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Knowledge, Behavior, and Self Care Practices of Female University Students Regarding Vaginal Discharge: A Cross- Sectional Survey

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ABSTRACT

Background: Vaginal discharge is a prevalent reproductive health issue affecting adolescent girls, with significant implications for both their physical and psychological well-being.

Aim: To assess knowledge, behavior, and self-care practices about vaginal discharge among female students at Assiut University.

Subjects and methods: A descriptive cross-sectional study design was employed. This study was conducted at 6 faculties at Assiut University, with total number (1018) female students. Data were gathered using a self-administered questionnaire composed of four tools. Tool I, included a socioeconomic scale, menstrual history, past and current history of vaginal discharge, Tool II included questions to assess students' knowledge about vaginal discharge, Tool III included health behavior assessment scale, and Tool IV included Self-reported practices toward vaginal discharge.

Results: The present study's findings indicated that 57.7% of studied students were aged > 20 years, and 58.1% resided in rural areas. In addition, a notable positive correlation was observed between students' knowledge and their behavioral scores concerning vaginal discharge.

Conclusion: Most students displayed insufficient knowledge about vaginal discharge regarding vaginal discharge; approximately two-fifths did not adopt suitable health behaviors, and over one-third demonstrated unsatisfactory hygienic practices.

Recommendations: Develop and implement regular reproductive health education programs targeting female university students to enhance their knowledge and correct misconceptions about vaginal discharge, menstrual hygiene, and genital care

Keywords: *Behavior, Female Students, Knowledge, Self-Care Practices, Vaginal Discharge.*

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1. INTRODUCTION

Vaginal discharge refers to any non-bloody fluid expelled from the vagina that differs from what is typical. It may or may not have an odor and can occur with or without itching. Vaginal discharge is generally categorized into two main types: normal (also referred to as physiological) and abnormal (or pathological) **[1]**.

Physiological discharge from the vagina is distinguished by being clear in color, not too so, odorless, and not itchy or burning, and by having more epithelial cells, which are part of the natural flora. This acidic liquid, which has a pH between 3.5 and 4.5, prevents the growth of other germs that could cause vaginal discharge **[2]**.

Abnormal vaginal discharge involves an unusual secretion from the vagina, which may appear white, yellow, or greenish. This condition is often accompanied by symptoms such as discomfort, itching, or a foul odor; it occurs due to bacteria, fungi, viruses, and stress **[3]**. According to estimates, 35–42% of individuals with reproductive organ infections between the ages of 10 and 18 and 27–33% of those with reproductive organ infections between the ages of 18 and 22 experience vaginal discharge **[4]**.

Female students are at higher risks of developing vaginal discharge due to lack of exposure to reproductive health knowledge. Adolescent vulnerability is also brought due to ignorance, which influences actions that fail to maintain sufficient and appropriate genital hygiene **[5,6]**.

Maintaining good personal hygiene and ensuring proper moisture balance in the vaginal area are essential for preventing excessive discharge. Before cleaning, always wash your hands thoroughly, and use minimal amounts of mild soap or cleanser to avoid irritation. Additionally, changing underwear regularly helps reduce excess moisture, which can otherwise contribute to infections and symptoms related to vaginal discharge **[7]**.

Community health nurses are essential in boosting vaginal health because they teach young women about good hygiene and healthy living practices. Avoiding tight clothing, using breathable cotton underwear, and practicing good hygiene can help prevent infections. Additionally, regular exercise, a balanced diet, and a decrease in sugar consumption all promote vaginal health **[8]**. They can support female students' reproductive health and prevent urogenital infections in their capacity as researchers, educators, and counselors **[9]**.

Significance of the study

Vaginal discharge is considered an important health issue that requires early medical attention. If left untreated, it can result in complications such as infertility or pelvic inflammatory disease and may also serve as an early indicator of cervical cancer, which is present in about 95% of cases and can be fatal if treatment is delayed. According to the World Health Organization (WHO), nearly all adolescents experience vaginal discharge, with those aged 12–22 years representing approximately 60% of reported cases **[10, 11].**

Teenagers' lack of knowledge about vaginal discharge, combined with feelings of embarrassment when approaching medical professionals, are primary reasons for avoiding treatment. This often leads to recurrent issues with abnormal discharge, which can negatively affect both their physical health and overall quality of life **[12].**

Aime of the study:

The study aims to assess knowledge, behavior, and self-care practice about vaginal discharge among female students at Assiut University.

