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THE VULVOVAGINAL CANDIDIASIS, GENITAL HYGIENE BEHAVIORS AND SELF-EFFICACY IN PATIENTS WITH DIABETES: A DESCRIPTIVE CROSS-SECTIONAL STUDY

DİYABETLİ HASTALARDA VULVOVAJİNAL CANDİDİASİS, GENİTAL HİJYEN DAVRANIŞLARI VE ÖZ-ETKİLİLİK: TANIMLAYICI KESİTSEL BİR ÇALIŞMA

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ABSTRACT

Objective: The study aimed to investigate the relationship between vaginal candida, genital hygiene behaviors, and self-efficacy in patients with diabetes.

Methods: This cross-sectional study was conducted in two state hospitals in Sinop and Bolu in Turkey. A total of 267 patients who met the inclusion criteria were enrolled in the study. Data were collected using a questionnaire for descriptive characteristics developed by the researchers, the Inventory of Genital Hygiene Behavior, and the Self-Efficacy-Type 2 Scale.

Results: Participants frequently had genitalia itching (20.2%), genitalia burning (18%), dyspareunia (15%), and vaginal itching (11.2%). In the study, 14.2% of women applied to an obstetrician due to their current symptoms, and 13.5% took treatment for the diagnosis of vaginitis. Although 4.1% had some symptoms, they did not consult an obstetrician and did not receive a diagnosis. The positive and low correlation was between the Inventory of Genital Hygiene Behavior, Self-Efficacy-Type 2 scale, and medical treatment and physical exercise sub-dimensions of the scale ($p<0.05$). There was also a significant difference Self-Efficacy-Type 2 scale and the medical treatment sub-dimension ($p<0.05$). The mean scores of the Inventory of Genital Hygiene Behavior and Self-Efficacy-Type 2 scale differed significantly according to the presence of vaginal infection symptoms.

Conclusion: Patients with diabetes need information on sexual health and genital hygiene from healthcare professionals. However, the developing self-efficacy level in the patients may help with genital hygiene behaviors and prevent vaginal infections.

Keywords: Diabetes Mellitus, Genitalia, Hygiene, Self-Efficacy, Vulvovaginal Candidiasis.

ÖZET

Amaç: Bu çalışmada diyabetli kadın hastalarda vajinal kandida, genital hijyen davranışları ve öz-yeterlilik arasındaki ilişkinin araştırılması ve diyabetli kadınların genital hijyen davranışları konusundaki bilgi gereksinimlerinin değerlendirilmesi amaçlandı.

Gereç ve Yöntem: Tanımlayıcı ve kesitsel tipteki bu araştırma, Türkiye'de Sinop ve Bolu illerinde bulunan iki devlet hastanesinde yapıldı. Genel olarak, dahil etme kriterlerini karşılayan 267 hasta çalışmanın örneklemini oluşturdu. Veriler, araştırmacılar tarafından geliştirilen tanımlayıcı özellikler anketi, Genital Hijyen Davranışları Envanteri (IGHB) ve Tip 2 Diyabet Öz-etkililik Ölçeği kullanılarak toplandı.

Bulgular: Katılımcılar sıklıkla genital bölgede kaşıntı (%20.2), genital bölgede yanma (%18), disparoni (%15) ve vajinal kaşıntı (%11.2) deneyimlediklerini belirtti. Araştırmada kadınların %14,2'sinin mevcut şikayetleri nedeniyle kadın doğum uzmanına başvurduğu, %13,5'inin vajinit tanısı için tedavi gördüğü, %4.1'inin bazı semptomları olmasına rağmen kadın doğum uzmanına başvurmadığı ve tanı almadığı belirlendi. Genital Hijyen Davranışları Envanteri ile Tip 2 diyabet öz-etkililik ölçeği ve ölçeğin medikal tedavi ve fiziksel egzersiz alt boyutları arasında pozitif yönde düşük düzeyde anlamlı ilişki bulundu ($p<0.05$). Ayrıca Genital Hijyen Davranışları Envanteri ile Tip 2 diyabet öz-etkililik ölçeği ve medikal tedavi alt boyutu arasında anlamlı fark bulundu ($p<0.05$). Genital Hijyen Davranışları Envanteri ile Tip 2 diyabet öz-etkililik ölçeği puan ortalamalarının vajinal enfeksiyon belirtisi durumuna göre anlamlı farklılık gösterdiği saptanmıştır.

