

A Descriptive Comparative Study of Vaginal Infection Control Practices between Rural and Urban Women

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Abstract

Background: Vaginal infection (VI) is a global health problem for women that requires specific control practices. **The aim:** The study aimed to compare women from rural and urban areas in Minia governorate in Egypt regarding their vaginal infection control practices. **Setting:** One public hospital in Minia city and three public health centers in three villages (Bani Ahmed, Tahnashi, and El-Bourjia) in Minia governorate in Egypt. **Design:** A descriptive comparative research design. **Sampling:** A convenient sample included 200 women [rural women = 100 and urban women = 100] were recruited in the current study. **Tools:** Two tools were used to collect data, Tool I: Interviewing questionnaire that includes 4 parts. Part 1: Sociodemographic characteristics, Part 2: Reproductive history, Part 3: Characteristics of vaginal discharge and Part 4: Personal hygiene habits. Tool II: Vaginal Infection Control Practices Scale includes 2 parts: Part 1: Vaginal infection control practices. Part 2: Practice during menstruation to avoid lower reproductive tract infection. **Results:** The percentage of urban women was significantly higher than the percentage of rural women in terms of maintaining high levels of personal hygiene habits. The most distinct difference was the number of showers taken per week. The percentage of urban women was significantly higher than the percentage of rural women in terms of their menstruation hygiene practices. The most distinct difference was the use of sanitary cotton pads. The percentage of urban women was significantly higher than the percentage of rural women in terms of their vaginal infection control practices. The most distinct difference was the use of odors to relieve vaginal odor. **Conclusion.** There are significant differences between rural and urban women in terms of personal hygiene habits, menstruation hygiene practices, and vaginal infection control practices, favoring urban women. **Recommendations:** It is recommended that promising educational training programs and /or intervention techniques be designed to develop women's awareness and knowledge of the importance of their overall hygiene habits, menstruation hygiene practices, and infection control practices for their sexual life and overall health.

Keywords: Vaginal infection control, Hygiene Habits, Menstruation, Rural women, Urban women.

Introduction

Vaginal infection (also known as vaginitis) is a general term that refers to inflammation of the vaginal wall due to imbalance between yeast and vaginal bacteria. It may also be caused by changing in the natural vaginal defensive mechanisms such as flora of the vagina, vaginal pH, and epithelial layer of the vagina (Reichman, 2019; Willems et al., 2020). Vaginal Infection is a common health problem for women. It is estimated that the percentage of women ages 14-49 suffering vaginal infection was 16.5% worldwide and 38% in the United States (Centers for disease control and prevention, 2022). It is also estimated that one million women worldwide suffer from genitourinary system infections

such as urinary tract infections and bacterial vaginosis, and that 75% of them suffer genital infections. The percentage of prevalence has been found to be 8%–75% for of bacterial vaginosis (BV), 2.2%–30% for vulvar vaginal candidiasis (VVC) and 0%–34% for trichomoniasis (VT) (Karadeniz, 2019).

In Egypt, Abbas et al. (2016) reported that of sample of 3894 patient from Upper Egypt, roughly 8.24% suffered vaginal infection. They found that the rate of occurrence was 60.8% for candidiasis, 75.2% for bacterial vaginosis and 64.1% for vulvovaginal candidiasis. Shawaky et al. (2022), using a sample of pregnant and non-pregnant women in Alexandria, found that 59.1% of women had bacterial vaginosis,

50.2% had vulvovaginal candidiasis (VVC), and 24% women had mixed infections. BV and *Candida* spp. were the most common mixed infection as they were detected in 21% of women.

Vaginitis can be either noninfectious or infectious. There are several factors that may be responsible for non-infectious vaginitis including underclothes sensitivity, products of womanly hygiene, vaginal douches, spermicidal and occupational exposure, tampons irritation, sanitary napkins, hypoestrogenism, intra uterine device (IUD), pessaries, and using chemical products. It may also be caused by insertion of foreign body into the vagina. Infectious vaginitis represents 90% of all vaginal infections in women of reproductive age (**Plisko et al., 2021**). There are several factors that may be responsible for non-infectious vaginitis including *Candida albicans* (*C. albicans*) such as yeast, Bacterial vaginosis (BV) caused by *Gardnerella vaginalis* (*G. vaginalis*) such as bacteria, and trichomonas vaginalis (*T. vaginalis*) such as protozoa (**Gonçalves et al., 2016**).

The main procedure to avoid complications of the vaginal infection is to maintain personal hygiene and apply some infection control practices including intravaginal practices that are frequently used to treat any disruptions of vaginal health. However, it is estimated that in 2018 nearly 70% of people worldwide used basic hygiene services. Furthermore, the world bank estimated that 500 million females worldwide do not have menstrual products and cannot access facilities for menstrual hygiene (**Kayser et al., 2019**). For example, the National Family Health Survey 2015-2016 in India estimated that 36% women only are using sanitary napkins (**Ram et al., 2020**).

Several researchers explained that the prevalence of these hygiene practices may be affected by medical factors such as access to medical care services and facilities as well as ethnicity, geographical location, and sociocultural factors (**Mieth et al., 2021**). For example, **Zhang et al. (2009)**, using a sample of married women in rural areas of China, found that reproductive tract infections was related to several factors including demographical factors (e.g., occupation and education), healthy factors (hygiene practices,

abortion, menstrual period, menstruation, number of deliveries) and sexual factors (the period between abortion and sexual intercourse afterwards, knowledge and the frequency of sexual intercourse per month). **Saeed et al. (2016)** using a sample of women in reproductive age in Erbil in Iraq, reported that bacterial infection was significantly observed in vaginal discharge of women of older age group, rural residence, and pregnant women. Similarly, **Abbas et al. (2016)** reported that of a sample of 3894 patient from Upper Egypt, 79.5% with abnormal vaginal discharge were living in rural and semi-urban areas.

