



Effect of cognitive–behavioral therapy on sexual self-esteem and sexual function of reproductive-aged women suffering from urinary incontinence

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Received: 9 November 2022 / Accepted: 24 December 2022 / Published online: 30 January 2023
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Abstract

Introduction Patients with urinary incontinence may fear sexual activity due to the unpredictability of urine leakage during intercourse. Given the effective role of cognitive–behavioral therapy in correcting negative thoughts and attitudes, this study was aimed to investigate the effect of cognitive–behavioral therapy on sexual self-esteem and sexual function of reproductive-aged women suffering from urinary incontinence.

Methods This study was a randomized controlled clinical trial conducted on 84 reproductive-aged women (18 to 45 years old) with urinary incontinence who referred to Health Centers of Dezful, Iran. After random allocation, the participants were divided into two groups of intervention and control ($n=42$). The intervention group attended eight 45-min sessions of cognitive–behavioral therapy, while the control group received only routine interventions. The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), the Scale of Self-Esteem Index for Women-Short-form (SSEL-W-SF), and the Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12) were completed before, immediately after, and 4 weeks after the end of the intervention by patients in both groups.

Results The overall scores of sexual self-esteem and sexual function immediately and 4 weeks after the end of the intervention showed a statistically significant difference in the intervention group compared to the control group ($p < 0.001$). Also, the results showed that in women with urinary incontinence, an increase in the sexual self-esteem score is associated with an increase in the sexual function score ($r = 0.9$), $p < 0.001$.

Conclusion Cognitive–behavioral therapy was found to increase sexual self-esteem and improve sexual function in reproductive-aged women suffering from urinary incontinence.

Keywords Cognitive–behavioral therapy · Sexual self-esteem · Sexual function · Urinary incontinence

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Introduction

Today, urinary incontinence is one of the serious and common health and social problems in women of reproductive age, and its incidence increases with age [1]. Urinary incontinence is any involuntary leakage of urine, and is divided into three types: stress incontinence, urgency incontinence, and mixed incontinence [2]. Nearly 350 million people worldwide suffer from urinary incontinence. Its prevalence is reported to be 46% among Iranian women in general [3].

The consequences of urinary incontinence are divided into three categories: physical, psychological, and social. The psychological effects include anxiety, worry and despair, stress, mood swings, and low self-esteem [4, 5], while its physical consequences include the feeling of wetness, dirty clothes, foul-smelling odor, and skin sensitivity, which affect to a great extent the quality of life and daily activities of the patient [6]. Also, due to the fear of incontinence, everyday activities such as traveling, shopping, playing with children, sports, and sexual activity are negatively affected by the stress and the shame caused by this condition [7–9].

Patients with urinary incontinence may fear sexual activity due to the unpredictability of urine leakage during intercourse, and this fear can ultimately lead to decreased sexual desire and self-esteem [10].

The systematic review studies on women with urinary incontinence have reported that urinary incontinence had negative effects on women's intimacy and sexual satisfaction and caused changes in the ways they experience their sexuality and sexual function [11, 12].

Urinary incontinence and sexual dysfunction may occur at any stage of life and can lead to discomfort and frustration [13–15].

The most important challenge for health service providers is that women tend to wait and hide their problem before taking action to treat it in a timely and effective manner [16]. Delay in treatment leads to a progressive chronic disease, and psychological effects due to this chronic disease [17, 18].

Also, people who have chronic diseases have to struggle with challenges such as: being aware of the symptoms related to the disease, adapting to a lifestyle with difficulties, coping with mental and emotional reactions related to the chronic disease, and complying with medication regimen [19]. Conservative treatment, drug therapy, and surgery can be used to treat urinary incontinence [20]. However, considering the temporary effects of conservative methods, the side-effects caused by the use of pharmaceutical methods and the invasiveness of surgical methods, and that emotional and behavioral factors play a major role in the cause of incontinence, it seems logical to use

psychological methods in addition to use other standard treatments [21].

Therefore, self-management strategies help improve self-care activities and optimize health in these patients. Among these strategies, cognitive–behavioral therapy (CBT) has been associated with promising results [19].

CBT is a combination of cognitive and behavioral approaches and is based upon the premise that thoughts, feelings, physical sensations, and actions are interrelated. This approach helps the patient to recognize their distorted attitudes and dysfunctional behaviors. Then, regular discussions and organized behavioral tasks are used to change these thoughts and behaviors. By modifying thought and behavior patterns, beneficial changes are made in the patient's mood and lifestyle. One of the advantages of this approach is the use of treatment protocols tailored to the patient's diagnosis and the associated problems [22].

Researchers found that CBT has been associated with women's improved relationships and sexual performance. CBT has also an effective role in correcting negative thoughts and attitudes, and improvement of sexual attitude and sexual self-confidence [22, 23].