Sonuç: Diyabetli kadın hastalar, sağlık uzmanlarından cinsel sağlık ve genital hijyen konusunda bilgi almaya gereksinim duymaktadır. Bununla birlikte hastaların öz-yeterlilik düzeylerinin geliştirilmesi genital hijyen davranışlarına ve vajinal enfeksiyonların önlenmesine yardımcı olabilir.

Anahtar Kelimeler: Diabetes Mellitus, Genital, Hijyen, Öz-yeterlilik, Vulvovajinal Kandidiyazis.

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INTRODUCTION

Diabetes is a common chronic disease with increasing incidence and secondary health problems worldwide (IDF, 2021). In addition to the most well-known health problems such as cardiovascular diseases, stroke, renal failure, and retinopathy that develop as a complication of diabetes, genital infections also occur in people with diabetes (Deshpande et al., 2008; Nyirjesy, Sobel, 2013).

Genital infections usually occur in women are called vulvovaginal candidiasis (VVC). Changes in the vaginal environment often lead to gaining the pathogenic properties of commensal opportunistic Candida organisms (Gonçalves et al. 2016). Host-specific and behavioral risk factors may be predisposing factors for vulvovaginal candidiasis. These factors include pregnancy, hormone replacement therapy, immunosuppression, antibiotics, glucocorticoids, oral contraceptives, and uncontrolled diabetes mellitus, etc. (Patel et al. 2004; Sobel 2007, Gonçalves et al. 2016). In studies on this topic, the incidence of VVC in women diabetes higher than women with without diabetes (Goswami et al. 2006; Grigoriou et al., 2006; Savetha et al., 2021). Vaginal candida colonization and the development of recurrent VVC are also more common in diabetic women (Gunther et al., 2014). High glucose levels contribute to the development of VVC by disrupting basic host defense mechanisms and facilitating Candida adhesion to vaginal epithelial cells (Gonçalves et al., 2016).

Studies of life-threatening complications of diabetes and measures to prevent these complications are more common in the literature. In addition, some studies describe the association between vaginal Candida infections and diabetes and determine their frequency. However, new studies are needed to examine patients' experiences, information needs, and genital hygiene behaviors related to vaginal Candida infections. Patients generally lack information on VVC infections and have difficulty communicating with healthcare professionals because they view VVC infections as private matters. VVC infections can later develop into serious health problems. A multicenter study conducted in Turkey found that although patients presenting to obstetrics and gynecology clinics frequently had vaginal symptoms, about 2/3 of the patients consulted a physician, and half of the women were diagnosed with VVC. The same study stated that patients had information deficits and incorrect behaviors related to sexual health and genital hygiene, but there was no relationship between genital hygiene behaviors and VVC (Unal Toprak et al., 2022).

Self-efficacy, one of the five structures of Bandura's social cognitive theory, is defined as the level of confidence people need to perform a behavior within their capabilities. Self-efficacy is a critical aspect of diabetes self-management. A high level of self-efficacy leads to the management of diabetes and the development of a healthy lifestyle (Hailu et al., 2019). Self-efficacy is a psychological concept defined as a person's self-perception of their ability to achieve and accomplish goals. High self-efficacy is associated with less reported pain in patients with or without type 2 diabetes, better self-care, more frequent healthy behaviors, and higher quality of life (Huayanay-Espinoza et al., 2021). The literature states that high levels of self-efficacy in patients with type 2 diabetes increase adherence to treatment and decrease complications, thereby improving health behaviors (Qiu et al., 2020).

The primary aim of this study was to investigate the relationship between vaginal candida, genital hygiene behaviors, and self-efficacy in female patients with diabetes. It is thought that this study will help to fill the knowledge gap in the literature. In addition, it is foreseen that the findings obtained by this descriptive study may shed light on the awareness of women with diabetes about VVC and the intervention studies to be carried out on the topic.

MATERIALS AND METHODS

The Design of the Study

This research was cross-sectional study. The study was conducted at Sinop State Hospital and Abant Izzet Baysal University Izzet Baysal Koroglu State Hospital between 30.07.2018-30.12.2018.