Significance of the Study

Vaginal infection represents a common medical problem for women. The American College of Obstetricians and Gynecologists estimates that a third of women with vaginas will suffer vaginal infection during their life (**Plisko et al., 2021**). The Centers for disease control and prevention (**2022**) estimated the percentage of women ages 14-49 suffering vaginal infection was 16.5% worldwide and 38% in the United States. In Egypt, despite the shortage of formal statistics on vaginal infection, **Kamel et al. (2019)** reported that of 400 women had abnormal vaginal discharge, 40.9% had vulvovaginal candidiasis, 10.2% had bacterial vaginosis, 6% had trichomonas vaginalis, 17.1% had an intermediate stage between the normal vaginal flora and bacterial vaginosis and 2.1% women were suffering from co-infection.

Researchers have explained that if vaginal infection left untreated, it doesn't have long term damages such as infertility. However, vaginal infection may prevent or delay pregnancy because it can influence the pH of the vaginal secretions and consequently it can make the vagina unprepared for the sperm. Furthermore, vaginal infection is uncomfortable because it can result in discharge, itching, irritation, and/or burning. There is also a possibility that vaginal infection can pass to the husband through sexual contact (**de Paula Sousa et al., 2022; Safary et al., 2020**). The impact of vaginal infection may also be psychological. For example, **Rashad et al. (2022)**, using a sample of 105 women who suffered vaginal infection in Egypt, found

those women also suffered emotional well-being and quality of life problems.

Aim of the Study

This study aims at:

- 1.Examining differences between rural and urban women in personal hygiene habits.
- 2.Examining differences between rural and urban women in menstrual hygiene practices.
- 3.Examining differences between rural and urban women in vaginal infection control practices.

Hypotheses of the Study

- 1.There is significant differences between rural and urban women in personal hygiene habits at significance level of 0.05
- 2.There is significant differences between rural and urban women in menstrual hygiene practices at significance level of 0.05.
- 3.There is significant differences between rural and urban women in vaginal infection control practices at significance level of 0.05.

Materials and Method

Design: The present study uses a comparative research design as its research methodology. This research designs aims at comparing two or more groups with the goal of discovering something new about one or more of the groups being compared. Overall, the comparative study analyzes phenomena and put them together to find similarities and differences (Land & Harvey, 2021).

Settings: This study was conducted in Minia University Hospital of Women, Obstetrics and Children and three health centers in three villages in Minia governorate in Egypt: Health Center of Bani Ahmed, Health Center of Tahnashi, and Health Center of El Bourjia. The hospital and the three health centers were chosen as a convenient sample (Land & Harvey, 2021).

Subjects: The sample of the present study included 200 women divided among Minia University Hospital of Women, Obstetrics and Children (n = 100) and three health centers in three villages in Minia governorate in Egypt: Health Center of Bani Ahmed (n = 40), Health Center of Tahnashi (n = 20), and Health Center of El-Bourjia (n = 40). It is a non-probabilistic

convenient sample (Land & Harvey, 2021). Table 1 shows a summary demographics data of this sample. The researchers uses the Epi info program version 7.0 with the parameters of 5% variance, 95% confidence level, and 0.80 power to calculate the sample size for the present study (Carstensen., 2022).

Inclusion criteria: The convenient sample was recruited for the present study according to several including criteria such as women resident in Minia city or one of the three villages (Bani Ahmed, Tahnashi, and El-Bourjia), women having abnormal vaginal discharge, women with regular menstrual cycle assessed as 28 days \pm 3 days, and women who agree to participate in data collection.

Exclusion criteria: Women who have normal vaginal discharge, women with irregular menstrual cycle, women disagree to participate in data collection.

Tools: In order to collect the necessary data for the study, two tools were used:

Tool I: Interviewing questionnaire:

The researchers developed and presented this questionnaire in Arabic to participant women based on a thorough review of the related literature (Kamel et al., 2019; Karadeniz, 2019). It consisted of four parts:

Part 1: This part described the sociodemographic characteristics of participant women. It included 6 items: age (years), educational level, marital status, occupation, age of marriage (years), and duration of marriage (years).

Part 2: This part described the reproductive history of participant women. It included 9 items: age of menarche (years), regularity of menstruation, period of menstruation (days), number of pregnancies, number of deliveries, complications in previous pregnancy, use of contraceptive, type of contraceptive method, and duration of contraceptive use (years).

Part 3: This part described the characteristics of vaginal discharge of participant women. It includes 8 items: vaginal discharge, odor, color, viscosity, frequency, associated signs, onset, and treatment.

Part 4: This part described personal hygiene habits of participant women. It includes 3 items: number of showers taken per week,

material used for vaginal rinsing, and methods for hair removing.

Tool II: Vaginal Infection Control Practices Scale.

The researchers developed and presented this scale in Arabic to participant women based on a thorough review of the related literature (Kamel et al., 2019; Plisko et al., 2021; Zhang et al., 2009).

Part 1: This part described vaginal infection control practices. It included 11 items.

Part 2: This part described practice during menstruation to avoid lower reproductive tract infection. It included 7 items.

Scoring system: A binary scoring coding system was used for each item of the two parts of the Vaginal Infection Control Practices Scale where "Done" was scored 1 and "Not Done" was scored zero. The percentages were recorded for analysis purposes. The score for part I ranges from 0 to 11 and for part II from 0 to 7. The total score for the whole scale can range from 0 to 18.

