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Prevalence of Symptoms of Urinary Tract Infection and Its Risk Factors among Unmarried Female Medical and Dental Students in A Tertiary Care Hospital, Kannur

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Abstract
Background*: Urinary Tract Infection (UTI) is the one of the most common bacterial infection seen in females especially in the reproductive age group. This study aims to estimate the prevalence of symptoms and the risk factors of UTI among unmarried female medical and dental students of Anjarakandy Integrated Campus.*
Methods*: A cross sectional study was conducted in Anjarakandy Integrated Campus among Medical and Dental students. A total of 150 unmarried female medical and dental students were included in the study. A self-structured, self-administrated questionnaire in English language was used to collect data which was then entered in Microsoft excel and analyzed using SPSS18.*
Results*: Prevalence of UTI among female medical and dental students of Anjarakandy Integrated Campus is found to be 31.3 %. Significant association was seen symptoms of UTI and limitation of water intake, incorrect perineal washing technique, lesser frequency of changing pads, frequency of bathing and frequency of changing underwear.*
Conclusion*: In our study we found that behavioral factors play an important role in causation of UTI. We should educate the students regarding the correct method of perineal cleaning, good hydration. Promotion of women friendly toilets with availability of sanitary pads are also recommended.*
Key Word: *Urinary Tract Infection, Prevalence, Medical students, Dental students*

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I. Introduction

Urinary Tract Infection (UTI) is defined as the presence of microbial pathogen in the urinary tract [1]. Clinically UTI can be asymptomatic or symptomatic. Most common symptoms of UTI are dysuria, increased frequency of micturition, foul smelling urine, supra-pubic or lower abdominal pain, pain in loin or backache etc. Asymptomatic infection of the urinary tract occurs without the presence of symptoms. UTI is diagnosed in both cases by routine microscopic examination and culture of urine[2]. The most common causative organism of UTI is E. coli [3].

Urinary tract infection usually develops in the lower urinary tract (urethra and bladder) and if not properly treated they ascend to the upper urinary tract (ureters and kidneys) and cause severe damage to the kidneys. Other complications caused by UTIs are bladder infection (cystitis), urethral infection (urethritis), kidney infection (pyelonephritis) and infection of the ureter (urethritis).[4]The symptoms of UTI can bring about a great discomfort to the patients resulting in a compromised quality of life.[5]

Although UTI affects both genders, women of the reproductive age group (15-44 years) are the most vulnerable.[7]

The lifetime risk of developing UTI for a female is 60% which is very high in contrast to males which is only 13%[6]. 25-30% of women between 20-40 years of age will get UTIs[8] and 25% of those who have had one

episode are at risk of recurrence[9]. Nearly 1 in 3 women will have had at least 1 episode of UTI requiring antimicrobial therapy by the age of 24 years.[10]

Risk factors which make women in this age group more susceptible than men include short urethra, and certain behavioral factors which include delay in micturition, sexual activity, multiple partners and the use of diaphragms and spermicides which promote colonization of the periurethral area with coliform bacteria.[12] Incidence of infection in females increases directly with sexual activity and child-bearing.[1]Wiping perineal area back to front post-micturition was also found to be associated with a greater risk of developing urinary tract infection than wiping front to back.[13]

Medical and dental students were chosen as study subjects as there is paucity of epidemiological data on this segment of the population. A study done among unmarried nursing students found the prevalence of UTI to be 19.8% and some of the stated being that they are themselves were not aware of certain preventive aspects and hence not practicing the same or in some cases, even though aware, they were not much bothered regarding the same either due to their hectic schedule or tedious work shifts.[14] Medical and dental students too spent most of their time under such circumstances. Symptoms of UTI as well as recurrent episodes can reduce their quality of life as well as pose as a hindrance in their academic life. Identifying the magnitude of the problem and the risk factors can help in planning IEC and BCC activities among them at early age. Hence, this study was conducted to determine the prevalence of symptoms of UTI and its associated behavioral risk factors of UTI among unmarried female medical and dental students of Anjarakandy Integrated Campus.

II. Methodology

A Cross-sectional study was conducted in Anjarakandy Integrated Campus which is a tertiary care hospital in Anjarakandy, Kannur during the period of 16 April – 15 May 2019. All unmarried female undergraduate medical and dental students who were present on the days of the study were included. Ethical clearance was taken from the Institute's Ethical Committee and permission from the respective principals were taken prior to the start of the study. Using convenient sampling technique, a total of 150 students were selected for the study. The students were approached individually during their free hours in the college library and hostel. The purpose of the study and contents of the questionnaires were explained to the student. After getting informed written consent from them data was collected using self -structured, self –administrated questionnaire in English language.