The Population and Sample of the Study

The data were obtained from female patients with diabetes whom the Diabetes Education Nurse followed up at Sinop State Hospital and Abant Izzet Baysal University Izzet Baysal Koroglu State Hospital. The inclusion criteria for the study were to be diagnosed with Type 2 Diabetes, be over 18 years old, be female, be married, have no communication and understanding problems, and volunteer to participate. A total of 267 patients who met the inclusion criteria at the specified dates were study samples. The patients who were male, single, younger than 18 years, with type 1 diabetes, non-volunteer

and had communication and understanding problems were excluded. The sample size did not calculate, and convenience sampling was preferred for the study duration.

Instruments

The data were collected using a questionnaire for descriptive characteristics developed by the researchers (Cangöl and Tokuç, 2013; Dalbudak, Bilgili, 2013; Erbil et. al, 2013; Orak and Canuygur, 2014; Sevil et al., 2013), Genital Hygiene Behaviors Inventory (IGHB), and the Self-Efficacy (SE)-Type 2 Scale.

The questionnaire for descriptive characteristics

The questionnaire consisted of two parts. The first part included questions on the socio-demographics such as age, educational status, marital status, income status, and the diabetes characteristics such as diabetes type, duration, treatment method, and complications. The second part included questions about risk factors for vaginal candidiasis like smoking, alcohol, antibiotic use, and urinary tract infection history.

The Inventory of Genital Hygiene Behaviors (IGHB)

Ege and Eryılmaz (2005) developed the Genital Hygiene Behaviors Inventory. The IGHB is a one-dimensional inventory of 4-point Likert types from never (1) to always (4) and consists of 27 questions about general hygiene, menstrual hygiene, toilet hygiene, and sexual hygiene practices. In the IGHB, 17., 26., and 27. statements are reverse statements. The lowest score is 27, and the highest score is 108. As the score increases, the genital hygiene behaviors also elevate to the desired level. The Cronbach's alpha (α) reliability coefficient of the scale was 0.86. In this study, Cronbach's alpha value was 0.73.

Self-Efficacy (SE)- Type 2 Scale

The SE-Type 2 scale was developed by Bijl et al.(1999). Kara, Van der Bijl, Shortridge-Baggett, Asti, and Erguney (2005) studied the validity and reliability of the Turkish version of the scale. The scale includes 20 items based on a five-point Likert-type, and response options range from "yes, I'm sure" (5) to "no, I'm not sure"(1). The scale had three sub-dimensions: diet and feet control, medical treatment/control, and physical exercise. The highest scores indicate a high level of self-efficacy. The Cronbach's alpha coefficient of the scale was 0.88. In this study, Cronbach's alpha value was 0.91.

Data collection procedure

The instruments were applied to patients followed by Diabetes Nurses who worked at Sinop Ataturk State Hospital and Izzet Baysal Koroglu State Hospital. All patients who met the research criteria were informed about the study. The researchers interviewed patients face-to-face and filled out instruments for approximately 20 minutes.

Data analysis

Data were analyzed using the statistical program IBM SPSS 23. Frequencies and percentages were calculated for categorical variables on patients' descriptive characteristics. Numeric variables such as age, diabetes duration, HgA1c values, and scale points were analyzed using descriptive statistics. Tests for skewness and kurtosis were used to verify that numeric variables had a normal distribution. Data were analyzed using the Kruskal Wallis Test and Spearman's rho correlation coefficient as the variables did not have a normal distribution. The accepted significance level was $p < 0.05$.

Ethical considerations

Before the data collection process, verbal and written consent was obtained from the patients who will participate in the study with the patient information form. Ethics committee approval has been received from 31.10.2018 date and 44 numbers of the Sinop University Human Research Ethics Committee.

Limitations

The study has several limitations. One of these was related to the study sample. The sample consisted of patients who met the inclusion criteria and were available in two public hospitals at the time of the research. However, the results can shed light on broader sample or intervention studies. Another limitation was that vaginal infections, self-efficacy levels on diabetes management, and genital hygiene behaviors were based on patients' self-report.