To establish content validity of the data collection tools of the present study, three professors of nursing reviewed and examined the items of these tools. Those professors suggested some minor changes to the items of these tools and the researchers of the present study have made these changes. As for the reliability of the data collections tools, the Cronbach's alpha for the Vaginal Infection Control Practices Scale was .86 for Part I and .89 for Part II.

Operation of the study:

This study was executed as following:

Approval: Approval was obtained from authorities to collect data from Minia University Hospital of Women, Obstetrics and Children and three health centers in three villages in Minia governorate in Egypt: Health Center of Bani Ahmed, Health Center of Tahnashi, and Health Center of El-Bourjia.

Pilot study: A pilot study was conducted using a sample of 20 participant women (10% of the total sample). These 20 participants were not part of the main sample of the study. The pilot

study had four main aims: (1) assess the feasibility of the study and the applicability of the data collection tools, (b) identify any potential problems that may hinder data collection, (3) identify time needed for data collection, (4) identify the clarity of the instruction given to participant women. The pilot study has suggested minor changes in the data collection tools concerning the paraphrasing of some items for clarity purposes.

Ethical considerations: Ethical approval was obtained from Minia University, Faculty of Nursing Research Ethics Committee. The purpose of the study was explained to participant women at the beginning of each session of data collection and oral consents were obtained from participant women. Participant women were assured that participation in the study was voluntary and that the collected data would be kept confidential and would be used for research purposes only.

Field work: Data collection continued for six weeks. Each week has three days of data collection; one day at Minia University Hospital of Women, Obstetrics and Children and 2 days in three villages health centers: Health Center of Bani Ahmed, Health Center of Tahnashi, and Health Center of El-Bourjia. Each day has two sessions; each run for one hour. At the beginning of each session, the researchers welcomed participant women, communicated effectively and explained the purposes of the study for each participant. The researchers read and explained the items for each woman when needed. Illiterate participant women received help from the researchers to respond to the items. The average time for filling the data collection tools was 45 minutes.

Statistical design: After data collection, the researchers numbered the data collection sheets and entered data to the SPSS 25.0. The data were preliminarily explored using statistical tables and figures. The appropriate statistical analyses procedures were used to analyze the collected data. This includes calculation of means, standard deviations, percentages, and Chi-Square Test (X^2).

Results

Table (1): Table 1 demonstrated that for rural women, the mean age was 28.46 +1.83, 46% of women were illiterate, and 74% were housewives. A total of 63% were married, 65% married at age 20-25 years old, and 51% have from 6-10 years of marriage. For urban women, the mean age was 32.13+2.40, 45% of women had university education, and 83% were working. A total of 55% were married, 45% married at age 26-30 years old, and 64% have from 6-10 years of marriage.

Table (2): shows that for rural women, 56% had menarche at 10-14 years, 68% suffered irregular menstruation, and 79% used IUD. For urban women, 62% had menarche at 10-14 years, 64% suffered irregular menstruation, and 68% used IUD.

Table (3): shows that for rural women, 65% of women suffer vaginal discharge, 59% of them had bad odor vaginal discharge, and 70% had intermittent vaginal discharge. A total of 66% of rural women suffered vaginal discharge for more than one month and 80% received treatment. For urban women, 57% of women suffer vaginal discharge, 53% of them had bad odor vaginal discharge, and 64% had intermittent vaginal discharge. A total of 70% of urban women suffered vaginal discharge for more than one month and 88% received treatment.

Table (4): shows that for rural areas, 62% took 1-3 showers per week, 60% used water for virginal rinsing, and 52% used sweet to remove hair. For urban women, 80% took 1-3 showers per week, 70% used water for virginal rinsing, and 62% used sweet to remove hair.

Table (5): shows that for urban women 75% wear cotton clothes, 83% wear personal underwear only, 86% sanitize their underwear, 92% change their underwear regularly, 95% using sanitary pads. A total of 67% of women wash their hands before toilet; however, 98% wash their hands after toilet. A total of 90% of women apply vaginal douches, 93% perineal care during toilet and 80% use odors to relieve vaginal odor. For urban women, 52% wear cotton clothes, 70% wear personal underwear only, 66% sanitize their underwear, 72% change their underwear regularly, 84% using

sanitary pads. A total of 52% of women wash their hands before toilet; however, 87% wash their hands after toilet. A total of 75% of women apply vaginal douches, 81% perineal care during toilet and 54% use odors to relieve vaginal odor. Figure 1 shows total vaginal infection control practices among women from rural and urban areas.

Table (6): shows that for rural women, 63% take a bath during menstruation, 67% stood up during a bath, 65% use antiseptic to care for perineal, and 75% disinfect or clean toilet before and after use. A total of 40% of rural women use sanitary cotton pads, 70% change pads for every bath, and 82% wore new pad every 4 hours in 1st day then every 8 hours. For urban women, 84% take a bath during menstruation, 75% stood up during bath, 85% use antiseptic to care for perineal, and 93% disinfect or clean toilet before and after use. A total of 86% of urban women use sanitary cotton pads, 87% change pads for every bath, and 85% wore new pad every 4 hours in 1st day then every 8 hours. Figure 2 shows total practice during menstruation to avoid lower reproductive tract infection between rural and urban women.

