



Chinese medical staff's knowledge, attitudes and practices towards breast cancer patients' sexual health management: A cross-sectional study

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ABSTRACT

Objective: The objective of this research was to assess the level and determinants of medical personnel's knowledge, attitudes, and practices regarding the management of sexual health in breast cancer survivors residing in western China.

Background: Sexual well-being is a crucial aspect of one's overall satisfaction with life. Once female sexual dysfunction (FSD) occurs, it will affect patients' satisfaction and life quality seriously. In all healthcare settings, the management of sexual health relies heavily on the vital contribution of medical personnel. Nevertheless, the sexual requirements of individuals with breast cancer are still partially unmet.

Design: A web-based questionnaire was used to conduct a multi-centered, cross-sectional study involving medical staff from 26 hospitals in nine cities of Guizhou Province, China.

Methods: Data was gathered from healthcare professionals using a validated tool, the knowledge, attitudes, practices assessment scale for managing the sexual health of breast cancer patients in medical staff. This tool was used to evaluate the knowledge, attitudes, and practices of medical staff regarding sexual health management.

Results: In this study, a grand total of 3181 healthcare professionals took part. The overall KAP scores, including knowledge, attitudes, and practices, were 47.15 ± 11.91 , 72.55 ± 12.56 , and 58.61 ± 11.45 , respectively. Three variables exhibited a strong and favorable correlation. The study identified significant concerns regarding the limited understanding of medical personnel regarding effective strategies for enhancing sexual health function in breast cancer patients, as well as their diminished confidence in addressing FSD. The scores of knowledge, attitudes, and practices related to sexual health management were significantly influenced by whether or not training was received.

Conclusions: The study results emphasize the importance of adopting a holistic approach to enhance the understanding, perspectives, and behaviors of healthcare professionals regarding the

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management of sexual health. In addition to enhancing the standard of care for individuals with breast cancer.

1. Introduction

Breast cancer is the leading cancer detected in women, and it has become the primary reason for female cancer fatalities globally [1]. The survival rate of individuals with breast cancer has risen due to progress in screening, diagnosis, and treatment. For patients with breast cancer limited to the mucosa, the 5-year survival rate can reach as high as 98% with systematic treatment. Specifically, the survival rates for stage II and stage III tumors are 85% and 60% respectively [2]. Consequently, the survival rate among individuals who have battled breast cancer has shown significant enhancement, leading to a substantial rise in the population of survivors [3–5]. As people's perception of health changes, enhancing the quality of life for individuals diagnosed with cancer has become a crucial component of worldwide efforts to combat cancer. Consequently, there is a growing focus on investigating secure and efficient therapies for breast cancer patients that can enhance their quality of life [6]. Moreover, the conventional biological assessment criteria for cancer treatment have become challenging to comprehensively evaluate the effectiveness of breast cancer therapy. Consequently, an increasing number of researchers have shown heightened interest in the postoperative quality of life among individuals who have survived breast cancer [7–9].

Sexual well-being is a crucial aspect of one's overall satisfaction in life, as it forms the foundation for a contented marital and familial relationship [10,11]. Sexual life, a marriage lubricant, is an important way for couples to transmit emotions and show affection. Human body releases beta-Endorphin during sex. Beta-Endorphin is a natural sedative and analgesic, which can create a relaxed and worry-free internal environment for the nervous system, stabilize emotions and behaviors, and reduce symptoms such as anxiety and depression [12]. Hence, a healthy sexual life can yield various advantages, including boosting the immune system, experiencing enjoyment, fostering a harmonious marital relationship, and aiding in rehabilitation [13,14]. The surgical and comprehensive treatment undergone by breast cancer patients can result in physical and psychological trauma, especially in terms of sexual dysfunction, due to the fact that the female breast is considered a representation of beauty, motherhood, and sexual appeal [15–18].

Disorders of sexual function in women, known as female sexual dysfunction (FSD), encompass three main categories: disorders related to sexual desire/arousal, difficulties with orgasm, and genito-pelvic pain/penetration disorder [19]. Sexual dysfunction (FSD) is the most common issue experienced by breast cancer survivors globally. It encompasses four primary symptom categories: sexual desire disorder, arousal disorder, orgasm disorder, and sexual pain [20]. According to recent research, the occurrence of FSD among individuals who have survived breast cancer varies globally, with rates ranging from 32% to 94% and the possibility of it lasting for an extended period has been indicated by multiple studies [21–27]. Consequently, the combination of a high occurrence and extended period of FSD imposes a significant emotional, physical, and psychological load on individuals who have survived breast cancer, ultimately impacting their satisfaction and overall quality of life. However, it is important to note that the discussion of sexual dysfunction is a delicate subject in both Eastern and Western societies, particularly among women in China. Numerous healthcare practitioners exhibit hesitancy in openly addressing matters related to sexuality, and their sexual knowledge and communication abilities are restricted [28,29]. In the present day, the range and substance of medical professionals' work are expanding, requiring them to give greater consideration to public health concerns, particularly amidst the COVID-19 crisis, including individuals diagnosed with breast cancer. Furthermore, the well-being of one's sexual life serves as a significant determinant for the outlook of breast cancer. Improving the quality of sexual health management requires essential knowledge, a positive attitude, and appropriate practice. Professional guidance for sexual intimacy is necessary for individuals diagnosed with breast cancer and their partners. Unfortunately, medical staff do not meet the patients' needs [30,31].