RESULTS

The mean of the participants' ages was 55.1±8.9. 70.1% of the patients graduated from primary school, 91.4% were married, and 69.7% were moderate income. The mean diabetes duration and HgA1c levels of them were 78.7±60.4 months and 7.1±1.5%, respectively. Half of them (58%) used insulin for diabetes treatment. 43.4% of participants reported having another chronic disease together with diabetes, and 43.1% had taken medications for their chronic health problems (Table 1).

Table 1. Participants' Descriptive Characteristics

Descriptive characteristics	$\bar{X}$ **±SD**	**Min-Max**
Age	55.1±8.9	24-89 years
Diabetes Duration	78.7±60.4	1-360 months
HbA1c (n=236)	7.1±1.5	3.5-11.9%
Number of pregnancy	3.2±1.6	0-10
Educational Level	**n**	**%**
Illiterate or Literate	26	9.7
Primary school	187	70.1
High school	35	13.1
Bachelor	19	7.1
Marital status		
Married	244	91.4
Single	23	8.6
Income status		
Low	78	29.2
Moderate	186	69.7
High	3	1.1
Diabetes treatment		
Insulin	155	58
Oral antidiabetics (OAD)	64	24.0
OAD&Insulin	47	17.6
Only diet treatment	1	0.4
Having another chronic disease	116	43.4
Taking medicine for other diseases	115	43.1
Using Tobacco	13	4.9
Taking antibiotics	57	21.3
Urinary tract infection history	39	14.6
Obstetrical surgery or diseases	2	0.7
Using a contraceptive method	106	39.7
Postmenopausal patients	203	76
Sexually active Patients	235	88

When women with diabetes were asked whether they had symptoms related to VVC, they often stated that they always or sometimes experienced genitalia itching (20.2%), genitalia burning (18%), dyspareunia (15%), and vaginal itching (11.2%). However, sexually active women had itching during or after intercourse (17.1%), and non-postmenopausal women had an increase in complaints during menstruation (21.9%) (Table 2).

Table 2. Participants' Vaginal/Genitalia Symptoms

Symptoms	Yes (Always/sometimes)		No (Never)	
	n	%	n	%
Genitalia itching	54	20.2	213	79.8
Genitalia burning	48	18	219	82
Dyspareunia	40	15	227	85
Vaginal itching	30	11.2	237	88.8
Genitalia redness	18	6.7	249	93.3
Vaginal discharge like cottage cheese	16	6	251	94
Foul-smelling vaginal discharge	15	5.6	252	94.4
Dysuria	14	5.2	253	94.8
Increasing the amount of vaginal discharge	10	3.7	257	96.3
Vaginal odor like yogurt/dough	6	2.2	261	97.8
Genitalia swelling	6	2.2	261	97.8
Itching during or after intercourse*	40	17.1	195	82.9
Increase in complaints during menstruation**	14	21.9	50	78.1

*Percentage was calculated for sexually active women, n=235
** Percentage was calculated for non-postmenopausal women, n=64

In the study, 14.2% of women applied to an obstetrician due to their current complaints, and 13.5% took treatment for the diagnosis of vaginitis. Although 4.1% had some symptoms, they did not consult an obstetrician and were not diagnosed (Table 3).

Table 3. Participants' Hygiene Behaviors and Information on Genital Infections in Diabetes

	n	%
Genital infection symptoms		
Yes, possible	11	4.1
Yes, diagnosed	36	13.5
No	220	82.4
Consulting with an obstetrician	38	14.2
Taking treatment for Vaginitis	36	13.5
Having information on genital infections in diabetes	166	62.2
Resources of information*		
TV programs	89	31.4
Friends	51	18
Diabetes nurse	48	17
Internet	29	10.2
Physician	24	8.5
Midwifery	21	7.5
Brochure	12	4.2
Magazine	9	3.2
Having sufficient information	18	6.7
Need information for genital infections	217	81.3
Genital cleaning method		
Water and toilet paper	241	90.3
Other**	26	9.0
Using a deodorant/an antiperspirant in the genital area	3	1.0
Washing inside of the vagina	59	22.1

* Percentages were calculated according to the total number of answer (n=283)
**Other (water, Antiseptic solution, toilet paper, soap)

62.2% of the female patients with diabetes who participated in the study stated that they knew about genital infections as a complication of diabetes. They frequently specified that they learned from TV programs (31.4%), friends (18%), and diabetes nurses (17%). While 6.7% found their information on this issue sufficient, 81.3% stated that they needed information on it (Table 3).