Table (1): Sociodemographic characteristics of women in rural (n=100) and urban (n = 100) areas

Demographic characteristics	Rural		Urban		X ²	p-value
	No.	%	No.	%		
Age (years)						
25-	28	%28	22	%22	2.63	<i>p</i> > 0.05
30-	33	%33	44	%44		
35-	39	%39	34	%34		
Mean±SD	28.46 ±1.83		32.13±2.40			
Educational level						
Illiterate	46	%46	10	%10	39.92	<i>p</i> < .001
Can read and write	28	%28	20	%20		
Secondary education	16	%16	25	%25		
University level	10	%10	45	%45		
Marital status						
Single	22	%22	32	%32	3.72	<i>p</i> > 0.05
Married	63	%63	55	%55		
Widow	10	%10	6	%6		
Divorce	5	%5	7	%7		
Occupation						
Working	26	%26	83	%83	65.51	<i>p</i> < 0.001
Housewife	74	%74	17	%17		
Age of marriage (years)						
20-25	65	%65	30	%30	25.01	<i>p</i> < .001
26-30	20	%20	45	%45		
30-	15	%15	25	%25		
Mean±SD	22.33 ± 1.36		24.55 ±1.98			
Period of marriage (years)						
1-5	32	%32	15	%15	8.03	<i>p</i> < .001
6-10	51	%51	64	%64		
10-	17	%17	21	%21		
Mean±SD	7.41 ± 1.14		9.45 ± 1.58			

Table (2): Reproductive history of women in rural (n=100) and urban (n = 100) areas

Reproductive history	Rural		Urban		X ²	p-value
	No.	%	No.	%		
Age of menarche(years)						
10-14	56	%56	62	%62	1.04	<i>p</i> > 0.05
15-17	46	%46	38	%38		
Mean±SD	14.36±1.66					
Regularity of menstruation						
Irregular	68	%68	64	%64	0.36	<i>p</i> > 0.05
Regular	32	%32	36	%36		
Period of menstruation (days)						
2-5	25	%25	30	%30	0.63	<i>p</i> > 0.05
6-10	75	%75	70	%70		
No of pregnancies						
1-3	72	%72	68	%68	0.38	<i>p</i> > 0.05
4-7	28	%28	32	%32		
No of deliveries						
1-3	72	%72	68	%68	0.38	<i>p</i> > 0.05
4-7	28	%28	32	%32		
Complications in previous pregnancy						
Yes	19	%19	26	%26	0.38	<i>p</i> > 0.05
No	81	%81	74	%74		
Use of contraceptive						
Yes	85	%85	79	%79	0.38	<i>p</i> > 0.05
No	15	%15	21	%21		
Contraceptive method						
COCP	11	%11	15	%15	3.25	<i>p</i> > 0.05
IUD	79	%79	68	%68		
Injectable	10	%10	17	%17		
Period of contraceptive use (years)						
1-5	63	%63	57	%57	0.38	<i>p</i> > 0.05
6-10	37	%37	43	%43		

Table (3): Distribution women in rural (n= 100) and urban (n= 100) areas regarding characteristics of vaginal discharge

	Rural		Urban		X ²	p-value
	No.	%	No.	%		
Vaginal discharge						
Yes	65	%65	57	%57	1.34	<i>p</i> > 0.05
No	35	%35	43	%43		
Odor						
Bad odor	59	%59	53	%53	0.73	<i>p</i> > 0.05
No odor	41	%41	47	%47		
Color						
White	71	%71	65	%65	0.83	<i>p</i> > 0.05
Yellow	29	%29	35	%35		
Viscosity						
Liquid	62	%62	67	%67	0.54	<i>p</i> > 0.05
Viscous	38	%38	33	%33		
Frequency						
Continuous	30	%30	36	%36	0.81	<i>p</i> > 0.05
Intermittent	70	%70	64	%64		
Associated signs						
Purities	56	%56	52	%52	0.59	<i>p</i> > 0.05
Abdominal pain	28	%28	33	%33		
Redness	16	16%	15	%15		
Onset						
less than 1 month	34	%34	30	%30	0.37	<i>p</i> > 0.05
More than 1 month	66	%66	70	%70		
Treatment						
Yes	80	%80	88	%88	2.3	<i>p</i> > 0.05
No	20	%20	12	%12		

Table (4): Distribution of women in rural (n= 100) and urban (n= 100) areas regarding personal hygiene habits

	Rural		Urban		X ²	p-value
	No.	%	No.	%		
No of Shower per week						
1-3	62	%62	80	%80	7.86	<i>p</i> < .001
3-< 5	38	%38	20	%20		
Material for vaginal rinsing						
Water	60	%60	70	%70	14.10	<i>p</i> < .001
Water soap	10	25%	20	%20		
Others described by doctor	30	%15	10	%10		
Hair removing (perineum & pubic)						
Sweet	52	%52	62	%62	8.93	<i>p</i> < .001
Shaving	33	%33	35	%35		
Special machine	15	%15	3	%3		

Table (5): A comparison between women from rural (n=100) and urban (n =100) areas regarding vaginal infection control practices

Item		Rural		Urban		X ²	p-value
		No	%	No	%		
Wear cotton clothes	Done	52	52%	75	75%	11.4	<i>p</i> < .001
	Not Done	48	48%	25	25%	1	
Boil underwear	Done	57	57%	60	60%	0.18	<i>p</i> > 0.05
	Not Done	43	43%	40	40%		
Wear personal underwear only	Done	70	70%	83	83%	4.70	<i>p</i> < .001
	Not Done	30	30%	17	17%		
Sanitize underwear	Done	66	66%	86	86%	10.9	<i>p</i> < .001
	Not Done	34	34%	14	14%		
Change underwear regularly	Done	72	72%	92	92%	13.5	<i>p</i> < .001
	Not Done	28	28%	8	8%		
Using sanitary pads	Done	84	84%	95	95%	6.44	<i>p</i> < .001
	Not Done	16	16%	5	5%		
Wash hand before toilet	Done	52	52%	67	67%	4.66	<i>p</i> < .001
	Not Done	48	48%	33	33%		
Wash hand after toilet	Done	87	87%	98	98%	8.72	<i>p</i> < .001
	Not Done	13	13%	2	2%		
Vaginal douching	Done	75	75%	90	90%	7.79	<i>p</i> < .001
	Not Done	25	25%	10	10%		
Care of the perineum during toilet	Done	81	81%	93	93%	3.26	<i>p</i> < .001
	Not Done	19	19%	7	7%		
Use odors to relieve vaginal odor	Done	54	54%	85	80%	22.6	<i>p</i> < .001
	Not Done	46	46%	15	15%		