Research questions:

1. What is the level of female university students' knowledge about vaginal discharge?

2. What are the health behaviors of female university students toward vaginal discharge?

3. What are self-reported practices of female university students toward vaginal discharge?

4. Is there a correlation between female university students' knowledge and their healthy behaviors regarding vaginal discharge?

5. Is there an association between female university students' knowledge of vaginal discharge and the self-reported practices toward vaginal discharge?

6. Is there a correlation between female university students ' behavior and their self-reported practices toward vaginal discharge?

2. SUBJECTS AND METHODS:

Research design:

A descriptive cross-sectional study design was conducted in this study.

Setting:

Assiut University is comprised of nineteen faculties, including thirteen practical and six theoretical colleges. For this study, six faculties were selected: four practical (Physical Education, Agriculture, Dentistry, and Computing and Information) and two theoretical (Commerce and Education), which were randomly selected by writing the names of all theoretical and practical faculties on slips of paper, placing them in a bowl, and drawing lots.

Sample:

The total number of female students enrolled in the selected faculties was 42,261. Using EPI/Info software, version 3, and

applying a 99.9% confidence interval (CI), the required sample size was calculated to be 926 students. To account for an anticipated 10% dropout rate, the sample was increased to 1,018 students. A multistage random sampling technique was used, with proportional allocation applied to determine the number of female students selected from each faculty using the following formula: –

The actual number of female students in each faculty x Estimated sampling size by Epi info

Total number of female students in selected faculties **[13]**.

- This sample was divided into the following table:

Faculty	Actual number of students	Estimated sample size
Faculty of Agriculture	723	56
Faculty of Dentistry	409	32
Faculty of Computing and Information	370	29
Faculty of Physical Education	2148	166
Faculty of Commerce	4056	314
Faculty of Education	5434	421
Total	**13140**	**1018**

After that the female students in each faculty were selected by simple random sample to complete the sampling process.

Inclusion criteria:

The study included single female students who accepted to participate in the study.

Tools of data collection:

After reviewing related literature, a self-administered questionnaire included four tools:

Tool I: Included in three parts:

Part (1): A socioeconomic status (SES) scale, designed by **Abdel-Tawab [14]**, was used. It included the student's name, age, gender, current academic year, residence, parents' educational level and occupation, family income, types of housing, number of family members, and rooms.

Part (2): Menstrual history was assessed to collect data regarding menstrual characteristics of students. It included the age at which they experienced their first period (menarche), number of bleeding days, duration, amount, regularity of the menstrual cycle, and symptoms associated with menstruation.

Part (3): This part consisted of fifteen questions related to past and current history of vaginal discharge. It included complaints of vaginal discharge, and if present, questions on duration, frequency, color, consistency, odor, volume, and timing of any significant increases in amount. It also covered associated symptoms, medications taken, the person who prescribed them, and their effect **[15]**.

Tool II: Included two parts:

Part (1): Consisting of nine questions to assess female students' knowledge about the composition and structure of the female reproductive system, and menstruation **[16,17]**.

Part (2): This part consists of twenty-six questions designed to assess female students' knowledge regarding vaginal discharge **[16,17]**.

Scoring system of Tool II: -

The total knowledge score for students was 70 points. Each correct response was awarded one point, while incorrect or "I don't know" answers received zero. Some questions included multiple correct responses. Scores for all items were summed and then converted into a percentage using the following formula:

- **Poor Knowledge: -** < 50
- **Fair knowledge: 50** % to < 75%
- **Good Knowledge:** ≥ 75% **[17]**

Tool (III): Health behavior assessment scale about vaginal discharge: This tool was adapted from Abd El Tawab et al. **[19]** and was further modified by the researcher. The modifications were made to ensure the questions were culturally and socially appropriate for assessing the health behaviors of female students concerning vaginal discharge. The final assessment scale consists of eleven questions.

