ORIGINAL ARTICLE

Bacterial Vaginosis Awareness Among Pediatric and Adolescent Age Groups in Saudi Arabia

Ettedal A. Aljahdali, MBBCH, SBOG, CBG-OBGYN AFSA

Department of Obstetrics and Gynecology, Faculty of Medicine
King Abdulaziz University, Jeddah, Saudi Arabia

Correspondence
Dr. Ettedal A. Aljahdali
P.O. Box 80215, Jeddah 21589, Saudi Arabia
e.M: dr.aljhdali@hotmail.com

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Abstract

Bacterial vaginosis has turned into one of the most common medical condition among women here in Saudi Arabia. Several contributing factors, including the lack of knowledge have been affiliated with this infection and yet the cause remains uncertain. The aim of this study is to determine the level of population awareness regarding bacterial vaginosis both in pediatric and adolescent age groups. It also seeks to evaluate the relationship between the outlined causative factors and bacterial vaginosis. A cross sectional descriptive study was conducted using a self-developed questionnaire and was distributed among the participants (adolescent girls, mothers and non-mothers) over a period of four months from December 2013 until March 2014 at King Abdulaziz Hospital, Jeddah, Saudi Arabia. The study revealed that a remarkable number of the mother respondents demonstrated awareness on bacterial vaginosis in pre-pubertal and adolescent age group (289, 96.98%). The sample of population under the pre-pubertal age group (122, 40.94%) had higher incidence rates of bacterial vaginosis in comparison with the adolescents and non-mothers (17, 6.25%). Advanced research is required to better understand the pathological and physiological mechanisms of bacterial vaginosis. Continuing studies are necessary to enhance the accuracy of its diagnosis and modalities of treatment.

Keywords

Bacterial vaginosis; Douching; *Gardnerella vaginalis*; Anaerobic pathogens; Lactobacilli; Polymicrobial; Gynecologist; Adolescent; Pre-pubertal

Introduction

Bacterial vaginosis (BV) is an emerging public concern which is characterized by an alteration in the bacterial equilibrium of a woman's vaginal flora. This happens when the number of lactobacilli is reduced, compromising its protective role to maintain the vagina's normal acidity levels. As a result, an overgrowth of anaerobic pathogens occurs manifesting symptoms of a thin vaginal discharge and a fishy vaginal odor[1]. *Previous findings showed specimen cultures were* dominated by *Gardnerella vaginalis* (*G.*

vaginalis) species[2]. Apart from species of *G. vaginalis*, several other anaerobic organisms were attributed with BV thus reaching to a conclusion that BV is therefore a polymicrobial infection[3]. Unfortunately, it remains unclear due to lack of *concrete evidence about the main etiologic cause of BV*[4].

Based on recent studies, vaginosis is one of the most frequent conditions complained by gynecologic patients who are in the reproductive age[5]. Symptoms of vaginal discharge prompted patients to seek medical advice[6].

In a study conducted by Verstraelen *et al*.[7], it stated that BV is prevalent among adolescents including girls who never had sexual contacts. Oppositely, Fethers *et al*.[8] mentioned that BV does not exist in non-sexually experienced women. Currently, researchers cited that it is perceived to be a sexually transmitted infection, although majority of the reported cases were not caused by sexual intercourse[9].

Several risk factors have been associated with BV. According to Brotman *et al*.[10], douching posed greater risks of disturbing the vaginal flora. Similarly, excessive washing modifies the proportion of good pathogens which enhances the possibility of bad bacteria to thrive[11]. Another investigation concluded that multiple sex partners and smoking predisposes a person to acquire the infection[9].

There have been some preventive measures suggested such as avoidance of wearing tight pants and non-cotton underwear, however, it's relation to BV is yet to be proven scientifically, mainly in pre-pubertal and adolescent non-sexually active girls.

This study aspires to provide information about the level of awareness among people living in Saudi Arabia. Likewise, to determine the relativity of the risk factors and preventive measures with BV.

Materials and Methods

There was a total of 570 respondents who actively took part in answering the questionnaire for this study. Out of those 298 were mothers with pre-pubertal daughters and 272 combined girls and non-mother respondents. It was conducted at King Abdulaziz University Hospital (KAUH) Jeddah, Saudi Arabia and in nearby establishments from December 2013 until March 2014. The surveys were distributed to target participants in KAUH waiting areas of the clinics, within the university, and in the public areas of the aforementioned locations.

