

RESEARCH ARTICLE

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Sexual Dysfunction in Patient's Diagnosed with Cervical Cancer in Comparison to the Healthy Female Population

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Abstract

Objective: Aim of the study was to evaluate and compare the prevalence female sexual dysfunction (FSD) in cervical cancer (CC) survivors to a healthy female population. **Materials and Methods:** This observational prospective trial was conducted at Thammasat University Hospital, Thailand, between April 2023 and February 2024. Participants were CC survival who attended an outpatient cancer clinic. Subject with age between 30 and 60 years old and engaged in sexual intercourse at least once within the last 4 weeks were recruited. The control group was women who attended outpatient gynecologic clinic for routine pelvic examination with no serious medical diseases and no malignancy. The female sexual function index (FSFI) was applied to all the participants during the survey. Other demographic data of the participants were collected. **Results:** A total of 116 cases were enrolled in the study. Participants were equally divided into the study and control groups. The mean age and BMI of participants were 49.4 years and 24.7 kg/m², respectively without statistical significance. The FSD's prevalence of the CC survival was significantly higher than control group (34.5 and 10.4 percent, respectively). CC survivors reported significantly poorer outcomes in the domains of lubrication, sexual satisfaction, and pain compared to the control group. **Conclusion:** The prevalence rates of CC survival and control group was 34.5 and 10.4 percent, respectively. Three out of six FSFI domains namely lubrication, satisfaction, and pain showed more problematic for CC survivors compared to control group.

Keywords: Cervical cancer survivors- female sexual dysfunction- FSFI score

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Introduction

Female sexual dysfunction (FSD) was characterized by persistent and recurrent difficulties in initiating and completing one or more phases of the physical sexual response cycle, including desire, arousal, orgasm, and resolution [1]. FSD can affect biological, psychological, behavioral, and sociocultural factors, thereby impacting the quality of life [1, 2]. According to the World Health Organization (WHO), sexuality was a significant factor in determining quality of life. It was linked to thoughts, feelings, actions, social integration, and both physical and mental health, as well as overall well-being [3].

Cervical cancer (CC) ranked as the fourth most commonly diagnosed cancer among women globally, with approximately 570,000 new cases reported in 2018, accounting for 6.6% of all female cancer [4]. In Thailand, CC was still one of the major public health problems with age standardized incidence rate (ASR) at 16.4 per 100,000 in year 2020 [5]. For over two decades, it has been

established that human papillomavirus (HPV) infection was a predominant cause of CC in Thailand, responsible for 86–95% of the cases. As a result, only persistent high-risk HPV infections can lead to CC [6].

The global strategy to eliminate cervical cancer focused on three main objectives included widespread vaccination, early screening for eligible women, and treatment for those with positive screening results, which was implemented in Thailand [5]. Excellent result of CC treatment came from surgery from expertise gynecologic oncology surgeon, intensity modulated radiotherapy, effective chemotherapy, agent and targeted therapy [7].

The treatment of CC typically involved either surgery or radiotherapy, both of which can result in FSD. This dysfunction often raised from bilateral oophorectomy or ovarian failure caused by radiation, leading to a sudden onset of menopause. Further bilateral oophorectomy's complication includes vaginal dryness, dyspareunia, decreased libido, and depression. Additionally, radical hysterectomy or radiation can shorten the vaginal

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canal, causing anatomical distortions that impact sexual function. Consequently, surgery may lead to dyspareunia, anorgasmia, and body image distortion, all of which contribute to FSD [8].

The quality of life for women who were CC survivors has declined which was impacting their overall health [9-11]. As CC survivors lived longer, the importance of maintaining life satisfaction becomes increasingly important. Generally, female sexual desire was crucial for reproductive health and linked to an enhanced quality of life [12]. This study aimed to evaluate and compare the prevalence FSD in CC survivors to a healthy female population. The results of this research might add some aspect to the improvement of comprehensive patient management strategies which would be beneficial to both the oncological and holistic needs of the patients.

Materials and Methods

This observational prospective trial was conducted at Thammasat University Hospital, Thailand, between April 2023 and February 2024. The study received approval from the Human Ethics Committee of Thammasat University (MTU-EC-OB-1-067/66). Participants were women diagnosed with CC who attended an outpatient cancer clinic (OPCC) at Thammasat Hospital, Pathumthani, Thailand for disease progression surveillance according to the regular protocol. Inclusion criteria included CC survivors (study group) were between 30 and 60 years old. Additionally, CC survivors who had engaged in sexual intercourse at least once within the last 4 weeks prior to the survey were. Exclusion criteria included participants with language barriers, underlying diseases requiring urgent treatment, namely cardiovascular disease, stroke, psychiatric disorders, illicit drug use, refusal to participate, and those diagnosed with more than one type of cancer. In the control group, women who attended outpatient gynecologic clinic for routine pelvic examination with no serious medical diseases and no malignancy were recruited.

