

ORIGINAL ARTICLE

# Increased vaginal discharge during pregnancy: prevalence, causes, and associated symptoms

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## ABSTRACT

**Background:** Vaginal discharge is a common gynecological condition among women of childbearing age that frequently requires care. It affects about one-third of all women and half of pregnant women. This study is designed to investigate the prevalence of increased vaginal discharge during pregnancy, its associated symptoms and the doctor diagnosed causes among pregnant women in different areas of Saudi Arabia.

**Methodology:** A cross-sectional study was carried out on pregnant women in different regions of Saudi Arabia, during the period from 1 May to 31 July 2019. Data were collected by using a pre-designed online disseminated questionnaire which includes questions designed to fulfill the study objectives. Risk factors were determined using the  $X^2$  test. A  $p$ -value of less than 0.05 was considered as statistically significant.

**Results:** The incidence of increased vaginal discharge among the studied pregnant women was 72.2%. The most common associated symptom reported in our study was itching in 49.2% of cases followed by redness in 48.4%, dysuria in 36%, and swelling in 4.5%. The discharge was colorless in 39.1% of cases, whitish in 32.1%, and yellowish in 28.7%. As regards treatment, 66.3% had medical treatment and improvement occurred in 56% cases, recurrence after treatment occurred in 43.4%. The most common causes were fungal infection in 23.3% of cases, a bacterial infection in 22.6%.

**Conclusion:** The incidence of increased vaginal discharge among the studied pregnant women was 72.2%. The most common causes were fungal infection in 23.3% of cases, a bacterial infection in 22.6%. Therefore, we recommend health education for pregnant women about the importance of treatment of the cases and following the preventive measures to prevent the recurrence.

**Keywords:** Increased vaginal discharge, pregnant women, Saudi Arabia.

## Introduction

Vaginal discharge may be an ordinary physiological or pathological event. Distinguishing abnormal from ordinary discharge is often challenging, both from the view of the patient and the health care provider. Vaginal discharge production may vary from woman to woman and may change in consistency and appearance depending on many factors (hormones, menstrual cycle, pregnancy, and infection) [1]. Abnormal vaginal discharge also predisposes important morbidity in the form of pelvic inflammatory diseases, loss of the pregnancy, premature labor, increase susceptibility to sexually transmitted infections, infertility, endometriosis, urethral syndrome, and low birth weight [2]. Vaginal discharge from the pathology may be of vaginal or cervical origin. Vaginal

discharge may be associated with bacterial vaginosis (BV), *Candida* spp infection, and *Trichomonas vaginalis* (TV). Cervical discharge is generally caused by infection with *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Mycoplasma Genitalium*. Main herpes simplex cervicitis may also occur as a vaginal discharge [3]. *Chlamydia*

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trachomatis, Neisseria gonorrhoeae, and TV are sexually transmitted diseases. Therefore, bacterial vaginosis and candida infections are non-sexually borne infections [4]. In pregnant females, vaginal discharge is also normal, genital mucosa becomes thinner during pregnancy and has a larger surface area that makes pregnant females more vulnerable to infection [5,6]. During pregnancy, pathological vaginal discharge can cause severe damage to pregnant females and their babies, including premature infection, low birth weight, chorioamnionitis, postpartum endometritis, and post-caesarean wound infection [7,8]. A cross-sectional study was carried out which included 233 pregnant females attending the obstetric clinic in the tertiary hospital of Western India found that; a total of 183 (78.54%) pregnant females had vaginal discharge on clinical examination and *Candida albicans* was the most common clinical diagnosis among them. Of 183 cases diagnosed clinically as vaginal discharge syndrome, 38 (20.7%) were tested positive in laboratory investigations. Out of 50 clinically negative cases, 9 (18%) were detected positive for one of the sexually transmitted infections (STIs) on laboratory testing [9]. A previous study included women living in the city of Rio Grande, Southern Brazil, who gave birth in 2010 reported that, of the 2,395 women studied, 43% had pathological vaginal discharge during pregnancy. The analysis showed that younger women of lower socioeconomic conditions, those with a history of abortion, vaginal discharge in a previous pregnancy, and treated for depression, anemia, and urinary tract infection during their current pregnancy, were more likely to have pathological vaginal discharge. Vaginal discharge during pregnancy was highly prevalent in the sample studied calling for proper risk factor management at the primary care level [10]. This study is designed to investigate the prevalence of increased vaginal discharge during pregnancy, its associated symptoms and the doctor diagnosed causes among pregnant women in different areas of Saudi Arabia.

