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A CROSS-SECTIONAL STUDY ON FACTORS CONTRIBUTING TO INCREASED PREVALENCE OF VAGINAL CANDIDIASIS IN PREGNANT MOTHERS ATTENDING ANTENATAL CLINIC AT TORORO GENERAL HOSPITAL, TORORO DISTRICT.

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ABSTRACT.

Background:
The purpose of the study was to determine the factors (Social demographic and human behavioral) contributing to the increased prevalence of vaginal candidiasis in pregnant mothers attending antenatal clinics at Tororo General Hospital, Tororo district.

Methodology:
The study employed a cross-sectional study design with simple random sampling as the sampling technique. Data was collected on a sample size of 50 respondents using questionnaires comprised of closed questions written in English and later translated to local languages, data was analyzed using tally sheets, computed into frequency and percentage using the Microsoft Excel program with illustrated figures(bar graphs and pie charts)and tables for easier interpretation.

Results:
The overall results in regards to social demographic factors contributing to the increased prevalence of vaginal candidiasis showed that (54%) of the respondents were within the age bracket of 27-35 years, (48%) had attained a secondary level of education, (52%) were unemployed, (86) % were urban residents and (54%) were within the gestation age of 7-9 months.

In addition to that, the results on behavioral factors contributing to the increased prevalence vaginal candidiasis showed that (80%) were practicing douching, (72%) were using Nylon knickers, (80%) had been on recent antibiotic treatment, and (78%) had been on recent antifungal treatment.

Conclusion:
The social demographic factors were quite pleasing but noticed poor behavioral factors of practicing douching, wiping the vagina after sex from behind to in front, recent antibiotic treatment especially due to self-medication, and putting on Nylon knickers.

Recommendation:
The health workers at Tororo General Hospital enrich pregnant mothers with knowledge on human behavioral causes of vaginal candidiasis.

Keywords: *Vaginal candidiasis, Pregnant mothers, Antenatal clinic, Tororo General Hospital, Tororo district*
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BACKGROUND.

Vaginal candidiasis is an opportunistic yeast fungal infection of the vagina and is responsible for (90%) of the cases of infectious vaginitis which constitutes a principal motive for women to seek out obstetric and gynecological services.
Vulvovaginal candidiasis is an infection caused by a yeast (a type of fungus) called candida. It can be referred to as candidiasis or monilosis. VVC can be recurrent (RVVV) or relapsing.

According to Iyevhobu, K et al., (2021), Candida species that cause vaginitis most often are c. albicans, c. glabrata, c. tropicalis. and Candida spp rarely cause infections including c. Para psilosis, c. pseudotropicalis, c. krusei and c. guilliermondi.
Vaginal candidiasis is one of the most common genital tract infections reported in pregnant women, a consequence of high circulating estrogen in pregnancy which facilitates the adherence of the candida to the vagina mucosa. This is responsible for the more severe symptoms and persistent infections that are typical of vaginal candidiasis

in pregnancy (Sule Odu et al, 2020).
Worldwide, recurrent vulvovaginal candidiasis affects about 138 million women annually, with a global annual prevalence of 3871 per 100000 women. The biggest occurrence is among people aged 25 to 34. By 2030, the number of women with recurrent vulvovaginal candidiasis is expected to reach over 158 million, resulting in 20240664 more cases based on current trends.

Continently, in Africa, studies in Nigeria have identified candidiasis to be quite common in pregnancy.
In East Africa, a study done in Aghakhan Hospital -Kenya reported C. albicans as the prominent species with a prevalence of (69.3%) followed by C. glabrata (12.9%). In Tanzania non-candida
albicans species were reported to contribute about (37%) of candida vaginitis cases.
In Uganda, recurrent vaginal candidiasis is estimated to occur in 375540 Ugandan women per year and candida in pregnant women affects up to 651600 women per year. (R. Parkes. Ratanshi, et al,2015).
When candidiasis is not detected during pregnancy, it not only causes psychological and physical stress for the mother, but the fetus is more likely to contract the fungus through the birth canal during delivery (SVD), resulting in newborn candidiasis of the oropharynx.
The aim of this study therefore is to determine the factors contributing to the increased prevalence of vaginal candidiasis in pregnant mothers.

General Objective.

To determine the factors contributing to the increased prevalence of vaginal candidiasis in pregnant mothers attending the antenatal clinic at Tororo General Hospital, Tororo District.

Specific Objectives.

- To determine social demographic factors contributing to the increased prevalence of vaginal candidiasis in pregnant mothers attending the antenatal clinic at Tororo General Hospital, Tororo District.
- To determine human behavioral factors contributing to the increased prevalence of vaginal candidiasis in pregnant mothers attending the antenatal clinic at Tororo General Hospital, Tororo District.

METHODOLOGY.

Study design.

The study employed a cross-sectional study design. This is because the study did not require follow-up of clients over some time and the information required was to be collected once from the study participants.

Study area.

Tororo General Hospital is located in the central business district of the town of Tororo in Tororo district, in the Eastern Region of the county, approximately 46 kilometers (29 miles), south of Mbale Regional Referral Hospital. The hospital receives an average of 150 patients per day with several departments namely, OPD, Inpatient, ART clinic, dental, pharmacy surgery, antenatal clinic, and pediatrics. The study was conducted within a period of seven months that is to say from September 2022 up to March 2023.

Study population.

The study population was pregnant mothers aged 18-45 years who came to seek antenatal services at Tororo General Hospital during the period of data collection.

Sample size determination.