2. Aim

This study aimed to evaluate the understanding, perspectives, and behaviors of healthcare professionals regarding the management of sexual health in patients with breast cancer. The initial study conducted in China focuses on evaluating the understanding, perspectives, and behaviors of breast cancer patients regarding the management of their sexual health. The purpose of this study was to enhance professional development training and enhance the overall quality of global medical care and patient health outcomes.

3. Methods

3.1. Setting and design

This study utilized a web questionnaire to conduct a multi-centered cross-sectional investigation among medical personnel from 26 hospitals in Guizhou Province, China, from February to June 2022. The study was guided by the behavioral theory known as "Knowledge-Attitude-Belief Practice (KABP)." The survey included a section on demographics and a validated scale called "the assessment of knowledge, attitudes, and practices for managing the sexual health of breast cancer patients in medical staff" [32].

3.2. Participants

All medical personnel at each of the 26 hospitals that took part were considered eligible to participate, employing convenience sampling. The medical personnel who were eligible for inclusion in the study had to meet the following criteria: (a) they had to be currently employed in the hospitals for at least one year, and (b) they had to possess a Nursing Practice Certificate issued by the Ministry of Health of China. All participants voluntarily took part. Medical personnel who do not meet the inclusion criteria were excluded due to the absence of an informed consent form. The completion of the questionnaire implies consent.

3.3. Sample size analysis

As per the criteria for determining the sample size of a multivariate linear regression equation, it is recommended to have a sample size that is at least 5–10 times greater than the number of independent variables [33]. This study will introduce a total of 12 variables that are independent. Hence, it is recommended to have a minimum of 60–120 cases for the sample size. To account for potentially incomplete or inaccurate questionnaires, it is advisable to increase the sample size by 20%, resulting in a range of 71–144 cases. Considering the adequacy of the sample’s representativeness, the ultimate sample size amounted to 3253 instances (Fig. 1).

3.4. Data collection

This study used a web-based questionnaires to collect data. Questionnaire Star (Changsha Ranxing Information Technology Co. Ltd) was responsible for the design and creation of the link for the questionnaire. A research collaborator in every hospital was in charge of recruiting participants and gathering information by means of promoting WeChat groups. All participants read the informed consent prior to fill the questionnaire. Participants gave informed consent to participate in the study by clicking the I agree button. After completed questionnaires, the answers were saved only by clicking the “submit” button after filling the questionnaire. No identifying information about individual medical staff was collected to ensure confidentiality and anonymity. Upon completion of the questionnaire, they did not receive any monetary compensation.