**Subjects and Methods**

A cross-sectional study was carried out on pregnant women in different regions of Saudi Arabia, during the period from 1 May to 31 July 2019. The sample size was calculated using the sample size equation:  $n = z^2 p(1-p)/e^2$ . Data were collected from the Saudi general female population. A multistage random sampling technique was followed. Data were collected by using a pre-designed online disseminated questionnaire which includes questions designed to fulfill the study objectives. Socio-demographic characteristics including age and educational status, family income, pregnancy order and area of residence. It also included questions about increased vaginal discharge during pregnancy, its odor, color, association with itching; doctor diagnosed causes, duration and treatment trials as medical treatment, herbal remedies or self-medication, and if there was recurrence after treatment in addition to the preventive measures as daily vaginal cleaning. The questionnaire had a brief introduction explaining the

aims and significance of the study to the participants. Participants were informed that participation is completely voluntary. No names were recorded in the questionnaires. All answers were kept secret and safe. All the data were analyzed using Statistical Package for Social Sciences version 20. Descriptive statistics were used for the prevalence and quantitative variables. Risk factors were determined using the  $\chi^2$  test. A *p*-value of less than 0.05 was considered as statistically significant.

**Results**

Table 1 shows that most (57.6) of the studied women aged between 21 and 30 years old, 76.1% were highly educated, 3.1% of them were smokers, and 35.1% of them had moderate family income. Only 2.7% of studied women had DM, 2.5% had HT, and 18.2% were obese. Table 2 shows the incidence of increased vaginal discharge among the studied pregnant women as 72.2% positive. Table 3 shows manifestations, treatment characteristics, and preventive measures of increased vaginal discharge among the studied pregnant cases. The most common symptom reported in our study was itching 49.2% followed by redness

**Table 1.** Socio-demographic characteristics and prevalence of increased vaginal discharge of the studied pregnant women (N = 1,022).

	Frequency	Percent
Age group		
• < 21	46	4.5
• 21–30	589	57.6
• 31–40	302	29.5
• 41–50	85	8.3
Total	1,022	100.0
Educational level		
• Basic	28	2.8
• Secondary	216	21.1
• University or more	778	76.1
Smoking status		
• No	990	96.9
• Yes	32	3.1
Family income		
• Good	209	20.5
• Very good	270	26.4
• Poor	79	7.7
• Moderate	359	35.1
• Excellent	105	10.3
Pregnancy order		
• First	333	32.6
• Second	245	24.0
• Third	152	14.9
• Fourth	106	10.4

*Continued*

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	Frequency	Percent
• Fifth	100	9.8
• Sixth	68	6.7
• Seventh or more	18	1.8
Geographical area		
• Eastern Province	701	68.6
• The northern area	18	1.8
• Western Region	100	9.8
• Central Region	73	7.1
• Southern area	130	12.7
Associated health problems		
Diabetes		
• No	994	97.3
• Yes	28	2.7
Hypertension		
• No	996	97.5
• Yes	26	2.5
Obesity		
• No	836	81.8
• Yes	186	18.2

**Table 2.** Incidence of increased vaginal discharge among the studied pregnant women, Kingdom of Saudi Arabia (KSA), 2019 (N = 1,022).

