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ORIGINAL ARTICLE

Urinary incontinence among Muslim women in Israel: risk factors and help-seeking behavior

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Abstract
Introduction and hypothesis The prevalence of urinary incontinence (UI) varies among women in different cultures. Muslim women with UI have complex issues related to the need for cleaning (ablution) before prayer. The aim was to assess the prevalence of UI, factors associated with it, its effect on quality of life, and help-seeking behavior among Muslim women.
Methods This was a cross-sectional study. Self-administered questionnaires completed by women 18–75 years of age who visited the primary care clinic between 21 June 2015 and 9 October 2015 and additional data collected from their medical records.
Results A total of 492 women (mean age 31.8 ± 9.5 years) participated in the study. Of these, 43% suffered from UI and 19% from severe to very severe UI. The mean score for interference in daily life (0–10) was 6.3 ± 3.7. Sixty percent of women with UI had stress incontinence, 23% urge incontinence, and 9% mixed incontinence. Only 10% had consulted previously with their physician regarding UI. Increased BMI (OR = 1.048, 95% CI 1.009–1.089) and polygamy (OR = 1.943, 95% CI 1.007–3.749) were associated with severe to very severe UI. Age, parity, and more severe degrees of UI were associated with help-seeking behavior (OR = 1.065 95% CI 1.008–1.125, OR = 0.763 95% CI 0.624–0.934, OR = 4.073 95% CI 1.410–11.765 respectively).
Conclusions Urinary incontinence is very common among Muslim women in primary care in southern Israel and significantly impairs their quality of life. Only a small percentage consults with their physician.

Keywords Urinary incontinence · Muslim women · Bedouin · Quality of life · Help-seeking behavior

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Introduction

Scientific background

Urinary incontinence (UI) is a very common problem for women, in particular for middle-aged and older women and has physical, psychological, and social effects [1]. Physically, patients suffer from secondary bacterial and fungal infections, pressure sores, and impaired sexual function. Psychologically, they suffer from depression, reduced self-esteem, reduced self-confidence, and embarrassment. Socially, they tend to avoid social events, have a reduced level of personal activity, a loss of independence, and increased costs [1, 2]. The common types of UI are stress incontinence, urge incontinence, and mixed stress and urge incontinence. Stress incontinence results from weakness of the pelvic floor muscles due to aging and vaginal deliveries, and direct perineal trauma is the most common type. Additional risk factors for UI are white race and obesity [3, 4]. UI is under-diagnosed because most patients do not consult with their physicians because of shame, embarrassment, and lack of awareness that there are therapeutic options. Incontinence does not always bother women and there is no consensus on the frequency rate that should be considered problematic. All types of UI have been reported, with varying prevalence rates, in the general female population: 51% in the United States [5], 40% in the UK [6], 17% in

France [7], 18% in Mexico [8], and 24% in Spain [9]. The reported prevalence rates in Muslim countries range from 40% in Turkey [10] to 29% in Saudi Arabia [11], to 11% in Pakistan [12].

Another factor that affects the perception of UI and attitudes towards it is religious-cultural identification. On the one hand, there are similarities between Eastern and Western women in terms of the feeling of lack of control, lack of confidence, and futility. On the other hand, UI has a much greater negative effect on Muslim women than on non-Muslim women. Ablution (*wadu*) is a ritual that is performed by every Muslim before prayers. Lack of control over urine, stools, or rectal gas negates ablution and necessitates repetition of the ritual. The prayer (*namaz*) is carried out five times daily and requires Muslims to stand, bend over, and sit while reciting verses from the Koran. These movements can cause loss of control in women with UI, which can subsequently lead to feelings of guilt and punishment [13].

Religious beliefs can lead to fatalism because the patients think that UI is decreed from above. Thus, there is said to be no point in seeking help. Linguistic and communication issues can also keep women from seeking help. When the physician does not speak Arabic, family members may serve as translators making the women less likely to be forthright on these intimate matters. Some Muslim patients feel that the medical staff are not sensitive enough and not really interested in their health problems [14, 15].

The Negev Bedouins are one of Israel's ethnic groups and make up 3.5% of the Israeli population. They are a traditional Muslim population with one of the highest rates of natural growth in the world. Customs such as polygamy (husband having more than one wife) and in-marriage, particularly among cousins, are accepted in this population [16].