However, there is a dearth of research addressing the effect of this type of therapy on sexual function and sexual self-esteem of reproductive-aged women with urinary incontinence. Therefore, this study aims to investigate the effect of CBT on sexual self-esteem and sexual function in these women. Results of this study can provide new insights into the treatment of women suffering from urinary incontinence.

Method

Research design and participants

This was a randomized controlled clinical trial conducted from July to December 2021 on 84 reproductive-aged women (18 to 45 years old) with urinary incontinence who were referred to Health Center No. 1 and Health Center No. 6 in Dezful, in the southwest of Iran.

Sampling

This project was approved by the Ethics Committee of Jundishapur University of Medical Sciences, Ahvaz (Ref. ID: IR.AJUMS.REC1400.102) and registered in the Iranian Registry of Clinical Trials (Ref. ID: IRCT20210516051312N1).

The participants were recruited from Health Center No. 1 and Health Center No. 6 in Dezful, in the southwest of Iran. The reason for choosing these centers was the large population covered and the large number of clients. After completion of the urinary incontinence questionnaire, 84

women with urinary incontinence were selected based on the inclusion and exclusion criteria.

The women were eligible to participate in the study if they: were married and at reproductive age (18–45 years), had urinary incontinence, were literate (high school diploma), were residents of Dezful, and had an age gap less than 10 years from their husbands.

Exclusion criteria were: having a history of serious physical or mental illness (such as psychotic disorders, schizophrenia or severe depression, requiring a special diet or medication), suffering from diseases affecting the sexual function of the woman or her husband (e.g., cardiovascular disease, thyroid disorder, cancer, etc.), participation in sexual education classes, and taking medication to improve sexual function.

After the participants were briefed on the objectives of the study, a written informed consent was obtained from them. Then, they completed the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), the Scale of Self-Esteem Index for Women-Short-form (SSEL-W-SF), and the Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12). Those who scored less than 24 in PISQ-12, less than 87 in SSEL-W-SF, and equal or greater than 1 in ICIQ-SF and met the inclusion criteria were included in the study.

Randomization

Allocation sequence generation

In this study, random allocation was done using a random number generating computer program. After random allocation, the participants were placed into intervention and control groups, $n=42$ each. Allocation of the women to the groups was done based on permuted block technique using blocks of six with a ratio of 1:1.

Allocation sequence concealment

In order to conceal the random allocation, sequentially numbered and sealed opaque envelopes were used. After generating a random sequence, a number of opaque envelopes equal to the research sample size were prepared, and each of the random sequences created was recorded on a card. Then the cards were placed in the envelopes. In order to maintain a random sequence, the envelopes were numbered in the same order on their outer surface. Finally, the lids of the envelopes were glued, and the envelopes were placed inside a box. At the time of enrollment, according to the order in which eligible participants entered the study, the envelopes were opened and the participants were placed in a group.

Blinding

Due to the nature of this research, blinding was not possible. Therefore, in order to reduce the possibility of bias, the person assigning participants into groups was not involved in sampling and data analysis.

Intervention

Before the start of the intervention (CBT), the necessary arrangements were made through phone calls to fix the time for the women's visit. Counseling was done by the lead researcher under the supervision of the thesis advisor in selected health centers of Dezful, Iran. Due to the spread of the corona virus, face-to-face meetings were held with minimal participants, observing social distancing and health precautions.

The intervention group ($n=42$) attended eight 45-min sessions of CBT conducted by the lead researcher once a week, while the control group received only routine interventions.

The content of the cognitive–behavioral therapy sessions was adjusted under the supervision and guidance of an experienced psychiatrist and using the resources available in medical sciences and the practical guide for cognitive–behavioral therapy [24].

The content of the sessions was as follows:

First session: initial introduction, familiarizing the members with each other, explaining the purpose of the study, emphasizing the confidentiality of answers, treatment contract, explaining how to complete the questionnaire, completing the questionnaire, introducing cognitive–behavioral therapy, teaching cognitive skills, and assignment (writing their thoughts).

Second session: review of the first session, review of assignment, introduction to urinary incontinence in women and its role in sexual self-esteem and sexual dysfunction, promoting sexual awareness, explaining the role of lifestyle in urinary incontinence, introduction to bladder anatomy, and giving an assignment.

Third session: review of the previous session, introduction to negative thoughts and opinions (involved in negative attitudes towards sexual issues), and giving an assignment.

Fourth session: review of the previous session, explaining the effect of psychological factors on sexual function, reviewing the previous meeting, checking the completion of the assignment, teaching psychological factors (founding factors, revealing factors, and maintaining factors), presenting the assignment.

Fifth session: review of the previous session, cognitive reconstruction and change of negative attitude towards sexual issues and urinary incontinence, introducing techniques to increase sexual self-esteem, review of clients' irrational

thoughts sheets, training on control skill, and giving an assignment.

Sixth session: review of the previous session, review of assignment, teaching effective communication skills and sexual disorders in women, and training on adaptation skills.