Table 4. Participants' Mean and Total Scores for IGHB

Items	**Never**	**Sometimes**	**Often**	**Always**	**Mean ±S.D.**
The whole patients (n=267)	**n/%**	**n/%**	**n/%**	**n/%**	
Participating in training on sexual health	251/94	7/2.6	5/1.9	4/1.5	1.1±0.5
Follow the news in the media about sexual health	209/78.2	45/16.9	5/1.9	8/3	1.3±0.6
Getting information from health care professionals about genital hygiene	230/86.2	24/9	7/2.6	6/2.2	1.2±0.6
Paying attention to genital hygiene	9/3.4	11/4.1	85/31.8	162/60.7	3.5±0.7
Washing hands before using the toilet	159/59.6	30/11.2	24/9	54/20.2	1.9±1.2
Washing hands after toilet	2/0.7			265/99.3	4.0±0.3
Bidet from back to front	189/70.8	19/7.1	18/6.7	41/15.4	1.7±1.1
Continuous use of diapers	193/72.3	5/1.9	12/4.5	57/21.3	1.7±1.3
Drying with toilet paper after bidet	6/2.2	5/1.9	7/2.6	249/93.3	3.9±0.5
Wearing cotton underwear	13/4.9	14/5.3	22/8.2	218/81.6	3.7±0.8
Changing underwear every day	38/14.2	11/4.1	29/10.9	189/70.8	3.4±1.1
Ironing your underwear	136/50.9	106/39.7	7/2.6	18/6.8	1.7±0.8
Monitoring the genital area for signs of disease	199/74.6	40/15	14/5.2	14/5.2	1.4±0.8
Regular visits to the obstetrician	227/85	32/12	2/0.7	6/2.3	1.2±0.6
Consulting the physician when have a foul-smelling discharge	32/12	38/14.2	35/13.1	162/60.7	3.2±1.1
Consulting the physician when itching in the genital area	32/12	31/11.6	32/12	172/64.4	3.3±1.1
Sexually active patients (n=235)					
Washing hands before sexual intercourse	194/82.6	5/2.1	3/1.3	33/14	1.5±1.1
Washing hands after sexual intercourse	2/0.9	2/0.9	3/1.2	228/97	3.9±0.3
Washing the genital area before sexual intercourse	196/83.4	4/1.7	4/1.7	31/13.2	1.4±1.0
Washing the genital area after sexual intercourse		1/0.4	2/0.9	232/98.7	4.0±0.2
Consult a physician when you have pain or bleeding during sexual intercourse	52/22.1	35/15	25/10.6	123/52.3	2.9±1.2
Using a condom during sexual intercourse/asking your partner to use it when have a foul-smelling discharge	204/86.8	6/2.6	14/6	11/4.6	1.3±0.8
Non-postmenopausal patients (n=64)					
Using ready-made pads during the menstrual period	1/1.6	4/6.3	1/1.6	58/90.6	3.8±0.6
Using diapers during menstruation	51/79.7	3/ 4.7	1/1.6	9/14	1.5±1.1
Taking a standing shower during menstruation	2/3.1	1/1.6	5/7.8	56/87.5	3.8±0.6
Washing hands before changing your pad	36/56.3	7/10.9	7/10.9	14/21.9	2.0±1.3
Washing hands after changing your pad	1/1.6			63/98.4	4.0±0.4

Table 4 shows the mean and total scores of female patients with diabetes for each item in the IGHB. The total score was calculated over non-menopausal and sexually active women who answered the scale. The total IGHB mean score was 71.4±7.6 (min-max. 62-100 points). In nearly half of the scale items, the mean scores of the women with diabetes were three and over. The mean scores of whole women for

items regarding paying attention to genital hygiene, washing hands after toilet, drying with toilet paper after bidet, and wearing cotton underwear were 3.5 and over. In the study, women with diabetes performed some of the genital hygiene behaviors in the IGHB often/always and some of them sometimes/never. Also, the participants often did not receive training or information from health personnel on sexual health (94%) and genital hygiene (86.2%).