Study Design

A cross-sectional descriptive study was used with the aid of a self-developed questionnaire written in Arabic. The survey was divided into three sub-parts. The first part intended to obtain the participant's demographic data. The second part included questions designed to further evaluate the awareness of this group of population about vaginosis. The last part was outlined to acquire the possible causes of BV.

Inclusion Criteria

All women and girls who are sexually and non-sexually active, premarital females ages 10 years and above, including female children below 10 years old under the care of their mothers. The age group of adolescent girls is from 10 to19 years old[12].

Exclusion Criteria

No exclusion criteria.

Data Analysis

The statistical analysis was done using the SPSS 16.0 software package. The statistical significance is set at level $p < 0.05$.

Results

Based on the population's (mothers) demographics, it was dominated by participants whose age ranged between 31 and above (282, 94.63%) as shown in Table 1. A frequency of 284 (95.3%) were Saudi nationals and a greater portion were married (291, 97.7%). Most of them have kids between 1 to 3 in number (270, 90.6%).

Almost all of the mothers were highly educated from a university (281, 94.3%) and were earning above average (284, 95.3%) (Table 1). Among the 298 mother participants, a total of 289 (96.98%) demonstrated a high level of awareness about BV (Table 2). This was evident based on the number of participants who

Table 1. Demographics of mother participants.

Group	Frequency	Percentage (%)
Age of mother participants		
21-25	4	1.34%
26-30	12	4.03%
31 & Above	282	94.63%
Total	298	100.00%
Nationality of mother participants		
Saudi	284	95.30%
Non-Saudi	14	4.70%
Total	298	100.00%
Marital Status of mother participants		
Married	291	97.70%
Divorced	4	1.30%
Widow	3	1.00%
Total	298	100.00%
Number of mother participants' kids		
1-3	270	90.60%
4-6	23	7.70%
7-9	5	1.70%
Total	298	100.00%
Educational level of mother participants		
Secondary	1	0.33%
High School	7	2.35%
University	281	94.30%
Higher Education	9	3.02%
Total	298	100.00%
Economic status of mother participants		
Below average	4	1.30%
Average	10	3.40%
Above average	284	95.30%
Total	298	100.00%

Table 2. Bacterial vaginosis information based on mother participants' data.

Group	Frequency	Percentage (%)
Knowledge of mother participants about bacterial vaginosis		
Yes	289	96.98%
No	9	3.02%
Total	298	100.00%
Signs of bacterial vaginosis according to mother participants		
Vaginal discharge	253	84.90%
Pain	84	28.19%
Redness	90	30.20%
Itching	68	22.82%
Rate of mother participants' daughters who had previous infection		
Yes	122	40.94%
No	176	59.06%
Total	298	100.00%
Actions done by mother participants whose daughter had infection		
Asked a doctor	80	26.85%
Asked friends	31	10.40%
Used previous medication	46	15.44%
Do nothing	2	0.67%
Not Applicable	176	59.06%

answered vaginal discharge (253, 84.90%) (Table 2) when asked about the signs of BV hence, its primary manifestation.

The percentage of daughters with ages 9 years and below who had infection (122, 40.94%) was quite less than those who had not been infected (176, 59.06%) as shown in Table 2. A large portion of those who had history of infection sought consultation from a doctor (80, 26.85%). There were 46 (15.44%, $p < 0.0005$) daughters who had greater risk for infection because they relied on previous medications (Table 2).

A huge number of the participants' daughters were perfectly well and didn't have any chronic diseases (289, 96.98%). The highly preferred type of undergarment and clothing used for their daughters were cotton (280, 93.96%) and tight pants (254, 85.23%) (Table 3).

As shown in Table 4, a significant percentage were not using disinfectants for their children (199, 66.78%), while those who utilized it (99, 33.22%) marked a frequency use of once per day (56, 18.79%) (Table 4). Those who are changing underwear at least twice per day were recorded with the highest rate of 136 (45.64%) (Table 3).

On the other hand, of the 272 combined girls and non-mothers, a total of 95 (34.93%) participants were between 16-20 years of age (Table 5). The sample was dominated by Saudis (192, 70.6%), most were married and sexually active (165, 60.66%, $p = 0.004$) (Table 5).