- The best method is to wash the external genital area from front to back.
- Washing the genital area by using douche in the toilet can harm the area.
- Washing the genital area from back to front cause infection.
- Wearing cotton underwear led to absorbing the wet.
- Random wash for genital area transmits germs.
- Nylon underwear leads to irritation and itching.
- Narrow underwear leads to increase sweat and stay wet for long time.
- Exposing the underwear to sunlight kills the germs.
- Wide underwear does not lead to sweat and become comfortable.
- A lot of use of plenty perfumed douches lead to infection.
- Seeking medical advice when vaginal discharge changes in color, amount, or odor.

Scoring system of Tool III: -

Responses were rated on a three-point scale: Accept (3), Sometimes (2), and Do Not Accept (1). This total score was categorized into two distinct groups:

- Accept health behavior: ≥ 60%.
- Not-Accept health behavior: < 60% **[18]**

Tool (IV): Self-reported practices of female students concerning vaginal discharge:

It consisted of 14 questions **[19-21]**.

Scoring system of practice:

Based on a total possible score of 14, one point was awarded for each item practiced and zero for each item not practiced. A total score below 60% was considered unsatisfactory practice, while a score above 70% was classified as satisfactory practice **[15]**.

Content validity: The tools were evaluated for content validity by a jury of seven experts in Community Health Nursing and Maternal and Newborn Health Nursing at Assiut University. They assessed the tools for clarity, relevance, comprehensiveness, understanding, and applicability.

Reliability: The reliability was analyzed by Cronbach's alpha coefficient test for the knowledge questionnaire, behavior, and self-care practice of studied female students. It was found to be (0.746, 0.862, and 0.767) respectively.

Pilot study: A pilot study was conducted on 102 female students (10% of the total sample), who were included in the study because no modifications were made to the tools. The pilot's study aimed to assess the clarity of the tools and estimate the time required to complete the questionnaire.

Ethical consideration:

The research proposal was approved by the Ethical Research Committee of the Faculty of Nursing, Assiut University (Approval no: 11202330726 on 26 December 2023).

Fieldwork

From the beginning of October 2024 through March 2025, data was gathered twice weekly. Each day, the researcher obtained between 27 and 29 self-administered forms, with participants typically taking 20 to 30 minutes to complete each one. Before starting, the aim of the study was explained to participating students, and their verbal consent was obtained to ensure their cooperation.

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 22). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were applied. The chi-square test was used to compare

categorical variables, while Pearson correlation was employed to examine relationships between quantitative variables. A p-value of <0.05 was considered statistically significant.

3. RESULTS

Table (1): Distribution of the studied female students according to their socio-demographic characteristics at Assiut University, 2024-2025.

Socio-demographic characteristics	No. (1018)	%
Age: (years)		
< 20	587	**57.7**
≥ 20	431	42.3
Mean ± SD (Range)	**19.48 ± 1.40 (18.0-24.0)**	
Faculty:		
Faculty of Education	421	**41.4**
Faculty of Commerce	314	30.8
Faculty of Physical Education	166	16.3
Faculty of Agriculture	56	5.5
Faculty of Dentistry	32	3.1
Faculty of Computers and Information	29	2.8
Academic year:		
First year	566	**55.6**
Second year	139	13.7
Third year	159	15.6
Fourth year	154	15.1
Residence:		
Rural	591	**58.1**
Urban	427	41.9
Socioeconomic level:		
Low	241	23.7
Middle	562	**55.2**
High	215	**21.1**

Table 1 shows that the socio-demographic characteristics for the studied female students', it was found that 57.7% were aged < 20 years with mean ± SD 19.48 ± 1.40 (18.0-24.0). Additionally, 41.4% were enrolled in the faculty of education, and 55.6% were in their first academic year. The study also revealed that 58.1% of participants originated from rural areas. Regarding the socioeconomic level, it was clear that 55.2% were classified as middle level, while 21.1% were categorized as having an elevated socioeconomic standing.

Table (2): Distribution of the studied female students regarding menstrual characteristics data at Assiut University, 2024-2025.