The questionnaire consisted of 28 questions out of which 7 are on socio-demo graphic variables, 11 are based on symptoms of UTI, 9 based on behavioral risk factors and one descriptive question for added suggestions.

The Operational definition used for Lower UTI symptoms for this study was considered as:

Any women complaining of burning micturition with or without, fever, increased frequency of micturition and flank pain.[13]

STATISTICAL ANALYSIS: Data was entered in Microsoft Excel and analyzed using SPSS18. Results were displayed as proportions and chi-square test was done to check for associations.

III. Results

Out of the 150 students surveyed, (96)64% were medical students and (54)36% were dental students. Their mean age was 22.01 ± 1.584 years. 61(40.6%) of them were Hindus, 57(38%) Muslim and the rest 32 (21.4%) Christian. 127 (84.7%) of total population were residing at hostel while 23(15.3%) resided at their own homes.

75(50%) of mothers of the study population were undergraduates followed by 33(22%) who had studied up to 10^{th} standard, 21(14%) who had education till Higher secondary. 18(12%) of the students had mothers who were post-graduates while 3(2%) of mothers had primary level of education. None of mothers were illiterate.

46(30.7%) of the study population were diagnosed with UTI in past 1 year, of which 41(89.13%) were diagnosed 1-2 times followed by 5(10.8%) diagnosed 3-4 times.

49(32.7 %) of total population gave history of having either a medical or a surgical risk factors for UTI. The most common risk factor identified is past history of UTI 37(24.7%) followed by renal stones (6%) and renal anomalies (1.35%). 0.7% of total population were on long term steroids.

The prevalence of symptoms of UTI in the past 3 months in the study group was found to be 31.3%.

SOCIO-DEMOGRAPHIC CHARACERISTICS OF RESPONDENTS AND SYMPTOMS OF UTI

40.6% of the medical students reported having experienced symptoms of UTI at least once in the past three months while only 14.8% of dental students had the same. This difference was found to be statistically significant.

[x^2 = 0.107005; p value =0.001071 at p< 0.05]. There is no statistically significant association between symptoms of UTI and age, religion, place of residence or mother's education. [TABLE 1]

TABLE 1: Association between socio-demographic characteristics & experience of symptoms of UTI in the past three months

Sociodemographic characteristics	Symptoms of UTI in past three months		Total (%)	Chi-square value	p-value (significant at p<0.05)
	Yes (%)	No/Don't Know (%)			
Age (yrs)					
19-22	24(26.4)	67(73.6)	91(60.7)	2.6451	0.10387
23-26	23(38.9)	36(61.1)	59(39.3)		
Stream					
Medical	39(40.6)	57(59.3)	96(64)	**10.7005**	**0.001071**
Dental	8(14.8)	46(85.2)	54(36)		
Religion					
Hindu	18(29.5)	43(70.4)	61(40.6)	0.2336	0.889745
Muslim	18(31.57)	39(68.4)	57(38)		
Christians	11(65.6)	21(21.3)	32(21.4)		
Place of residence					
Home	11(47.8)	12(52.2)	23(15.3)	3.4344	0.063852
Hostel	36(28.3)	91(71.7)	127(84.7)		
Education level of respondent's mother					
Primary	1(33.3)	2(66.7)	3(2)	0.7421	0.863265
Upto 10^{th} Std	11(33.3)	22(66.7)	33(22)		
Upto 12^{th} Std	8(38.1)	13(61.9)	21(14)		
Degree	22(29.3)	53(70.7)	75(50)		
Post-graduate	5(27.78)	13(72.2)	18(12)		

BEHAVIOURAL RISK FACTORS AND SYMPTOMS OF UTI

Majority of the participants (45.3%) said that they consumed only up to 3 to 5 glasses of water per day, followed by 31.3% who consumed at least 7 glasses and 23.3% who consumed more than 7 glasses per day. No significant association was seen between quantity of water consumption/day and symptoms of UTI. [Table 2]
67(44.7%) of the study participants reported that they had a habit of limiting their water intake due to fear of frequent micturition. A statistically significant association was seen between symptoms of UTI and limitation of water intake. **[TABLE 2]**