As the birth rate is very high and delivery is a major risk factor for stress incontinence, we assumed that there is a high prevalence of UI among Bedouin women. Based on the literature, there is underreporting of UI and a lack of sensitivity on the part of the medical staff [13]. Thus, the issue of UI in this Muslim Bedouin population is worthy of research.

Aims of the study

The primary aims of the study were to evaluate the prevalence of UI, factors associated with it and its effect on the quality of life of Bedouin women in a primary care clinic. An additional important goal was to evaluate whether these women complained of UI without having been asked about it directly, based on their computerized medical records over the previous 5 years. The secondary aims were to determine which types of UI exist among these Bedouin Muslim women, to identify factors associated with the severity of UI, to identify factors associated with help-seeking behavior, and to identify differences in patient characteristics for the various types of UI (stress, urge, and mixed).

Materials and methods

The study was approved by the Helsinki Committee of the Meir Medical Center (approval #030/2014 k). Informed consent forms were signed by all women.

Study type

This was a two-part observational study. The first part was based on self-administered questionnaires and the second on data collection from computerized medical records.

Location

The study was conducted in the Rahat Clinic of the Clalit Healthcare Services. Rahat is the largest Bedouin city in the Negev. The clinic population includes 5,750 women aged 18–75 who comprise 46% of the clinic's patient roster. The mean number of monthly visits to primary care physicians is 4,000.

Study population

The study population included all Bedouin women aged 18–75 years who came to the primary care clinic for any reason during the study period from 21 June 2015 to 9 October 2015. Women with cognitive impairment or illiteracy were excluded from the study, as were pregnant women.

Study instrument

Many instruments are available for the assessment of UI and its effect on quality of life, but most have not been adapted for international use. The International Consultation on Incontinence Short Form Questionnaire (ICIQ-UI SF), the most widely applied instrument for the evaluation of female UI [3], has been translated into many languages. The Arabic translation is considered valid and reliable [17], as reported in studies from Saudi Arabia, Egypt, and Syria [18]. The questionnaire was designed to the evaluate prevalence, type, and severity of UI, and its effect on quality of life. The ICIQ-UI SF was awarded the highest recommendation (grade A) by the committees of the 5th International Consultation of Incontinence. It consists of four items. The first three items (frequency, amount, and the impact on quality of life) comprise the sum score (0–21). The fourth item is a self-assessment of the etiology of UI and the patient's perception of the cause and type of leakage [2].

Bedouin women who came to the primary care physician for various reasons, and gave informed consent, were included

in the study and were asked to complete the ICIQ-UI SF in Arabic. They were also asked about age, years of education, residence (house/tent), whether they have built-in toilets in their home or makeshift outdoor accommodation, whether their husband has more wives, and about obstetric history (number of pregnancies, number of vaginal deliveries, and number of Caesarean sections). The patients completed the questionnaire immediately after their appointment with their physicians and they left the completed, identifiable questionnaire with the physician. The informed consent forms and the study questionnaires were distributed among the patients by the first author, a female physician who treats the study patients. This made it easier for the patients to open up on this sensitive issue.

The medical records of women who were identified as suffering from UI were surveyed to determine whether they had consulted with their physician over the previous 5 years because of UI. All visits over the previous 5 years, counting from the interview day, were reviewed for both historic information and recorded diagnoses. Data on BMI were collected from each patient's medical record.

Sample size calculation

Based on the medical literature we assumed that the prevalence of UI among Bedouin women would be at least 25%. Based on the cultural characteristics discussed above in addition to the investigators' subjective impressions, we assumed that UI would be documented in the medical record in less than half of the patients.

We based our sample size calculations on these assumptions. Assuming a precision of 10% for the prevalence of UI (25 ± 10%) and a precision of 12.5% for the documentation of UI in the medical record (50 ± 12.5% for women with UI), both with a significance level of 95%, the required sample size would be 492 women; 122 with anticipated UI and 61 with recorded documentation of this condition.

Statistical analyses

Categorical variables are presented as frequency and percentages. Continuous variables are presented as mean ± standard deviations (SD). UI was divided into four severity grades based on the sum of scores for questions 1–3 in the ICIQ-UI SF questionnaire: slight (1–5), moderate (6–12), severe (13–18), and very severe (19–21) [19].

