



Comparing App-based and Lecture-based Methods of Sexual Satisfaction Education: A Randomized Controlled Trial

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Abstract

Background: Sexual dysfunction is one of the most common complications of spinal cord injury with potentially negative impacts on sexual satisfaction.

Objectives: This study aimed to compare the effects of app-based and lecture-based sexual education on the sexual satisfaction of disabled men with spinal cord injury.

Methods: A randomized clinical trial was conducted on disabled men with spinal cord injury in 2019. The participants were selected using a convenience sampling method from the Welfare Organization of Birjand city. A demographic form and Larson's Sexual Satisfaction Questionnaire were completed before the intervention. Then, the participants were randomly assigned to two groups (app-based and lecture-based groups). In the app-based group, the sexual education content was prepared as an Android app that was accessible for the group participants for two months. Similar content was communicated to the lecture-based group in the form of lectures during ten 60- to 90-min sessions over two months. Six weeks after the end of the intervention, Larson's Questionnaire was completed again for both groups. Data were analyzed using the Fisher's exact test, Kolmogorov-Smirnov test, paired *t*-test, and independent *t*-test. The significance level was set at $P < 0.05$.

Results: In both groups, the mean scores of sexual satisfaction significantly increased after the intervention ($P < 0.05$). Nevertheless, the mean change in the sexual satisfaction score was significantly more in the app-based group (18.16 ± 3.31) than in the lecture-based group (7.52 ± 4.59) ($P < 0.05$).

Conclusions: App-based sexual education can be more effective than lecture-based sexual education in improving the sexual satisfaction of disabled men with spinal cord injury.

Keywords: Mobile Application, Sexual Education, Sexual Satisfaction, Lecture, Spinal Cord Injury

1. Background

Spinal Cord Injury (SCI) is a debilitating neurological condition with substantial socioeconomic impacts on both the inflicted individual and the health care system. In the United States, 250,000 people live with SCI, and 17,000 new cases are added every year (1, 2). As for the Iranian context, a 2015 study reported a prevalence of 318.45 people per million population (3).

Individuals with SCI may suffer from spinal cord injury, spinal nerve root injury, or both for any reason (4). Over time, they may experience long-term complications of SCI, such as respiratory and cardiovascular complications. Sexual dysfunction is one of the most common complications of SCI (5, 6). Sexual dysfunction can harm couples' sexual satisfaction (7). Sexual dissatisfaction not only destroys couples' passion but also can predispose them to heart at-

tack and migraine headaches (8). Thus, it is necessary to increase the sexual satisfaction of these patients (9).

Different methods such as drug therapy, psychological counseling, the use of assistive equipment, and sexual health education can partly alleviate sexual problems in patients with SCI. Sexual health education, through varying methods, is one of the most important interventions to improve sexual satisfaction (10). Education enhances the patient's feelings of control, self-efficacy, coping ability, and ability to change situations (11). The World Health Organization has acknowledged sexual empowerment via education as one of the best practices to observe sexual health and hygiene (12).

Educational methods can be categorized into conventional and modern types. One of the most common conventional methods is the lecture. In this method, the educator conveys concepts to the learner orally. A lecture

is associated with advantages such as direct, orderly, and logical presentation of materials (13, 14). However, this approach limits the active participation of learners and fails to account for individual differences between learners (15). On the other hand, as a non-traditional learning and teaching method, electronic-learning (e-learning) is a broad term that encompasses learning-associated concepts and technologies such as mobile-based learning and online learning (16, 17). E-learning is highly flexible and can be beneficial to people with different learning styles. Also, the speed of learning in this way is adjustable by the learner him/herself, and the materials can be reviewed by the learner whenever s/he feels needed (18). In the meantime, this method has its disadvantages. For example, it cannot replace the instructor, human interaction, and face-to-face communication in the classroom (19).

Several studies have reported that patient education with modern methods based on computer and mobile phone software facilitates the interaction between patients and health care providers (20-22). Reis and Wrestler (1994) reported that the use of a computer system to educate patients about common cold treatments shortened the number of visits to health services (21). Wieland et al. found that an immersive computer-based approach was successful for weight loss (23). While there is supporting evidence that modern methods of patient education are effective, some studies have published contradictory findings. Pal et al. reported that software-based self-management strategies for type 2 diabetes seemed to have a limited impact on blood glucose balance (24). Wofford argued that the area of computer-based patient education was still in the developing phase and highlighted the need for further proof of its effect on clinical results (25).