Table (6): A comparison between women from rural (n=100) and urban (n =100) areas regarding their practice during menstruation to avoid lower reproductive tract infection

Item		Rural		Urban		X ²	p-value
		No	%	No	%		
Taking shower during menstruation	Done	63	63%	84	84%	11.32	<i>p</i> < .001
	Not Done	37	37%	16	16%		
Stand up during taking a bath	Done	67	67%	75	75%	1.55	<i>p</i> > 0.05
	Not Done	33	33%	25	25%		
Use antiseptic to care for perineal	Done	65	65%	85	85%	10.66	<i>p</i> < .001
	Not Done	35	35%	15	15%		
Disinfect or clean toilet before and after use	Done	75	75%	93	93%	12.05	<i>p</i> < .001
	Not Done	25	25%	7	7%		
Use sanitary cotton pads	Done	40	40%	86	86%	45.38	<i>p</i> < .001
	Not Done	60	60%	14	14%		
Change pads for every bath	Done	70	70%	87	87%	8.56	<i>p</i> < .001
	Not Done	30	30%	13	13%		
Wear new pad every 4 hours in 1st day then every 8 hours	Done	82	82%	85	85%	0.32	<i>p</i> > 0.05
	Not Done	18	18%	15	15%		

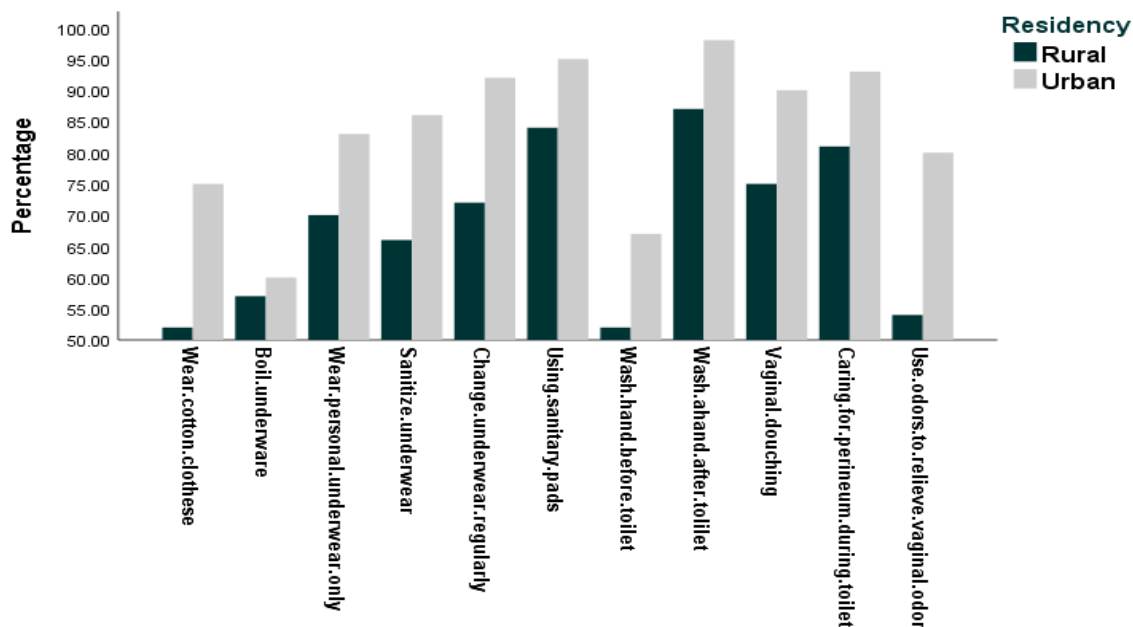


Figure 1. Total vaginal infection control practices between rural and urban women