Similar with the mothers, most of them were educated in the university level (128, 47.06%) (Table 5), however, their economic status were almost entirely below average (204, 75%).

Oppositely, Table 6 shows that the girls and non-mothers didn't have sufficient knowledge about BV (143, 52.57%). Based on Table 6, a very few number were recorded to have had BV (17, 6.25%).

Table 3. Preferred clothes of mother participants' daughters.

Group	Frequency	Percentage (%)
Type of underwear used by mother participants' daughters		
Cotton	280	93.96%
Non-cotton	18	6.04%
Total	298	100.00%
Frequency of Changing Underwear		
Once a day	100	33.56%
Twice a day	136	45.64%
More than twice per day	61	20.47%
Every 2 days or more	1	.33%
Total	298	100.00%
Response of mother participants when asked if daughter preferred tight pants or clothes		
Yes	254	85.23%
No	44	14.77%
Total	298	100.00%

Table 4. Disinfectants usage rate of mother participants' daughters.

Group	Frequency	Percentage (%)
Number of mother participants who use disinfectants for their daughter		
Yes	99	33.22%
No	199	66.78%
Total	298	100.00%
Frequency of using disinfectants for mother participants' daughters		
Once	56	18.79%
Twice	34	11.41%
3 or more	9	3.02%
Not using	199	66.78%
Total	298	100.00%

Table 5. Demographics of combined girls and non-mother participants.

Group	Frequency	Percentage (%)
Age of Combined Girls and Non-mothers		
10-15	33	12.13%
16-20	95	34.93%
21-25	88	32.35%
26-30	41	15.07%
31 & Above	15	5.52%
Total	272	100.00%
Nationality of Combined Girls and Non-mothers		
Saudi	192	70.60%
Non-Saudi	80	29.40%
Total	272	100.00%
Marital status of Combined Girls and Non-mothers		
Virgin	90	33.09%
Married (Sexually Active)	165	60.66%
Divorced	15	5.51%
Widow	2	0.74%
Total	272	100.00%
Educational Level of Combined Girls and Non-mothers		
Not Educated	6	2.20%
Primary	31	11.40%
Secondary	27	9.93%
High school	72	26.47%
University	128	47.06%
Higher Education	8	2.94%
Total	272	100.00%
Economic Status of Combined Girls and Non-mothers		
Below average	204	75.00%
Average	58	21.30%
Above average	10	3.70%
Total	272	100.00%
Below average	204	75.00%
Average	58	21.30%
Above average	10	3.70%

Table 6. Knowledge and rate of bacterial vaginosis infection based on girls and non-mother participants.

Group	Frequency	Percentage (%)
Knowledge of combined girls and non-mothers about bacterial vaginosis		
Yes	129	47.43%
No	143	52.57%
Total	272	100.00%
Number of combined girls and non-mothers who had previous infection		
Yes	17	6.25%
No	255	93.75%
Total	272	100.00%

A greater allocation was using cotton underwear (238, 87.50%) (Table 7), and tight pants or clothes (179, 65.81%) as shown in Table 7. A maximal fraction of combined girls and non-mothers were not using vaginal wash (146, 53.68%) (Table 8). For those who used disinfectants (126, 46.3%), a larger number were using it once per day only (65, 23.90%) (Table 8). Based on Table 7, it shows that there were 119 (43.75%) who stated that they change underwear at least once a day.

An enormous portion mentioned that they weren't masturbating (256, 94.12%) while 16 (5.88%) admitted that they do sometimes (Table 9).

Discussion

Although the mothers showed higher level of awareness about BV (289, 96.98%), their daughters who were in the pre-pubertal age group, were the ones who had higher incidence rates of BV (122, 40.94%), contrary with the infected adolescents and non-mothers (17, 6.25%) who had limited information (143, 52.57%). This can be correlated with the pathophysiological aspect of pre-pubertal girls where the levels of estrogen is low, resulting to fewer or zero number of lactobacilli responsible in maintaining alkalinity of the vagina[13], therefore allowing harmful bacteria to dominate

Table 7. Preferred clothes of combined girls and non-mother participants.