The Kish and Leis formula was used

$n=(z^2pq)/d^2$, The Kish and Leis formula (1965)Where;
n= sample size
d=a precision of the study, a precision of 10% was used due to limitation of the resources and timeof study.
z= standard normal deviation corresponding to 95% confidence interval which is 1.96 p=proportional characteristics where no reasonable estimate is given. Therefore 50% was used.q=(1-p) which is (1-50%) =0.5.
$n= (1.96^2\times 0.5 \times 0.5)/ 0.1^2= 96.04$
Approximately 96
The target population was therefore 96 respondents but due to financial and time constraints,50 respondents were used.

Sampling technique.

A simple random sampling technique was used to select respondents from the population to avoid bias and its findings were generalized since each respondent was given an equal chance of being chosen.

Sampling procedure.

Each participant available was assigned a unique number. The numbers were written on a similar piece of paper, folded placed in a bowl, and thoroughly mixed. The participants were selected randomly without replacement until the required number of samples were obtained.

Data Collection Method.

Data collection was determined by the quantitative method. This included the use of questionnaires.

Data collection tool.

Questionnaire.

A well-organized semi-structured questionnaire with closed-ended questions written in the English language by the researcher and translated into local languages was used to collect data from the respondents after giving them clear instructions with the help of a research assistant.

Data collection procedure.

After approval of the research proposal; an introductory letter from the Kampala School of Health Sciences research committee to the study area was obtained. When permission was granted, the researcher and the trained research assistants administered the questionnaire to the respondents. The purpose of the study was explained to the participants and data collection was achieved by signing a consent form by pregnant mothers aged 18-45 years then questionnaires were administered to those who had been sampled. To some, the questionnaire had to be translated into their local language.

Study variables.

Dependent variable.

The dependent variable was the increased prevalence of vaginal candidiasis in pregnant mothers.

Independent variables.

The independent variable was factors contributing to the increased prevalence of vaginal candidiasis.

Quality control.

Pre-testing the questionnaire.

The questionnaires were pretested among 5 pregnant mothers at Bulumbi Health Centre III, to assess the appropriateness of the questionnaire. The necessary adjustments were made accordingly to evaluate the effectiveness of the study following the standard criteria.

Plot Study.

To ensure the quality and reliability of the results the following were done, A questionnaire was designed and pretested by doing a pilot study among pregnant mothers at the antenatal clinic to assess its strength and relevancy. Adjustments were made where necessary to improve its strength relevance, reliability, and validity.

Training of research assistants.

Two research assistants with knowledge of local languages; Jopadhola, Ateso, and English trained on the research method and study objectives before data collection.

Inclusion criteria.

All pregnant mothers aged 18 -45 years diagnosed with vaginal candidiasis and who had willingly given consent to the particulars and were attending the antenatal clinic in Tororo General Hospital were included.

Data analysis and presentation.

Data was analyzed manually by use of tally sheets and presented by a computer program (Microsoft Excel) in the frequency distribution tables, pie charts, and bar graphs with the support of narratives.

Ethical consideration.

After the approval of the proposal by the supervisor and the principal of the Kampala School of Health Sciences, a letter of introduction was obtained from the school. The letter was used to introduce the researcher to the medical superintendent of Tororo General Hospital, Tororo District who granted the researcher permission to carry out the study and forwarded the researcher to the hospital staff on duty at the antenatal clinic who guided the researcher and introduced her to the respondents. Those meeting the study criteria were explained the purpose of the study verbally and confidentiality of the response was assured, the researcher requested the respondents who were willing to participate in the study to first consent. Informed consent was sought from the respondents before participating in the study. All this was done to ensure that the research ethics were observed throughout the study.

STUDY FINDINGS.

Demographic data.

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Table 1: Shows the distribution of respondents according to their demographic data. (N=50)

Variables	Frequency (f)	Percentage (%)
Age of respondents		
18-26	13	26
27-35	27	54
36-45	10	20
Total	**50**	**100**
Religion		
Protestants	18	36
Muslims	6	12
Catholics	12	24
Others	14	28
Total	**50**	**100**
Education levels		
Never went to school	5	10
Primary	17	34
Secondary	24	48
Tertiary institution	4	8
Total	**50**	**100**
Occupation		
Employed	20	40
Unemployed	26	52
Self-employed	4	8
Total	**50**	**100**
Marital status		
Single	5	10
Married	32	64
Separated	9	18
Widowed	4	8
Total	**50**	**100**
Residence		
Town	43	86
Village	7	14
Total	**50**	**100**
Tribe		
Japadhola	23	46
Itesot	15	30
Others	12	24
Total	**50**	**100**
Gestation period		
1-3 months	8	16
4-6 months	15	30
7-9 months	27	54
Total	**50**	**100**

From table 1, more than half of the respondents (54%) were within the age bracket of 27-35 years of age whereas the minority (20%) were within the age bracket of 36-45 of age.

As regards religion, most of the respondents (36%) were protestants whereas the least (12%) were Muslims.

The study further revealed that most of the respondents (48%) had attained a secondary level of education whereas the least (8%) had attained a tertiary institution/university level of education.

Findings obtained from 50 respondents showed that more than half of the respondents (52%) were unemployed whereas the least (8%) were self-employed.

The study also revealed that the majority of the respondents (64%) were married whereas the minority (8%) were

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widowed.