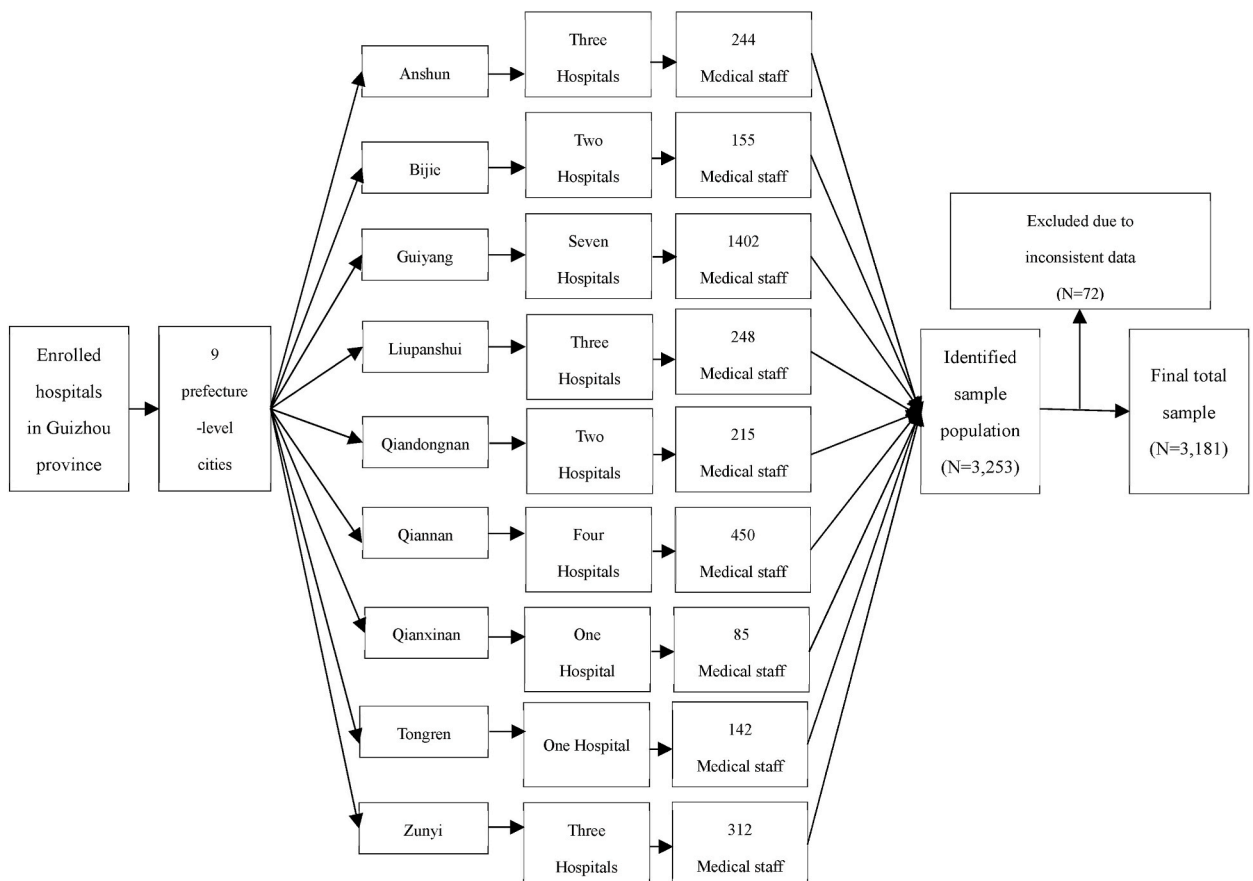


Fig. 1. Flowchart of medical staff sample selection in hospitals in Guizhou Province, China.

3.5. Ethical considerations

Initially, the Human Research Ethics Committee (2021-620) of the Affiliated Hospital of Guizhou Medical University granted permission to carry out the study. Participation in the study was entirely optional.

3.6. Data collection instruments

“The knowledge, attitudes, practices assessment scale for breast cancer patients’ sexual health management in medical staff” was used to investigate the level and factors of knowledge, attitudes, and practices of medical staff’s on managing breast cancer survivors’ sexual health in western China [32]. The scale comprises of questionnaires divided into four parts, which include demographic information and three additional questionnaires. The scale’s total score ranged from 51 to 255 points, with a higher score indicating a greater level of sexual health management by medical staff for breast cancer patients in terms of knowledge, attitudes, and practices.

In Section 1, the scale’s demographic information is examined, which includes age, gender, marital status, occupation, work history, job position, professional designation, highest level of education, department type, hospital type, and whether training is received.

In Section 2, the focus is on the understanding of healthcare professionals regarding the management of sexual health. This survey includes 16 multiple choice questions that pertain to the management of sexual health, each offering five different response options. The five themes of the 16 items encompass the likelihood of happening, patients’ perspective, evaluation instruments, factors of influence, and the severity of FSD. The participants provided their responses using a Likert-type scale consisting of 5 points, where the options ranged from 1 indicating “unaware” to 5 indicating “very aware”. The answers were then assigned scores ranging from 1 to 5 accordingly. It is possible to achieve a highest score of 80.

In Section 3, the focus is on the perspective of healthcare professionals regarding the management of sexual health. This survey includes 19 multiple choice questions designed to assess attitudes towards the management of sexual health. The 19 objects represent five categories: importance of FSD, accountability for preventing FSD, belief in the efficacy of FSD prevention, willingness to participate in the educational program on FSD management knowledge, and importance of managing FSD. The tool consists of five subscales that utilize a 5-point Likert scale, ranging from 1 (highly insignificant) to 5 (highly significant). Greater scores denoted a higher level of favorable attitudes.

In Section 4, the practices of medical personnel in regards to sexual health management are discussed. This questionnaire comprises 16 multiple choice items pertaining to the management of sexual health. The 16 items encompass four main topics: evaluating sexual function, implementing strategies for managing FSD, providing health education, and establishing a multidisciplinary team. The participants provided their responses using a Likert-type scale consisting of 5 points, where the options ranged from 1 indicating “never done” to 5 indicating “often”. The answers were then assigned scores from 1 to 5 accordingly. Greater scores denoted a higher level of favorable practice.