Statistical analyses were performed using the IBM SPSS package, version 23.

In the univariate analysis, we conducted a comparison of the characteristics of women by the presence or absence of UI and by the severity of UI (slight or moderate compared with severe or very severe). Differences between categorical variables were tested using Chi-squared or Fisher's exact test, in accordance with the size of the cells. Differences in continuous variables were tested using one-way ANOVA. Variables with statistically significant differences in the univariate analyses were entered into the multivariate models. Three multivariate binary logistic regression models were constructed: the first to identify factors associated with UI in general, the second to identify factors associated with severe to very severe UI, and the third to identify models associated with consultation with the doctor on UI. In all statistical tests, $P < 0.05$ was considered to be statistically significant.

Results

Patient characteristics

Four hundred and ninety-two women (mean age = 31.8 ± 9.5 years) were interviewed for the study. The mean BMI was 27.3 ± 6.4. Seventy-five percent of the participants had been pregnant in the past with a mean number of 4.9 ± 3.3 pregnancies. The mean number of vaginal deliveries was 3.5 ± 3.0 and 28% had undergone Cesarean sections. The mean education level was 11.3 ± 3.7 years. Twelve percent of the women belonged to polygamous families. Only two women lived in tents (the rest lived in houses) and one had a toilet outside of the house (Table 1).

UI, UI severity, UI type, and consultations with physicians for UI

Forty three percent of the women had UI, with the following degrees of severity; 9% mild UI, 15% moderate UI, 17% severe UI, and 2% very severe UI.

The fourth item of the ICIQ-UI SF questionnaire relates to self-assessment of the cause of UI. In 60% of the women the cause was stress incontinence based on a positive response to the option "Leaks when you cough or sneeze and leaks when you are physically active/exercising," in 23% it was urge incontinence based on a positive response to the option "leaks before you get to the toilet and leaks when you have finished urinating and are dressed," and 9% had mixed incontinence with characteristics of both stress and urge.

Among the 210 women with UI the mean score for interference with daily life was 6.3 ± 3.75 on a scale from 1 to 10. Only 21 women (10%) had consulted with their physician at least once over the previous 5 years for UI. Data from the ICIQ-UI SF are presented in Table 2.

Characteristics of women with UI

The differences between women with and those without UI are shown in Table 3. Women with UI were older (mean age 34.1 ± 10.2 vs 30.1 ± 8.6, $P < 0.001$ years),

Table 1 Patient characteristics (study population = 492)

	N	%
Age		
Mean ± SD	31.8 ± 9.5	
Median	30	
Range	19–66	
Total	492	
BMI		
Mean ± SD	27.3 ± 6.4	
Median	26.7	
Range	14.2–46.9	
Total	482	(mis = 10)
Pregnancies		
Never been pregnant	124	25.2
1+	368	74.8
Total	492	
Number of pregnancies		
Mean ± SD	4.9 ± 3.3	
Range	1–15	
Total	368	
Number of vaginal deliveries		
0	54	14.7
1	55	14.9
2–4	137	37.2
5+	122	33.2
Mean ± SD	3.5 ± 3.0	
Range	0–12	
Total	368	
Number of Cesarean deliveries		
0	265	72.0
1	53	14.4
2–4	42	11.4
5+	8	2.2
Mean ± SD	0.61 ± 1.2	
Range	0–7	
Total	368	
Education (years)		
0–8 years	92	18.7
9–12 years	280	57.0
13–14 years	37	7.5
15+ years	82	16.7
Mean ± SD	11.3 ± 3.7	
Range	0–22	
Total	491	(mis = 1)
Polygamous marriage		
Yes	57	11.6
No	435	88.4
Total	492	
Residence type		
House	490	99.6
Tent	2	0.4
Total	492	
Indoor toilet		
Yes	491	99.8
No	1	0.2
Total	492	

had a higher mean BMI (28.8 ± 6.5 vs 26.2 ± 6.1, $P < 0.0001$), and had more pregnancies and vaginal deliveries (5.3 ± 3.4 vs 4.5 ± 23.1, $P = 0.023$, and 3.8 ± 2.9 vs 3.2 ± 2.7, $P = 0.028$ respectively).