Increased vaginal discharge with pregnancy	No.	%
No	284	27.8
Yes	738	72.2
Total	1,022	100.0

48.4%, dysuria 36%, and swilling 4.5%. The discharge was colorless in 39.1% of cases, whitish in 32.1% and yellowish in 28.7%. As regards treatment, our study reported; 68.7% of cases seeking medical care, 66.3% had medical treatment and improvement occurred in 56% of cases, recurrence after treatment occurred in 43.4%. Regarding causes of vaginal discharge; the most common causes were fungal infection in 23.3% of cases, a bacterial infection in 22.6%, and only 2.4% for sexually transmitted diseases. Table 4 illustrates the relationship between increased vaginal discharge with pregnancy and age, educational level, pregnancy order, diabetes, hypertension, obesity, and smoking among the studied pregnant women. It is clear from the Table 4 that increased vaginal discharge with pregnancy was significantly associated with the age group of pregnant women ( $p < 0.05$ ).

### Discussion

Vaginal discharge is a common gynecological condition among women of childbearing age that frequently

**Table 3.** Accompanied symptoms, treatment characteristics and preventive measures of increased vaginal discharge among the studied pregnant cases, KSA, 2019 (N = 1,404).

	No.	%
Accompanied symptoms		
• Redness	357	48.4
• Itching	363	49.2
• Swilling	33	4.5
• Dysuria	266	36.0
• Color of the discharge		
• Colorless	289	39.1
• Whitish	237	32.1
• Yellowish	212	28.7
Smelling of the discharge		
• Not offensive	516	69.9
• Offensive	222	30.1
Causes of discharge (after investigations)		
• Normal discharge	381	51.6
• Fungal infection	172	23.3
• Bacterial infection	167	22.6
• Sexually transmitted diseases	18	2.4
Daily cleaning		
• With water	437	59.4
• With water and soap	106	14.4
• With vaginal cleaning solutions	182	24.7
• Water and salt	7	1.0
Treatment		
• Seeking medical care	507	68.7
• Lab. diagnoses	471	63.8
• Medical treatment	489	66.3
• Improvement of medical treatment	413	56.0
• Recurrence after treatment	320	43.4
• Herbal remedies	237	32.1
• Improvement of herbal remedies	237	32.1

requires care affecting about one-third of all women and half of pregnant women [5,11]. It is the second most common problem after menstrual disorders [12]. Vaginal discharge may be a normal physiologic occurrence or a pathological manifestation. It is often challenging to distinguish abnormal from normal discharge, both from the patient's and the health care provider's perspective. Moreover, normal physiologic variations occur due to biological or hormonal changes [13]. During pregnancy genital mucosa becomes thinner and has a greater surface area making pregnant women more susceptible to infections [14]. Pathological vaginal discharge can cause serious harm to pregnant women and their children, including prematurity, low birth weight, chorioamnionitis, postpartum endometritis, and post-cesarean wound infection [7,15]. This is a cross-

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**Table 4.** Relationship between increased vaginal discharge with pregnancy and age, educational level, pregnancy order, diabetes, hypertension, obesity and smoking among the studied pregnant women, KSA, 2019 (N = 1,022).

Variables	Responses	Increased vaginal discharge with pregnancy		Total (N = 1,022)	p-value
		Yes (n = 783)	No (n = 284)		
Age group	<21	32	14	46	0.001
		4.3%	4.9%	4.5%	
	21-30	457	132	589	
		61.9%	46.5%	57.6%	
	31-40	195	107	302	
		26.4%	37.7%	29.5%	
>40	54	31	85		
	7.3%	10.9%	8.3%		
Educational level	Primary	19	9	28	0.811
		2.6%	3.2%	2.7%	
	Secondary	154	62	216	
		20.9%	21.8%	21.1%	
	University or more	565	213	778	
		76.6%	75.0%	76.1%	
Pregnancy order	First	231	102	333	0.268
		31.3%	35.9%	32.6%	
	Second	192	53	245	
		26.0%	18.7%	24.0%	
	Third	111	41	152	
		15.0%	14.4%	14.9%	
	Fourth	75	31	106	
		10.2%	10.9%	10.4%	
	Fifth	68	32	100	
		9.2%	11.3%	9.8%	
	Sixth	47	21	68	
		6.4%	7.4%	6.7%	
Seventh or more	14	4	18		
	1.9%	1.4%	1.8%		
Diabetes	No	718	276	994	0.536
		97.3%	97.2%	97.3%	
	Yes	20	8	28	
		2.7%	2.8%	2.7%	
Hypertension	No	720	276	996	0.439
		97.6%	97.2%	97.5%	
	Yes	18	8	26	
		2.4%	2.8%	2.5%	
Obesity	No	599	237	836	0.225
		81.2%	83.5%	81.8%	
	Yes	139	47	186	
		18.8%	16.5%	18.2%	
Smoking	No	716	274	990	0.349
		97.0%	96.5%	96.9%	
	Yes	22	10	32	
		3.0%	3.5%	3.1%	