Seventh session: review of the previous session, teaching correct sexual intercourse, introduction to the sensitive points of the body, introduction to sensory focus techniques, teaching sexual coolers and explaining sex appeal elements, teaching sexual skills, and giving an assignment.

Eighth session: problem-solving skill training, preparation for the end of treatment, wrap up, and post-test.

Data collection tools

A number of tools were used in this research to collect the data. They will be explained briefly in this section:

The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF): This questionnaire was used for the diagnosis of urinary incontinence. The cut-off point of ICIQ-SF is a score equal to or greater than 1. This questionnaire contains three questions, and scores are given if urine leakage occurs more than once a month or less than once a week. This questionnaire was initially created by the International Continence Society and has been translated into more than 26 languages and used in various studies. The validity and reliability of the Persian version of ICIQ-SF were confirmed by Hajebrahimi et al. in Iran in 2012 [25]. They obtained a Pearson coefficient of 0.76, and the correlation between the ICIQ-SF questionnaire and diagnostic tests according to the obtained Cronbach's alpha (0.4) was moderate to high. The ICIQ-SF has been successfully translated into Farsi and has the necessary validity and reliability in diagnosing urinary incontinence among women in Farsi-speaking countries.

The Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12) was used to check sexual function. This questionnaire is the only valid questionnaire specifically designed for measuring sexual function in women with urinary incontinence. The short form of this questionnaire has 12 questions in three domains: behavioral–emotional (four questions), physical (five questions) and partner-related (three questions). The questionnaire is scored based on a five-point Likert scale from never (score: 0) to always (score: 4). The behavioral–emotional domain includes questions about sexual desire, orgasm, arousal, and satisfaction. The physical domain assesses episodes of pain during intercourse, urinary incontinence during intercourse, prevention of sexual function due to prolapse, and fear of urinary or fecal incontinence. The partner-related domain measures erectile dysfunction, premature ejaculation, and orgasm. Reverse scoring is used for questions 1 to 4. The

score of each domain is calculated by summing up the scores of single questions.

PISQ was designed by Rogers et al. in 2003 and has two forms, namely long (31 questions) and short (12 questions). The correlation between the subscales of the three domains in its long and short form is from $R=0.95$ to $R=0.75$ [26]. The short form of this questionnaire (PISQ-12) was used in this study. According to the study of Momenimovahe et al. which checked the validity and reliability of the Persian version of this questionnaire, the Cronbach's alpha coefficient was 0.84, and the alpha for all subscales was from 0.70 to 0.79, which shows that PISQ-12 is a short, useful, reliable, and valid tool specifically designed for evaluating sexual function in women with urinary incontinence [27].

The Scale of Self-Esteem Index for Women-Short-form (SSEL-W-SF): In this study, the Persian version of SSEL-W-SF was used. This questionnaire has 35 items and is used to measure effective responses in women's sexual evaluation of themselves. It includes five subscales that reflect the domains of sexual self-esteem: 1. skill/experience (the individual's ability to satisfy or be satisfied by a sexual partner and the opportunity to engage in sexual activity), 2. attractiveness (an individual's feeling about their sexual attractiveness, regardless of what other people perceive them to be), 3. control (the ability to regulate or manage one's thoughts, feelings and sexual interactions) 4. moral judgment (the compatibility of the individual's thoughts, feelings, and sexual behaviors with their moral standards), 5. adaptiveness (the compatibility of the individual's sexual experience or behavior with other personal goals or passions). By summing up the scores of the five domains, the total score of the scale is obtained, with higher scores indicating a higher sexual self-esteem.

This questionnaire was developed by Zeanah and Schwarz in 1996 [28]. In the Persian version of SSEI-W-SF, which was evaluated by Farokhi et al., the Cronbach's alpha coefficient for the whole questionnaire was 0.88 and for the subscales of skill/experience, attractiveness, control, moral judgment, and adaptiveness was: 0.73, 0.54, 0.66, 0.72, and 0.62 respectively, which indicates the good reliability of this tool [29]. Test–retest reliability was calculated to check the consistency of the scale results over time, and the correlation coefficient (retest reliability coefficient) for the whole scale was 0.91 and that for the subscales of skill/experience, attractiveness, control, moral judgment, and adaptiveness was 0.94, 0.82, 0.88, 0.89, and 0.88 respectively (in all cases $p < 0.001$).

Outcome measures

Sexual self-esteem and sexual function questionnaires were completed by the participants before, immediately after, and 4 weeks after the intervention (8 and 12 weeks after

the beginning of the intervention). Upon completion of the study, the educational material of the sessions was prepared in the form of a pamphlet and given to the control group.

Ethical considerations

Informed consent was obtained from the participants prior to the commencement of the study. This project was approved by the Ethics Committee of Jundishapur University of Medical Sciences, Ahvaz (Ref. ID: IR.AJUMS.REC1400.102) and registered in the Iranian Registry of Clinical Trials (Ref. ID: IRCT20210516051312N1).