Group	Frequency	Percentage (%)
Type of underwear used by combined girls and non-mothers		
Cotton	238	87.50%
Non-cotton	34	12.50%
Total	272	100.00%
Frequency of changing underwear		
Once a day	119	43.75%
Twice a day	95	34.93%
More than twice per day	56	20.59%
Every 2 days or more	2	0.73%
Total	272	100.00%
Preferred pants or clothes by combined girls and non-mothers		
Tight	179	65.81%
Non-tight	93	34.19%
Total	272	100.00%

Table 8. Disinfectants usage rate of combined girls and non-mother participants.

Group	Frequency	Percentage (%)
Number of combined girls and non-mothers who are using disinfectants		
Yes	126	46.32%
No	146	53.68%
Total	272	100.00%
Combined girls and non-mothers' frequency of using disinfectants		
Once	65	23.90%
Twice	49	18.01%
3 or more	12	4.41%
Not using	146	53.68%
Total	272	100.00%

Table 9. Frequency of masturbation of combined girls and non-mother participants.

Group	Frequency	Percentage (%)
Never	256	94.12%
Sometimes	16	5.88%
Total	272	100.00%

and increase their susceptibility for infection. Using previous medications to treat BV posed higher risks to acquire the infection ($p < 0.0005$) (as shown in Table 10). Women engaged in marital and premarital sexual activities ($p = 0.004$) revealed high significance with BV (Table 11).

As shown in Table 12, vaginal douching and its frequency were also greatly related to BV ($p = 0.004$, $p = 0.034$ respectively).

This was evidenced by the rates of infection for all age groups wherein the number of non-infected daughters (176, 59.06%) and girls or non-mothers (255, 93.75%) were relatively high, as the majority of them were not using vaginal disinfectants (199, 66.78% and 146, 53.68% respectively).

Oppositely, wearing tight pants ($p = 0.736$, $p = 0.248$) and cotton underwear ($p = 0.498$, $p = 0.345$) among all age groups were not associated with BV.

Table 10. Cross-tabulation of statistics between the sample's reliance on previous medication and data of having previous infection.

P-VALUE < 0.0005			Did your daughter had any infection before?		Total
			Yes	No	
Used Previous Medication	No	Count	76	176	252
		% Used previous medication	30.16%	69.84%	100.00%
	Yes	Count	46	0	46
		% Used previous medication	100.00%	0.0%	100.00%
Total		Count	122	176	298
		% Used previous medication	40.94%	59.06%	100.00%

Table 11. Cross-tabulation of statistics between the sample's marital status and data of having previous infection.

P-VALUE = 0.004			Did you have any infection before?		Total
			Yes	No	
Marital Status	Virgin	Count	2	88	90
		% Marital Status	2.22%	97.78%	100.00%
	Married	Count	11	154	165
		% Marital Status	6.67%	93.33%	100.00%
	Divorced/Widow	Count	4	13	17
		% Marital Status	23.53%	76.47%	100.00%
Total		Count	17	255	272
		% Marital Status	6.25%	93.75%	100.00%

Table 12. Comparison of results based on the group of mothers with daughters and group of girls and non-mothers based on frequency and use of disinfectants.

Mothers with Pre-Pubertal Daughters (N = 298)		Girls and Non-Mothers (N = 272)	
Do you use disinfectants for your daughter	**Frequency**	**Do you use disinfectants**	**Frequency**
Yes	99, 33.22%	Yes	126, 46.32%
No	199, 66.78% *(p = 0.004)*	No	146, 53.68%
Total	298, 100.00%	Total	272, 100.00%
Frequency of Use	**Percentage**	**Frequency of Use**	**Percentage**
Once	56, 18.79% *(p = 0.034)*	Once	65, 23.90%
Twice	34, 11.40%	Twice	49, 18.00%
3 or more	9, 3.00%	3 or more	12, 4.40%
Not using	199, 66.80%	Not using	146, 53.70%
Total	298, 100.00%	Total	272, 100.00%

Table 13. Comparison of results based on the group of mothers with daughters and group of girls and non-mothers based on preferred clothes, underwear and frequency of changing undergarments.