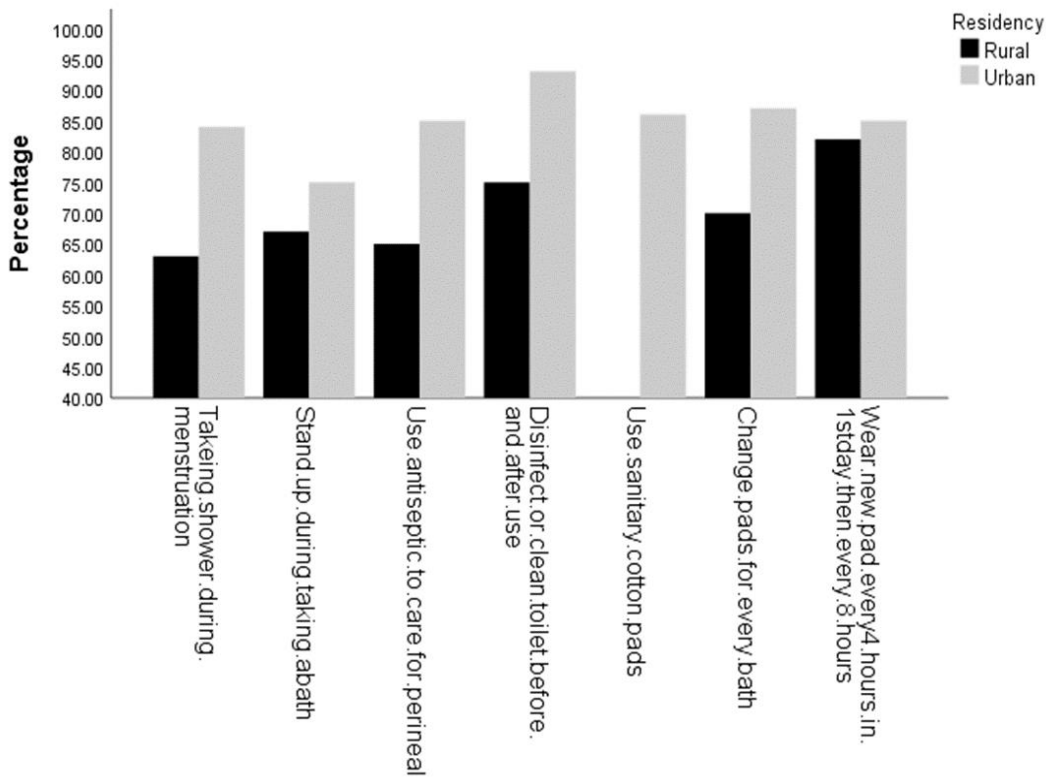


Figure 2. Total practice during menstruation to avoid lower reproductive tract infection between rural and urban women.

Discussion

Vaginitis refers to some changes in the chemical balance of vagina. Women can go through several vaginal cleaning practices to maintain their hygiene and sexual health. If left untreated, this vaginitis could damage women's reproductive organs, cause them many health problems, or pass problems to their husbands (Safary et al., 2020). It is expected that the difference in lifestyle, sociocultural background, and availability of health care services between urban and rural areas can contribute to differences between women from these areas in terms of hygiene and sexual health practices (Mieth et al., 2021). The aim of this study was to compare women from rural and urban areas in Minia in Egypt regarding, general hygiene habits, menstrual hygiene practices, and vaginal infection control practices.

The first finding of the present study is that the percentage of urban women was significantly higher than the percentage of rural women in terms of maintaining high levels of general hygiene habits. These habits include taking 1 to 3 showers a week, using material for vaginal rinsing such as water and water soap, and removing hair from perineum and pubic. The most distinct difference between rural and urban women was the number of showers taken per week. It was 62% for rural women and 80% for urban women.

Consistent with these findings, Anpalagam et al. (2020) examined personal hygiene habits in a sample of 122 rural households in Malaysia. They reported that 34% take a shower at least twice a week, 41% constantly remove hair from perineum and pubic, and 33% use water and water soap for vaginal rinsing. Deo (2022), using a sample of 145 rural women and 147 urban women aged between 22-46 in China, reported that the percentage of rural women was significantly lower than the percentage of urban women in terms of taking 1-3 showers a week (rural = 22% and urban = 37%), removing hair from perineum and pubic (rural = 33% and urban = 52%), and using water and soap for vaginal rinsing (rural = 41% and urban= 66%).

The second finding of the present study is that the percentage of urban women was significantly higher than the percentage of

rural women in terms of their vaginal infection control practices. These practices include wearing of cotton clothes, wearing personal underwear only, sanitizing underwear, changing underwear regularly, using sanitary pads, hand washing before toilet, hand washing after toilet, vagina douching, perineal care during toilet, and use odors to relieve vaginal odor. The most distinct difference between rural and urban women was to use odors to relieve vaginal odor. It was 54% for rural women and 85% for urban women. However, there weren't significant differences between rural and urban women regarding boil underwear as a vaginal infection control practice.

Consistent with these findings, Shwoif (2018) compared two samples of 77 urban women and 80 rural women in Kazakhstan in terms of their controlling practices of yeast infection. He reported that the percentage of rural women was significantly less than the percentage of urban women in terms of use personal underwear only, sanitize underwear, change underwear regularly, and use odors to relieve vaginal odor. However, there wasn't significant differences between rural and urban women in terms of use of sanitary cotton pads or perineal care during toilet.

Lahme et al. (2018) found that in a sample of 120 rural women in Zambia, only 34% wash their hand before toilet, 65% wash their hand after toilet, 39% change sanitary pads regularly, and 45% do vagina douching. Arumugam et al. (2014) used the Menstrual Hygiene Index with sample of 212 rural and 206 urban females aged 15-44 years in India. They found significant differences between rural (35%) and urban (63.3%) women in terms of the prevalence of menstrual hygienic practices.

The third finding of the present study is that the percentage of urban women was significantly higher than the percentage of rural women in terms of taking a bath during menstruation, using antiseptic to care for perineal, disinfecting or cleaning toilet before and after use, using sanitary cotton pads, and changing pads for every bath. The most distinct difference between rural and urban women was to sanitary cotton pads. It was 40% for rural women and 86% for urban women. However, there weren't significant differences between

rural and urban women regarding standing up during a bath and wearing new pad every 4 hours in 1st day then every 8 hours. Consistent with these findings, **Rochan (2021)**, using a sample of 145 rural women and 140 urban women in Kenya, found that for rural women, 22% use home-made pads and 24% change their underwear regularly. In contrast, for urban women, 78% use sanitary cotton pads and 84% change their underwear regularly.

The reported differences between rural and urban women in the present study in terms of personal hygiene habits, menstrual hygiene habits, vaginal infection control practices can be interpreted within the framework of the difference in lifestyle and sociocultural background as well as the availability health care services between urban and rural areas in Egypt.