TABLE 2: Symptoms of UTI and water intake and micturition habits

Water intake and micturition habits	Symptoms of UTI			Chi-square value	p-value (significant at p<0.05)
	Yes (%)	No/Don't know (%)	Total (n=150) (%)		
Daily consumption of water(glasses)					
3-5	22(32.4)	46(67.6)	68(45.3)	0.0852	0.958284
Up to 7	14(29.7)	33 (70.3)	47 (31.3)		
>7	11 (31.4)	24 (68.5)	35 (23.4)		
Limitation of water intake due to fear of frequent micturition					
Yes, always/sometimes	35(52.2)	32(47.8)	67(44.7)	**28.1604**	**<0.00001**
No	12(14.4)	71(20.4)	83(55.3)		
Habit of holding back urine					
Yes	44(33.1)	89(66.9)	133(88.7)	1.6692	0.196367
No	3(17.7)	14(82.3)	17(11.3)		

88.6% of the study subjects said that they had a habit of holding back urine. Of them 33.3% reported having symptoms of UTI in the past three months. Only 17.6% of those who never held back their urine reported having symptoms of UTI. However this difference was not found to be statistically significant. [TABLE 2]

Of 150 females 136(90.6%) reported that they took body bath on a daily basis while 14(9.4%) did not. A significantly higher proportion (78.5%) of those who did not take daily bath had experienced symptoms of UTI when compared to 26% who had daily body bath [x^2=16.0145; p value= 0.00063 ,at p<0.05]

Majority of the students i.e. 95(63.3%) reported that they changed their underwear twice a day while 45(30%) changed once a day and 10(4.67%) thrice a day. There exists a statistically significant association between symptoms of UTI and frequency of change in underwear with 42,4% of the students who changed their

underwear once a day reporting symptoms of UTI and only 26.7% of them who changed twice or thrice a day reporting the same. **[TABLE 3]**

109(72.6%) of the respondents said that they used cotton underwear while 41(27.3%) used synthetic material underwear. No statistically significant association between symptoms of UTI and material of underwear [x^2=2.6911, p value=0.100913, at p<0.05]. [TABLE 3]

Only 64(42.6%) of the study participants said that they always dried their underwear under direct sunlight.No statistically significant association was seen between this habit and having symptoms of UTI. [TABLE 3]

Among 150 females of study group, majority 81(54%) used soap and water to clean their perineal area followed by 47(31.3%) who used only water and 22(14.7%) who used vaginal wash. A significantly higher proportion of students who used vaginal wash (63.6%) reported symptoms of UTI in the past three months when compared to those who used water or water with or without soap. [x^2= 12.6987; p-value = 0.001748 at p value<0.05]. [TABLE 3]

23(15.3%) of the students said that they used female hygiene products. No statistically significant association was seen between its use and symptoms of UTI. [TABLE 3]

76(50.7%) of the students practiced the correct technique of washing and wiping the perineal region i.e. front to back. A significant difference was seen in the prevalence of UTI symptoms among those who practiced the correct technique (23.7%) and those who did not (39.2%). [TABLE 3]

TABLE 3: Symptoms of UTI and personal hygiene habits

Habits related to Personal hygiene	**Symptoms of UTI**			**Chi-square value**	**p-value (significant at p<0.05)**
	Yes (%)	**No/Don't know (%)**	**Total (n=150) (%)**		
Daily bathing					
Yes	**36(26)**	**100(74)**	**136(90.6)**	**16.0145**	**0.00063**
No	**11(78.5)**	**3(21.5)**	**14(9.4)**		
Type of underwear					
Cotton	**30(27.6)**	**79(72.4)**	**109(72.6)**	2.6911	0.100913
Synthetic	**17(41.4)**	**24(58.6)**	**41(27.4)**		
Drying underwear under direct sunlight					
Yes,always	**16(25)**	**48(75)**	64(42.7)	3.6758	0.159148
No/sometimes	31(36.1)	55(63.9)	86(57.3)		
Frequency of change of underwear per day					
Once	**19(42.2)**	**26(57.7)**	45(30)	**6.3395**	**0.042014**
Twice/Thrice	28(26.7)	77(73.3)	105(70)		
Product used for cleansing perineal region					
Water	11 (23.4)	36(76.6)	47(31.3)	**12.6987**	**0.001748**
Soap and Water	22(27.2)	59(72.8)	81(54)		
Vaginal Wash	14(63.6)	8(36.4)	22(14.7)		
Use of feminine hygiene products					
Yes	11(47)	12(53)	23(15.3)	3.4344	0.063852
No	36(28)	91(72)	127(84.6)		
Wash and Wipe					
Back to front	29(39.2)	45(60.2)	74(49.3)	**4.1893**	**0.040679**
Front to back	18(23.7)	58(76.3)	76(50.7)		