Mothers with pre-pubertal daughters (N = 298)		Girls and Non-Mothers (N = 272)	
Type of underwear	**Frequency**	**Type of underwear**	**Frequency**
Cotton	280, 93.96% (p = 0.498)	Cotton	238, 87.50% (p = 0.345)
Does daughter prefer tight pants	**Frequency**	**Does daughter prefer tight pants**	**Frequency**
Yes	254, 85.23% (p = 0.736)	Yes	179, 65.81% (p = 0.248)
Frequency of changing underwear	**Percentage**	**Frequency of changing underwear**	**Percentage**
Once a day	100, 33.60%	Once	119, 43.75% (p = 0.825)
Twice	136, 45.64% (p = 0.247)	Twice a day	95, 34.90%
More than twice per day	61, 20.50%	More than twice per day	56, 20.60%
Every 2 days or more	1, 0.30%	Every 2 days or more	2, 0.70%
Total	298, 100.00%	Total	272, 100.00%

Additionally, poor hygiene did not show direct relation with the infection (p = 0.247, p = 0.825) (Table 13).

Conclusion and Recommendation

Bacterial vaginosis infection is not only confined among adolescents and women who are in their reproductive age, this study showed that pre-pubertal females are also inclined to have BV. Furthermore, since sexual activity predisposes a person to transmit and acquire infection, safe sex practices are highly advised.

As there are few proven measures to counteract the condition, it is highly recommended to seek consultation from a healthcare provider. Self-medication is discouraged without a definite diagnosis of the reported signs and symptoms.

Moreover, continuing analysis and experimentation are proposed towards a breakthrough on BV interpretation and regimen options. One great suggestion would be to probe the possibility of attributing weather conditions with BV, specifically in humid places such as the middle east. This can be performed by way of culture sampling through vaginal swab.

Ultimately, a profound method for educating the people would still be the best tool for its early prevention. There is a major need to strengthen the campaign for awareness, highlighting the latest information about BV.

Conflict of Interest

The author has no conflict of interest.

Disclosure

The author did not receive any type of commercial support either in forms of compensation or financial for this study. The author has no financial interest in any of the products or devices, or drugs mentioned in this article.

Ethical Approval

Obtained.

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الاتهابات المهبليه ومدى وعي المجتمع لحدوثها لدى الاطفال والمراهقين في المملكة العربيه السعوديه

اعتدال عطيه عبد الرحمن الجحدلي
قسم النساء والتوليد، كلية الطب
جامعة الملك عبد العزيز
جده - المملكة العربيه السعوديه

المستخلص. اصبحت الالتهابات النسائية المهبلية من المشاكل الشائعة في المملكة وهناك العديد من العوامل المساعدة لحدوثها ومنها غياب الوعي الصحي للأسباب الحقيقية المسببة لها لدى بعض الفئات العمرية. الهدف من هذه الدراسة معرفة مدى وعي المجتمع بوجود هذه الالتهابات لدى الاطفال والمراهقين وعلاقه الاسباب المعروفة لحدوث هذه الالتهابات لدى هذه الفئة العمرية من المجتمع. دراسة مقطعية وصفية بواسطة تعبئة نوعين من الاستبيان ذاتي التطوير (للفتيات المراهقات، الامهات) تمت على اربعة اشهر ديسيمبر٢٠١٣ الى مارس ٢٠١٤ وقد تم توزيع الاستبانة على الفئات العمرية المستهدفة في اماكن الانتظار في عيادات المستشفى الجامعي بجده والحرم الجامعي والأماكن العامة (المولات). دلت نتائج الاستبيان على ان ٩٧٪ من الامهات على علم ومعرفه بوجود وامكانية حدوث هذه الالتهابات لدى الفتيات قبل البلوغ والمراهقات قبل الزواج، وذلك بالسؤال عن اعراض هذه الالتهابات البكتيرية حيث ان ٨٤٪ وقع اختيارهم على وجود الافرازات ك عرض اساسي. الا ان المراهقات من زوجات وغير زوجات كانت معرفتهم اقل نسبيا ٥٢,٦٪. اضافة الي ان استخدام الغسول المهبلي الداخلي من قبل المراهقات النشطات جنسيا مصاحب لحدوث الالتهابات بنسبه أكبر. والجدير بالذكر ان لبس البنطال الضيق او الملابس القطنية الداخلية لم يظهر اي فرق في نسبة حدوث هدة الالتهابات لدى جميع الفئات المستهدفة .الاطفال قبل سن البلوغ كانت نسبه الإصابة لديهم اعلى من الفيات بعد البلوغ. النتائج من هذا الاستبيان اننا ما زلنا بحاجة الي دراسات أكبر واوسع لمعرفة الاسباب الحقيقية لحدوث هذه الالتهابات لدى الفتيات قبل البلوغ والمراهقات قبل الزواج.