sectional study was conducted among 1,022 pregnant women from different regions of KSA, to investigate the prevalence of increased vaginal discharge during pregnancy, its associated symptoms and the doctor diagnosed causes among pregnant women in different areas of Saudi Arabia. According to the incidence of increased vaginal discharge among pregnant women, our study found that there was an increase in vaginal discharge with pregnancy in 72.2% of cases. These results were higher than another study conducted in the city of the Rio Grande, Southern Brazil among 2,395 pregnant women, which reported that 43% of them had pathological vaginal discharge during pregnancy [10]. Another study carried out among 400 pregnant women reported; the prevalence of abnormal vaginal discharge in pregnancy was 31.5% [16]. Similar to our results, in Western India, another study was conducted among 233 pregnant females found that (78.5%) of them had vaginal discharge on clinical examination [9]. Another study reported a high prevalence rate of abnormal vaginal discharge; the study was conducted among 206 pregnant women, the abnormal discharge was seen in (91%) of them [17]. Regarding the relationship between increased vaginal discharge with pregnancy and other variables, our study found that there was the only relation with age ( $p = 0.001$ ) and it was most common among the age group 21–30 years by 61.9%. However, there was no relation with educational level, pregnancy order, diabetes, hypertension, obesity, and smoking ( $p > 0.05$ ). Another study reported that abnormal vaginal discharge in pregnant was more common (45.8%) among those aged 20–24 years [16]. In contrast to our results another study showed that pathological vaginal discharge during pregnancy was significantly associated with; maternal age; living with a partner; household asset index; parity; vaginal discharge in a previous pregnancy; and diabetes, depression, threatened premature labor, urinary infection, and hospitalization during the current pregnancy [10]. Abnormal vaginal discharge is predominantly caused by the replacement of normal vaginal flora by pathogenic bacteria. The causes of abnormal vaginal discharge may be infective or non-infective. It is usually related to one of the three conditions, such as BV, vulvovaginal candidiasis (VC), and trichomoniasis [18]. We found that the most common causes were fungal infection in 23.3% of cases, a bacterial infection in 22.6%, and only 2.4% for sexually transmitted diseases. However, studies carried out in developing countries demonstrated that the vaginal discharge is caused by STIs in up to 90% of cases [19,20]. Pathological vaginal discharge includes secretions accompanied by itching, rash or soreness, persistent, increased discharge, burning during urination, white, clumpy discharge, a discharge that is heavier and thicker than usual and grey/white or yellow/green discharge [21]. The most common symptom reported in our study was itching 49.2% followed by redness 48.4%, dysuria 36%, and swelling 4.5%. The discharge was colorless in 39.1% of cases, whitish in 32.1%, and yellowish in 28.7%. As regards treatment, our study

reported, 68.7% of cases seeking medical care, 66.3% had medical treatment and improvement occurred in 56% of cases, recurrence after treatment occurred in 43.4%.

## Conclusion

The incidence of increased vaginal discharge among the studied pregnant women was 72.2%. The most common causes were fungal infection in 23.3% of cases, a bacterial infection in 22.6%. Therefore, we recommend health education for pregnant women about the importance of treatment of the cases and following the preventive measures to prevent the recurrence. Also, we recommend more detailed research studies must be conducted regarding this issue.

## List of Abbreviations

KSA Kingdom of Saudi Arabia

## Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

## Funding

None.

## Consent for publication

Informed consent was obtained from all the participants.

## Ethical approval

The research was done after verbal approval of King Faisal University.

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