Sample size estimation

In this study, the study sample size was calculated using the G-power program and based on the results of a previous study [30], with 95% confidence, 95% power and assuming $\alpha = 0.05$, $\beta = 0.05$, $sd1: 7.8$, $sd2: 5.6$, $m1: 27.3$, $m2: 35.29$, and effect size: 0.85. According to the results, the sample size of each group was 37, and assuming a 20% attrition rate, the final sample size was calculated to be 84 (two groups of 42).

Statistical analysis

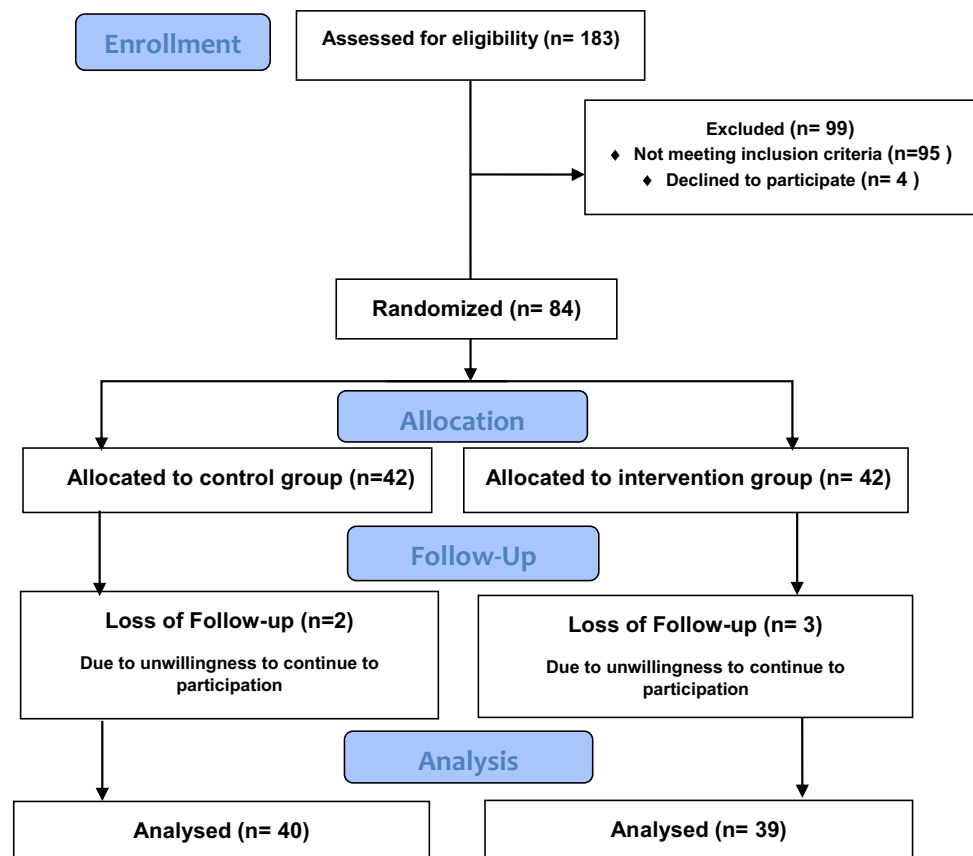
Data analysis was done by SPSS version 25.0, using descriptive statistics methods including frequency distribution, graphs, and central tendency and dispersion indices. Kolmogorov–Smirnov test was used to test the normality of quantitative variables. Chi-square and independent *t*-tests or non-parametric Mann–Whitney test were used to compare qualitative and quantitative variables respectively. Repeated measures analysis of covariance was used to control confounding factors, since there were repeated measurements.

Results

The initial participants of the study were 183 women suffering from incontinence, of whom 84 (42 in the treatment group and 42 in the control group) met the inclusion criteria. Two women in the treatment group and three in the control group were excluded from the study due to unwillingness to continue participation. Finally, 40 women in the treatment group and 39 in the control group were studied. (Fig. 1).

The two studied groups did not have statistically significant differences and were homogeneous in terms of demographic variables including age, educational attainment,

Fig. 1 Flowchart of the progress through the phases of the trial



economic status, employment, frequency of coitus, and type of urinary incontinence ($p > 0.05$) (Table 1).

Prior to the intervention, the two studied groups were not significantly different in terms of the mean score of sexual self-esteem ($p > 0.05$). However, immediately after the end of 8 weeks of intervention and 4 weeks after the end of the intervention, the two studied groups had a statistically significant difference in terms of the mean score of their sexual self-esteem and its domains including skill/experience, attractiveness, control, moral judgment, and adaptiveness ($p < 0.001$). In the two domains of adaptiveness and attractiveness, intra-group changes were significant only in the intervention group ($p < 0.001$). In the other three domains (i.e., control, skill/experience, moral judgment), intra-group changes were significant in both intervention and control groups, but these changes in the intervention group were upward and more pronounced, while these changes in the control group were downward and slight. (Table 2 and Fig. 2A).

