle.	62	41.3	88	58.7	138	92.0	12	8.0	86.640	**0.000***
Record notes, symptoms and moods:	59	39.3	91	60.7	133	88.7	17	11.3	79.225	**0.000***
Activate reminders from the alarm icon at the top right of the application to remind you of the following (beginning of the menstrual cycle, end of the menstrual cycle, premenstrual symptoms, changing sanitary pads).	59	39.3	91	60.7	137	91.3	13	8.7	89.541	**0.000***
To follow up on the days of the current cycle and the symptoms that have been recorded, click on the calendar at the top right of the application.	59	39.3	91	60.7	139	92.7	11	7.3	95.068	**0.000***
To discover ideas related to menstruation and the menstrual cycle, the life of teenage girls by clicking on the icon located at the bottom right of the application.	59	39.3	91	60.7	137	91.3	13	8.7	89.541	**0.000***
Share or publish posts related to menstruation by clicking on the icon at the top left of the application.	59	39.3	91	60.7	139	92.7	11	7.3	95.068	**0.000***
Return to the main menu through the icon located in the bottom left of the application.	59	39.3	91	60.7	142	94.7	8	5.3	103.859	**0.000***

***P-value ≤ 0.05= Significant (S)**

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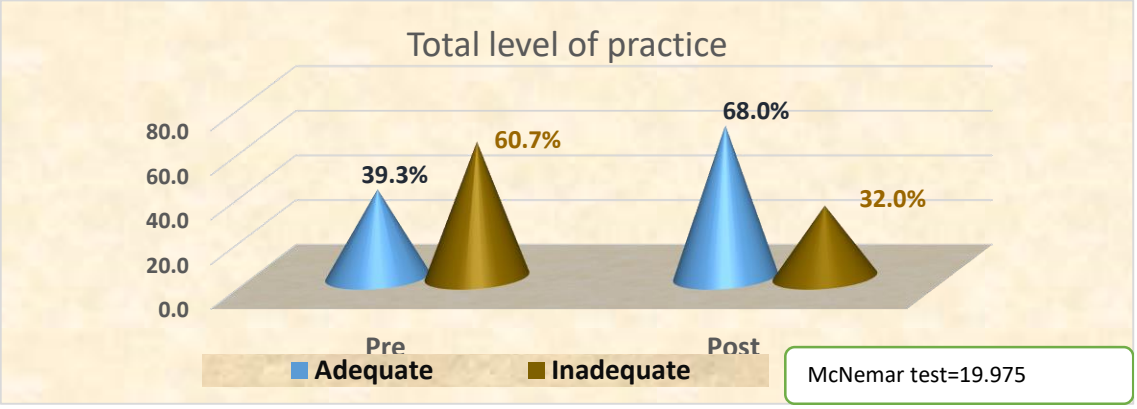

*P-value ≤ 0.05= Significant (S)

Figure (2): Distribution of the studied young females according to their total level of practice pre and post utilization of menstrual tracking application (n=150).

Table (5): Distribution of the studied young females according to their attitude regarding menstrual tracking application (n=150).

Items	Pre						Post						MH test	P-value
	Agree		Neutral		Disagree		Agree		Neutral		Disagree			
	N	%	N	%	N	%	N	%	N	%	N	%		
The menstrual cycle tracking application useful for women.	54	36.0	27	18.0	69	46.0	147	98.0	2	1.3	1	0.7	130.639	**0.000***
The menstrual cycle tracking application effective in tracking the menstrual cycle	45	30.0	29	19.3	76	50.7	134	89.3	11	7.3	5	3.3	114.586	**0.000***
The menstrual cycle tracking application effective with irregular cycle	26	17.3	30	20.0	94	62.7	74	49.3	53	35.3	23	15.3	72.499	**0.000***
The menstrual cycle tracking application help in relieve pain and menstrual disorders?	15	10.0	33	22.0	102	68.0	94	62.7	33	22.0	23	15.3	107.185	**0.000***
The menstrual cycle tracking application help identify any changes in menstrual cycle that may be an indicator of potential health problems	21	14.0	25	16.7	104	69.3	97	64.7	30	20.0	23	15.3	101.065	**0.000***
Data taken from menstrual cycle tracking application can be used to diagnose a health condition?	14	9.3	25	16.7	111	74.0	82	54.7	37	24.7	31	20.7	95.560	**0.000***
The menstrual cycle tracking application make you feel comfortable and reassured as it predict menstrual fluctuation?	22	14.7	28	18.7	100	66.7	106	70.7	27	18.0	17	11.3	114.024	**0.000***
the menstrual cycle tracking application allow to deal with premenstrual syndrome	20	13.3	24	16.0	106	70.7	118	78.7	17	11.3	15	10.0	139.227	**0.000***
Do follow the personal steps completely during the menstrual cycle, which may effect on body health	25	16.7	24	16.0	101	67.3	128	85.3	14	9.3	8	5.3	151.320	**0.000***