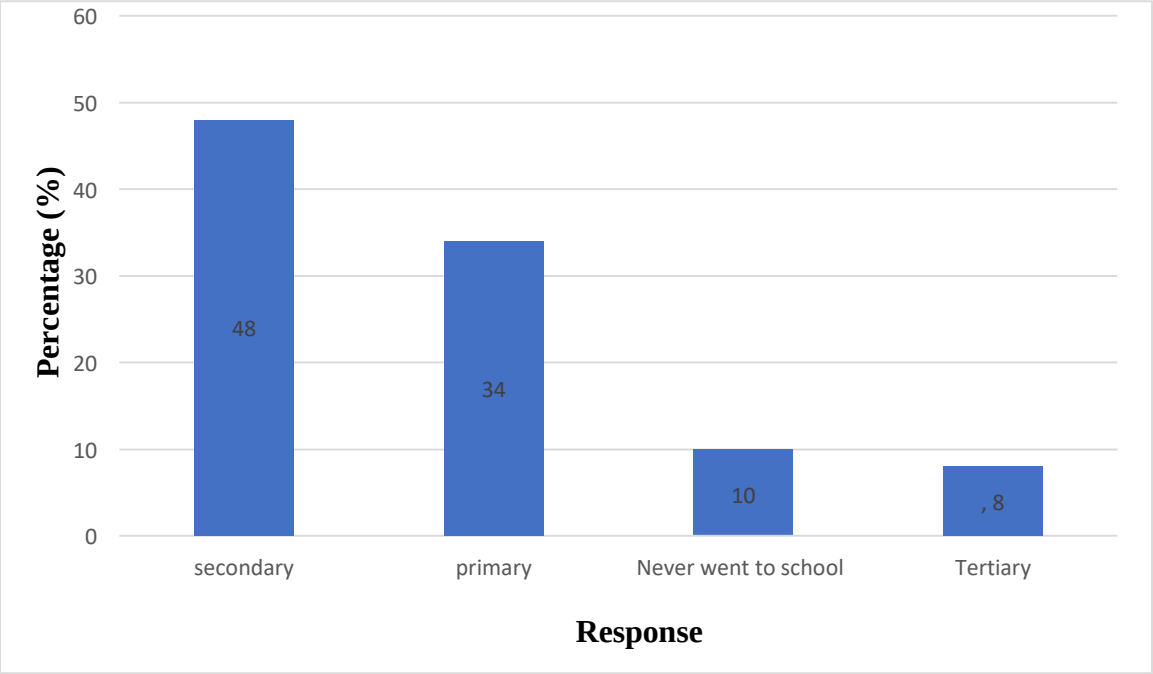
Based on the study findings, the majority of the respondents (86%) were urban residents whereas the minority (14%) were village residents.

Findings related to the tribe showed that most of the respondents (46%) were Jopadhola whereas the least (24%) were from tribes other than Jopadhola and Itesots.

The study discovered that most of the respondents (54%) were within the gestation age of 7-9 months whereas the least (16%) were within the gestational age of one to three months.

Determination of social demographic factors contributing to increased vaginal candidiasis in pregnant mothers.

Figure 1: Shows the distribution of respondents according to education levels.(N=50)



From figure 1, most (48%) of the respondents had attained a secondary level of educationwhereas the least (8%) had attained a tertiary /institution level of education.

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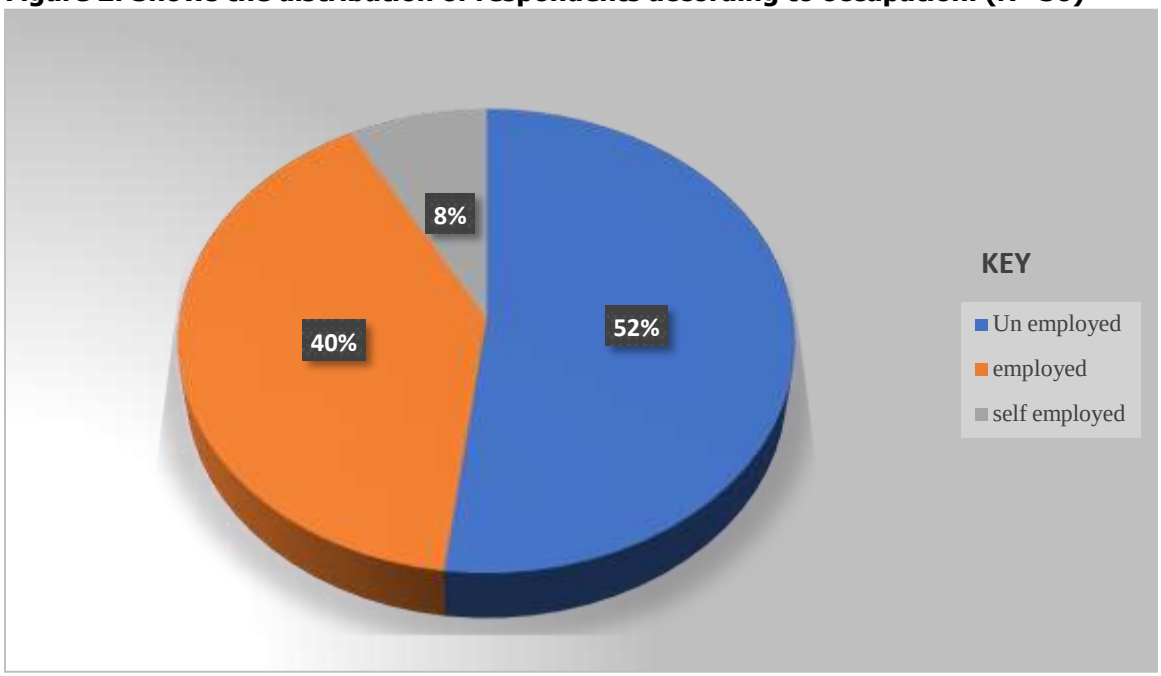
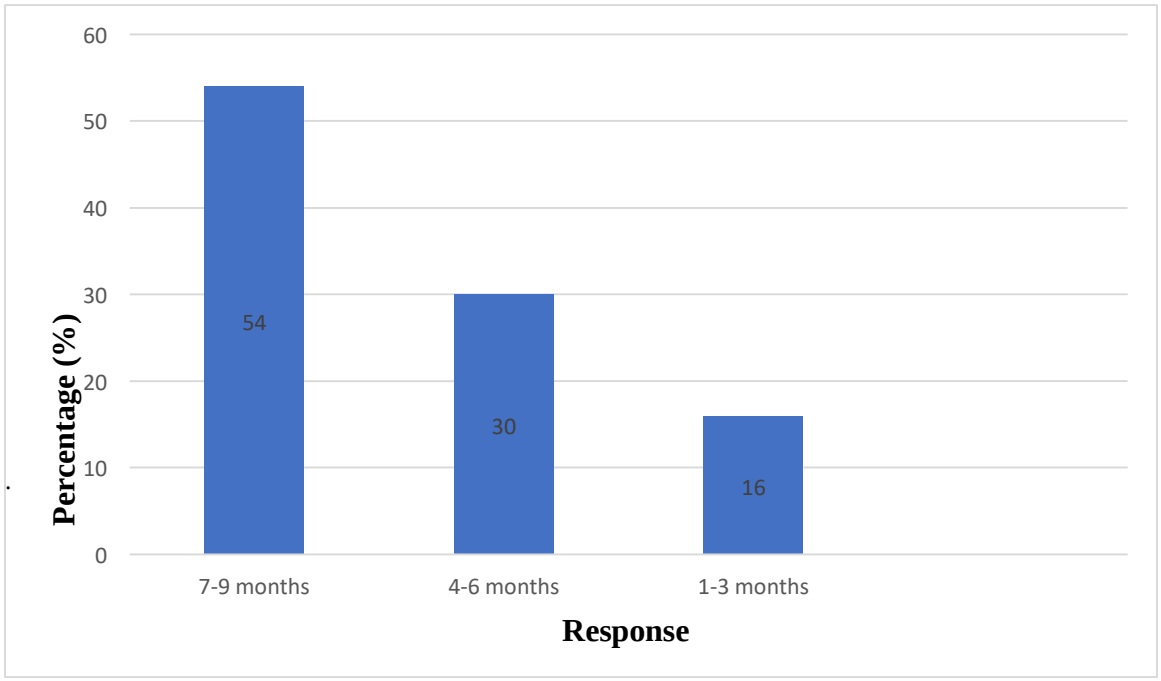
Figure 2: Shows the distribution of respondents according to occupation. (N=50)