Before the study, the two groups had no statistically significant difference in terms of the mean score of sexual function ($p > 0.05$). However, immediately after the end of eight weeks of intervention and 4 weeks thereafter, the two studied groups had a statistically significant difference in terms of the mean score of sexual function and its domains, including the behavioral-emotional, physical, and partner-related domains. ($p < 0.001$). In behavioral-emotional and the partner-related domains, the changes within the group were significant only in the intervention group ($p < 0.001$).

Although the intra-group changes in both the intervention and control groups were significant in terms of the physical domain, these changes were upward and more pronounced in the intervention group, while these changes in the control group were downward and slight (Table 3 and Fig. 2B).

Examining the correlation between sexual self-esteem and sexual function based on Pearson's coefficient showed that as the sexual self-esteem score increases, there will be a rise in sexual function score of women with urinary incontinence ($r = 0.9$; $p < 0.001$) (Fig. 3).

Discussion

The results of the present study showed the positive effect of cognitive-behavioral therapy on increasing the total score of sexual self-confidence and all its dimensions including skile/experience, attractiveness, moral judgment, control, and adaptiveness in reproductive-aged women with urinary incontinence. The CBT was also able to improve the total score of sexual function and all its dimensions, including behavioral-emotive domain, physical domain and partner-related domain in these women. The findings showed that with the increase in the sexual self-confidence score in women with urinary incontinence, the sexual performance score of these women also increases linearly.

Several studies have shown the effect of cognitive-behavioral therapy on improving sexual performance in women [31–34], but so far no study has investigated the positive

Table 1 Comparison of demographic factors of subjects in intervention and control groups

Variable	Sub-group	Intervention group ($n = 42$) n (%) \bar{X}	Control group ($n = 42$) n (%) \bar{X}	P -value †
Type of urinary incontinence	Stress incontinence	(64.3)	(50)	0.292
	Urge incontinence	(11.9)	(23.8)	
	Mixed incontinence	(23.8)	(26.2)	
Economic status	Poor	(16.7)	(11.9)	0.657
	Moderate	(57.1)	(66.7)	
	Good	(26.2)	(21.4)	
Occupation	Employed	(26.2)	(14.3)	0.139
	Unemployed	(73.8)	(85.7)	
Educational attainment	Diploma	(59.5)	(61.9)	0.823
	University	(40.5)	(38.1)	
Number of coitus	Once a month	(21.4)	(16.7)	0.849
	Once a week	(59.9)	(61.9)	
	Two to three times a week	(18.7)	(21.4)	
Variable		Mean (SD)*		P -value **
Age		41.48 ± 2.86	41.95 ± 3.35	0.486
weight		68.26 ± 7.64	69.4 ± 8.68	0.526
BMI		26.78 ± 2.83	26.07 ± 2.64	0.236

* Mean ± standard deviation; \bar{X} Number (percent); † Data was analyzed by Independent t -test; ** Data was analyzed by chi-square tests; p -value < 0.01 was considered significant.

Table 2 Changes in mean and standard deviation of sexual self-esteem score before and after the intervention in the two groups

Variable		Intervention group (<i>n</i> = 40)	Control group (<i>n</i> = 39)	MD (95% CI) #	<i>P</i> -value χ
Total score of sexual self-esteem	Before intervention	81.06 ± 0.976	81.06 ± 0.976	0.238 (−2.349 to 2.825)	0.986
	8 weeks after intervention	107.22 ± 0.999	80.46 ± 1.012	25.975 (22.986–28.964)	< 0.001
	12 weeks after intervention	79.05 ± 1.022	104.4 ± 0.009	25.348 (22.448–28.248)	< 0.001
<i>P</i> -value *		< 0.001	< 0.001	-	-
Skill/experience	Before intervention	20.52 ± 0.501	20.23 ± 0.507	0.476 (−0.881 to 1.834)	0.681
	8 weeks after intervention	24.17 ± 0.48	19.49 ± 0.486	4.609 (3.336–5.883)	< 0.001
	12 weeks after intervention	23.77 ± 0.493	19.36 ± 0.499	4.616 (0.682–24.756)	< 0.001
<i>P</i> -value *		< 0.001	0.038	-	-
Attractiveness	Before intervention	15.62 ± 0.497	16.28 ± 0.473	−0.571 (−1.934 to 0.791)	0.074
	8 weeks after intervention	20.87 ± 0.455	16.31 ± 0.461	4.487 (3.219–5.755)	< 0.001
	12 weeks after intervention	16.28 ± 0.485	19.82 ± 0.472	3.542 (2.231–4.854)	< 0.001
<i>P</i> -value *		0.146	< 0.001	-	-
Moral judgment	Before intervention	16.72 ± 0.576	18.17 ± 0.569	0.404 (−1.177 to 1.986)	0.076
	8 weeks after intervention	23.55 ± 0.484	17.94 ± 0.49	5.317 (3.943–6.690)	< 0.001
	12 weeks after intervention	23.2 ± 0.468	17.21 ± 0.474	5.085 (3.352–6.819)	< 0.001
<i>P</i> -value *		0.011	< 0.001	-	-
Control	Before intervention	10.59 ± 0.655	10.05 ± 0.647	−0.523 (−2.217 to 1.169)	0.559
	8 weeks after intervention	15.67 ± 0.649	9.56 ± 0.658	5.975 (4.236–7.714)	< 0.001
	12 weeks after intervention	16.02 ± 0.609	9.87 ± 0.676	6.153 (4.510–7.796)	< 0.001
<i>P</i> -value *		0.008	< 0.001	-	-
Adaptiveness	Before intervention	17.23 ± 0.536	16.77 ± 0.543	1.452 (0.012–2.892)	0.552
	8 weeks after intervention	22.53 ± 0.496	16.92 ± 0.499	5.487 (4.029–6.946)	< 0.001
	intervention	21.56 ± 0.469	16.56 ± 475	5.994 (4.625–7.363)	< 0.001
<i>P</i> -value *		< 0.001	0.43	-	-