Menstrual characteristics data	No. (1018)	%
Age of menarche: (years)		
9 – 12	338	33.2
13 or more	642	63.1
I can't remember	38	3.7
Mean ± SD (Range)	19.48 ± 1.40 (18.0-24.0)	
Days of menstrual bleeding:		
> 3 days	53	5.2
3 - 7 days	946	92.9
> 7 days	19	1.9

Duration of menstrual cycle:		
< 21 days	344	33.8
21 - 35 days	604	59.3
> 35 days	70	6.9
Amount of menstrual bleeding:		
Less than 3 pads per day	483	47.4
3 - 4 pads daily	472	46.4
More than 4 pads per day	63	6.2
Regular menstrual cycle:		
Regular	751	73.8
Irregular	267	26.2
Symptoms associated with menstruation (≠)		
Lower back pain	745	73.2
Mood change	933	91.7
Abdominal pain	209	20.5
Slight increase in temperature	806	79.2
Swelling in the breast	267	26.2
Headache	51	5.0
Vomiting	47	4.6
Diarrhea	11	1.1

(≠) More than one answer was selected.

Table2 presents data on the menstrual characteristics of female students at Assiut University. The findings indicate that 63.1% of the participants experienced menarche at or after the age of 13. Regarding menstrual patterns, 92.9% reported a bleeding duration of 21–35 days, while 59.3% noted a menstrual cycle length within the same range. In terms of hygiene practices, 47.4% used fewer than three pads per day. Concerning associated symptoms, mood changes were the most prevalent, affecting 91.7% of students

Table (3): Distribution of the studied female students regarding history of presence of vaginal discharge at Assiut University, 2024-2025.

Vaginal discharge	**No. (1018)**	**%**
Suffering from vaginal discharge:		
Yes	718	70.5
No	300	29.5
Duration of vaginal discharge (n = 718)		
Less than a month	75	10.4
From 1 to 3 months	87	12.1
More than 3 to 6 months	99	13.8
More than 6 months	457	63.6
Frequency of vaginal discharge:		
Continuous	140	19.5
Intermittent	578	80.5
Color of the vaginal discharge		

Clear	310	43.2
White	339	47.2
Yellow	69	9.6
Consistency of the vaginal discharge		
Thick white	176	24.5
Thin	181	25.2
Mucoid	330	46.0
Frothy	31	4.3
Odor of the vaginal discharge		
Non-offensive	466	64.9
Offensive	203	28.3
Fishy	49	6.8
Volume of vaginal discharge		
Few do not require changing clothes	529	73.7
Requires changing underwear	162	22.6
Requires the use of a sanitary pad	27	3.8
Time of noticeable increase in vaginal secretion		
Before menstruation	300	41.8
After menstruation	130	18.1
In the middle of the month	162	22.6
All days of the month	126	17.5
(≠) Other symptoms appearing with vaginal discharge		
None	425	59.2
Itchiness and scratching in the genital area	221	30.8
Lower abdominal pain	130	18.1
Burning sensation	165	23.0
Dysuria	21	2.9
Fever	26	3.6
Vulval edema	38	5.3
Intermenstrual bleeding	15	2.1

(≠) Responses are not mutually exclusive.

Table3 revealed that 70.5% of students suffer from vaginal discharge, 63.6% of them said they suffer for < 6 months and 80.5% had intermittent vaginal discharge. The most common discharge types were white 47.2% and mucoid 46.0%. Regarding the odor of discharge, 64.9% of them had a non-offensive odor and only 3.8 % mentioned the discharge requires the use of a sanitary pad. In addition to 59.2% of them don't suffer from any symptoms with vaginal discharge.

