

# Impact of Recurrent Urinary Infections on the Quality of Life of Women in Outpatient Care: a Case-control Study

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## Research Article

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# Abstract

**Background:** The repetitive urinary tract infections impact women's quality of life and represent an important problem for women's physical and mental health, causing relevant social impacts. This study aimed to evaluate the impact of recurrent urinary tract infections on the quality of life of women with recurrent infections.

**Methods:** This is a case-control study with 49 women with recurrent urinary tract infections, confirmed by urine culture, without complications and 49 women without recurrent urinary tract infections, seen at an outpatient clinic of a public teaching hospital in the city of Niterói, Rio de Janeiro, Brazil. Quality of life was evaluated using the Brazilian version of the World Health Organization's shortened questionnaire, the WHOQOL-Bref.

**Results:** Women with urinary tract infections showed greater impairment of quality of life in the physical ( $p = 0.007$ ) and psychological ( $p = 0.038$ ) domains, with lower quality of life score in their self-assessment ( $p = 0.002$ ), when compared to the group control. Women with recurrent urinary infection had mean scores significantly lower than the control group in the Energy and fatigue ( $p = 0.003$ ), Positive feelings ( $p = 0.014$ ), Self-esteem ( $p = 0.040$ ), Dependence on medication ( $p = 0.029$ ), Negative feelings ( $p = 0.023$ ) and Recreation and leisure ( $p = 0, 0.041$ ).

**Conclusions:** Recurrent urinary tract infections have an important impact on the quality of life of women, especially in the Physical and Psychological domains, representing a significant problem for women, health professionals, and the health system.

## Introduction

Urinary tract infections (UTI) are common bacterial infections, which affect about 150 million people a year, being more common in women. It is estimated that one in three women has at least one episode of UTI throughout their lives and that the likelihood that women will have a recurrence of urinary tract infections increases with advancing age. This increase in the incidence of recurrent urinary infections is due to factors such as the lower production of estrogen in the climacteric and a higher prevalence of urinary incontinence [1,2].

Clinically, several factors can be associated with UTI such as female gender, sexual activity, diabetes, obesity, genetic susceptibility, and vaginal infection caused by different organisms that colonize the perineum and vagina, and can cause isolated or recurrent infections (recurrences or reinfections), at varying intervals [3,4].

The literature shows that between 20 and 30% of women who have an initial episode of urinary tract infection will have recurrent infections. These recurrent urinary infections increase the expenses with consultations, laboratory tests, medications, and hospitalizations, representing an economic burden for

the health system. They also generate a social cost related to absenteeism and the morbidity of the affected people [2,3,5].

Studies demonstrate a high impact of recurrent urinary tract infections and cystitis on people's quality of life [6,7]. Many women with recurrent urinary infections have discomfort due to the physical, psychological, emotional, and social effects that can interfere with daily activities and quality of life, making these infectious conditions an important health problem for women, however, it can be alleviated with the correct treatment [8].

Prophylaxis can be a strategy to improve the quality of life of patients and avoid the overuse of antibiotics. However, there is no consensus in Latin America on the prophylaxis and treatment of recurrent urinary infections [5].

European studies indicate that the impact of recurrent urinary tract infections on women's quality of life is significant and represents an important problem for women's physical and mental health, causing relevant social impacts [2,9]. In this context, investigate how much recurrent urinary infections compromise the quality of life of women contributes to the assistance, promotion, and health care actions, which may impact the management of services, based on cost reduction in the treatment of these women.

Therefore, this study aimed to assess the impact of recurrent urinary tract infections on the quality of life of women with recurrent infections.

## Methods

This is a case-control study with 98 women, 49 with recurrent urinary tract infections, without complications (cases), and 49 without urinary tract infections (controls) assisted at an outpatient clinic of a public teaching hospital in the city of Niteroi, Rio de Janeiro Brazil.

Recurrent infection is the occurrence of three episodes of urinary tract infection with three positive urine cultures in the last 12 months, or two previous episodes in the last six months [10].