One possible reason for the findings of the present study is the difference in sociocultural and educational levels among rural and urban women. The demographics of the sample of the present study showed that most urban women had secondary (25%) or university (45%) education, whereas most of rural women were illiterate (46%) or just know how to read and write (28%). The demand-for-health-model (**Grossman, 2017**) proposes that higher levels of education can affect people's health and healthy behavior directly by leading to more effective use of health inputs by enhancing people's abilities to make decisions (productive efficiency) and improve people's abilities to attain and process health information (allocative efficiency) and thus higher-educated people are more likely to choose healthier lifestyle than less-educated people. High educational level may also affect people's hygiene habits indirectly by offering people better employment opportunities and thus higher wages which in turn can help people gain access to other more effective health inputs (**Grossman, 2022**).

Another possible reason for the findings of the present study is that there may be some logistic barriers for making progress in personal hygiene in rural areas. This means that there may be some factors in rural areas which may not facilitate women's practice of personal hygiene compared to urban areas. For example, a high number of households in rural areas in Egypt are still not supplied with water system.

Access to clean water and consequently good hygiene practices not only keeps rural women thriving, but also gives them a healthier life. The UNICEF estimated that 7.3 million people in Egypt do not have access to safe water, of which 5.8 million live in rural areas and that 12% of rural people live in dwellings not connected to the water system. In a cross-sectional study, **Phaswana-Mafuya and Shukla (2005)** emphasized the relationship between the availability of water and electricity facilities and personal hygiene practice. He found that of sample of 700 villagers (47.7% were females), 90% agreed that physical factors (e.g., access to water supply resources) and 89% agreed that educational factors (e.g., hygiene education) were facilitators of safe hygiene practices.

A third possible reason for the findings of the present study is the difference in the availability, accessibility, and efficiency of health care services between rural and urban areas in Minia governorate in Egypt. It is expected that personal hygiene habits, menstrual hygiene practices, and vaginal infection control practices would be improved if women had access to continuous high-quality health care services. These services can improve women's ability to take correct decisions concerning their sexual life and overall health and enrich their accessibility and processing of health care information. The Egypt Demographic Health Survey (EDHS) (**El-Zanaty & Way, 2009**), showed that for women's health and maternal health care in rural areas, 19.1% of women used the public health sector and 54.5% used the private sector and 26.4% had no medical care. According to **Galal and Al-Gamal (2014)**, there significant differences in the number health care providers and the quality of health care services in rural and urban areas in Egypt favoring urban areas. They found that over 60% of urban families and 78.8% of rural families in their sample had health complaints. A total of 49.7% of urban families and 23% of rural families visited outpatient clinics in public hospitals. However, 25.7% of urban families and 42.8% of rural families visited private clinic. They also reported that rural families were found to seek health care advice from non-professional providers such as pharmacies to save money.

Conclusion

The findings of the present study showed distinct differences between rural and urban women in terms of personal hygiene habits, menstrual hygiene practice, and vaginal infection control practices. These differences can be interpreted within the framework of differences in lifestyle, sociocultural background, level of education, and availability of health care services between urban and rural areas. Overall, these findings showed that urban women are more likely than rural women to be aware and knowledgeable of the importance of personal hygiene habits, vaginal infection control practices, and menstrual hygiene practices for their sexual life and overall health. It seems that urban women are more capable than rural women of putting their awareness and knowledge into real life health practices.

Recommendations

In the light of the findings of the present study, the following recommendations can be put forward:

1. Design and develop educational and training programs to increase women's awareness and knowledge of vaginal infection control practices.
2. Increase the number of medical convoys to rural areas to spread culture of personal hygiene.
3. Provide rural areas with stable and safe access to electricity and water not only to keep women thriving, but also to give them a healthier life.
4. Expand the development of health units in rural areas to improve women's accessibility to efficient health care services and consultations.
5. Show more program on women's health through mass media to increase women's awareness of best health practices during menstruation.

Implications for nursing practices

The findings of the present study have the following implications for nursing practices:

1. The nurse should apply patient-centered care by providing women suffering from vaginal infection control with health care services that

respect and meet patients' needs and preferences.

2. The nurse can decide the level of health care guidance needed by women during their vaginal infection on case by case basis.
3. The nurse can play a vital role in diagnosing, treating, and preventing of vaginal infection. For example, the nurse can perform assessment of women for common signs and symptoms, help women understand their bodies, inform women about important symptoms they may experience and the reasons for these symptoms, and clarify to women the difference between normal and abnormal discharges.
4. The nurse can identify women at risk for vaginal infection and warn them against risk factors and unapproved treatment methods of vaginal infection.
5. The nurse can provide health education to women regarding general and menstrual hygiene and habits to avoid vaginal infection.
6. The nurse can facilitate access of women to medical services particularly primary care service, offer them support and contribute towards the relief of their physical and emotional pain that is cause by vaginal infection.

References

- Abbas, A. M., Shaaban, O. M., Badran, S. M., Shaltout, A. S., Nasr, A., & Abdullah, S. A. (2016). Risk factors and health hazards of vaginal infections in upper Egypt: A cross-sectional study. *Thai Journal of Obstetrics and Gynecology*, 3, 50-56.
- Anpalagam, T., Ai Ying, Y., Ravikumar, D., & Rai, S. B. (2020). Personal hygiene and sanitation in a rural community in Kedah. *International Journal of Community Medicine and Public Health*, 7(4), 1263-1267
- Arumugam, B., Nagalingam, S., Varman, P. M., Ravi, P., & Ganesan, R. (2014). Menstrual hygiene practices: Is it practically impractical? *International Journal of Medicine and Public Health*, 4(4)-90-105.
- Carstensen, B., Plummer M., Laara, E., Hills, M. (2022). Epi: A package for statistical analysis in epidemiology. R package version 2.47,