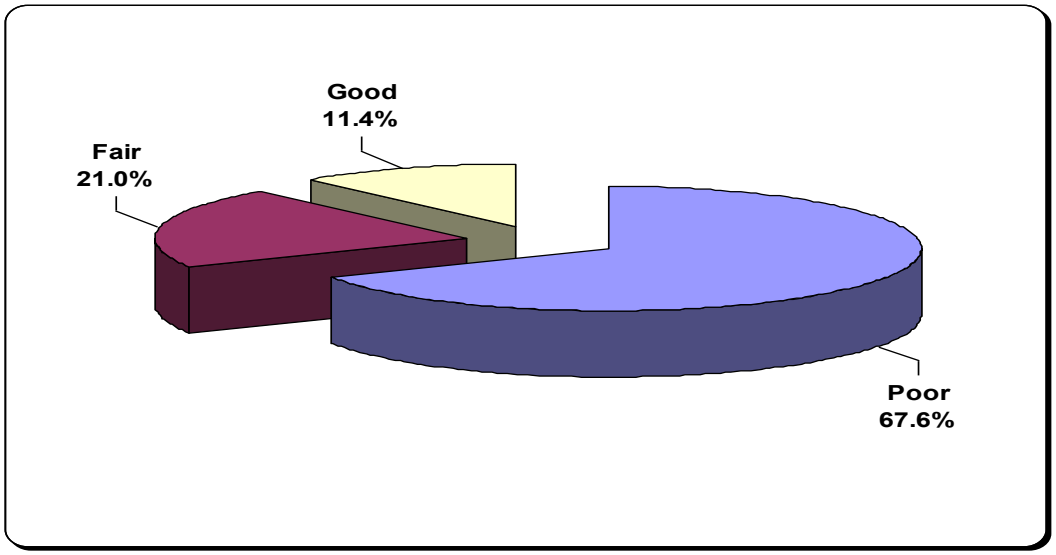

Fig. (1): Total knowledge score level among studied female students' regarding to vaginal discharge at Assiut University, 2024-2025. (N=1018)

Figure 1 it cleared that 67.6% of participant had poor knowledge, while 21.0% of them had fair knowledge, and only 11.4% had good knowledge regarding vaginal discharge.

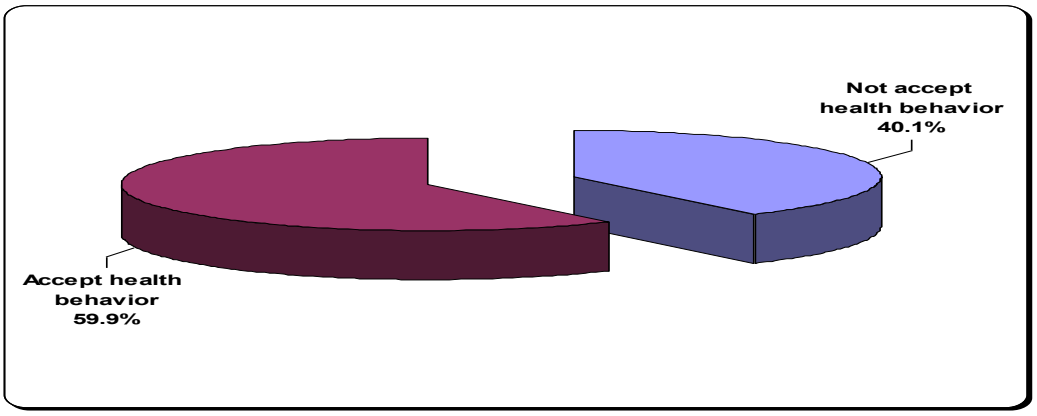

Fig. (2): Total health behavior score of studied female students regarding vaginal discharge at Assiut University, 2024-2025 (N=1018).

Figure 2 it revealed that 59.9% of the students had accepted health behavior, while (40.1%) had not accept health behavior.

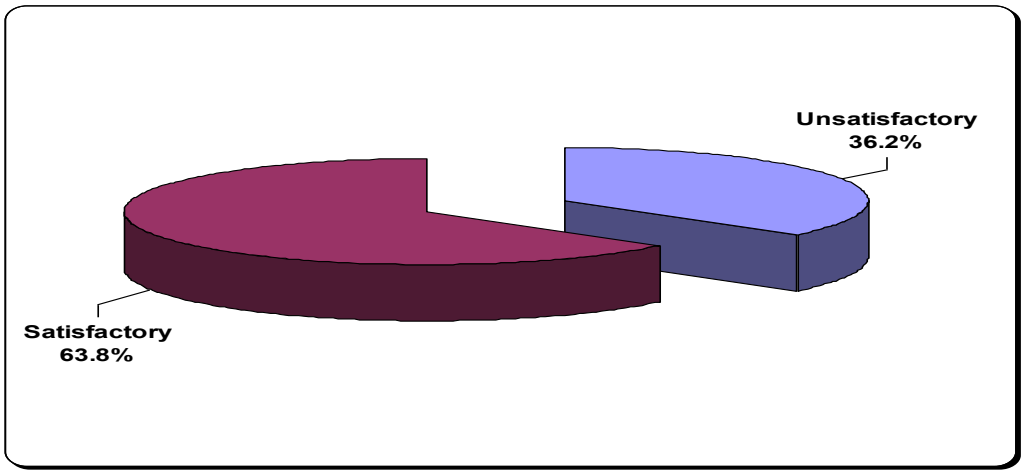

Fig. (3): Distribution of studied female students regarding to total scores of self-reported practices toward vaginal discharge at Assiut University, 2024-2025 (N=1018).