TABLE 4: Symptoms of UTI and habits related to menstrual hygiene

Habits related to menstrual hygiene	**Symptoms of UTI**			**Chi-square value**	**p-value (significant at p<0.05)**
	Yes (%)	**No/Don't know (%)**	**Total (n=150) (%)**		
Type of Menstrual absorbent used					
Sanitary pads	43(44.7)	96(69.5)	139(92.7)	0.1396	0.708673
Cloths	4(36.5)	7(63.5)	11(7.3)		
Frequency of change of sanitary pads/cloth					
Within 12 hrs	42(31.8)	90(68.2)	132(94.9)	**8.4449**	**0.003661**
>12hrs	3(42.8)	4(57.2)	7(5.1)		
Drying sanitary cloths under direct sunlight (n=11)					
Yes	1(33.3)	2(66.7)	3(27)	0.7486	0.386916
No	5(62.5)	3(37.5)	8(73)		

Most of the study participant's i.e.139 (92.7%) reported using sanitary pads during their menstruation. The rest 11(7.3%) said that they used cloth.No statistically significant association between symptoms of UTI and type of menstrual absorbent used. [TABLE 4]

Majority of the students 132(94.9%) said that they changed their sanitary pads/cloth within 12hrs during menstruation. Only 31.8%) of the respondents who changed within 12hours reported having experienced symptoms of UTI compared to 42.8% of those who changed after 12 hour period. This difference was found to be statistically significant. [$x^2 = 8.4449$, p value = 0.003661 at $p<0.05$. [TABLE 4]

Among the 11 students who used cloth for menstruation, only 3(27%) reported that they dried the cloth under direct sunlight while most did not. There is no statistically significant difference in prevalence of symptoms of UTI between those who did and those who did not. [TABLE 4]

14(9.33%) of the student reported that they were sexually active. However, no statistically significant difference was seen in prevalence of symptoms of UTI among them and those who were not.

IV. Discussion

In our study, age of the students ranged from 19-26years. The overall prevalence of symptoms of UTI in the past three months in the present study was found to be 31.3% which was comparatively higher compared to the 19.8% prevalence found in the study by Vyas et al, among nursing students in North India.[13]

In the present study, no significant association was found between UTI symptoms and age group as was found in the study by Vyas et al as well as in a study by Sevil S et al among university students in Turkey[13,14] .This may be associated with the fact that the students in the study group were of similar age groups. In contrast to our result, a study done among female workers in a selected garment industry of Dhaka city showed an association between UTI and age.[15]

Studies show that mothers play a key role in educating their daughters on the aspects of genital area and menstrual hygiene.[16,17] In the present study however mother's education does not play any significant role. Similar results were also found in studies done by Sevil S et al and Vyas et al.[13,14]

In contrast with the study of Kriengner N et al, which shows no association with limited water intake and UTI, the present study shows association with intake of water and symptoms of UTI which is in line with findings of Begum N et al's and Vyas et al's studies.[13,15,18]

44% of girls in study population of Vyas et al had habit holding urine whereas in the present study 89.3% had this habit. The reason however for holding back urine was found was found to be the same, i.e. fear of "catching germs from the toilet seat of public toilets".[13]

In Begum N et al's study, 72.2% of those who had UTI gave history of taking less than two glass of water.[15] similarly in our study, a statistically significant association was seen between symptoms of UTI and limitation of water intake.

In this study, a significantly higher proportion (78.5%) of those who did not take daily bath had experienced symptoms of UTI when compared to 26% who had daily body bath. Similarly in Sevil et al's study, history of genital infections was significantly more in those who took bath once a week that those who took bath daily or at least 2-3 times a week.[14]

The type and cleanliness of the underwear as well as the frequency with which it is changed are important factors regarding the risk of getting a urinary infection.

Synthetic and nylon underwear are a trend among women especially younger women. These types of underwear, however, does not absorb perspiration as much as the cotton underwear does, causing the perineum to remain humid and leading an increased risk of genital tract infection which can lead to urinary infections.[19] In our study however, no significant association was found UTI and type of underwear used.