Table 5 includes the correlations between IGHB and SE-Type 2 scale and its sub-dimensions. The positive low correlation was between the IGHB and SE-Type 2 scale, and medical treatment and physical exercise sub-dimensions of the scale (Table 5).

Table 5. The correlations between IGHB and SE-Type 2 scale and its sub-dimensions

	IGHB (r; p)	**SE-Type 2 scale**	**SE-Type 2 scale -diet and foot control (r; p)**	**SE-Type 2 scale -medical treatment (r; p)**	**SE-Type 2 scale - physical exercise (r; p)**
IGHB (r; p)	1.000				
SE-Type 2 scale (r; p)	0.390 0.001*	1.000			
SE-Type 2 scale -diet and foot control (r; p)	0.244 0.052	0.844 0.001*	1.000		
SE-Type 2 scale - medical treatment (r; p)	0.384 0.002	0.923 0.001*	0.650 0.001*	1.000	
SE-Type 2 scale - Physical exercise (r; p)*	0.430 0.001*	0.691 0.001*	0.428 0.001*	0.651 0.001*	1.000
mean±S.D.(min.-max.)	70.9±8.0 (62-100)	56.3±13.4 (30-91)	34.9±7.8 (17-59)	14±5.3 (5-25)	7.3±2.6 (3-15)

* Spearman's rho correlation coefficient; p<0.05

However, a significant difference between the vaginal infection symptoms and IGHB and SE-Type 2 scale and the medical treatment and physical exercise sub-dimensions (p<0.05) (Table 6).

Table 6. Vaginal Infection Symptoms, IGHB and SE-Type 2 Scale and its Sub-Dimensions

Scales	**Vaginal infection symptoms**	**N**	**Mean Rank**	**Test Statistics***
SE-Type 2 scale	Yes, diagnosed	16	45.34	Chi-Square: 16.719 p: 0.001*
	Yes, possible	3	54.83	
	No	45	26.44	
SE-Type 2 scale -diet and foot control	Yes, diagnosed	16	38.38	Chi-Square: 5.955 p:0.051
	Yes, possible	3	50.83	
	No	45	29.19	
SE-Type 2 scale -medical treatment	Yes, diagnosed	16	47.47	Chi-Square: 22.436 p: 0.001*
	Yes, possible	3	57.67	
	No	45	25.50	
SE-Type 2 scale -Physical exercise	Yes, diagnosed	16	42.59	Chi-Square: 6.473 p:0.039*
	Yes, possible	3	27.83	
	No	45	29.22	
IGHB	Yes, diagnosed	16	43.97	Chi-Square: 8.226 p: 0.016*
	Yes, possible	3	26.83	
	No	45	28.80	

* Kruskall Wallis Test; p<0.05

DISCUSSION

Yeast infections are a substantial health problem in women. They are called vulvovaginal candidiasis, caused by Candida species, and commonly affect the vulva. Although VVC is a preventable and treatable problem, it is generally considered a private subject among women. Therefore, it can be diagnosed later. When it is not treated well or exposure to risk factors cannot be prevented, it causes recurrent chronic infections (Sobel, 2016). However, VVC negatively affects body image, sexual activity, and quality of life. Fear of sexually transmitted diseases or cancer and fear of infertility in women also lead to economic and occupational losses (Dalbudak, Bilgili, 2013; Denning et al., 2018).

Studies conducted with different groups in different regions of Turkey stated that women's genital hygiene behaviors are insufficient and they need information (Cangöl and Tokuç, 2013; Gözüyeşil, 2020; Karadeniz et al., 2019; Orak and Canuygur, 2014; Sevil et al., 2013; Unal Toprak et al., 2022). Some studies specified that there is a connection between genital hygiene behaviors and vaginal infections (Dalbudak, Bilgili, 2013; Yesilcicek Calik et al., 2020). Unal Toprak et al. (2022) found that about 2/3 of the diabetic women consulted a physician, and half of them were diagnosed with VVC. However, they stated that there was no relationship between genital hygiene behaviors and VVC. The frequency of vaginal infection symptoms in women in these studies also varied considerably. This difference may be due to the sample characteristics and study design. In the current study, patients with diabetes had various risk factors for VVC, such as antibiotic use, surgery, and contraception, in addition to diabetes. Risk factors for VVC are well described in the literature (Patel et al. 2004; Sobel 2007, Gonçalves et al. 2016).