From figure 2, more than half (52%) of the respondents were unemployed whereas theleast (8%) were self-employed.

Figure 3: Shows the distribution of the respondents according to gestation age. (N=50)



From figure 3, more than half (54%) of the respondents were within the gestation age of7-9 months whereas the least (16%) were within the gestation age of 1-3 months.

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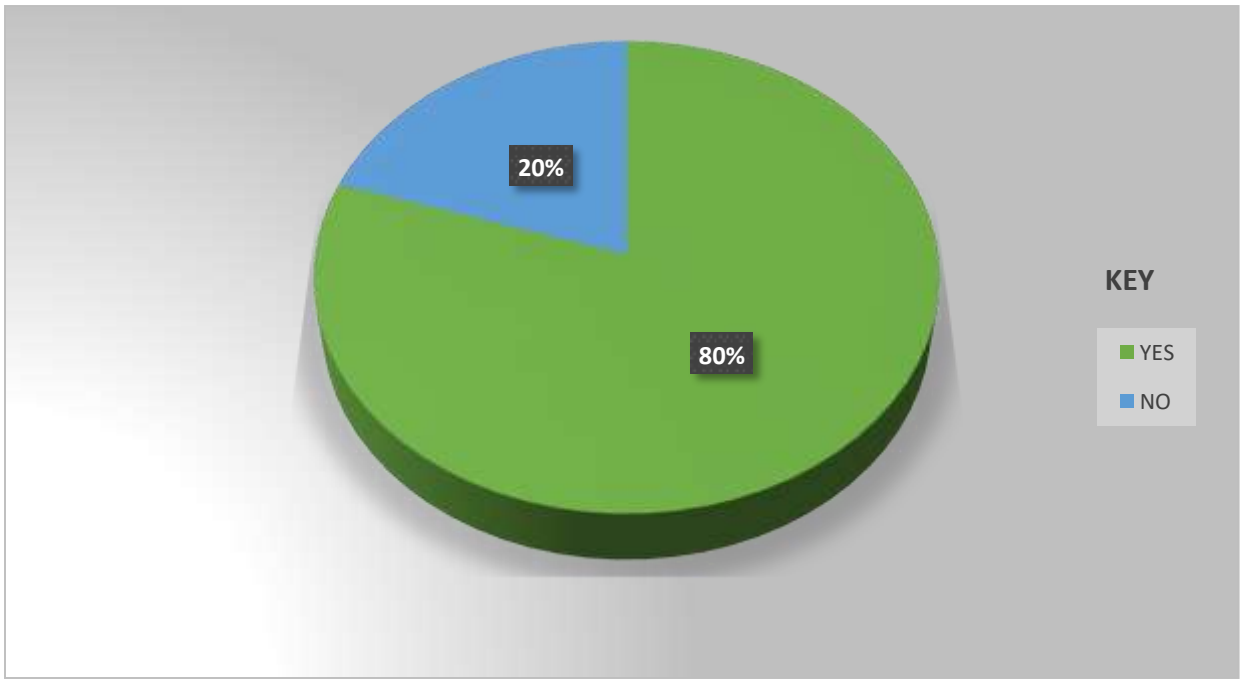
Figure 4: Shows the distribution of respondents according to whether they practice douching. N=50



From figure 4, the majority of the respondents (80%) were practicing douching whereas theleast (20%) were not practicing douching.