Sexual health care is often overlooked in nursing (26). This seems to be true in Iranian society because, in the Iranian culture, sexual issues have long been known as taboos (27). Due to the shame in Iranian society, sex education is not well presented for all people. Individuals with SCI are no exception. On the other hand, there are no suitable facilities for disabled people with SCI. Given that most people have access to the Internet, more attention is being paid to modern teaching methods.

Therefore the present study was designed to compare the effect of app-based versus lecture-based sexual education on sexual satisfaction among disabled men with SCI.

2. Methods

A randomized-controlled clinical trial (IRCT20190515043601N2) was conducted in 2019. The participants were selected by the census method. Out of

90 disabled individuals with SCI and open records in Birjand Welfare Organization, 68 met the inclusion criteria. The inclusion criteria comprised SCI from T8 to L2 vertebrae, age range from 20 to 60 years, being married, ability to read and write, access and ability to use smartphones and the Internet, and lack of known disorders in the visual and auditory systems. The exclusion criteria included unwillingness to continue with the study, couples' divorce during the study, absence from more than two sessions in the lecture-based group, and being offline for more than five hours in the app-based group.

2.1. Intervention

Researchers referred to the Birjand Welfare Organization and explained the research objectives to potential participants who, subsequently, signed written consent forms for participation (n = 68). They completed a demographic form and Larson's Sexual Satisfaction Questionnaire (1988). Afterward, the selected participants were randomly assigned to either app-based (n = 34) or lecture-based (n = 34) groups using the blocking allocation method (Figure 1).

The contents of sexual education for the two groups were prepared under the supervision of a sexologist and experts from the Education and Research Department of South Khorasan Welfare Organization. Also, the contents followed valid textbooks (28). Then, computer and software experts developed these contents into an Android application. The topics in this app included the importance of sexual health, familiarity with sexual anatomy and sexual function, misconceptions about sexual relations of the disabled patients, appropriate positions for disabled individuals with SCI, strategies to enhance intimacy in matrimonial relations without intercourses, and education on how to discuss sexual needs (Figure 2). The app was accessible to the app-based group members for two months.

As for the lecture-based group, a nurse was responsible for the sexual education of disabled people, while an expert from the South Khorasan Welfare Organization supervised the presented contents. Before the lecture sessions, the lecturing nurse presented the contents in two one-hour training sessions under the supervision of a sexologist and a specialist from the Education and Research Department of South Khorasan Welfare Organization. To perform the intervention in the lecture-based group, the researchers divided the individuals into three subgroups based on their education levels. The intervention for the lecture-based group was delivered to the three subgroups in 10 sessions within two months. The duration of each session was 60 to 90 minutes. For the researchers to ensure that the contents provided for both groups were similar, the app-based group received only contents that were presented in the lecture-based group each week. Six weeks af-