Mean difference (95% CI); χ Independent *t*-test; * Repeated measures ANOVA

effects of this therapy on sexual dysfunction in women of reproductive age with urinary incontinence.

In the study by Sarabi et al., CBT significantly changed false beliefs and improved sexual performance in women with sexual dysfunction [31]. Although the number of CBT sessions in the current study (eight sessions) was less than that in Sarabi (14 sessions), the educational content of our study provided the same positive effects. In the study by Hucker et al. (2015), CBT counseling was offered online and led to a significant increase in the sexual function score of women with mixed sexual problems [32]. Rostamkhani et al. (2020) found that CBT raised the scores of the dimensions of the sexual function questionnaire in postmenopausal women [33]. Irvani et al. (2019) also reported that CBT could improve sexual function in pregnant women [34]. Therefore, the results of the present study are consistent with the results of the aforementioned studies with regard to the effectiveness of cognitive–behavioral therapy on improving sexual performance.

There are several reasons for causing sexual dysfunction in women with urinary incontinence [35–39]. Up to a quarter

of women who have urinary incontinence at least monthly may experience urinary leakage during sexual activity. As a result, some women may have avoided sexual activity altogether due to concerns about this leakage [35]. Women with urinary incontinence have been reported to feel ashamed and believe that they have lost their attractiveness [36]. UI intensifies fear of sexual contact and increases dissatisfaction with sexual life in women with urinary incontinence [37]. Urgency UI is significantly associated with lower self-esteem [38], which significantly influences sexual dysfunction [39].

Several mechanisms were suggested to explain the effectiveness of CBT to treat sexual function in this women. Relying on the premise that thoughts, feelings, physical sensations, and actions are interrelated, CBT helps patients to recognize their distorted attitudes and ineffective behaviors and to take action for changing them [22]. Research shows that CBT is effective in treating sexual dysfunction and sexual self-esteem, especially in women, by bringing about changes in their negative attitudes [22, 23]. In a study, Behavioral therapy was reported to be more effective than

Fig. 2 **A** Changes in total of sexual self-esteem score before and after treatment in control and intervention groups. **B** Changes in total sexual function score before and after the treatment in control and intervention groups