Table 2: Shows the distribution of the respondents according to how often they do douche in a day. (N=40)

Response	Frequency (f)	Percentage (%)
1-2times a day	10	25
3-4times a day	28	70
5-6times a day	2	5
TOTAL	40	100

From table 2, the majority of the respondents (70%) were douching 3-4 times a day whereasthe minority (5%) were douching 5-6 times a day.

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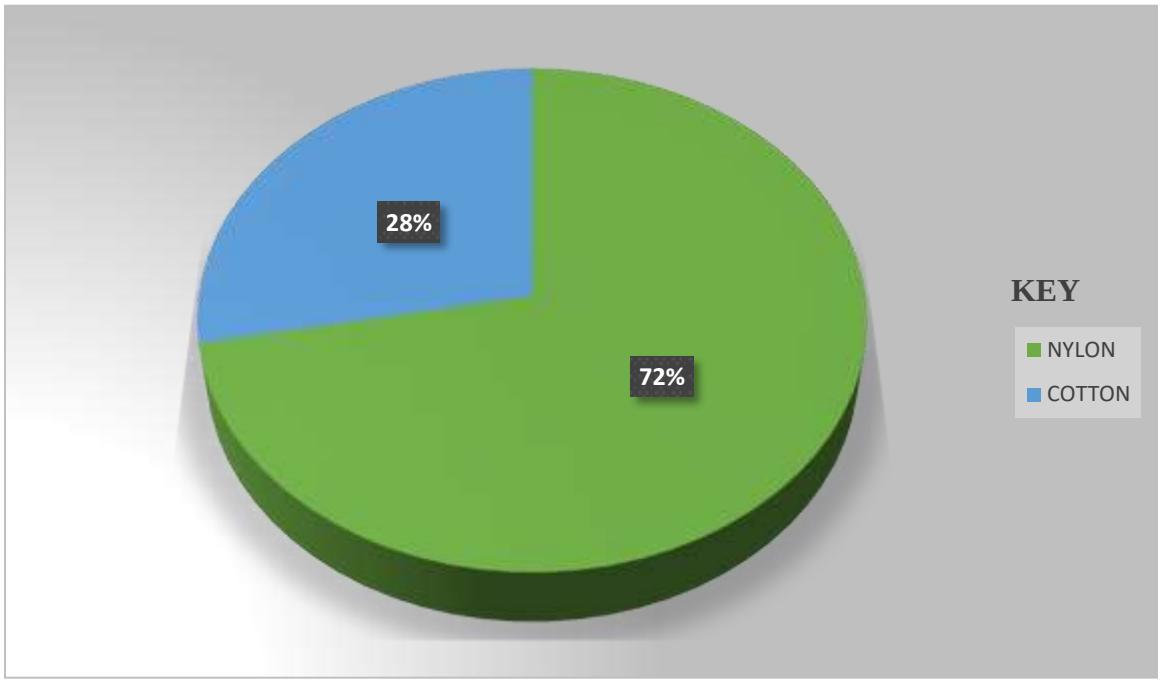
Table 3: Shows the distribution of the respondents according to what they use for douching. (N=40)

Response	Frequency(f)	Percentage (%)
Plain water	4	10
Laundry soap	28	70
Medicated soap	8	20
TOTAL	40	100

From table 3, the majority of the respondents (70%) were using laundry soap for douchingwhereas the minority (10%) were using plain water.

Figure 5: Shows the distribution of respondents according to which type of knickers they use. (N =50)



From figure 5, the majority of the respondents (72%) were using Nylon knickers whereas theminority (28%) were using cotton knickers.