3.7. Data analysis

Statistical analysis was conducted using SPSS version 21.0 for Windows (SPSS, Chicago, IL). The sample was described using descriptive statistics (frequency, percent). Descriptive information is presented as n (%) or average \pm standard deviation. The percentage of scores for both the overall and individual dimensions is calculated by dividing the mean scores by the theoretical maximum and multiplying by 100%. This study categorized certain continuous variables, such as age and years of hospital experience, into distinct groups. To investigate disparities between FSD management scales and demographic information, we conducted both the independent-samples *t*-test and one-way ANOVA. For *t*-tests, we used *t*-tests for equal variances if both samples satisfied the assumption of equal variance; for unequal variances, we applied *t*-tests for unequal variances. Intergroup comparisons were by Tukey test. The examination of the relationship between knowledge, attitudes, and practices involved the utilization of the Pearson correlation coefficient. We utilized multiple linear regression (stepwise) to investigate the potential variables influencing knowledge, attitude, and behavior. The Wald statistic was utilized to obtain adjusted means, standard errors, and *P* values. These values were then used to identify predictors of knowledge, attitudes, and practices scores, taking into account potential confounders. We used two-sided significance tests for all analyses with statistical significance set at a *P* value of 0.05.

4. Results

4.1. Characteristics of the sample

The survey link was sent to a total of 3300 medical staff online. 3253 participants agreed to complete the questionnaires and submitted it. The response rate was 98.6%. In the end, a total of 3181 medical personnel filled out the survey, with the participation of Twenty-six hospitals. 72 questionnaires were excluded from the study due to inconsistent information. The majority of the sample was obtained from a general hospital (89.4%). The age group between 31 and 40 had the highest prevalence, accounting for 38.8%. The majority of participants (92.3%) were female. Seventy-four percent were married. Among the medical staff, the majority achieved a bachelor’s degree as their highest educational attainment (70.2%), while the smallest percentages were attributed to postgraduate or higher education (0.8%) and secondary vocational school education (0.8%). Furthermore, 46.5% of respondents possessed a clinical work experience ranging from 5 to 10 years, while 48.4% were employed in a tertiary hospital. 11.2% and 15.8% medical staff worked

in department of breast and oncology respectively. In terms of the participants' position and professional designation, the majority (88.7%) were general medical staff, while 70.8% were primary medical staff. Table 1 displays the findings.

4.2. Knowledge

The mean scores of knowledge were 47.15 ± 11.91 , and the rate of scores was 58.93%. The themes that received the three lowest knowledge scores were the patients' attitude towards sex life of couples after breast cancer surgery (2.81 ± 0.93), the assessment tools commonly used for sexual dysfunction (2.62 ± 0.90), and the Female Sexual Function Index (2.59 ± 0.91). Supplementary Material 1 contains the presented contents.

Based on the findings from the one-way ANOVA analysis (Table 1), a significant association was observed between age and

Table 1

Demographic characteristics correlation with knowledge, attitudes, and practices in the area of breast cancer patients' sexual health management (N = 3181).