The group of cases included women aged 18 years old or older; with two or more histories of urinary tract infection within six months and/or three or more episodes of infection within one year, suggested by clinical history and confirmed by urine culture; with asymptomatic bacteriuria confirmed by two tests. We excluded pregnant women and women who were using a bladder catheter, who had obstruction of the urinary tract or neurogenic bladder.

For the constitution of the control group, we selected 49 women matched by age to the group of cases, who underwent outpatient treatment at the institution and had no urinary tract infection.

For data collection, we used an instrument developed by the authors, containing clinical variables, and the Brazilian version of the World Health Organization's quality of life questionnaire, the Whoqol-Bref,

consisting of 26 questions whose answers are given on a scale of the Likert type, through four types of scales (depending on the content of the question): intensity, capacity, frequency, and evaluation [11].

The Whoqol-Bref allows a generic, multidimensional and multicultural measure, for subjective assessment of the quality of life, in four domains - Physical, Psychological, Social Relations, and Environment -, and two general questions, the first is related to the quality of life and the second to health. The higher the score for each domain, the better the quality of life. Values below 50.00 indicate an important impairment of quality of life [11,12].

Data analysis was performed using the Statistical Package for Social Sciences (SPSS), version 23.0. Clinical variables were used to describe the sample studied.

Quality of life was assessed considering: frequencies and descriptive statistical measures for general questions regarding the life and health of the individuals studied (How would you rate your quality of life?; How satisfied are you with your health?); mean scores and standard deviations for the Whoqol-Bref domains, and mean scores for the facets that make up the Whoqol-Bref domains, comparing the two groups (cases and controls). To compare the groups, we applied a chi-square test for general questions and a t-test for domains and facets, considering a significance level of 95% ( $p \leq 0.05$ ).

## Results

The women's age ranged from 18 to 87 years old, with a mean of 41.6 ( $\pm 17.0$ ) years old; 42.9% had between one and three pregnancies; 32.2% had between one and three deliveries and 74.5% claimed to have an active sex life; 37.8% had urinary incontinence (UI), with 9.2% having stress UI, 14.3% overactive bladder and 14.3% mixed incontinence. Also, 46.9% of patients in the control group and 18.4% of women with recurrent urinary tract infections were hypertensive ( $p = 0.003$ ).

When comparing body mass index (BMI), 59.6% of patients in the control group and 44.2% of women with recurrent urinary tract infection were overweight or some degree of obesity, with 36.2% of women in the control group had grade I obesity and 11.6% of women with recurrent urinary tract infection had grade III obesity ( $p = 0.002$ ). Regarding the use of contraceptives, 23.5% of women used continuous contraceptives.

Table 1.

Clinical characteristics of women undergoing outpatient treatment.

	Cases	Controls	p-value <sup>1</sup>
Pregnancy			
None	17 (34.7)	18 (36.7)	0.439
One to three	18 (36.7)	24 (49.0)	
Four or more	6 (12.2)	7 (14.3)	
Childbirth			
None	25 (61.0)	31 (63.3)	0.800
One to three	13 (31.7)	16 (32.7)	
Four or more	3 (7.3)	2 (4.1)	
Cesarean delivery			
None	24 (48.5)	27 (55.1)	0.491
One to three	16 (39.0)	22 (44.9)	
Four or more	1 (2.4)	-	
Active sex life			
Yes	40 (81.6)	33(67.3)	0.105
No	9 (18.4)	16 (32.7)	
Type of Urinary Incontinence			
No	26 (53.1)	35 (71.4)	0.293
Stress urinary incontinence	5 (10.2)	4 (8.2)	
Overactive bladder	9 (18.4)	5 (10.2)	
Mixed incontinence	9 (18.4)	5 (10.2)	
Hypertension			
Yes	9 (18.4)	23 (46.9)	0.003
No	39 (79.6)	26 (53.1)	
Diabetes			
Yes	2 (4.1)	5 (10.2)	0.251
No	46 (93.9)	44 (89.8)	
Body Mass Index (BMI)			

Malnutrition	1 (2.3)	-	0.002
Normopeso	23 (53.5)	19 (40.4)	
Overweight	12 (27.9)	10 (21.3)	
Grade I obesity	2 (4.7)	17 (36.2)	
Grade II obesity	-	1 (2.1)	
Grade III obesity	5 (11.6)	-	
Use of contraceptives			
No	23 (46.9)	28 (57.1)	0.150
Male condom and spermicide	9 (18.4)	7 (14.3)	
Continuous oral contraceptives	14 (28.6)	9 (18.4)	
Cyclic oral contraceptives	-	4 (8.2)	
Intrauterine Device (IUD)	-	1 (2.0)	

<sup>1</sup> Chi-square test.