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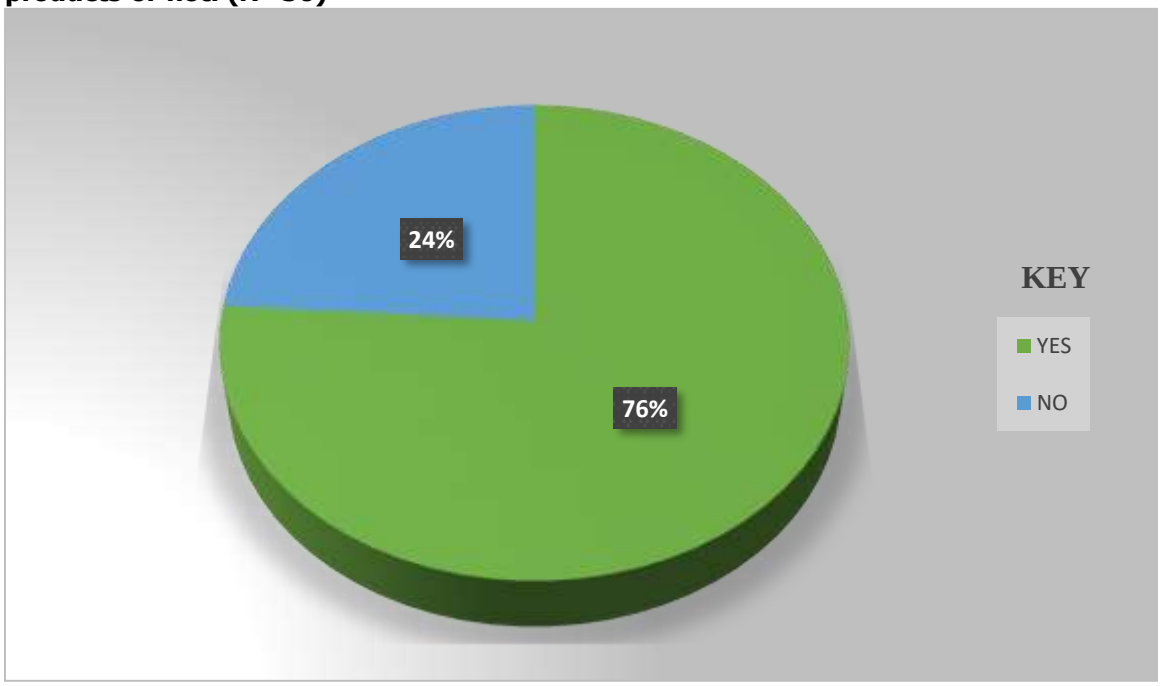
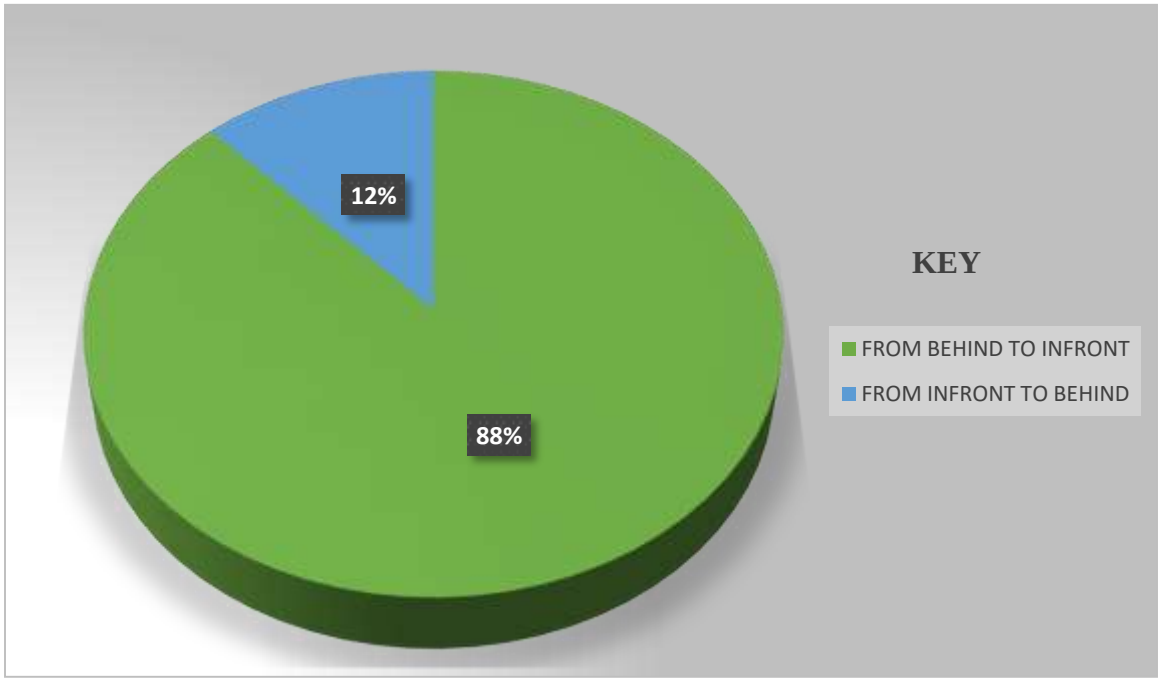
Figure 6: Shows the distribution of respondents according to whether they take milk andits products or not. (N=50)



From figure 6, the majority of the respondents (76%) were taking milk and its productswhereas the minority (24%) were not taking milk products.

Figure 7: Shows the distribution of the respondents according to direction of wiping the vagina after sex. (N=50)



From figure 7, the majority of the respondents (88%) were wiping their vaginas from behindto in front after sex whereas