The sample size was calculated based on the Dandamrongrak study from 2021 [8]. The prevalence of FSD among gynecologic cancer survivors was 53 percent (52/98). Type 1 and Type 2 errors were set at levels of 5 and 10 percent, respectively. The number of subjects required for statistical significance were 96 cases. An additional 20 percent was added to compensate for potential data loss, resulting in a sample size of 120 cases for this study. The participants were classified into two groups including the study and control groups. Each initially consisted of 60 participants. Before recruitment, participants were informed about the study process.

This questioning process was conducted privately and only the investigator and the participant were present. Participants were informed that they could ask any questions about the questionnaire at any time during the process. Following a comprehensive explanation of the study, informed consent was obtained from each participant. Upon receiving consent, each participant was provided with a questionnaire consisting of four sections. Participants who were uncomfortable with any aspect of

the study were allowed to withdraw at any point.

The demographic data of the participants were collected in the first part of the questionnaire. Obstetric and gynecologic history of the participants were presented in the second part. The third part included a Thai translation the female sexual function index (FSFI), which consists of 19 self-administered instrument items that assess six domains of sexual function [13]. The six domains of female function for sexually active encompassing desire, arousal, lubrication, orgasm, satisfaction, and pain were explored. In each domain, the higher score indicated non-sexual dysfunction. The fourth part evaluated participant satisfaction before and after the completion of the questionnaire. Each question scored on a scale from 0 to 5. The FSFI scores ranged from 2 to 36. The score of less than 26 on the FSFI indicated FSD, providing a sensitivity of 0.77 and specificity of 0.85 for detecting clinical diagnoses of FSD [14].

Data analysis was divided into categorical and continuous data. The categorical data results were presented as n (%), while the continuous data results were shown as mean \pm standard deviation. Group comparisons for categorical data were conducted using the chi-square test or Fisher's exact test. In contrast, group comparisons for continuous data were performed using an independent t-test. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 (SPSS Inc., Chicago, USA). A p-value less than 0.05 was considered statistically significant.

Results

A total of 116 cases were enrolled in the study. Participants were equally divided into the study and control groups as shown in Figure 1. The mean age and BMI of participants were 49.4 years and 24.7 kg/m², respectively without statistical significance. The total number of government officers among the control group (46.6%, 27/58) was statistically higher than that in the study group (17.2%, 10/58), p-value < 0.01. Most participants were Buddhism (116/118). Half of the participants (59/116) had an educational level of a bachelor's degree or higher, which was not statistically significant between both groups. One-fifth (16/58) of the study cases underwent surgical staging surgery without post-operative adjuvant treatment. Demographic characteristics, including underlying disease, religion, and marital status, were comparable between the two groups, as shown in Table 1.

Overall, FSFI score of the control group was significantly higher than that of the CC survival group (53.7 vs 45.5, p = 0.03). The prevalence of FSD among CC survival (study group) and control group were 34.5 (20/58) and 10.4 (6/58) percent, respectively.

The FSFI total score, along with the lubrication, sexual satisfaction, and pain were significantly lower in the study group when compared to those of the control group, as shown in Table 1 and Figure 2. However, the desire, arousal, orgasm in both groups were not statistically different. Detailed of each question in the FSFI questionnaires were provided in Table 2 and Figure 2.

Table 1. Demographic Characteristics of Cervical Cancer Survivors (study, n=58) and Control (n=58) with the Comparison between FSD and NFSD of Cervical Cancer Survival

	Control*	Study*	p-value	FSD**	NFSD**	p-value
Age (years)	48.9±6.0	49.8±8.2	0.48	54.0±4.3	47.9±7.3	<0.001
Marital status**	48(82.8)	50 (86.2)	0.865	18(69.2)	80(88.9)	0.015
Occupation			<0.001			0.116
GO	27 (46.6)	10 (17.2)		5(19.23)	32(35.56)	
Other	31 (53.4)	48 (82.8)		21(80.77)	58(64.44)	
No UD**	29 (50.0)	18 (31.0)	0.04	16(61.54)	62(68.89)	0.482
BMI						
<25	11 (69.0)	22 (40.0)	0.042	11(69.0)	22(40.0)	0.042
≥25	9 (90.0)	16 (45.7)	0.027	9(90.0)	16(45.7)	0.027
Education			0.103			
<Bachelor	22 (37.9)	35 (60.3)		13(83.0)	22(54.0)	0.073
≥Bachelor	36 (62.1)	23 (39.7)		7(70.0)	16(32.7)	0.037
Vaginal delivery			0.003			
Yes	25 (43.1)	41 (70.7)		15 (93.7) ^d 1 (6.3) ^e	26(53.0) ^d 24 (4.7) ^e	0.003
No	33 (56.9)	17 (29.3)		5 (50.0) ^d 5 (50) ^e	12(30) ^d 28 (70) ^e	0.232
FSFI	53.7±17.0	45.5±21.7	0.03	20(76.9)	38(42.9)	0.002