Table 2 shows that the percentage of women with recurrent urinary tract infection who consider the quality of life to be poor or very bad (14.2%) is significantly higher than the percentage of women in the control group (2.0%) who assess the quality of life as poor or very bad ( $p = 0.027$ ). In contrast to this result, we observed that the percentage of women with recurrent urinary infection who consider the quality of life as good or very good (55.1%) is significantly lower than the percentage of women in the control group (73, 4%) who assess the quality of life as good or very good ( $p = 0.027$ ).

Also, the percentage of women with recurrent urinary infection who were dissatisfied or very dissatisfied with their health (48.9%) is significantly higher than the percentage of women in the control group (14.3%) who were dissatisfied or very dissatisfied with their health ( $p = 0.004$ ). While the percentage of women with recurrent urinary tract infections who were satisfied or very satisfied with their health (34.7%) is significantly lower than the percentage of women in the control group (59.2%) who were satisfied or very satisfied health ( $p = 0.004$ ).

Table 2.

Frequencies of answers of women with and without recurrent urinary tract infection and average scores for general questions of quality of life.

Question	Response options	With Infection (Cases)		No Infection (Controls)	
		n	%	n	%
<i>How would you rate your quality of life?</i> ( $p = 0.027$ ) <sup>1</sup>	<i>1-very bad</i>	1	2.0	-	-
	<i>2-bad</i>	6	12.2	1	2.0
	<i>3-neither bad nor good</i>	15	30.6	12	24.5
	<i>4-good</i>	19	38.8	33	67.3
	<i>5-very good</i>	8	16.3	3	6.1
	Average score	3,6		3.8	
	Standard deviation	1,0		0.6	
<i>How satisfied are you with your health?</i> ( $p = 0.004$ ) <sup>1</sup>	<i>1-very dissatisfied</i>	6	12.2	3	6.1
	<i>2-dissatisfied</i>	18	36.7	4	8.2
	<i>3-neither satisfied nor dissatisfied</i>	8	16.3	13	26.5
	<i>4-satisfied</i>	16	32.7	24	49.0
	<i>5-very satisfied</i>	1	2.0	5	10.2
	Average score	2,8		3.5	
	Standard deviation	1,1		1.0	

<sup>1</sup> Chi-square test.

Women with recurrent urinary tract infection showed greater impairment of quality of life in the Physical ( $p = 0.007$ ) and Psychological ( $p = 0.038$ ) domains, and had a higher score in the self-assessment of quality of life ( $p = 0.002$ ), as shown in Table 3.

Table 3.

Evaluation of quality of life in groups of women with and without recurrent urinary tract infection.

WHOQOL Bref domains	With Infection (Cases) <sup>1</sup>	No Infection (Controls) <sup>1</sup>	p-value <sup>2</sup>
Physicist	62.81 ± 15.59	71.35 ± 14.89	0.007
Psychological	67.79 ± 14.76	73.95 ± 14.18	0.038
Social relationships	77.76 ± 13.60	75.52 ± 15.03	0.440
Environment	67.33 ± 13.78	63.52 ± 12.05	0.148
Self-assessment of quality of life	72.65 ± 12.37	63.06 ± 17.10	0.002

<sup>1</sup> Mean ± standard deviation. <sup>2</sup>t-test

The assessment of the impact of recurrent urinary tract infections on quality of life showed that women with urinary tract infections (cases) obtained an average 13.2% lower than women in the control group (without urinary tract infection), as shown in Figure 1.

After analysis adjusted for possible confounding factors (hypertension, active sex life, BMI, and use of contraceptives), we found that the association between recurrent urinary infection and quality of life remained statistically significant ( $\beta = -1.95$ ;  $p = 0.014$ ).