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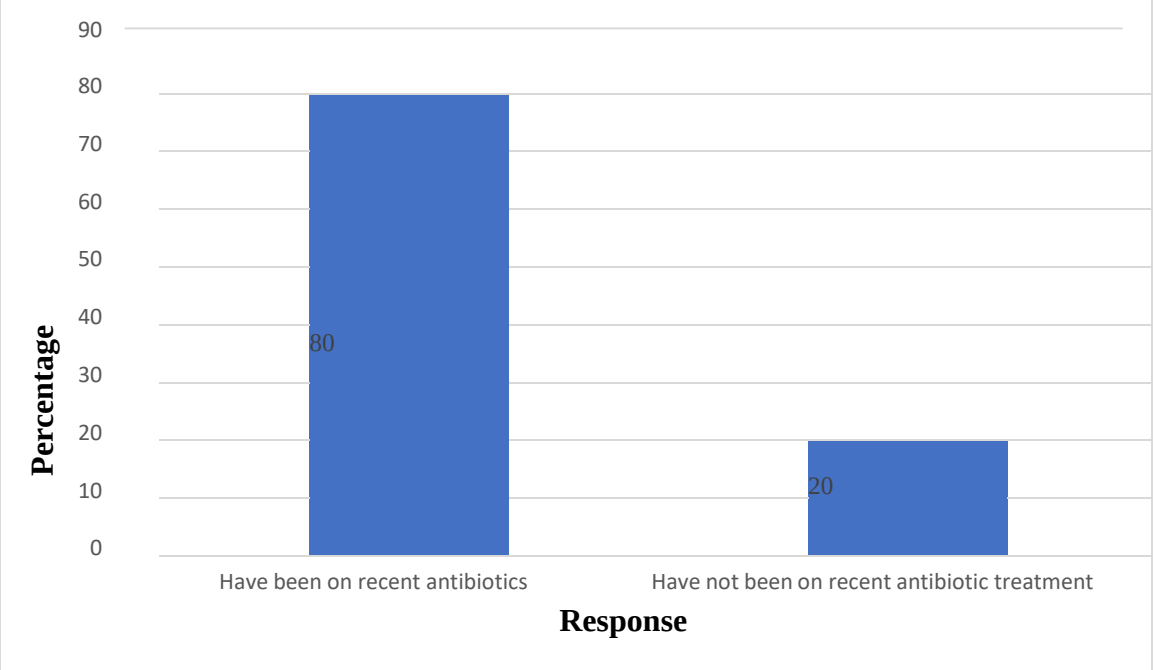
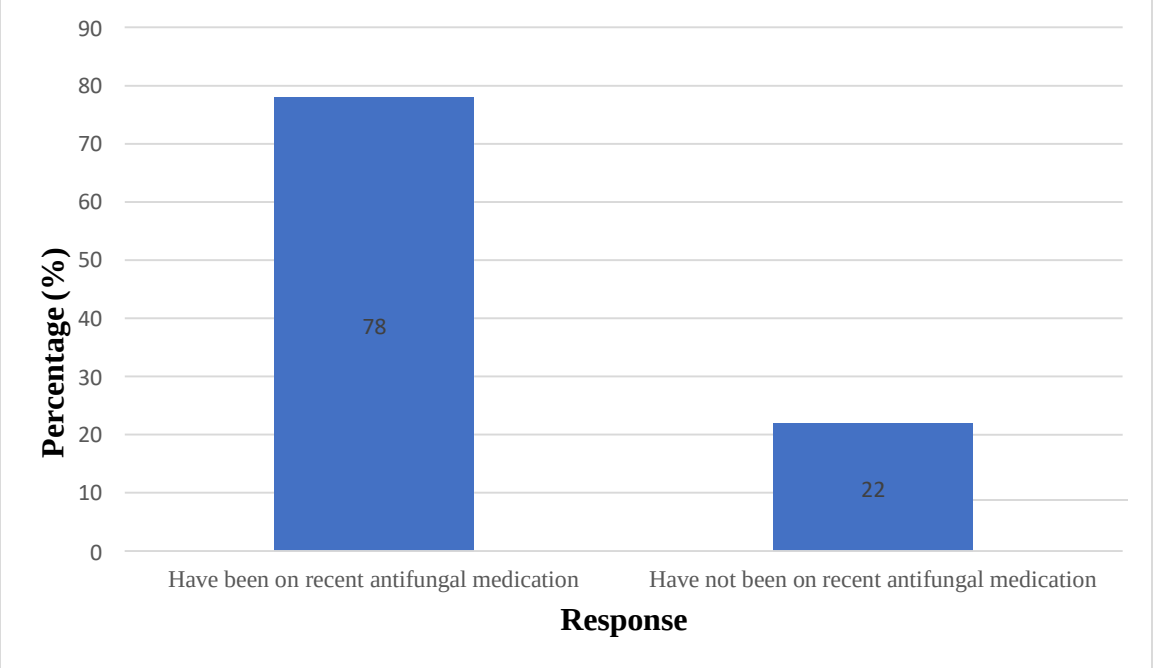
the minority (12%) were wiping their vaginas from in front to behind.

Figure 8: Shows the distribution of respondents according to whether they have been on recent antibiotic treatment.(N=50)



From figure 8, the majority of the respondents (80%) had been on the recent antibiotic treatment whereas the minority of the respondents (20%) had not been on recent antibiotic treatment.

Figure 9: Shows the distribution of respondents according to whether they had been on recent antifungal medication. (N=50)



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From figure 9, the majority of the respondents (78%) had been on recent antifungal treatment whereas the minority (22%) had not been on recent antifungal treatment.

Table 4: Shows the distribution of respondents according to how many sexual patterns they have. (N=50)

Response	Frequency(f)	Percentage (%)
1	8	16
2	30	60
3	7	14
4	3	6
Others	2	4
TOTAL	50	100

From table 4, the majority of the respondents (60%) had two sexual partners whereas the minority (4%) consisted of others who had specified the number of sexual partners they had.

DISCUSSION.

Social demographic factors contributing to increased prevalence of vaginal candidiasis in pregnant mothers.

The study showed that more than half of the respondents (54%) were within the age bracket of 27-35 years. The possible reasons might be the relation of these results to the fact that participants of this age group used drugs and contraceptives discriminatively to prevent pregnancy and are also highly sexually active. Another reason could be that the association of age group with the prevalence of vaginal candidiasis was affected by other variables.

The study revealed that most of the respondents (48%) had attained a secondary level of education. This finding indicates that there was probably a knowledge gap. This is in correlation with the findings of those who had been on recent antibiotic therapy and antifungal therapy in this same study population. This is not in line with Edem et al (2021), where results showed that women with an advanced level of education had the highest (36%) incidence of vvc while those with no formal education had the least (12.7%).

From the study findings, more than half (52%) of the respondents were unemployed. This finding indicates that probably the study population had a low socioeconomic status. This is probably because most of the respondents ended up in secondary education. The study finding was consistent with Mushi, M. F et al (2019), where results revealed that having low social economic status was also found to predict laboratory-confirmed vaginal candidiasis.
The study further revealed that the majority (64%) of the respondents were married. This finding indicates that the majority of the mothers had been in active sex practice and probably used contraceptives to have planned birth of children. This is probably because the majority of the mothers could have been married to polygamous husbands. This is in agreement with the findings of Maha Abdul-Aziz et al (2019), where results revealed that those who were married to polygamous husbands were at about three and a half times higher risk of being infected with vvc than those married to monogamous husbands.