Variables	Frequency (%)	Knowledges		Attitudes		Practices	
		Mean \pm SD	Test results	Mean \pm SD	Test results	Mean \pm SD	Test results
Gender							
Male	244 (7.7)	47.57 \pm 12.81	$t' = 0.533$	71.13 \pm 12.75	$t = -1.835$	57.69 \pm 11.13	$t = -1.308$
Female	2937 (92.3)	47.12 \pm 11.83	$P = 0.595$	72.67 \pm 12.54	$P = 0.067$	58.69 \pm 11.47	$P = 0.191$
Age							
≤ 25	420 (13.2)	48.98 \pm 10.52	$F = 9.530$	72.13 \pm 12.06	$F = 0.507$	58.70 \pm 10.82	$F = 0.932$
26 to 30	1147 (36.1)	47.83 \pm 11.93	$P = 0.000$	72.36 \pm 12.74	$P = 0.678$	58.61 \pm 11.50	$P = 0.424$
31 to 40	1235 (38.8)	46.55 \pm 12.35		72.86 \pm 12.80		58.85 \pm 11.66	
≥ 51	379 (11.9)	45.07 \pm 11.42		72.56 \pm 11.80		57.73 \pm 11.27	
Marital status							
Married	2361 (74.2)	46.85 \pm 11.92	$F = 4.282$	72.67 \pm 12.38	$F = 0.415$	58.65 \pm 11.38	$F = 0.370$
Unmarried	742 (23.3)	48.24 \pm 11.81	$P = 0.014$	72.22 \pm 13.04	$P = 0.660$	58.61 \pm 11.72	$P = 0.691$
Divorced/Widowed	78 (2.5)	45.87 \pm 11.91		72.08 \pm 13.40		57.51 \pm 11.02	
Career							
Nurse	2905 (91.3)	47.34 \pm 11.88	$t' = 2.817$	72.77 \pm 12.58	$t' = 3.261$	58.81 \pm 11.39	$t' = 3.138$
Doctor	276 (8.7)	45.20 \pm 12.07	$P = 0.005$	70.26 \pm 12.16	$P = 0.001$	56.48 \pm 11.84	$P = 0.002$
Work experiences (years)							
< 2	474 (14.9)	49.13 \pm 11.17	$F = 5.839$	71.95 \pm 12.53	$F = 1.247$	58.95 \pm 11.06	$F = 0.630$
2 to 5	711 (22.4)	47.19 \pm 11.37	$P = 0.000$	71.90 \pm 12.81	$P = 0.289$	58.15 \pm 11.50	$P = 0.641$
5 to 10	1032 (32.4)	47.18 \pm 12.34		72.82 \pm 12.42		58.51 \pm 11.53	
10 to 20	735 (23.1)	46.50 \pm 12.12		72.99 \pm 12.72		59.00 \pm 11.53	
> 20	229 (7.2)	44.94 \pm 11.89		73.19 \pm 11.94		58.52 \pm 11.49	
Position							
Head nurses	309 (9.7)	44.64 \pm 11.44	$F = 14.548$	74.13 \pm 12.13	$F = 4.446$	58.97 \pm 11.55	$F = 0.704$
Department Chairs	49 (1.5)	41.20 \pm 11.82	$P = 0.000$	75.67 \pm 10.06	$P = 0.012$	60.24 \pm 9.70	$P = 0.495$
General medical staff	2823 (88.7)	47.53 \pm 11.90		72.32 \pm 12.63		58.54 \pm 11.47	
Professional title							
Junior	2251 (70.8)	48.14 \pm 11.80	$F = 18.837$	72.35 \pm 12.61	$F = 1.031$	58.70 \pm 11.40	$F = 1.325$
Intermediate	729 (22.9)	45.10 \pm 11.92	$P = 0.000$	73.03 \pm 12.23	$P = 0.378$	58.63 \pm 11.32	$P = 0.265$
Senior vice	179 (5.6)	43.51 \pm 10.92		73.35 \pm 12.38		57.12 \pm 12.48	
Senior	22 (0.7)	47.15 \pm 11.91		70.23 \pm 18.63		60.77 \pm 10.91	
Highest educational attainment							
Postgraduate or above	25 (0.8)	47.72 \pm 8.75	$F = 2.797$	73.84 \pm 12.03	$F = 3.371$	57.92 \pm 11.08	$F = 1.427$
Bachelor degree	2234 (70.2)	46.76 \pm 11.96	$P = 0.039$	72.90 \pm 12.63	$P = 0.018$	58.77 \pm 11.52	$P = 0.233$
Three-year college education	898 (28.2)	48.12 \pm 11.79		71.80 \pm 12.32		58.35 \pm 11.23	
Secondary vocational school education	24 (0.8)	46.58 \pm 13.14		66.88 \pm 13.78		54.38 \pm 12.70	
Type of department							
Ob-Gyn	329 (10.3)	46.08 \pm 12.32	$F = 9.134$	72.89 \pm 12.34	$F = 1.001$	59.67 \pm 11.09	$F = 1.098$
Rehabilitation	112 (3.5)	47.09 \pm 11.00	$P = 0.000$	74.72 \pm 11.00	$P = 0.423$	60.04 \pm 11.26	$P = 0.361$
GIM	952 (29.9)	45.91 \pm 11.55		72.86 \pm 12.68		58.54 \pm 12.00	
General surgery	339 (10.7)	46.68 \pm 11.13		71.86 \pm 12.73		58.03 \pm 11.31	
Breast	357 (11.2)	50.78 \pm 12.19		72.30 \pm 12.89		58.87 \pm 11.16	
Oncology	502 (15.8)	48.49 \pm 12.06		72.35 \pm 12.28		58.17 \pm 11.33	
Others	590 (18.5)	46.71 \pm 12.05		72.16 \pm 12.71		58.41 \pm 11.10	
Type of hospital							
General hospital	2844 (89.4)	47.13 \pm 11.85	$t = -0.357$	72.55 \pm 12.50	$t = 0.004$	58.57 \pm 11.33	$t = -0.592$
Specialist hospital	337 (10.6)	47.37 \pm 12.44	$P = 0.721$	72.55 \pm 13.09	$P = 0.997$	58.96 \pm 12.40	$P = 0.554$
Level of hospital							
Tertiary hospital	1540 (48.4)	47.01 \pm 11.88	$t = 0.674$	72.24 \pm 12.72	$t = 1.324$	58.24 \pm 11.55	$t = 1.787$
Secondary hospital	1641 (51.6)	47.29 \pm 11.94	$P = 0.500$	72.83 \pm 12.41	$P = 0.186$	58.96 \pm 11.34	$P = 0.074$
Receive training							
Yes	1083 (34.0)	52.79 \pm 11.78	$t = 20.409$	74.39 \pm 12.57	$t = 5.971$	60.84 \pm 11.60	$t = 7.988$
No	2098 (66.0)	44.24 \pm 10.89	$P = 0.000$	71.60 \pm 12.46	$P = 0.000$	57.46 \pm 11.20	$P = 0.000$