Figure 2 shows the mean scores for the facets of the Whoqol-Bref domains, according to the study groups (cases x control), showing that women with recurrent urinary tract infection had impairment in the facets of Sleep and rest (48.47), Dependence on medication or treatments (44.27), positive feelings (46.94), recreation and leisure (44.9), while women in the control group showed impairment in the financial resources facet (45.42).

The group of women with recurrent urinary tract infection had mean scores significantly lower than the control group in the facets Energy and fatigue ( $p = 0.003$ ), Positive feelings ( $p = 0.014$ ), Self-esteem ( $p = 0.040$ ), Dependence on medication ( $p = 0.029$ ), Negative feelings ( $p = 0.023$ ) and Recreation and leisure ( $p = 0, 0.041$ ).

## Discussion

The results of the study showed that the recurrence of urinary tract infections in women has an important impact on the quality of life and satisfaction with health. The study also showed that women with recurrent urinary infections have a compromise in physical and psychological aspects related to the quality of life, significantly higher than women in the control group. These results corroborate studies carried out with Asian and European women, with recurrent urinary tract infections, showing a wide

negative impact of recurrent infections on the quality of life of women, mainly affecting the physical and mental dimensions [1,13].

The greater impairment in the physical and psychological domains presented by women with recurrent urinary infections can be explained by the chronicity of the symptoms resulting from these diseases, which can compromise work activities, the practice of physical activity, the exercise of family care, and other daily activities of women. Also, these infections cause symptoms such as burning or pain when urinating (dysuria), frequent or urgent urination, polyuria, hematuria, and/or lower abdominal discomfort, which can influence women's daily activities and quality of life [4,14].

In Brazil, a study with women with recurrent urinary infections, using the Whoqol-bref and King's Health Questionnaire (KHQ) instruments, identified the effect of recurrent infections on women's physical, social and sexual activities, with loss of self-esteem and emergence of anxiety and depression [15]. By compromising the performance of daily activities, recurrent infections impact the mental health of women, triggering feelings such as frustration, irritation, and tiredness [2].

A study with women from five European countries showed that recurrent urinary infections are associated with the development of stress in a large number of women, which can lead to the development of depression [2]. Such findings are similar to a study conducted with women of seven different nationalities, in which more than 60% of women with recurrent urinary tract infections had some degree of depression [1].

The compromised quality of life-related to sleep and rest conditions, positive feelings and recreation, and leisure, presented by women with recurrent urinary tract infection, may be associated with the clinical picture caused by infectious episodes. This hypothesis is reinforced by the significantly lower scores presented by women with recurrent urinary tract infection in the facets of positive feelings, self-esteem, recreation, and leisure, compared to the control group.

The discomfort from urinary urgency caused by the infection can affect the quality of sleep of women, compromising social life, impairing satisfaction in enjoying life [16]. There are also losses related to leisure activities, such as group social activities, travel, and family activities, which can compromise self-esteem, aggravating the negative impact on the quality of life of these women [15,17].

Recurrence of episodes of urinary infection requires frequent drug treatments, including antibiotic therapy. In addition to generating an important economic burden for the public health system, the inappropriate use of antibiotics can favor the development of multi-resistant microorganisms, complicating the clinical picture of infections. This may explain the low score related to the facet dependence on medication or treatments presented by women with recurrent urinary infection, statistically lower than that presented by women in the control group [2,15,18,19].

European data showed that recurrent urinary infections cause increased absenteeism and medical appointments. According to the literature, each episode of urinary tract infection generates, on average,

three days of sick leave. This loss of ability to work associated with emotional exhaustion caused by the infectious condition and its treatment leads to a greater loss of energy and increased fatigue in women with recurrent urinary tract infection, favoring the emergence of negative feelings, such as bad mood, anxiety, and depression, and impacting economic productivity [2,16,18].

Although the literature shows an increase in the level of well-being of women, there are no reports of improvement in the quality of life-related to treatment. For this reason, successful medical treatment of the infection episode will not always lead to an improvement in the patient's quality of life. However, studies indicate that, when treatment-related adverse events occur, women tend to have greater impairment of quality of life [1,2].