Changing the underwear frequently as mentioned earlier, is critical in preventing genital and urinary infections. However, unlike in previous studies, our study did not demonstrate any relationship between the frequency of changing innerwear and of urinary infections.[20,21] Vyas et al's study produced similar result as our study.[13]

Disinfecting effect of UV radiations from sunlight on clothes is a well-known concept. Only 64(42.7%) dried their underwear in sunlight. Only 25% of them reported having symptoms of UTI in the past three months when 31(36.1%) of those who did not/sometimes dried experienced the same. There may be restrictions in terms of privacy issues in drying their undergarments outside in sunlight. These findings were concurrent with the findings from Vyas et al's study.[13]

Currently, there are many different intimate feminine hygiene products that may be used for cleanliness and/or odor control, but some can alter the normal pH level/microbiota needed for protection against infection.[22] In the present study, 22(14.7%) who used vaginal wash for cleaning their perineal region and a significantly higher proportion of them (63.6%) reported symptoms of UTI in the past three months when compared to those who used water or water with or without soap.

It has been described by the previous studies that wrong perineal hygiene practices (i.e. back to forward) may lead to infections due to the transfer of microorganisms from the anus to the vagina and urinary tract.[14,23] The present study also supported this finding as a significantly higher frequency of urinary infections among participants who were using incorrect technique to clean the perineum. Other studies as Singh MM et al, and Narayan BK et al also reported a lower frequency of genital infections among the participants practicing correct genital hygiene in contrast to those who clean the genital area incorrectly.[24,25] All these findings indicate that the awareness regarding correct perineal cleaning is not adequate even among the medical. In our study almost half of them (49.3%) were not practicing the correct technique which was almost the same scenario in Vyas et al's study among nursing students in which almost 64% did not practice the correct technique.[13]

Majority of the students in the present study used sanitary pads as menstrual absorbent. Only 7.3% of them used cloth. No significant difference was seen between type of menstrual absorbent used and symptoms of UTI. In Vyas et al's study even though like in our study the proportion of girls using cloth were quite low (8.47%) but the prevalence of UTI was quite common amongst them.[13]

During menstruation, failure to change hygienic pads frequently (4-6 times/day) increases the risk of infection due to accumulation of blood within the pads associated with prolonged use, providing a moist and warm environment which facilitates growth of microorganisms.[26] A significantly higher proportion of students who changed their pad/cloth after >12hrs experienced symptoms of UTI within last three months when compared to those who changed within 12 hrs.

LIMITATION

The sample size was small and therefore the results cannot be generalized to all the medical and dental students. Convenient sampling was used and hence the result may be skewed. The students may not have been completely honest with their answers as many of the questions involved were quite personal.

V. Conclusion

Prevalence of symptoms of UTI is high among the medical and dental students of Anjarakandy Integrates Campus when compared to other studies. This is a matter of concern. Certain behavioral risk factors were found to have a significant influence in this. Limiting water intake fearing frequent urination and holding back of urine due to not wanting to use public toilets were found to be major risk factors. Daily bathing, use of cotton underwear and changing underwear at least twice a day were found to lower the risk of UTI. Incorrect perineal washing technique, infrequent changing of sanitary pads and using chemicals other than soap and water were found to have a significantly higher risk of developing symptoms of UTI. Lack of awareness regarding these risk factors, lack of time to spend time for one's health, busy schedules may be some factors which could play in this aspect.

VI. Recommendations

Creating awareness among the students regarding the correct methods of perineal cleaning, importance of daily bathing and menstrual hygiene is of utmost importance. Ensuring availability of safe drinking water along with increasing number of toilets in the college and hostels & maintain cleanliness could promote its use among the students. Promotion of women friendly toilets with availability of sanitary pads and pad disposable methods in the college premise may also motivate them to change their sanitary pads on time. Providing private open spaces for hanging undergarments in hostels could again motivate the girls to ensure that their undergarments are well dried in the sunlight.

More comprehensive studies are needed to reveal any relationships between the various behavioral risk factors and urinary tract infections.