Ob-Gyn, Obstetrics and gynecology; GIM, General internal medicine; t' , t-tests for unequal variances.

knowledge ($F = 9.530, P < 0.001$). According to the findings from Tukey's test, there was a clear distinction in knowledge scores between individuals aged ≤ 25 years and those aged 31–40 years ($P = 0.002$), as well as those aged ≥ 41 years ($P < 0.001$). Nevertheless, there was no significant variation observed in the ages of individuals ≤ 25 years and those aged 26–30 years. However, the knowledge score varied significantly among medical personnel with varying marital status ($F = 4.282, P = 0.014$), work experience ($F = 5.839, P < 0.001$), position ($F = 14.548, P < 0.001$), professional rank ($F = 18.837, P < 0.001$), highest level of education ($F = 2.797, P = 0.039$), and department type ($F = 9.134, P < 0.001$).

Medical staff who were unmarried had higher knowledge scores than who were married, and the difference ($P = 0.016$) was significant according to Tukey's test. Although there was no disparity in knowledge score between the unmarried and divorced/widowed groups ($P = 0.217$). According to Tukey's test, medical personnel with less than two years of work experience achieved higher knowledge scores compared to those who had been working for 2–5 years ($P = 0.047$), 5–10 years ($P = 0.025$), 10–20 years ($P = 0.002$), and more than 20 years ($P < 0.001$). Intragroup comparisons revealed that the knowledge scores of general medical staff were significantly higher than those of head nurses ($P < 0.001$) and department chairs ($P = 0.001$). Junior medical staff had higher knowledge scores compared to medical staff with intermediate ($P < 0.001$) and Senior vice title ($P < 0.001$). Nevertheless, the Tukey's test indicated that there were no notable disparities in the knowledge scores among various highest educational attainment groups ($P > 0.05$). Clearly, when comparing within the group, it was evident that the scores of medical personnel in the breast department were significantly higher than those in the Ob-Gyn ($P < 0.001$), GIM ($P < 0.001$), General surgery ($P < 0.001$), and other departments ($P < 0.001$). The results of an independent-samples *t*-test indicated a significant difference in knowledge scores between nurses and doctors ($t' = 2.817, P = 0.005$). Medical staff who had received training had a higher FSD knowledge score among breast cancer patients compared to those who did not ($t = 20.409, P < 0.001$). [Table 1](#) presents the contents.

4.3. Attitudes

The mean scores of attitudes were 72.55 ± 12.56 , and the rate of scores was 76.37%. The three lowest scores of attitudes were achieved on the themes: conducting sexual life guidance generating embarrassment (3.77 ± 0.73), the age of medical staff affecting the sexual health education (3.73 ± 0.77), gender differences in healthcare workers affecting the choice of questions for patients' counseling (3.72 ± 0.79) ([Supplementary Material 1](#)).

Nurses exhibited a marginally more favorable outlook towards FSD management in breast cancer patients compared to doctors when the overall average attitude score was categorized by profession ($t' = 3.261, P = 0.001$). Significant variations were observed between attitude and position ($F = 4.446, P = 0.012$), as well as the highest level of education achieved ($F = 3.371, P = 0.018$). Interestingly, intragroup comparisons revealed that there was significant difference between head nurses and general medical staff ($P = 0.042$). Nevertheless, based on the Tukey test, there was no significant variation in attitude scores among various highest educational attainment groups ($P > 0.05$). Medical personnel who received training in the relevant field achieved significantly higher scores compared to those who did not receive training ($t = 5.971, P < 0.001$). [Table 1](#) displays additional information.

4.4. Practices

The mean scores of practices were 58.61 ± 11.45 , and the rate of scores was 73.26%. The themes with the three lowest scores in practices were related to instructing patients to utilize additional tools to enhance the pleasure of their sexual life (3.59 ± 0.83), assessing the sexual function of the patient (3.56 ± 0.83), and informing patients about the possibility of enhancing their sexual desire through touch, self-stimulation, and similar methods. (3.55 ± 0.84). [Supplementary Material 1](#) contains the comprehensive outcomes.

Nurses exhibited a marginally more favorable perspective on FSD management compared to doctors when the overall average score of practices was categorized by profession ($t' = 3.138, P = 0.002$). According to the *t*-test findings, the group that underwent training generally achieved higher scores compared to the group that did not receive any training ($t = 7.988, P < 0.001$). The other factors were not different in the univariate analysis ([Table 1](#)).

The correlation analysis results are displayed in [Table 2](#). A clear and favorable correlation was observed between knowledge and

Table 2
Correlation of knowledge, attitudes, and practices related to management breast cancer patients' sexual health of medical staff.