Thus, the definition and implementation of effective strategies for the prevention and treatment of recurrent urinary tract infections require that health professionals, especially doctors and nurses, understand the real impact of these infections on women's lives. This implies the sharing of decisions between professional and patient, aiming to meet expectations and improve the quality of life of women [2,20].

Despite a recent multi-center European study pointing out that prophylactic treatment can reduce the number of infectious episodes and improve the quality of life of women, the lack of consensus on prophylaxis and treatment of recurrent urinary infections in Latin America hinders the adoption of prophylactic measures [1,2,13]. Thus, further studies are needed to assess the effectiveness, risks, and benefits of different prophylactic options in the health and quality of life of women with recurrent urinary infections.

## Conclusion

The study showed that recurrent urinary tract infections negatively impact the quality of life of women, especially in the physical and psychological aspects, compromising the level of satisfaction with health. These results prove that recurrent urinary infections represent a public health problem, which affects women, professionals, and the health system.

The adoption of prophylactic measures shows the scarcity of studies that prove its effectiveness and in the absence of a Latin American consensus. Thus, we concluded that further studies are needed to expand the discussion on the risk factors associated with recurrent urinary infections, their socio-economic impacts, and the effectiveness of prophylactic treatments, producing knowledge that supports the implementation of effective actions for health care in this population.

## Abbreviations

UTI: Urinary tract infections; BMI: body mass index; KHQ: King's Health Questionnaire.

## Declarations

**Ethical approval:** All procedures were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by institutional research committee, School of Medicine, Fluminense Federal University (Opinion No. 20,075, of April 13, 2012).

**Consent to participate:** All patients have signed a written consent for treatment and data analysis. The treatment has not been changed by the design of this study.

**Data availability:** Data are available at the School of Medicine, Fluminense Federal University. Patients did not approve to a public data deposition.

**Conflicts of interest:** The authors declare that they have no conflicts of interest.

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**Authors' contributions:** All authors have (1) substantial contribution to the conception or design (CAF), or acquisition (GMH, CAF), analysis or interpretation of data (LGL, JFO), for the work; (2) Drafting the work (LGL, JFO) or revising it critically for important intellectual content (JCCE, GMH, CAF); (3) Final approval of the version to be published (LGL, JFO, JCCE, GMH, CAF); (4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved (LGL, JFO, JCCE, GMH, CAF).