MH test=Marginal homogeneity test *P-value ≤ 0.05= Significant (S)

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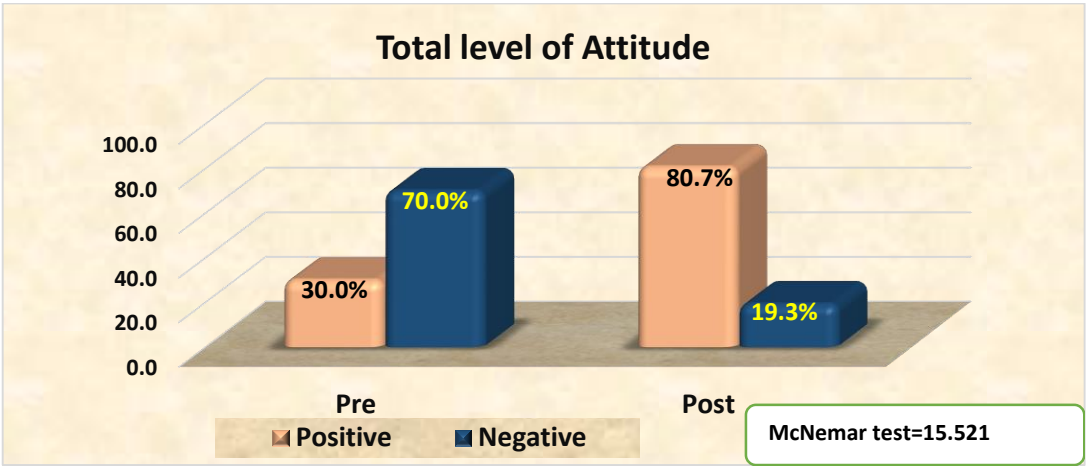
Helwan International Journal for Nursing Research and Pratctice
Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/



*P-value ≤ 0.05= Significant (S)

Figure (3): Distribution of the studied young females according to their total level of attitude pre and post utilization of menstrual tracking application (n=150).

Discussion

The menstrual cycles of females are crucial to their comprehensive well-being and are distinguished by systematic and repetitive manifestations. Ongoing observation of the menstrual cycle can facilitate health administration. Surveillance systems are requisite to enhance menstrual health and furnish readily accessible health data for women **(Critchley et al., 2020; Park, 2021).** Menstrual tracking applications (MTAs) are popular mHealth tools that allow users to monitor their menstrual cycles and symptoms. These apps offer various features, with 91% providing cycle prediction and 64% offering symptom tracking **(Ko et al., 2023; Trépanier et al., 2023).**

This study aimed to evaluate the effect of utilization of menstrual tracking application on knowledge, practice and attitude among young females.

Regarding to socio-demographic data of the studied females, the present study, clarified that more than half of the studied young females were in age of 18 years old and more than half of them were from urban residence. Also, more than two third of them were from families consisted of ≥5 members.

This result was coinciding with the study performed by **Grieger and Norman (2020)** who studied "Menstrual cycle length and patterns in a global cohort of women using a mobile phone app: Retrospective Cohort study" on global scale among 1.5 million users and revealed that the about half of the participants their age were 18 years.

On the other hand, this result was contraindicated with the study performed by **Alshurafa, (2023)** who studied "Knowledge, Attitudes and Practices Regarding Menstruation among Adolescents, Female in the Gaza Strip" in Palestine and revealed that were mean age = 14.9, and more than one third of the females were from families consisted of Fourth to sixth members.

As regards knowledge of the studied females regarding menstrual cycle &menstrual tracking application, the current study demonstrated that minority of the studied young females had correct knowledge regarding normal Interval of menstrual cycle and Pattern of menstrual cycle respectively pre utilization of menstrual tracking application which improved to more than half of them post utilization of menstrual tracking application.

These results were observed as significant statistical difference between pre and post utilization of menstrual tracking application regarding all items of Knowledge about menstrual cycle at P-value ≤0.05.

This result findings were coinciding with the study performed by **Idoko et al. (2022)** who studied "Knowledge and Practice of Menstrual Health and Hygiene among Young People in Jos, Plateau State, Nigeria"

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Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/

signified that the minority of the participants had right knowledge regarding normal interval regarding menstrual cycle.Also, this result findings were corroborated with the study performed by **Karasneh et al. (2020)** who studied "Smartphone Applications for Period Tracking: Rating and Behavioral Change among Women Users" on Jordan reported that there was effectiveness of menstrual tracking applications and improvements in knowledge and behaviour post-utilization.