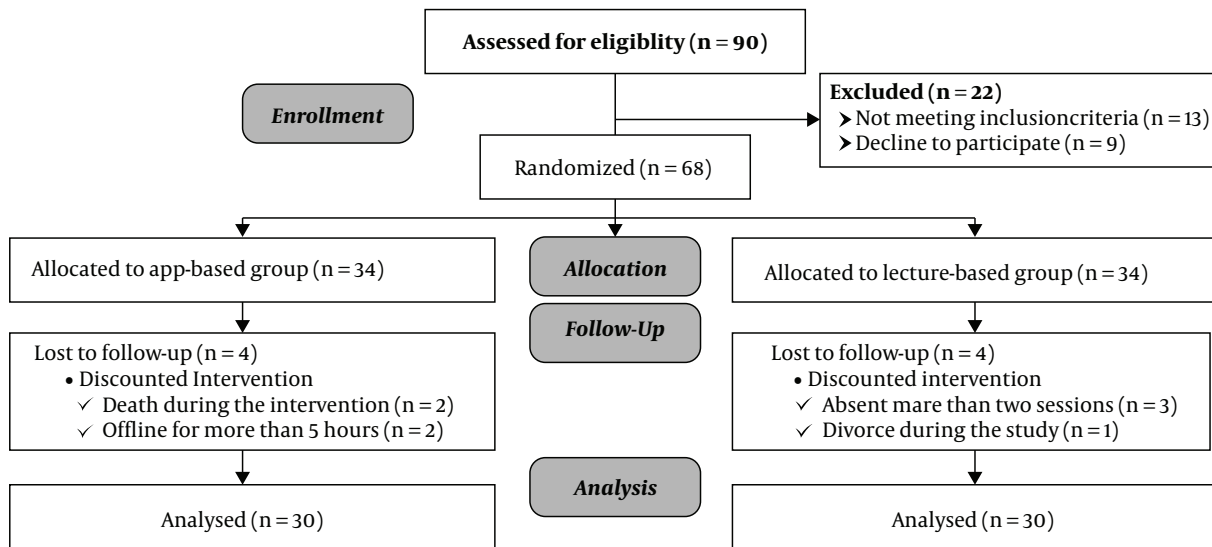


Figure 1. CONSORT flow diagram

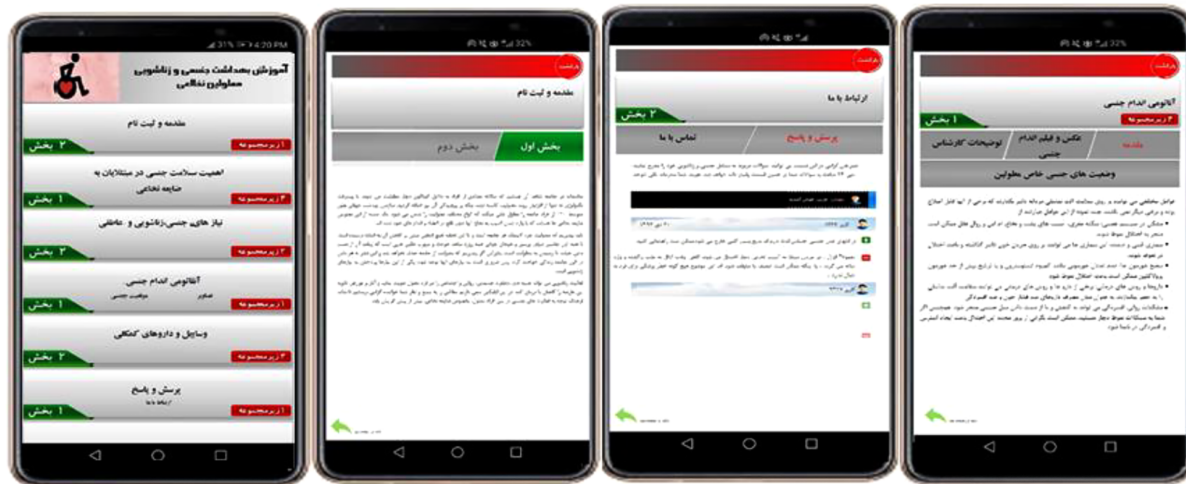


Figure 2. The complete educational tool (Android App), covering the start page, introduction, registration, contact, and sexual anatomy pages

ter the intervention, the Larson’s Sexual Satisfaction Questionnaire was re-administered to both groups. Four participants in each group were excluded (Figure 1). Therefore, data were analyzed for 30 individuals in each group.

2.2. Data Collection Tools

A demographic characteristic form and the Sexual Satisfaction Questionnaire (Larson, 1988) were used for data collection. The demographic form included age, gender, location of SCI, marriage duration, level of education, ASIA

impairment grading, and drug history. The Sexual Satisfaction Questionnaire, designed by Larson et al., included 25 items and four dimensions, comprising desire to have sexual relations, sexual attitude, quality of sex life, and sexual compatibility. The items were answered on a five-point Likert scale (always = five, often = four, sometimes = three, rarely = two, and never = one). Items 4, 5, 6, 7, 8, 9, 11, 14, 15, 18, 20, 24, and 25 were reversely scored. The minimum and maximum scores were 25 and 125, respectively. Higher scores indicated greater sexual satisfaction (29). Bahrami et al. reported that Cronbach’s alpha is to be greater than

0.7 for all dimensions and positive/negative questions (30). The reliability of all dimensions of this questionnaire was more than 0.76 based on Cronbach's alpha.

2.3. Ethical Considerations

The Ethics Committee of Birjand University of Medical Sciences approved the research design under the code IR.BUMS.REC.1397.235. The researcher explained the purpose of the study to the participants. Before signing informed consent forms, they were told that they could withhold at any stage of the study without paying any fees.

2.4. Data Analysis

Data were analyzed using SPSS version 16.0. Descriptive statistics (frequency, and percentage) were used to describe the demographic variables. Fisher's exact test was used to compare the distribution of demographic variables. In the inferential section, the data were first examined for normal distribution using the Kolmogorov-Smirnov test. The independent *t*-test was used to compare the mean scores of sexual satisfaction and its dimensions between the two groups and paired *t*-test to investigate the intra-group differences. The significance level was set at $P < 0.05$.