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## Figures

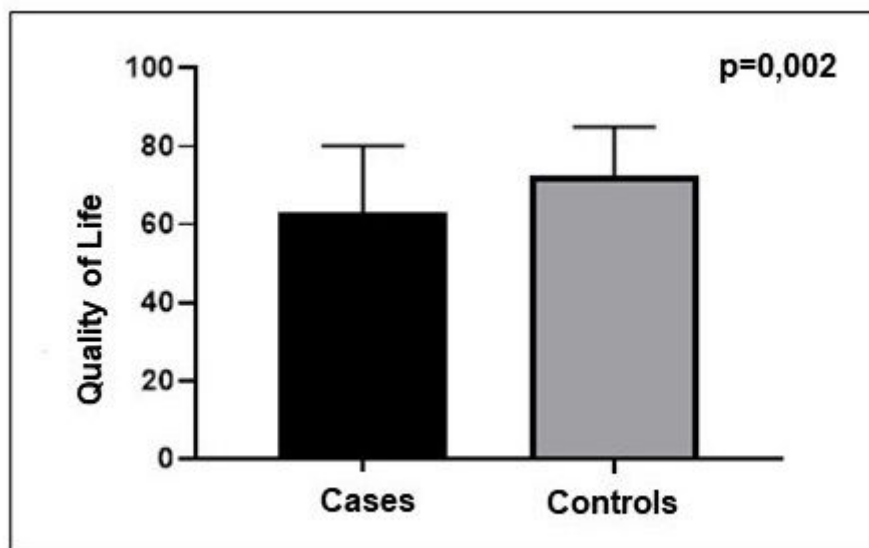
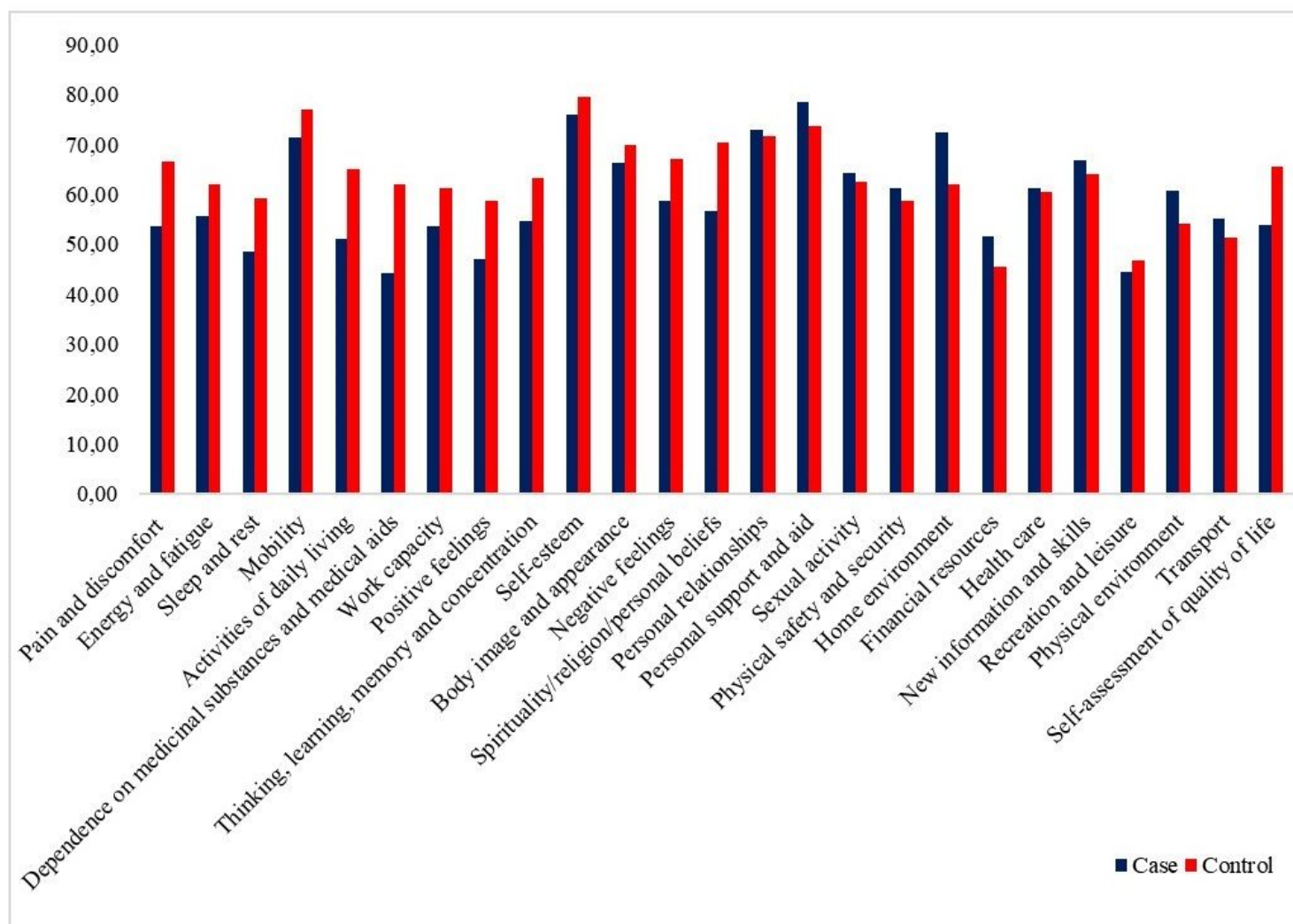


Figure 1

Impact of recurrent urinary tract infection on the quality of life of women treated at an outpatient service.



**Figure 2**

Mean scores for the facets of the Whoqol-Bref domains, according to the study groups (cases vs. control).