From the researcher point of view, before using the apps, many young females may not have paid close attention to the details of their cycles. The tracking process itself encourages them to regularly engage with this data, making them more aware of the normal patterns, intervals, and potential deviations. The interactive nature of these apps makes learning more intuitive and personalized.

As regards to young females according to their knowledge about menstrual tracking application, the present study findings reported that, the minority of the studied young females had correct knowledge regarding disadvantages of the menstrual tracking application and example of menstrual tracking application pre utilization of menstrual tracking application which improved to more than half of the females post utilization of menstrual tracking application.

This result findings were corroborated with the study performed by **Ford et al. (2020)** who studied "The association between reproductive health smartphone applications and fertility knowledge of Australian women" reported that, app users were 1.9 times more likely to answer correctly the most (CI: 1.4–2.8, $p < 0.001$) than non-app users. Also, this result was agreed with the study performed by **Grądzik et al. (2022)** who conducted a study about "The popularity and usability of mobile applications for women and expecting mothers" clarified that more than half of the participants possessed accurate comprehension pertaining to menstrual monitoring application.

As regards practice of the studied females regarding menstrual tracking application, Concerning practice of the studied young females regarding menstrual tracking application, the current study revealed that record notes, symptoms and moods done by more than one third of the studied young females pre utilization of menstrual tracking application which improved to the majority of the females post utilization of menstrual tracking application. Share or publish posts related to menstruation by clicking on the icon at the top left of the application done by more than one third of the studied young females pre utilization of menstrual tracking application which improved to the most of them post utilization of menstrual tracking application.

This result findings were consistent with the study performed by **Broad et al. (2022)** who studied "A survey of women's experiences of using period tracker applications: Attitudes, ovulation prediction and how the accuracy of the app in predicting period start dates affects their feelings and behaviours" clarified that the two common statements were 'Entering my data is part of my routine', approximately two fifth. Additionally, this result was strongly agreed with **Girling et al. (2023)** in their study titled "The role of menstrual apps in healthcare: provider and patient perspectives" indicated that most of the participants said that; Apps allow them to track a variety of symptoms (e.g., amount of bleeding, pain, mood).

Conversely, this result was disagreed with the study performed by **Sou et al., (2024)** who studied "Please cyme: Towards enhancing menstrual health awareness through customization and personalized visualization in a menstrual health app" revealed that; the minority of the females said that "I feel a change in my mood during the menstrual cycle".

Based on the investigator's assessment, menstrual tracking apps are designed to be user-friendly, providing a simple and structured way to record data about one's cycle, symptoms, and moods. This accessibility encourages users to engage more consistently with their tracking habits, leading to an increase in the percentage of females who regularly record such information.

As regards attitude of the studied females regarding menstrual tracking application, the current study illustrated that the minority of the studied young females agreed regarding "Data taken from menstrual cycle tracking application can be used to a health condition" pre utilization of menstrual tracking application which improved to more than half of them post utilization of menstrual tracking application. the tenth of the studied young females agreed regarding "The menstrual cycle tracking application help in relieve pain and menstrual disorders" pre utilization of menstrual tracking application which improved to about two third of the studied females post utilization of menstrual tracking application.

ISSN 2786-0183
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Vol. 4, Issue 9, Month: March 2025, Available at: https://hijnrp.journals.ekb.eg/

Also, there was a significant statistical difference between pre and post utilization of menstrual tracking application regarding all items of young females' attitude regarding menstrual tracking application at P-value ≤0.05.

This result was fairly consistent with the study performed by **Broad et al. (2022)** who demonstrated that the majority women use these apps to understand their menstrual cycles and symptoms better, including dealing with menstrual disorders like endometriosis. For instance, some respondents mentioned that the app helped them plan ahead for severe pain associated with conditions like endometriosis, which allowed them to manage their symptoms more effectively. Together with, this result was inconsistent with **Stujenske et al. (2023)** who mentioned that more than two thirds of the women with conditions like PCOS (Polycystic Ovary Syndrome), endometriosis, and infertility found that tracking technologies aided in diagnosis.

Conclusion:

The finding of the current study achievement the aim and support the research hypothesis that the utilization of menstrual tracking application positive effect on knowledge, practice and attitude among young females. Statistically significant positive Correlation between total level of knowledge, practice and attitude pre and post utilization of menstrual tracking application among the studied young females.

Recommendations:

Recommendations for further research studies:

- Study the effect of menstrual tracking application on reproductive health among large scale of adolescent females

Further recommendation:

- Investigate the experiences and factors affecting using of menstrual tracking application among young females.
- Explore the motivations and barriers to using period tracker application among adolescent females.

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