Figure3 displayed that 63.8% of the students had satisfactory practices and 36.2% of them had unsatisfactory practices regarding vaginal discharge.

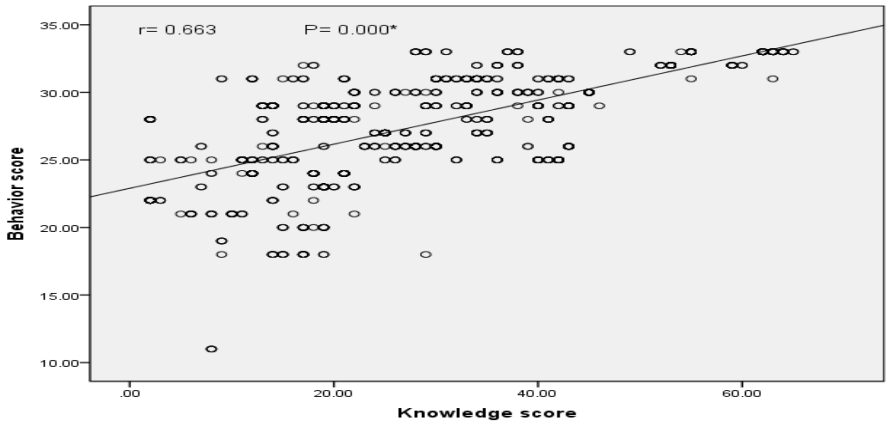

Fig. (4): Correlation between studied students' knowledge and behavior score regarding vaginal discharge at Assiut University, 2024-2025 (N=1018).

Figure 4 it reported that a positive correlation r = 0.663 between students' total knowledge scores and their behavior regarding vaginal discharge, with a statistically significant p = 0.000.

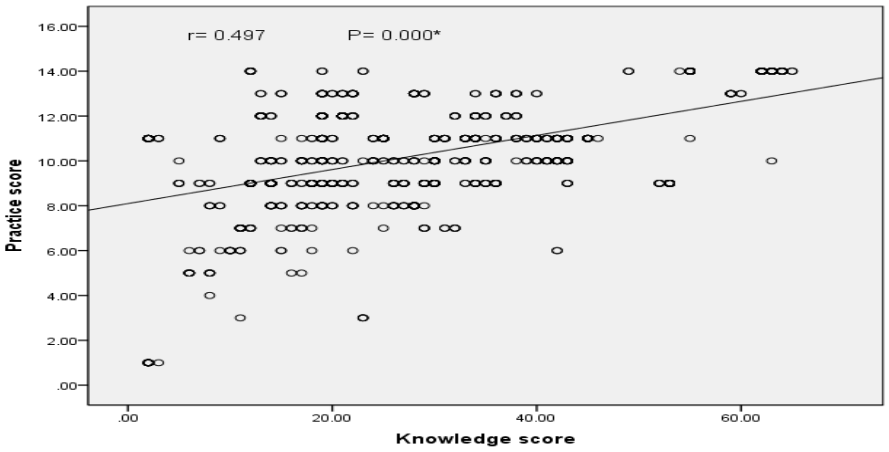

Fig. (5): Correlation between studied students' knowledge and self-reported practices score regarding vaginal discharge at Assiut University, 2024-2025 (N=1018).

Figure 5 it presented that a positive correlation r = 0.497 students' total knowledge scores and their self-reported practices concerning vaginal discharge with a statistically significant p = 0.000.