3. Results

The demographic characteristics of participants are presented in Table 1. The results showed that the baseline characteristics did not have any significant differences between the two groups ($P > 0.05$) (Table 1). There was also no significant difference between the two groups before the intervention in terms of the mean scores of sexual satisfaction and its dimensions ($P > 0.05$). In the app-based group, the paired *t*-test results showed significant differences in the mean scores of the desire for sexual relationships, sexual attitude, quality of sex life, and sexual compatibility between the pre-intervention and post-intervention phases ($P < 0.05$). In the lecture group, there was a significant difference between the pre-intervention and post-intervention phases only in the sexual compatibility dimension ($P = 0.04$). In both groups, the mean scores of sexual satisfaction significantly increased six weeks after the intervention compared to before the intervention ($P < 0.05$) (Table 2).

After the intervention, the independent *t*-test results showed significant differences between the app-based group and the lecture-based group in the mean scores of sexual satisfaction dimensions, except for sexual compatibility ($P < 0.05$). In addition, at the end of the intervention, there was a significant difference in the mean score

Table 1. Demographic Variables in Two Groups (N = 60)

	App-based Group, Frequency (Percentage)	Lecture-based Group, Frequency (Percentage)	P Value
Age			0.55
20 - 29	3 (10.0)	1 (3.33)	
30 - 39	14 (46.6)	13 (43.3)	
40 - 49	9 (30.0)	10 (33.3)	
50 - 59	4 (13.3)	6 (20.0)	
Marriage duration (years)			0.74
1 - 9	12 (40.0)	10 (33.3)	
10 - 19	14 (46.6)	16 (53.3)	
20 - 29	4 (13.3)	4 (13.3)	
Lesion location			0.69
T8,9,10	3 (10.0)	5 (16.6)	
T11,12	11 (36.6)	13 (43.3)	
L1,2	16 (53.3)	12 (40.0)	
Education level			0.48
Elementary	7 (23.33)	8 (26.66)	
Diploma	16 (53.33)	13 (43.33)	
University	7 (23.33)	9 (30.01)	
Cause of spinal cord injury			0.64
Traumatic	25 (83.3)	28 (93.33)	
Tumor	2 (6.66)	1 (3.33)	
Infection	1 (3.33)	1 (3.33)	
Osteo- porotic fracture	2 (6.66)	0	
ASIA Impairment Grading			0.58
Grade A	3 (10)	4 (13.33)	
Grade B	9 (30)	7 (23.33)	
Grade C	13 (43.33)	11 (36.66)	
Grade D	5 (16.66)	8 (26.66)	
Drug history			0.36
SSRI	6 (20)	8 (26.66)	
TCA	14 (46.66)	17 (56.66)	
Sildenafil	10 (33.33)	5 (16.66)	

of sexual satisfaction between the two groups ($P = 0.04$) (Table 2). The independent *t*-test results showed that the mean changes in the scores of desire for sexual relationships, sexual attitude, and quality of sex life were significantly higher in the app-based group than in the lecture-

Table 2. Mean Scores of Sexual Satisfaction and its Dimensions and Score Changes Before and Six Weeks After the Completion of the Intervention^a

	Time, Mean \pm SD		P value ^b	Mean Difference \pm SD
	Before	After		
Desire for sexual relationships				
App-based	15.40 \pm 3.30	21.02 \pm 3.37	0.03	5.62 \pm 3.27
Lecture-based	16.91 \pm 1.17	18.67 \pm 3.83	0.29	1.76 \pm 2.59
P value ^c	0.91	0.04	-	< 0.001
Sexual attitude				
App-based	25.30 \pm 4.74	30.16 \pm 4.40	0.001	4.86 \pm 4.81
Lecture-based	24.08 \pm 5.20	25.97 \pm 5.14	0.47	1.89 \pm 5.27
P value ^c	0.72	0.02	-	0.04
Quality of sex life				
App-based	12.92 \pm 3.31	16.74 \pm 3.11	0.001	3.82 \pm 3.18
Lecture-based	12.97 \pm 3.73	13.78 \pm 3.56	0.67	0.81 \pm 3.46
P value ^c	0.51	0.01	-	0.01
Sexual compatibility				
App-based	15.02 \pm 3.52	19.00 \pm 3.95	0.01	3.98 \pm 3.78
Lecture-based	14.64 \pm 3.53	18.7 \pm 4.14	0.04	4.06 \pm 3.85
P value ^c	0.94	0.79	-	0.37
Sexual satisfaction				
App-based	68.86 \pm 12.24	86.92 \pm 15.05	< 0.001	18.06 \pm 12.46
Lecture-based	69.60 \pm 14.03	77.12 \pm 16.59	0.04	7.52 \pm 6.49
P value ^c	0.33	0.049	-	< 0.0001