Genital hygiene behaviors are also one of these risk factors (Dalbudak, Bilgili, 2013). The literature recommends that female patients with diabetes should pay attention to genital hygiene behaviors to reduce or prevent the risk of VVC (Faraji et al., 2012; Gonçalves et al. 2016). However, there are not many studies examining the genital hygiene behaviors and vaginal infection symptoms of these patients. The present study examined the relationship between VVC infection and genital hygiene behaviors.

In the study, the presence of vaginal infection was discussed based on patient self-report. We found that there may be patients with an ongoing infection or with an infection that has already been diagnosed and treated, as well as undiagnosed patients who have not sought medical attention despite symptoms of vaginal infection. Vaginal infection symptoms such as genital and vaginal itching, cheesy discharge, dyspareunia, and dysuria were evaluated as possible vaginal infections. These symptoms were common in patients participating in the study and have also been reported in studies in the literature (Cangöl and Tokuç, 2013; Gözüyeşil, 2020; Karadeniz et al., 2019; Orak and Canuygur, 2014; Sevil et al., 2013; Unal Toprak et al., 2022; Yesilcicek Calik et al., 2020).

As in other populations in the literature, a significant difference between genital hygiene behaviors and vaginal symptoms was found in female patients with diabetes. Although there are some deficits in genital hygiene behavior in women, the behavior of "monitoring the genital area for signs of disease," which is related to early detection of symptoms, was found to be performed less frequently. The total score of the genital hygiene behavior inventory was slightly lower than the study results of Dalbudak and Bilgili (2013) and Karadeniz et al. (2019) but higher than the results of Gözüyeşil (2020).

Women especially need information about sexual and genital hygiene. Diabetes nurses ranked third in the sources from which they obtained information on this topic. For diabetes nurses who monitor patients with diabetes more frequently and long term, it seems feasible to inform patients about VVC infections as a complication of diabetes. Diabetes nurses focus on increasing patient participation in diabetes management and enhancing patient self-efficacy. Self-efficacy helps to achieve good glycemic control and maintain diabetes self-care behaviors (Walker et. al, 2020). Also, Hirji et al. (2012) found patients with poorly controlled diabetes had higher risks for genital infections. This study was the first to examine vaginal symptoms, genital hygiene behaviors, and self-efficacy levels in female diabetics. It was found that there was a significant difference between patients' vaginal symptoms and their self-efficacy scores and medical treatment and physical exercise subdimensions. This result suggests that vaginal infections can also be prevented by improving patients' self-efficacy. Therefore, by informing female diabetic patients about this issue and supporting their self-efficacy the nurses may enhance genital hygiene behaviors and prevent vaginal infections.

CONCLUSION

The women with diabetes in the study had some vaginal symptoms, and some of those did not consult the obstetrician for their symptoms. They often had often insufficient knowledge of sexual health and genital hygiene, and also inaccurate genitalia hygiene behaviors. Female patients with diabetes need information on the topic. However, a low correlation was between IGHB and SE-Type 2 scale and its sub-dimensions, and a significant difference between IGHB and SE-Type 2 scale and the medical treatment sub-dimension. Therefore, the development of self-efficacy levels in the patients, which were quite essential for diabetes management, can help with genital hygiene behaviors and prevent vaginal infections. Also, we recommend clinical researchers renew the study with sexually active diabetic patients are 15-49 years and in a larger sample group. They can study moderating effect of self-efficacy on the relationship between IGHB and vaginal infections.

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Conflict of Interest

The authors have no potential sources of conflict of interest to disclose.

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Author Contributions

Concept and Design: AAY, BBÖ, FÜT.**; Data Collection/Literature Search:.;** AAY, BBÖ, FÜT.**; Analysis and Interpretation of Data:** AAY.**; Preparation of the Article:** AAY, BBÖ, FÜT.**; Approval of the Final Version:** AAY, BBÖ, FÜT.

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