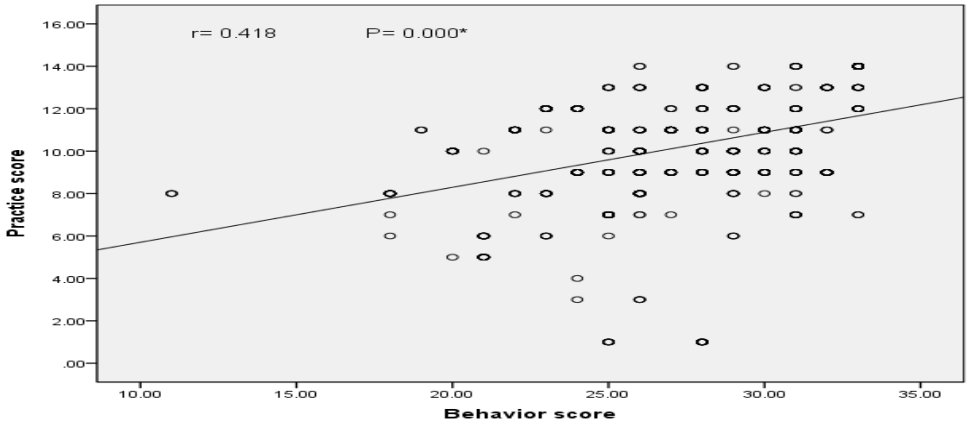

Fig. (6): Correlation between the total score of students' behavior and self-reported practices regarding vaginal discharge at Assiut University, 2024-2025 (N=1018).

Figure 6 illustrates a positive correlation (r = 0.418) between students' total behavior scores and their self-reported practices regarding vaginal discharge with a statistically significant p = 0.000.

4. DISCUSSION

Vaginal discharge is a widespread problem experienced by women of all ages. According to a report from the National Population and Family Planning Agency, more than 80% of teenagers have limited knowledge about reproductive health, particularly concerning vaginal discharge **[3, 22]**.

This study was designed to assess knowledge, behavior, and self-care practices about vaginal discharge among female students.

Regarding the socio-demographic characteristics of the studied participants, the present study revealed that more than half were under 20 years of age, with a mean age of 19.48 ± 1.40 years. This finding aligns with the results reported by **Tehsin et al. [23]**, who documented a similar mean age of 19.41 years. In contrast, the findings diverge from those of **Gudia et al. [24]**, who observed that only slightly more than one-fifth of their participants were under 20 years old.

Of the surveyed students, more than half reported residing in rural areas. This result is consistent with the findings of **Aini et al. [25]**, who noted a predominantly rural background among female students in Upper Egypt. In contrast, the outcome diverges from the study by **Abd El Tawab et al. [18]**, which found that over two-thirds of students came from rural regions, while roughly one-third were from urban areas.

The findings reveal that more than half of the students in the sample identified as having a middle socioeconomic status.

This trend mirrors the outcomes of **Mohamed et al. [26]**, who documented similar patterns of moderate-income reporting among university students in Egypt.

In relation to the menstrual characteristics of female students, these findings align with **Kumar & Sharma [27]**, who reported that menarche commonly occurs between the ages of 12 and 14. Conversely, these results diverge from research by **Singh et al. [28]** in India, which documented a greater incidence of early menarche (before age 12) among university students.

According to the current study, most of the student participants experienced menstrual bleeding lasting between 3 and 7 days. This result is supported by findings from **Azziz et al. (2025) [29]**, who confirmed that this duration aligns with the typical range observed worldwide for menstrual periods.

More than a quarter of the studied students reported having irregular menstrual cycles, a finding that contrasts with the results of **Yilmaz & Özkan [30]**, who observed irregular cycles in over two-fifths of the female student population.

The study noted that mood fluctuations were the most commonly reported symptom during menstruation. This aligns with research by **Abdelmoty et al. [31]**, which indicated high rates of premenstrual syndrome and dysmenorrhea among university students in Egypt, where emotional symptoms were predominant.

The current study's results diverged from those of **Kim et al. [32]**, who observed mood changes in over two-thirds of their participants. This discrepancy could potentially be attributed to cultural differences in how individuals describe symptoms or to variations in awareness and approaches to managing menstrual health.

In the present study, a history of vaginal discharge was reported by three-quarters of female students, with over two-thirds experiencing it for more than six months. These findings align with **Gupta & Sharma [33]**, who similarly observed that three-quarters of college-aged women had experienced vaginal discharge, and more than half of them had symptoms persisting beyond six months. The results of the current study contrast with those of **Suminar et al. [34]**, who reported that most female students had experienced vaginal discharge.