*, mean ± standard deviation (SD); **, n (%); GO, government officer; Other, housewife, merchant, farmer; BMI, body mass index (kg/m²); UD, underlying disease (hypertension, dyslipidemia, diabetes mellitus); FSFI, female sexual function index; FSD, female sexual dysfunction (FSFI score <26); NFSD, normal female sexual function (FSFI score ≥26); d, study group, e: control group

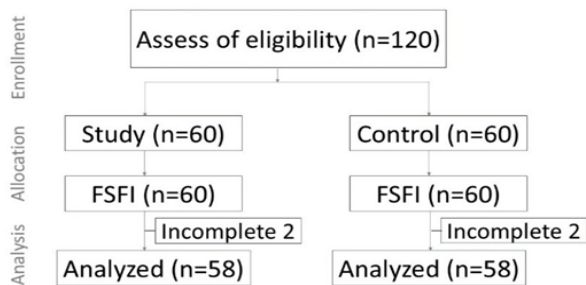


Figure 1. Flow Chart of Study. FSFI, female sexual index; Study, cervical cancer survivors

In Table 1, the study group consisting of women with a BMI both below or above 25 kg/m² showed a significantly higher problems of FSD compared to the control group. Women with an educational level higher than a bachelor's degree also had a higher issue of FSD compared to the control group significantly. However, there was no significant difference in FSD between the control and study groups for women with an education level below a bachelor's degree and those who did not give birth through vaginal delivery.

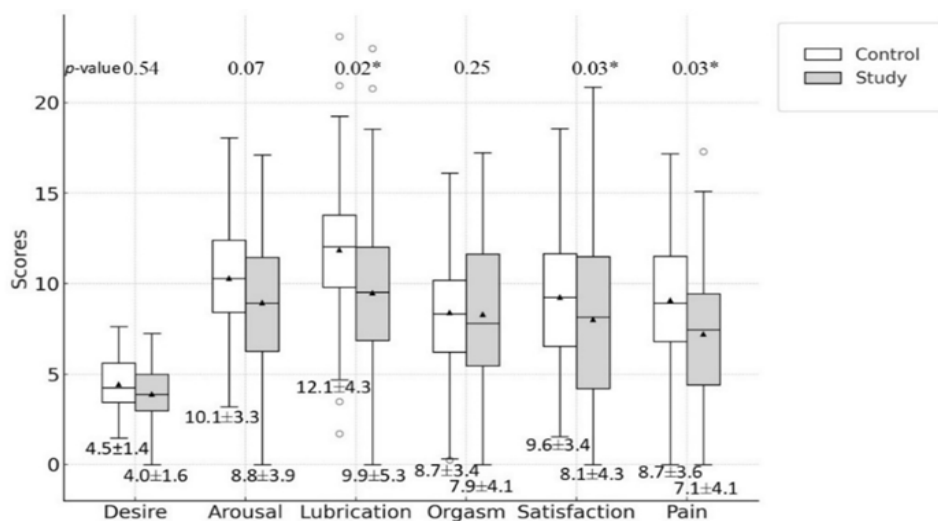


Figure 2. Comparison Domain of Female Sexual Function Index between Control and Study Group. *, significant; Study, cervical cancer survivors