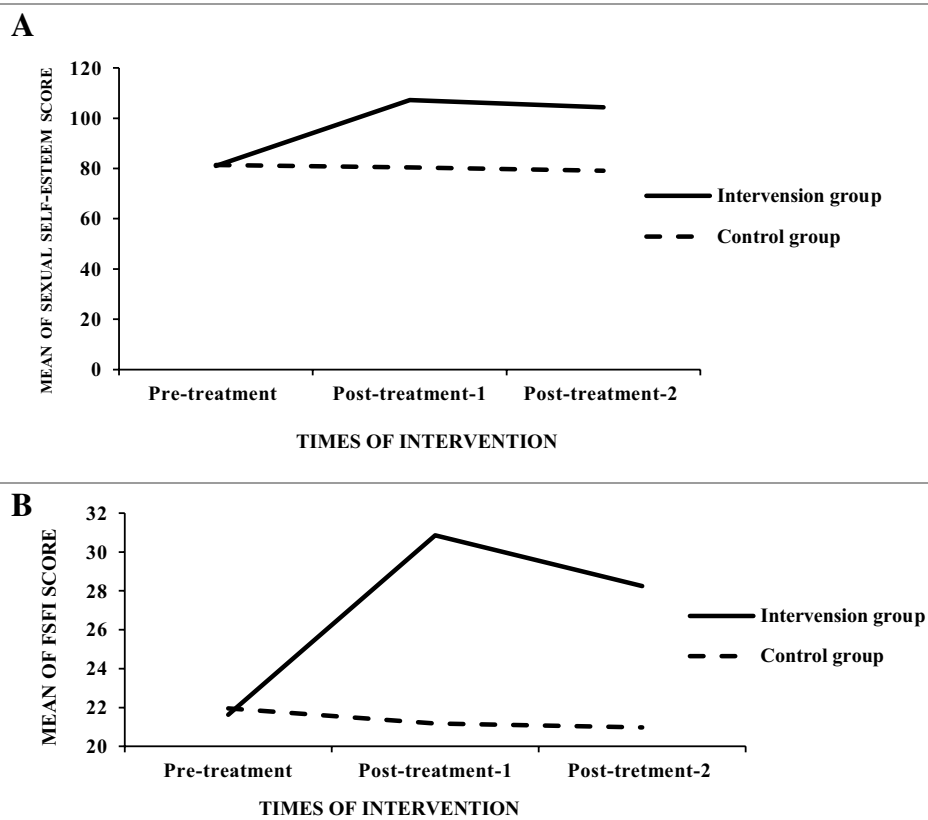
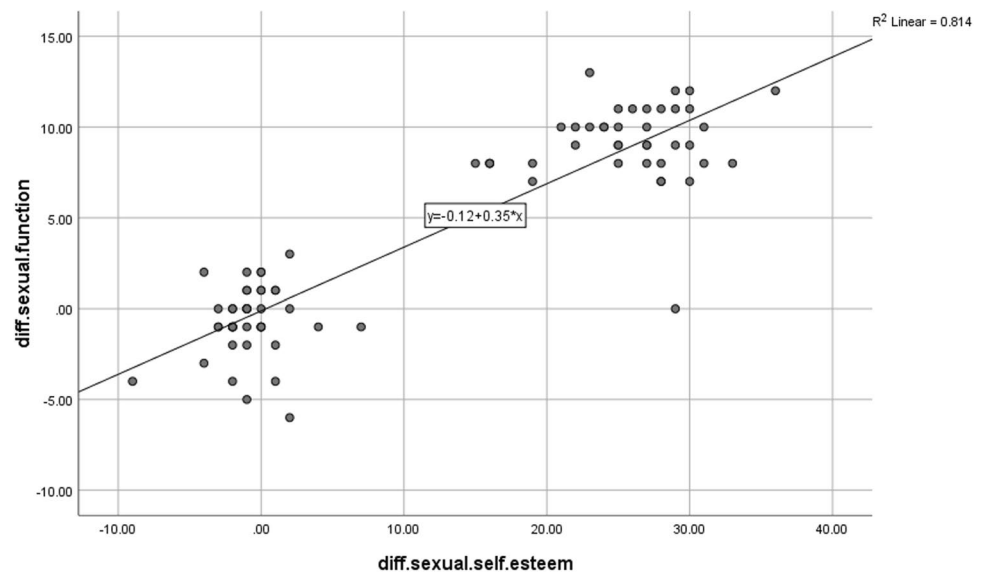


Table 3 Changes in mean and standard deviation of sexual function score before and after the intervention in the two groups

Variable		Intervention group (n = 40)	Control group (n = 39)	MD (95% CI) #	P-Value χ
Total score of sexual function	Before intervention	21.63 ± 0.202	21.95 ± 0.207	-0.261 (-0.858 to 0.334)	0.356
	8 weeks after intervention	30.85 ± 0.286	21.18 ± 0.236	9.390 (8.422–10.358)	< 0.001
	12 weeks after intervention	28.25 ± 0.27	20.97 ± 0.27	7.250 (6.50–7.992)	< 0.001
P-value *		< 0.001	0.221	-	-
Behavioral–emotive domain	Before intervention	6.28 ± 0.309	6.94 ± 0.276	-0.666 (-1.414 to 0.081)	0.092
	8 weeks after intervention	10.51 ± 0.272	7.17 ± 0.272	3.170 (2.415–3.925)	< 0.001
	12 weeks after intervention	9.41 ± 0.247	7.1 ± 0.247	2.246 (1.512–2.980)	< 0.001
P-value *		0.491	< 0.001	-	-
Physical domain	Before intervention	11.13 ± 0.263	11.2 ± 0.263	-1.666 (-0.965 to 0.632)	0.837
	8 weeks after intervention	14.83 ± 0.235	10.49 ± 0.235	4.292 (3.618–4.966)	< 0.001
	12 weeks after intervention	13.95 ± 0.255	10.23 ± 0.255	3.719 (2.995–4.442)	< 0.001
P-value *		< 0.001	< 0.001	-	-
Partner-related domain	Before intervention	4.28 ± 0.22	3.58 ± 0.206	0.380 (-0.162 to 0.924)	0.099
	8 weeks after intervention	5.84 ± 0.195	3.51 ± 0.195	2.268 (1.730–2.806)	< 0.001
	12 weeks after intervention	4.9 ± 0.199	3.59 ± 0.199	1.310 (0.757–1.862)	< 0.001
P-value *		0.273	< 0.001	-	-

Mean difference (95% CI); χ Independent t-test; * Repeated measures ANOVA

Fig. 3 Correlation between change in total scores for sexual function and sexual self-esteem



anticholinergics in treating UII in a network meta-analysis [12].