Women with UI had lower education levels (10.7 ± 4.1 vs 11.8 ± 3.2 years, $P = 0.003$) and more women with UI lived in a polygamous family (15.1% vs 8.9%, $P = 0.046$).

Comparison of women without UI with women with mild and severe levels of UI

Table 4 shows a comparison between women without UI and women with mild and severe degrees of UI. Women with severe UI were older than those with mild UI and those without UI (36.2 ± 10.3 vs 32.3 ± 10.3 vs 30.1 ± 8.6 years respectively, $P < 0.001$) had a higher mean BMI (29.8 ± 6.7 vs 28.1 ± 6.3 vs 26.2 ± 6.1 respectively, $P < 0.001$), had more pregnancies (6.1 ± 3.6 vs 4.5 ± 3.2 vs 4.5 ± 3.6 respectively, $P < 0.0001$), more deliveries (5.3 ± 3.1 vs 3.8 ± 2.9 vs 3.7 ± 2.6 respectively, $P < 0.001$), and more vaginal deliveries (4.6 ± 2.8 vs 3.2 ± 2.9 vs 3.2 ± 2.6 respectively, $P = 0.001$). Women with severe UI had fewer years of education (10.1 ± 4.4 vs 11.2 ± 3.9 vs 11.8 ± 3.2 years respectively, $P = 0.001$) and a higher percentage of polygamous families (27.1% vs 10.2% vs 8.9% respectively, $P = 0.003$).

A comparison of women with different types of UI

No statistically significant differences in any sociodemographic or delivery variables were seen among women with the different types of UI (stress, urge, and mixed).

Multivariate comparison of women without UI with women with mild and severe levels of UI

In the multivariate logistic regression models presented in Table 5, one can see that increased BMI is significantly associated with UI (OR = 1.049, 95% CI 1.017–10.82) and increased BMI together with a polygamous family is associated with severe and very severe UI (OR = 1.048, 95% CI 1.009–1.089 and OR = 1.943, 95% CI 1.007–3.749 respectively).

Table 2 ICIQ-SF ($N = 492$)

	n (%)
How often do you leak urine? ($N = 492$)	
Never	280 (56.9)
Once a week	105 (21.3)
2–3 times a week	39 (7.9)
Once a day	21 (4.3)
Several times a day	37 (7.5)
All the time	10 (2.0)
How much urine do you usually leak? ($N = 492$)	
None	280 (56.9)
A small amount	172 (35.0)
A moderate amount	32 (6.5)
A large amount	8 (1.6)
Overall, how much does leaking urine interfere with your everyday life? ($N = 210$)	
Mean ± SD	6.3 ± 3.7
Median	7.0
Range	0–10
Total score incontinence (urge) ($N = 490$)	
Grade 0—none (0)	280 (57.1)
Grade 1—slight (1–5)	45 (9.2)
Grade 2—moderate (6–12)	73 (14.9)
Grade 3—severe (13–18)	83 (16.9)
Grade 4—very severe (19–21)	9 (1.8)
Mean ± SD	4.6 ± 6.2
Range	0–21
When does urine leak? (more than one answer is possible) ($N = 492$)	
Never—urine does not leak	280 (56.9)
Leaks before you can get to the toilet	65 (13.2)
Leaks when you cough or sneeze	144 (29.3)
Leaks when you are asleep	6 (1.2
Leaks when you are physically active/exercising	4 (0.8)
Leaks when you have finished urinating and are dressed	4 (0.8)
Leaks for no obvious reason	11 (2.2)
Leaks all the time	8 (1.6)
Type of incontinence	
Stress incontinence	127 (59.9)
Urge incontinence	48 (22.6)
Mixed incontinence	20 (9.4)
Other incontinence	17 (8.0)
Previous complaints of incontinence (based on medical records) ($N = 212$)	
No	191 (90.1)
Yes	21 (9.9)

Consultation with the physician for UI was significantly associated with age (OR = 1.065, 95% CI 1.008–1.125), number of deliveries (OR = 0.763, 95% CI = 0.624–0.934), and severe UI (OR = 4.073, 95% CI 1.410–11.765).