	Scores of knowledge	Scores of attitudes	Scores of practices
Scores of knowledge			
Pearson's correlation	1	0.286**	0.384**
Sig.		0.000	0.000
N	3,181	3,181	3,181
Scores of attitudes			
Pearson's correlation	0.286**	1	0.713**
Sig.	0.000		0.000
N	3181	3181	3181
Scores of practices			
Pearson's correlation	0.384**	0.713**	1
Sig.	0.000	0.000	
N	3,181	3,181	3,181

Note: ** $P < 0.001$.

attitudes ($r = 0.286, P < 0.001$). Attitude scores were elevated as the knowledge score was enhanced. Concurrently. There was a clear and significant correlation between knowledge and practice, with a statistically significant relationship ($r = 0.384, P < 0.001$). Clearly, there was a strong correlation between attitude and practice ($r = 0.713, P < 0.001$).

4.5. Outcomes from several equations of linear regression

To investigate knowledge, attitudes, and practices scores, an analysis was performed using various linear regression equations to examine factors that are independently linked. In the Multiple linear regression model (Table 3), knowledge was found to be significantly associated with the training received, hospital level, various professional titles, and attended careers. After controlling for other variables, Table 4 reveals that receiving training, pursuing various professions, achieving higher education, working in different hospitals, and holding different positions are the independent factors that influence attitudes. Receive training, career, level of hospital and highest educational attainment were independent influencing factors of practice scores (Table 5).

5. Discussion

The purpose of this study was to investigate the understanding, perspectives, and behaviors of healthcare professionals in Guizhou Province regarding the management of sexual health in breast cancer patients. The study involved medical staff from twenty-six facilities located in nine prefectures. Having adequate knowledge and awareness about sexual dysfunction is crucial for achieving positive outcomes in breast cancer patients, as it forms the foundation for adopting appropriate attitudes and practices. The current study found that the rate of medical staff's knowledge score in managing sexual health was 58.93%, with a mean knowledge of 47.15 ± 11.91 . This illustrates the fact that medical staff's knowledge of managing sexual health is scarce. Additionally, there have been other investigations indicating that Chinese healthcare practitioners possess inadequate expertise to offer advice on sexual well-being and frequently neglect the sexual well-being of their clients [34]. Furthermore, the matter of sexual orientation and sexual health among individuals diagnosed with breast cancer has been consistently overlooked in both clinical and research environments [35,36]. Hence, healthcare professionals must enhance their understanding and expertise in handling sexual well-being among individuals who have survived breast cancer. Specifically, in our research, healthcare professionals had a limited comprehension of patients' perspective on their sexual life following mastectomy. These participants were least knowledgeable about assessment tools use in sexual health. Improving sexual health outcomes begins with assessing sexual function. The Female Sexual Function Index (FSFI) is the primary tool used to assess sexual function [37], and this holds true for breast cancer survivors as well [38]. A theoretical study also indicated sexual health education training programs should include definition and Clinical manifestations of sexual dysfunction, that is, how to assess breast cancer survivors' sexual function [39].

The current research found that the medical personnel had a favorable outlook on the management of sexual health for individuals who have survived breast cancer. Some researchers draw the same conclusion [40]. Approximately 87% of the healthcare personnel were of the opinion that the implementation of sexual health education was essential. Obviously, there is strong evidence that knowledge influences attitudes [41]. The findings of our research indicate that training in this field has an impact not only on the level of knowledge but also on individuals' attitudes towards managing sexual health. A quasi-experimental study reached similar conclusions [42]. The training program on sexual health care boosted the nurses' self-assurance and overall enhanced their understanding and perspectives on sexual matters. Also, we found a positive correlation between knowledge, attitudes, and management practices. Significant and robust positive correlations were found between the scores of attitudes and practices. Considering the sensitivity of discussing sexual health matters, particularly within Asian communities, it becomes crucial for breast cancer patients to enhance the attitudes of medical personnel towards managing sexual health [32]. Other studies corroborated it [43,44].

Based on the findings of our research, the performance of the healthcare professionals was also commendable. Furthermore, the staff's sufficient expertise and optimistic mindsets were advantageous in effectively addressing sexual health concerns in individuals with breast cancer. However, breast cancer patients' sexual health requirements are significantly neglected [30]. The likely cause of this is the infrequent discussion of sexual issues and the extent of sexual dysfunction experienced by patients in the field of oncology [45,46]. Healthcare professionals should refrain from discussing sexual issues that are restricted by the patients' age, gender, culture, socioeconomic status, and religion, as it is considered disrespectful and inappropriate [47]. The management of sexual health is hindered by limited time, insufficient resources, and a lack of organizational support [48,49]. In particular, the lowest scores of practices were the theme: telling patients that they can improve their sexual desire through touch, self-stimulation, etc. Sex is a multidimensional experience, not limited to sexual intercourse. Partners should help each other reach orgasm by caress-like stroking touch [50,51]. In light of this, medical institutions ought to enhance their attention towards sexual matters and offer diverse assistance

Table 3

The results of linear regression analysis to investigate the effect of demographic characteristics on medical staff's knowledge about management of breast cancer patients' sexual health (N = 3181).