From the study findings, the majority of the respondents (86%) were urban residents. This finding indicates a probable correlation between the place of residence and douching practices as douching agents are easy to get from urban areas. This is probably because the Tororo General Hospital is found in an urban setting in the municipality of Tororo district. The current results were in line with a study that was conducted in Eket by Edem et al (2021), where results showed that women residing in urban regions had a high incidence (68.4%) of vulvovaginal candidiasis.

The study results showed that most of the respondents (54%) were within the gestation age of 7- 9 months. This finding indicates that mothers in the third trimester of pregnancy are more prone to getting vaginal candidiasis. This is probably due to a higher rate of altered PH and sugar content in vaginal secretion and increased estrogen level which produces more glycogen in the vagina providing a good source of carbon level needed for

candida growth and germination compared to the other two trimesters of pregnancy. The study findings were consistent with Dong Z et al (2022), where results regarding the gestation period showed that during pregnancy especially in the last trimester, the risk can be as high as 50%.

Determination of human behavioral factors contributing to vaginal candidiasis in pregnant mothers.

The results of the study indicated that the majority of the respondents (80%) were practicing douching. These findings indicate that the majority of the pregnant mothers thought of douching agents as good products for cleaning the vagina, this is probably because the majority (86%) of the respondents were residing in the urban setting where accessibility to douching agents is easy.

Furthermore, the findings indicated that the majority (70%) of the respondents were douching 3-4 times a day. These findings indicate that the majority of the pregnant mothers had made this a habit. This is probably because more than half (52%) of the pregnant mothers were unemployed. These findings agree with Bruna Gonclaves et al (2016), where results showed that behavioral risk factors of VVC include glucocorticoid use, habits of hygiene, clothing, sexual practices, and douching.

The result of the study indicated that the majority of the respondents (70%) were using laundry soap for douching. These findings indicate that majority of the pregnant mothers could afford laundry soap compared to other expensive douching agents. This is probably because more than half (52%) of the respondents were unemployed. These findings agree with Bruna Gonclaves et al (2016), where results showed that behavioral risk factors of VVC include glucocorticoid use, habits of hygiene, clothing, sexual practices, and douching.

The results of the study indicated that the majority (72%) of the respondents used nylon type of knickers. These findings indicate that the majority of the mothers could not probably bear the expense of the cotton knickers. This is probably because more than half of the pregnant mothers (52%) were unemployed. These findings are not in line with Ekom Edem et al (2021), where results showed that the majority of the respondents (63%) used a mixture of fabrics.

The results of the study further indicated that the majority (76%) of the respondents were taking milk and its products. These findings indicate that the majority of the women were nutritionally mindful of their body nutrient requirements in pregnancy. This is probably because the majority (86%) were urban
residents, these findings agree with Livia Custodio Pereira et al (2021), where results showed that ingestion of milk and dairy product consumption was significantly higher compared to the control group ($p<0.0001$).

The results of the study indicated that the majority (88%) of the respondents were wiping themselves from behind to in front, these findings indicate that the majority of the pregnant mothers thought of vaginal wiping after sex as a normal practice but did not know the right direction of wiping the vagina. This is probably because they never had adequate knowledge of the direction of wiping their vagina. These findings are in agreement with Xianling Zeng et al (2018), where results showed that the majority of the respondents (62%) were wiping their vaginas from back to front.

The results of the study indicated that the majority (80%) of the respondents had been on recent antibiotic treatment. These findings indicate that the majority of the mothers were most likely practicing self-medication. This is probably because more than half (52%) of the pregnant mothers were unemployed and drug shops were more accessible places for them to get help. Another reason could be because a minority of the pregnant women had attained tertiary /university level of education thus a knowledge gap. These results agree with the findings of Ekom Edem et al (2021), where results showed that the majority (61%) had recently been on antibiotic medication.

The results of the study indicated that the majority (78%) of the respondents had been on recent antifungal medication. These findings indicate that the majority of pregnant women have recurrent vulvovaginal candidiasis. This is probably a consequence of high circulating estrogen in pregnancy which facilities the adherence of candida to vaginal mucosa since the study population of this research were the pregnant mothers. This agrees with the findings of Kaitlin Benedict et al (2022), were results showed that overall, (72%) of the women with vvc had reported a prescription of antifungal treatment use, (40%) reported OTC antifungal treatment use, and 16% reported both.

CONCLUSION.

Therefore, the researcher concluded that social demographic factors like low level of education, gestational age of 7-9 months, and human behavioral factors like practicing douching and being on recent antibiotic treatment are strong causes of the increased prevalence of vaginal candidiasis.

RECOMMENDATIONS.

The government through the Ministry of Health should educate pregnant mothers about vaginalcandidiasis, and proper vulvovaginal hygiene practices to reduce the prevalence of vaginal candidiasis due to human behavioral factors in pregnancy.
The government through the ministry of finance, planning, and economic development should lift the economic status of the public so that they can be able to acquire the obstetric

and gynecological health services they need.

The researcher recommends the hospital staff of Tororo General Hospital equip pregnant mothers with knowledge about candidiasis in pregnancy.

The study further recommends further studies on factors contributing to the increased prevalence of vaginal candidiasis over a wider geographical area to identify more solutions.

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ABBREVIATIONS AND ACRONYMS.

AIDS: Acquired Immune Deficiency Syndrome
HIV: Human Immunodeficiency Virus
MOH: Ministry of Health
OTC: Over-the-counter
Spp: Species
SVD: Spontaneous vaginal delivery
VVC: Vulvovaginal candidiasis

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