Table 3 Characteristics of patients with incontinence ($N = 212$)

	Urinary incontinence		*P*
	Yes ($N = 212$)	No ($N = 280$)	
Age			
Mean ± SD	34.1 ± 10.2	30.1 ± 8.6	<0.0001
Range	19–66	19–56	
BMI			
Mean ± SD	28.8 ± 6.5	26.2 ± 8.6	<0.0001
Range	14.2–46.9	15.2–46.4	
Pregnancy			
None	35 (16.5)	89 (31.8)	<0.0001
1+	177 (83.5)	191 (68.2)	
Pregnancies			
Mean ± SD	5.3 ± 3.4	4.5 ± 3.1	<0.0001
Range	1–15	1–14	
Deliveries			
Mean ± SD	4.5 ± 3.1	3.7 ± 2.6	0.006
Range	0–15	0–11	
Vaginal deliveries			
Mean ± SD	3.8 ± 2.9	3.2 ± 2.7	0.028
Range	0–12	0–11	
Cesarean deliveries			
Mean ± SD	0.7 ± 1.3	0.5 ± 1.1	0.155
Range	0–7	0–5	
Years of education			
0–8	52 (24.5)	40 (14.3)	
9–12	112 (52.8)	168 (60.0)	
13–14	16 (7.5)	21 (7.5)	0.032
15+	31 (14.6)	51 (18.2)	
Mean ± SD	10.7 ± 4.1	11.8 ± 3.2	0.003
Range	0–21	0–22	
Polygamous marriage			
Yes	32 (15.1) 180	25 (8.9) 255	0.046
No	(84.9)	(91.1)	

Discussion

The population in this study was relatively young, with a mean age of 32 years. The Bedouin population is known to be young [20] and has a high birth rate [16]. Despite the young age, the mean BMI of the participants was within the obese range. Arab women in Israel have higher rates of obesity than Jewish women [21]. The mean number of years of education in this population, which is known to have a low educational level [22], was 11 years. About 12% of the women were in a polygamous marriage, a known custom in this population [23], and the vast majority lived in permanent housing rather than tents (an urban population).

The percentage of women with any type of UI was about 43%, which is similar to rates reported in the UK [6] and Turkey [10] and is one of the highest in the world.

Table 4 Characteristics of patients with slight/moderate compared with severe/very severe incontinence and patients without incontinence ($N = 492$)

	Urinary incontinence			*P*
	Slight/moderate	Severe/very severe	None	
Age				
Mean ± SD	32.3 ± 10.3	36.2 ± 9.7	30.1 ± 8.6	<0.0001
Range	19–66	20–59	19–56	
BMI				
Mean ± SD	28.1 ± 6.3	29.8 ± 6.7	26.2 ± 6.1	<0.0001
Range	14.2–45.9	15.6–46.9	15.2–46.4	
Pregnancy				
None	22 (18.6%)	13 (14.1%)	89 (31.8%)	0.001
1+	96 (81.4%)	79 (85.9%)	191 (68.2%)	
Pregnancies				
Mean ± SD	4.5 ± 32	6.1 ± 3.6	4.5 ± 3.1	<0.0001
Range	1–15	1–15	1–14	
Deliveries				
Mean ± SD	3.8 ± 2.9	5.3 ± 3.1	3.7 ± 2.6	<0.0001
Range	0–12	0–15	0–11	
Vaginal deliveries				
Mean ± SD	3.2 ± 2.9	4.6 ± 2.8	3.2 ± 2.7	0.001
Range	0–12	0–12	0–11	
Ceserean deliveries				
Mean ± SD	0.6 ± 1.1	0.7 ± 1.4	0.5 ± 1.1	0.390
Range	0–5	0–7	0–5	
Education (years)				
0–8	22 (18.6%)	30 (33.0%)	40 (14.3%)	0.011
9–12	67 (56.8%)	45 (49.5%)	168 (60.0%)	
13–14	10 (8.5%)	4 (4.4%)	21 (7.5%)	
15+	19 (16.1%)	12 (13.2%)	51 (18.2%)	
Mean ± SD	11.2 ± 3.9	10.1 ± 4.4	11.8 ± 3.2	0.001
Range	0–21	0–18	0–22	
Polygamous marriage				
Yes	12 (10.2%)	20 (21.7%)	25 (8.9%)	0.003
No	106 (89.8%)	72 (78.3%)	255 (91.1%)	