According to the study, approximately half of the participating students reported experiencing a white and mucoid discharge. These traits suggest the discharge may be physiological or linked to mild infections. The results align with those of **Adegoke et al. [35]**, who identified candidiasis and bacterial vaginosis as the predominant infections associated with similar discharge characteristics among university students in Nigeria.

This statement stands in contrast to the results of research conducted by **Nabwire et al. [36]** in Uganda, which reported that more than two-fifths of participants experienced offensive-smelling discharge, suggesting a higher prevalence of pathological vaginal conditions in that population.

Current research indicates a concerning lack of knowledge about vaginal discharge among female students, a finding similar to the work of **El-Masry et al. [37]**, who reported poor awareness and widespread misconceptions.

In contrast, **Shafiee et al. [38]** observed significantly better levels of knowledge and improved practices, suggesting that structured educational efforts could enhance understanding. These contrasting results emphasize the need for culturally appropriate, school- and university-based reproductive health programs to strengthen adolescent girls' awareness and promote healthier behaviors regarding vaginal discharge.

The current study indicates that female students have limited understanding of abnormal vaginal discharge. These results are consistent with those of **Abdelmoneam et al. [16]**, who revealed low awareness among women, especially concerning the characteristics of abnormal discharge and related harmful practices. However, in contrast, a 2022 study by **Shafiee et al. [38]** at the International Islamic University Malaysia (IIUM) documented substantially higher levels of awareness.

The study revealed that over two-thirds of students were unfamiliar with specific complications associated with abnormal vaginal discharge, and three-quarters were unaware of preventive measures. These results align with the findings of **El-Masry et al. [37]**, which highlighted that a significant number of women also lacked knowledge about complications and exhibited poor vaginal hygiene practices. However, these results contrast with those of **Alenizy et al. [39]**, who reported higher levels of awareness regarding risk factors and preventive behaviors among adolescent females.

Regarding total knowledge score about vaginal discharge among the female participants, this study revealed that over two-thirds exhibited poor understanding. These results contrast with the findings of **Alase et al. [40]**, where more than two-fifths of adolescent girls demonstrated good knowledge. The discrepancy may be due to the smaller sample size in the earlier study compared to that of the present research.

The present study's findings, which indicate a generally high level of self-care practices related to abnormal vaginal discharge, align with the results of **Raduan & Mohamed Zain [41]**, who also found that a majority of participants exhibited good self-care in this area.

However, these results differ from the observations of **Gweda et al. [15]**, whose research in Tanta City showed that only a minority of students demonstrated satisfactory self-care practices regarding vaginal discharge.

The identified positive correlation (r = 0.497) between the participants' knowledge and their self-reported practices scores pertaining to vaginal discharge corroborates findings from prior research. Specifically, the results are supported by **Kenzi & Anastasya [42]**, who documented that individuals with more comprehensive vaginal health knowledge were significantly more prone to adopt appropriate hygienic practices, consequently reporting fewer instances of abnormal discharge.

Moreover, these findings are in harmony with those of **Abdelmoneam et al. [16]**, who also reported a significant positive correlation between total knowledge scores and self-care practice scores regarding vaginal discharge.

5. LIMITATION OF THE STUDY

This study faced two limitations. The first was the difficulty in obtaining approvals from the colleges, which was a time-consuming process. The second challenge was gathering the students during the academic term, as coordinating with their schedules proved to be complicated.

6. CONCLUSION

Based on the results of the present study, the most of female students exhibited limited knowledge regarding vaginal discharge; approximately two-fifths did not engage in appropriate health behaviors, and over one-third demonstrated unsatisfactory hygienic practices.

7. RECOMMENDATION

- Develop and implement regular reproductive health education programs targeting female university students to enhance their knowledge and correct misconceptions about vaginal discharge, menstrual hygiene, and genital care.
- Recommend integrating women's reproductive health into the university's general education curriculum, especially in non-medical faculties.
- Conduct additional research into vaginal discharge to investigate its frequency, underlying causes, and related factors across varied demographic groups, and assess how effective educational programs are in increasing awareness and promoting appropriate healthcare-seeking behavior.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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