- <https://CRAN.Rproject.org/package=Epi>
- Centers for disease control and prevention (2022, November 17). *Bacterial vaginosis (BV) statistics*. Centers for disease control and prevention. <https://www.cdc.gov/std/bv/stats.htm>
- de Paula Sousa, E. A., de Souza, A. C., de Lira Silva, M., & de Oliveira Braga, T. R. (2022). Nursing conduct in the treatment of vulvovaginitis in the gestational period. *Health and Society*, 2(03), 104-120.
- Deo, J. I. (2022). Personal hygiene in Chinese society during Covid-19. *Journal of Applied Nursing*, 5(2), 85-96.
- El-Zanaty, F. and Way, A. (2009) *Egypt Demographic and Health Survey 2008. Demographic and Health Surveys*, Ministry of Health, Cairo.
- Galal, S. B., & Al-Gamal, N. (2014). Health problems and the health care provider choices: A comparative study of urban and rural households in Egypt. *Journal of epidemiology and Global Health*, 4(2), 141-149.
- Gonçalves, B., Ferreira, C., Alves, C. T., Henriques, M., Azeredo, J., & Silva, S. (2016). Vulvovaginal candidiasis: Epidemiology, microbiology and risk factors. *Critical reviews in microbiology*, 42(6), 905-927
- Grossman, M. (2017). On the concept of health capital and the demand for health. In *Determinants of Health* (pp. 6-41). Columbia University Press.
- Karadeniz, H., Ozturk, R., & Ertem, G. (2019). Analysis of genital hygiene behaviors of women who applied to women's illnesses and birth polyclinic. *Erciyes Medical Journal*, 41(4), 402-409.
- Kamel, A. D., Hassan, S. A. E. K., Nawar, N. N., & Hassan, S. M. (2019). Prevalence of common types of vaginal infections among women attending gynecology clinics in Egypt. *Malaysian Journal of Medical Research (MJMR)*, 3(1), 41-49.
- Kayser, G. L., Rao, N., Jose, R., & Raj, A. (2019). Water, sanitation and hygiene: Measuring gender equality and empowerment. *Bulletin of the World Health Organization*, 97(6), 438-445.
- Lahme, A. M., Stern, R., & Cooper, D. (2018). Factors impacting on menstrual hygiene and their implications for health promotion. *Global health promotion*, 25(1), 54-62.
- Land, L., & Harvey, M. (2021). *Research methods for nurses and midwives: Theory and practice*. Sager publications.
- Mieth, L., Mayer, M. M., Hoffmann, A., Buchner, A., & Bell, R. (2021). Do they really wash their hands? Prevalence estimates for personal hygiene behavior during the COVID 19 pandemic based on indirect questions. *BMC public health*, 21(1), 1-8.
- Phaswana-Mafuya, N. & Shukla, N. (2005) Factors that could motivate people to adopt safe hygienic practices in the eastern Cape province, South Africa. *African Health Sciences*, 5(1), 21-28.
- Plisko, O., Zodzika, J., Jermakova, I., Pcolkina, K., Prusakevica, A., Liepniece Karele, I., ... Rezeberga, D. (2021). Aerobic vaginitis—underestimated risk factor for cervical intraepithelial neoplasia. *Diagnostics*, 11(1), 97-116.
- Ram, U., Pradhan, M. R., Patel, S., & Ram, F. (2020). Factors associated with disposable menstrual absorbent use among young women in India. *International Perspectives on Sexual and Reproductive Health*. 46, 223-234.
- Reichman, O., Margesson, L. J., Rasmussen, C. A., Lev-Sagie, A., & Sobel, J. D. (2019). Algorithms for managing vulvovaginal symptoms—a Practical primer. *Current infectious disease reports*, 21, 1-9.
- Rochan, B. (2021). Barriers to personal hygiene in Kenya. *African Journal of Nursing Development*, 2 (1), 89-102.
- Saeed, Z. H., Mohammad, N. J., Ismail, R. A., & Mohammad, S. S. S. (2016). Common causes of vaginal infections in women with vaginal discharge

- attending the outpatient clinics of the maternity teaching hospital in Erbil. *Diyala Journal of Medicine*, 10(1), 59-65.
- Safary, M., Hakimi, S., Mobaraki-Asl, N., Amiri, P., Tvassoli, H., & Delazar, A. (2020). Comparison of the effects of fenugreek vaginal cream and ultra low-dose estrogen on atrophic vaginitis. *Current Drug Delivery*, 17(9), 815-822.
- Sayed, H. A. E., Aboud, S. A. H. H., & Ali, F. K. (2019). Effect of implementing nursing intervention guidelines on recurrent vaginitis among reproductive-age women. *Journal of Nursing and Health Science*, 8(6), 59-74.
- Shawaky, S. M., Al Shammari, M. M. A., Sewelliam, M. S., Ghazal, A.A. E. R., & Amer, A. N. (2022). A study on vaginitis among pregnant and non pregnant females in Alexandria, Egypt: An unexpected high rate of mixed vaginal infection. *AIMS microbiology*, 8(2), 167-177.
- Shwoif, H. (2018). State of personal hygiene in a new Kazakhstani community. *Journal of Nursing in Asia*, 4(1), 45-59-66
- Willems, H. M., Ahmed, S. S., Liu, J., Xu, Z., & Peters, B. M. (2020). Vulvovaginal candidiasis: A current understanding and burning questions. *Journal of Fungi*, 6(1), 27-38
- Zhang, X. J., Shen, Q., Wang, G. Y., Yu, Y. L., Sun, Y. H., Yu, G. B., ... & Ye, D. Q. (2009). Risk factors for reproductive tract infections among married women in rural areas of Anhui Province, China. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 147(2), 187-191.