Interestingly, despite the fact that most of the women suffered from mild incontinence with loss of a small amount of urine (35% of the 492 participants and 82% of the women with UI) and with a low frequency (21% of the 492 and 50% of the 212 had UI about once a week), the sense of impaired quality of life was high; thus, most of the women with UI were classified overall as moderate (15% of all the participants and 35% of the women with UI) or severe (17% of all the participants and 40% of the women with UI). One possible explanation for the great negative impact on quality of life found in this study is the young age of the participants who belong to a traditional Muslim population for whom UI negates ablution before prayer and necessitates a repeat of the ritual [14]. In a large sample of Muslim women from Pakistan, UI had a significant negative effect on quality of life [12].

The most common types of UI in this study were stress incontinence and urge incontinence. This is consistent with reports in the medical literature [3, 4, 11].

The most impressive finding in our study was that only 10% of the women with UI consulted with their physician on this problem over the 5 years before they were asked about it directly in the study. This very low consultation rate among women with UI has been reported from around the world in relation to women of varying ethnic origins and religious affiliations: 22% in Brazil [24], 20% in Egypt [25], 17% in England [6], 12% in Sri Lanka and Turkey [26, 27], 9% in Saudi Arabia, and 4% in China [28]. Thus, the rate that we found in the present study was among the lowest reported in the literature. Previous studies that tried to identify barriers to consulting in Muslim women with UI concluded that shame [15, 25] and the perception of UI as a normal aspect of aging

Table 5 Multivariate models for factors associated with: urinary incontinence, severe/very severe urinary incontinence, and help-seeking behavior

Variable	OR	95% CI	*P*
Risk factors for urinary incontinence			
Age	1.019	0.992–1.047	0.167
Polygamous marriage (yes)	1.408	0.771–2.572	0.266
Number of deliveries	1.048	0.963–1.141	0.277
Education (years)	0.969	0.918–1.023	0.253
BMI	1.049	1.017–1.082	0.003
Risk factors for severe/very severe incontinence			
Age	1.021	0.989–1.055	0.203
Polygamic marriage (yes)	1.943	1.007–3.749	0.048
Number of deliveries	1.082	0.980–1.194	0.120
Education (years)	0.968	0.908–1.032	0.319
BMI	1.048	1.009–1.089	0.016
Factors for help-seeking behavior			
Age	1.065	1.008–1.125	0.024
Polygamic marriage (yes)	1.147	0.321–4.093	0.833
Number of deliveries	0.763	0.624–0.934	0.009
Education (years)	1.025	0.911–1.154	0.680
BMI	1.013	0.939–1.093	0.732
Severe/very severe incontinence	4.073	1.410–11.765	0.009

[25] were important barriers whereas factors that favored consulting were encouragement by the husband, severe UI, and the desire for ablution before prayers [25, 27].

The findings that women with UI were older, had a higher BMI, had undergone more pregnancies and deliveries, had undergone more vaginal deliveries [3, 4, 29, 30], and were more educated [31] are consistent with the existing literature. These same characteristics were more common in women with more severe UI than in women with a lower degree of severity.

The finding that BMI is associated with a higher risk for UI is not surprising, because obesity is a risk factor for UI of all types [4, 32]. The association of severe UI with a polygamous marriage is interesting, new, and has not been reported previously in the literature. In a comprehensive review of the literature, we did not find a single paper that addressed this association.

A possible explanation is the mental stress experienced by women in these families [23] and the consequent depression, which has been described as a factor associated with UI [4]. Age and severity of UI have been reported to be predictors of help-seeking behavior [27, 33].

In summary, UI is a very prevalent problem in Muslim women is southern Israel and it has a significant negative effect on their quality of life. Despite this, only a small percentage of these women turn to their physician for help, especially older women with severe UI. Obesity and polygamous marriage are risk factors for more severe UI. Awareness of UI and its associated issues on the part of the staff and direct questioning can help to identify women with UI and enhance the provision of appropriate care. A similar study in the non-Muslim population of southern Israel might find similar characteristics or, alternatively, highlight the differences in the factors associated with UI in the two populations. A study of this type could assist in the development of preventive measures for this problem in the two populations.

Compliance with ethical standards

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