^aHigher scores indicating greater sexual satisfaction^bPaired *t*-test^cIndependent *t*-test

based group ($P < 0.05$). Also, the mean changes in the score of sexual satisfaction were significantly higher in the app-based group than in the lecture-based group ($P < 0.05$) (Table 2).

4. Discussion

The results of the present study showed a significant increase in the level of sexual satisfaction after the intervention in both groups. Our findings indicate that both methods (lecture-based and app-based) are valuable to improve the sexual satisfaction of men with SCI.

Various studies have shown that sex education, in general, increases sexual and marital satisfaction. The findings of the present study are consistent with Kim et al. study entitled "The effect of a sexual education program on spinal cord injured couples on disability acceptance, self-esteem, and marital relationship enhancement" (31). They are also in line with the results of Song et al. study entitled "Effects of a sexual rehabilitation intervention pro-

gram on stroke patients and their spouses" in South Korea. It showed that sex education and counseling play critical roles in promoting the sexual quality of life (32). It can be mentioned that one contributor to increased sexual satisfaction of the participants in both groups in the present study was the patients' empowerment to discuss sexual issues with their spouses. During the sexual education process in the present study, the participants learned to discuss their sexual expectations with their spouses quite explicitly. Moreover, their familiarizations with disability-specific sexual positions, the anatomy of the reproductive system, and sexual intimacy without complete intercourse may have led to increased sexual satisfaction.

The findings of the present study also showed that the app-based method was more effective than the lecture method. This finding is congruent with many other studies, despite the different research settings. For example, Gysels and Higginson found that modern technology-based education was better in many aspects than conventional forms of education, reporting that digital technologies in-

creased the knowledge and satisfaction of cancer patients (33). Saksena concluded that modern technology-based education enhances patients' knowledge and self-care abilities (34). Friedman et al. demonstrated that the use of modern technologies such as computer-based education may be a more effective method for patient education than traditional approaches, especially when patients were given information specific to their situations rather than general information (35).

Concerning the potential factors leading to this finding, the socio-cultural context in which the participants live is noticeable. As mentioned earlier, sexual issues have been associated with taboos in Iranian culture (27). The common culture in both society and families continues to exercise extreme caution regarding the education of sexuality in Iranian families. This causes individuals to keep their sexual problems a secret and restrain from talking about it openly to one another. The lack of discussion of sex issues impedes couples from being informed of each other's needs, and therefore, they may not receive proper education in this regard. They will inevitably be prone to receive sex education from informal and possibly unreliable sources. It can be assumed that the reason for the more significant impact of app-based sexual education than that of the lecture-based intervention lies partly in constant access to information on a completely confidential and anonymous basis, without the fear and worry of being judged by others and the possibility of posing sexual questions and concerns without any shame. In the lecture-based group, the participants might not have been able to raise questions in the presence of other participants, even if they had questions or ambiguities about the presented contents.

A major limitation of this study was the small sample size. We suggest conducting further studies with larger sample sizes.

5.1. Conclusion

App-based sexual education programs are strongly recommended to improve the sexual satisfaction levels in men with SCI.

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Footnotes

Authors' Contribution: Hossein Rahimi developed the original idea and the protocol, abstracted and analyzed the data, wrote the manuscript, and is a guarantor. Nasim Mehrpooya, Seyyed Abolfazl Vaghar Seyyedin Nad Najmeh Javan contributed to the development of the protocol, abstracted data, and prepared the manuscript.

Clinical Trial Registration Code: IRCT20190515043601N2 from <https://fa.irct.ir/trial/43800>

Conflict of Interests: The authors declare no conflict of interest.

Ethical Approval: IR.BUMS.REC.1397.235 from <http://ethics.research.ac.ir>

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Informed Consent: Researchers referred to the Birjand Welfare Organization and explained the research objectives to potential participants who, subsequently, signed written consent forms for participation.

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