As mentioned, in our study, CBT had a positive and significant effect on women's sexual self-esteem. In the study of Khataei et al. (2020), ten sessions of cognitive–behavioral counseling were associated with a significant increase in the sexual self-esteem scores of women in the intervention group. Although the number of counseling sessions in the current study was smaller than that of Khataei et al., the results of the two studies are consistent [40]. In another study, despite the different research participants, i.e., women of childbearing age who had undergone hysterectomy, CBT increased women's self-esteem [41].

As far as the domain of attractiveness is concerned, Hummel et al. reported reduced concern about body image in women with breast cancer after attending CBT sessions [42]. With respect to the domain of adaptiveness, Mohaddesi et al. (2016) found that CBT had a significant and positive effect on improving communication and conflict resolution skills of couples and their sexual relations [43]. Despite the difference in the study population, the results of the present study are consistent with the results of the mentioned studies with regard to the effectiveness of CBT on improving sexual self-esteem. In this regard, cognitive–behavioral therapy has been suggested as the first line of treatment for women with urinary incontinence [12].

Although according to the results of various studies, it seems that the factors affecting sexual dysfunction following urinary incontinence are unpleasant almost for all women, but anyway, considering the influence of culture and individual differences in the attitude of women to express sexual problems due to shame and modesty, the generalization of research findings to other women with different cultures and attitudes should be done with caution.

Limitations and strengths

This study is the first study to investigate the effect of CBT on improving self-esteem and sexual function in women with urinary incontinence. This study is also worthwhile in its use of a sexual function questionnaire that is specifically designed for women with urinary incontinence. Despite these strengths, there are a number of limitations, including the participants' fear of visiting health centers in person due to the corona virus pandemic, which created stress and affected their concentration during the treatment sessions. In this regard, an attempt was made to alleviate this limitation by observing the health precautions and keeping proper distance between people during the treatment sessions.

Conclusion

Based on the results of this study, CBT was found to increase self-esteem and improve sexual function in reproductive-aged women with urinary incontinence. Therefore, it is recommended as a non-invasive, low-cost and effective way to increase sexual self-esteem and improve sexual function in women with urinary incontinence.

Abbreviations CBT: Cognitive–behavioral therapy; PISQ–12: The Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire; ICIQ–SF: The International Consultation on Incontinence Questionnaire–Short form; SSEL–W–SF: The Scale of Self-Esteem Index for Women–Short-form; UI: Urinary incontinence; UII: Urge urinary incontinence

Acknowledgements This article was extracted from the master's thesis of Salimeh Moradinasab, an M.Sc. student of midwifery at Ahvaz Jundishapur University of Medical Sciences (Ref. ID: IR.AJUMS).

REC.1400.102). This study was also registered in the Iranian Registry for Clinical Trials (Ref. ID: IRCT20210516051312N1). The authors would like to express their gratitude to the Vice Chancellor for Research and Technology of Ahvaz Jundishapur University of Medical Sciences for supporting this project, as well as the officials and staff of Health Center No. 1 and Health Center No. 6 in Dezful, southwest of Iran, and all the participants of this research.

Authors' contributions SM: responsible for design, data collection, and writing of the manuscript in Persian. MI: responsible for design, data interpretation, and writing the manuscript in English. PM: involved in design and interpretation of data. BCh: responsible for data analysis and interpretation. ShM: responsible for supervision and guidance of the cognitive-behavioral therapy sessions. All authors read and approved the final manuscript.

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Funding This article was extracted from a MSc. Thesis written in the School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences (AJUMS), Ahvaz, Iran, and sponsored by the Deputy of Research of AJUMS, Ahvaz, Iran. This deputy has no role in design of the study, collection, analysis, and interpretation of the data and in writing the manuscript.

Data availability The datasets generated and/or analyzed during the current research are not publicly available as individual privacy could be compromised, but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate This paper has been adapted from a M.Sc. thesis written by Miss Salimeh Moradinasab, recorded at the Iranian Clinical Trial Registration Center with the code of IRCT20210516051312N1 and approved by Ethics Committee of Ahvaz University of Medical Sciences (Ref. No.: IR.AJUMS.REC.1400.102). Written and oral consent was obtained from patients to participate in the study.

Consent for publication All authors read and approved the final manuscript.

Competing interests No conflict of interest has been declared by the authors.

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