Independent variables	B coefficient	Standard coefficient	β -value	Statistics	P-value
Constant	49.312	0.886		55.6.27	0.000
Receive training	8.525	0.415	0.339	20.540	0.000
Professional title	-2.380	0.318	-0.124	-7.495	0.000
Career	-1.674	0.700	-0.040	-2.391	0.017

Table 4

The results of linear regression analysis to investigate the effect of demographic characteristics on medical staff's attitudes about management of breast cancer patients' sexual health (N = 3181).

Independent variables	B coefficient	Standard coefficient	β -value	Statistics	P-value
Constant	78.031	1.412		55.270	0.000
Receive training	2.789	0.466	0.105	5.985	0.000
Career	-2.488	0.787	-0.056	-3.163	0.002
Highest educational attainment	-1.102	0.423	-0.046	-2.606	0.009
Position	-0.814	0.372	-0.039	-2.188	0.029

Table 5

The results of linear regression analysis to investigate the effect of demographic characteristics on medical staff's practices about management of breast cancer patients' sexual health (N = 3181).

Independent variables	B coefficient	Standard coefficient	β -value	Statistics	P-value
Constant	6.299	0.869		7.246	0.000
Scores of attitudes	8.525	0.415	0.339	20.540	0.000
Scores of knowledge	0.188	0.012	0.196	15.652	0.000

to healthcare professionals in order to enhance the sexual health function as reported by patients.

The results of our research indicated that individuals who received relevant training had significantly higher scores in their knowledge of sexual health management. This concurs with other studies [51–53]. A theoretical analysis revealed that the educational materials on sexual well-being for individuals with breast cancer were divided into four categories: medical sexology, psychology, and practical aspects [44]. In order to offer psycho-educational treatments for individuals with breast cancer, it is crucial for healthcare professionals to acquire proficiency in problem-solving and communication abilities, counseling, hypnosis, education, and specialized sex therapies [30,53]. Hence, a methodical approach to learning can greatly contribute to enhancing one's understanding of sexual health [39]. Similarly, the same case applies for the attitudes scores. The study found that medical personnel who received training in sexual health management had significantly higher attitude scores, with an increase of 3.376 units. Furthermore, the knowledge and attitudes of medical staff have a significant impact on their practices in managing the sexual health of breast cancer patients. Hence, incorporating training on sexual health management into regular clinical training is necessary to address the problems associated with breast cancer.

6. Strengths and limitations

Our study population, which includes the participation of 26 hospitals across nine prefectures in Guizhou Province, China, is the major benefit of our research. The results were made more representative by having a substantial sample size. To assess the extent of understanding, beliefs, and actions, we employed reliable and valid instruments, and employed generalized estimating equations to group the data and account for any possible confounding factors. Study subjects were monitored during the time of completion of the survey questionnaires through remote quality control, increasing the accuracy of scores.

It is important to consider various constraints in this study. Firstly, we selected nonprobability samples based on convenience sampling. Convenience sampling, as it is widely recognized, stands as the prevailing approach for sampling populations. And we had no option but to choose this sample method. Despite our best attempts, we exerted considerable effort to enlarge the sample size in order to compensate for this shortfall. Like all other cross-sectional studies, the data collection method of this study captures a single moment in time, limiting the ability to make causal inferences. Social desirability bias has the potential to invalidate self-report measures. Hence, it is advisable to interpret attitude scores with caution.

7. Conclusion

Assessing the knowledge, attitudes, and practices of Chinese healthcare professionals regarding sexual health management enables educators and managers to implement focused strategies for enhancing particular aspects of sexual health management knowledge. In the end, these approaches could lead to smooth healthcare for these individuals, irrespective of where they are situated. Based on these findings, it is recommended to adopt a holistic strategy to enhance the understanding of sexual health management among Chinese healthcare professionals. Additionally, it is crucial to provide them with sufficient clinical exposure specifically dedicated to sexual health management to enhance their professional competence. It is advisable to conduct a nationwide study on the inclusion of sexual health information in clinical training.

Author contribution statement

Li Yao: Conceived and designed the experiments; Wrote the paper.

Yaling Li: Performed the experiments; Wrote the paper.

Tingshu Wang; Fangrong Jia; Li Hu; Qianya Zhang: Analyzed and interpreted the data.
Yu Zhang; XiaoLi You; Biyu Zhang; Wei Ming; Hong Li: Contributed reagents, materials, analysis tools or data.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix ASupplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e19486>.

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