Table 2. Comparison of FSFI Questionnaire

	Control	Study	p-value
Over the past 4 weeks,	53.7±17.0	45.5±21.7	0.025
1 How often did you feel SDI?	2.2±0.7	1.8±0.8	0.034
2 How would you rate your level of SDI	2.4±0.7	2.1±0.9	0.132
3 How often did you feel SA during SAI?	2.3±0.9	2.1±1.0	0.185
4 How would you rate your SA during SAI?	2.4±0.8	2.2±1.0	0.123
5 How confident were you about becoming SA during SAI?	2.6±1.0	2.2±1.0	0.028
6 How often have you been satisfied with your arousal during SAI?	2.7±1.1	2.4±1.3	0.128
7 How often did you become lubricated during SAI?	2.6±1.2	2.2±1.3	0.048
8 How difficult was it to become lubricated during SAI?	3.4±1.2	2.8±1.5	0.009
9 How often did you maintain your lubrication until completion of SAI?	2.7±1.2	2.4±1.5	0.217
10 How difficult was it to maintain your lubrication until completion of SAI?	3.4±1.2	2.7±1.6	0.01
11 When you had SSI, how often did you reach orgasm?	2.6±1.4	2.5±1.4	0.894
12 When you had SSI, how difficult was it for you to reach orgasm?	2.9±1.1	2.7±1.5	0.628
13 How satisfied were you with your ability to reach orgasm during SAI?	3.3±1.2	2.6±1.4	0.008
14 How satisfied have you been with the amount of emotional closeness during sexual activity between you and your partner?	3.1±1.2	2.6±1.5	0.042
15 How satisfied have you been with your sexual relationship with your partner?	3.3±1.2	2.6±1.5	0.014
16 How satisfied have you been with your overall sexual life?	3.2±1.2	2.8±1.5	0.096
17 How often did you experience discomfort or pain during VP?	2.9±1.3	2.2±1.4	0.008
18 How often did you experience discomfort or pain following VP?	2.9±1.4	2.4±1.5	0.066
19 How would you rate your level of discomfort or pain during or following VP?	2.9±1.3	2.5±1.5	0.094

FSFI, female sexual function index; SDI, sexual desire or intercourse; SA, sexual arousal; SAI, sexual activity or intercourse; VP, vaginal penetration; Study, cervical cancer survivors

Discussion

The prevalence of FSD in the CC survivor and control groups was 34.5 (20/58) and 10.4 (6/52) percent, with a mean score of 45.5 and 53.7, respectively. In Membrilla’s research conducted in Spain, all of the CC survivors had FSD, with a mean score of 14.2 ± 9.6 (with a cut-off point of 26) [15]. In Lee’s study, more than half of the

CC survivors and the control group experienced FSD, with mean scores of 23 ± 6.6 and 21.9 ± 8.2, respectively. With a cut-off point of 26, the results of Lee’s showed no significant difference between the two groups [16]. In Novackava’s study conducted in Czech Republic, less than half of the CC survivors who underwent nerve-sparing radical hysterectomy experienced FSD, with a mean score of 25.7 ± 5.6 (cut-off point of 26) [17]. Thailand is

Table 3. Comparison of the Current Study and Previous Study among Cancer Survivals with Female Sexual Dysfunction (FSD)

	Camila	Lee	Donkers	Yan	Novackava	Membrilla	Present
Year	2013	2015	2018	2019	2021	2023	2024
Country	Brazil	Korea	UK	China	Czech	Spain	Thailand
Case (n)	74	208	9	91	65	66	116
Age (years)	50.9	47.9	33	40.9	47.1	45.6	49.4
Prevalence (S/C, %)	NA/100	NA/NA	NA		NA	100/NA	34.5/10.4
Stage							
Early*	17 (48.5)	81(77.9)		41 (99.2)	32 (88.9)		26 (44.8)
Advance*	19 (51.5)	23 (22.1)		5 (10.8)	4 (11.1)		32 (55.2)
FSFI							
Study	21.72±7.4	23.0±6.6	19.7 (4, 29.7)**	Increase***	25.67±5.6	14.22±9.6	45.5±21.7
Control	30.76±2.9	21.9±8.2		NA		29±6.7	53.7±17.0
≥Bachelor*	NA	NA		NA		NA	Sig
BMI (<25, ≥25)			NS		NA		NS
Marital status (S*)	19 (51.4)	90 (86.5)		39 (84.8)		24(72.7)	98(84.5)

*, n (%); **, Median and interquartile range; ***, data reported as a graph; n, number of participants; S, study group (cervical cancer survivors); C, control group; FSFI, female sexual function index; BMI, body mass index (kg/m²); NA, not available; Sig, significant; NS, no significant

a Southeast Asian nation with deeply ingrained traditional values. Sex related topic is a subject to be approached with caution. On the contrary, in European or North American countries, such topics were more normalized and could be openly discussed. Consequently, when administering the questionnaire, Asian participants appeared more reserved in their responses. These conducts might have resulted in a lower reported prevalence of FSD of Asian countries compared to participants from European countries.