Reference

[1]. HotchandaniR, AggarwalKK. Urinary Tract Infections in women. Indian J ClinPractice.2012;23(4):187-94
[2]. Najar MS, Saldanha CL, Banday KA. Approach to urinary tract infections. Indian journal of nephrology. 2009 Oct;19(4):129.
[3]. Watring N, Mason JD. Deciphering Dysuria-Painful urination can be the result of anything from a simple urinary tract infection to a serious sexually transmitted disease. Here are the clues to look for to determine the etiology. Emergency Medicine. 2008;40(9):29.
[4]. John AS, Mboto CI, Agbo B. A review on the prevalence and predisposing factors responsible for urinary tract infection among adults. Eur J Experiment Biol. 2016;6(4):7-11.
[5]. Muthulakshmi M, Gopalakrishnan S. Study on urinary tract infection among females of reproductive age group in a rural area of Kancheepuram district, Tamil Nadu. Int J Community Med Public Health 2017;4:3915-21
[6]. Anderson JE. Seasonality of symptomatic bacterial urinary infections in women. J Epidemiol Community Health. 1983;37(4):286-90
[7]. R Nalini, J Ezhil Ramya. Recent Sensitivity Pattern of Escherichia Coli in Urinary Tract Infection. RRJMB. 2014;3(3)
[8]. Wilma JP. Shafers Medical Surgical Nursing. 7th edition, B.I. Publications: New Delhi 2002:p.637-40
[9]. Stapleton A. (1999) Host Factors in Susceptibility to Urinary Tract Infections. In: Baskin L.S., Hayward S.W. (eds) Advances in Bladder Research. Advances in Experimental Medicine and Biology, vol 462. Springer, Boston, MA
[10]. Kunin CM. Urinary tract infections in females. Clin Infect Dis. 1995;18:1-12

[11]. Litza JA, Brill JR, Urinary tract infections, Prim Care 2010;37(3):491-507.
[12]. Persad S, Watermeyer S, Griffiths A, Cherian B, Evans J. Association between urinary tract infection and postmicturition wiping habit. Acta obstetricia et gynecologica Scandinavica. 2006 Nov;85(11):1395-6.
[13]. VyasS VarshneyD, Sharma P, JuyalR, NautiyalV, ShrotriyeVP: An overview of the predictors of symptomatic UTI among nursing students.Annalsof Medical & Health Sciences Research.2015;5(1):54-58
[14]. Sevil S, Kevser O, Aleattin U, Dilek A, Tijen N. An Evaluation of the relationship between genital hygiene practices, genital infection. Gynecol Obstet. 2013;3(187):2161-0932.
[15]. Begum N, Mamoon AB, Hossain M, Chowdhury SA, Rahman MF. UTI among female workers in a selected garment industry of Dhaka city: A cross sectional study. ORION. 2006 Jan;23.
[16]. Reid G, Bruce AW (2003) Urogenital infections in women: can probiotics help? Postgrad Med J 79: 428-432
[17]. McIntyre FJ, McCloy R (1994) Shaving patients before operation: a dangerous myth? Ann R Coll Surg Engl 76: 3-4.
[18]. Krieger JN. Urinary tract infections: what's new?. The journal of urology. 2002 Dec 1;168(6):2351-8.
[19]. SBN K, Wilson SL, Adam JK. The Vaginal Microbiota in Women Health and Disease: Current Understanding and Future Perspectives-A Review. development.;2:13.
[20]. Moustafa MF, Makloof EM. Association between the hygienic practices for genital organs & sexual activity on urinary tract infection in pregnant women at women's health centre at assiut university hospital. Journal of American Science. 2012;8(9):515–22
[21]. Dimetry SR, El-Tokhy HM, Abdo NM, Ebrahim MA, Eissa M. Urinary tract infection and adverse outcome of pregnancy. Journal of Egypt Public Health Association. 2007;82:203–18
[22]. Chen Y, Bruning E, Rubino J, Eder SE. Role of female intimate hygiene in vulvovaginal health: Global hygiene practices and product usage. Women's Health. 2017 Dec;13(3):58-67.
[23]. Kısa S, Taşkın L. Behavioral and socio-demographic risk factors affecting the development of vaginal infection in married women aged 15-49 years presenting to a maternal and child health and family planning center in Ankara. Journal of Health and Society. 2007; 17 (1): 69-84.
[24]. Singh MM, Devi R, Gupta SS. Awareness and health seeking behaviour of rural adolescent school girls on menstrual and reproductive health problems. Indian J Med Sci. 1999;53:439–43.
[25]. Narayan BK. Puberty rituals, reproductive knowledge and health of adolescent school girls in south India. Asia Pacific Population Journal. 2002;16(2):225–38].
[26]. Bekar M, Yurtsal B, Güler G, Güler H, Uçar T, Bilgin İ, Güler N. Women's Attitudes toward Gynecological Health. Small.;241:77-0.

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