The study conducted by Membrilla demonstrated that the prevalence of FSD in CC survivors was statistically higher than among the control group in every domain [15]. However, the current study showed that the prevalence of FSD in CC survival group was statistically lower than that of the control group in three FSFI domains, namely, lubrication, satisfactory, and pain. In the study conducted by Correia, radiation combined with chemotherapy, radiotherapy, and surgery were reported to reduce lubrication and cause of pain [18]. The CC treatment can lead to menopausal status from ovarian castration. Ovarian failure from radiation was a consequence of decrease estrogen level. This might be resulting in FSD [18]. To address lubrication problems during sexual activity, the use of lubricating gels and vaginal ointments containing hyaluronic acid, as well as vitamins A and E, was a recommended solution for vaginal dryness correction, dyspareunia, and satisfaction level [18]. Vaginal dilators can also be used to enhance lubrication and prevent vaginal stenosis following radiotherapy. Additionally, the use of vaginal dilator in conjunction with vaginal estrogen can help reduce the side effects associated with CC treatment, namely sexual pain and dissatisfaction [18]. Furthermore, the use of vaginal estrogen has been shown to address symptoms such as dyspareunia, vaginal atrophy, and vaginal dryness [19]. This treatment can be used to alleviate symptoms in two domains identified in the current study, namely lubrication and dyspareunia [19]. Kovacevic's research highlighted that lubricants and moisturizers provided only short-term relief and their usages were unable to reverse vaginal atrophy [20]. Moreover, the use of vaginal dilators could be beneficial by minimizing adhesion formation between vaginal walls, enhancing elasticity, and reducing fibrosis [20]. A vaginal dilator was available at the sexual health clinic and was prescribed by the physicians [21].

In the current study, more than half of the participants (59/116) had an educational level higher than a bachelor's degree. Consequently, higher education levels were significantly associated with increased FSD. However, a study conducted by Tzung-Yi showed the opposite outcome, where a group with lower educational level was more highly associated with FSD problems [22]. This discrepancy could be attributed to the fact that cancer patients with higher educational levels tend to have better access to medical knowledge and resources, resulting in fewer FSD problems in patients with lower education levels [22]. In contrast, in the current study, Thai women with higher education levels were more likely to have concerns about their treatment, leading to a decreased desire for sexual intercourse.

There was no association between BMI and FSD in the

current study. The results indicated that the study group experienced significantly more FSD than the control group, irrespective of whether their BMI was below or above 25 kg/m². No studies had specifically investigated the relationship between CC survival who underwent vaginal delivery and their FSD experienced. Our investigation found that two-thirds of cervical cancer survivors who had vaginal deliveries were likely to experience FSD. However, previous research addressed the association between vaginal delivery and FSD [23]. From a previous systematic review of 31 studies, the majority found no significant difference in total FSFI scores between vaginal delivery and cesarean section in the general population [23]. According to Cattani's study, vaginal delivery with episiotomy was associated with dyspareunia but did not significantly impact FSD. Conversely, cesarean delivery was associated with a reduction in dyspareunia but did not influence FSD [24]. On the other hand, the current study involving CC survivors indicated that vaginal delivery was a factor significantly associated with increase prevalences of FSD. In contrast, our finding stated that cesarean delivery did not significantly affect FSD. This may be due to baseline dyspareunia in individuals who underwent vaginal delivery, combined with CC treatment. The treatment of CC can cause side effects such as reduced vaginal elasticity, shortening of the vaginal cavity, vaginal atrophy, and stenosis, all of which were previously reported to contribute to FSD [15]. A summary comparing the current study with previous studies was presented in Table 3.

The strength of this study was a case-control design, comparing the study and control group. The comparison between CC survival and healthy subject with similar demographic data were not commonly used in the majority of previous research. Additionally, the current study used the standard FSFI questionnaire, which was globally recognized tool for assessing FSD. Moreover, patients were all well-educated, contributing to the high level of cooperation throughout the research.

The limitations of the current study included a small sample group and the use of a single study group from a tertiary hospital. Additionally, the average age of participants was around 50 years, which could lead to misunderstandings when completing a self-reporting questionnaire. Although a structured interview was conducted, direct questions regarding sexual function might have been particularly sensitive.

In conclusion, the current study was observed that the prevalence of FSD was significantly higher in the CC survivor group compared to the control group. The prevalence rates were 34.5 and 10.4 percent, respectively. Notably, three out of six FSFI domains namely lubrication, satisfaction, and pain showed statistically significant differences, indicating these areas were more problematic for CC survivors. This highlights the need for the treatment to address these specific issues. Improving these aspects of FSD was essential for enhancing the quality of life of CC survivors. Therefore, problem-solving strategies should be implemented in clinical practice to support these individuals.

Author Contribution Statement

All authors contributed equally in this study.

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Conflict of interest

There was no conflict of interest in this study.

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