

ORIGINAL RESEARCH

The impact of nursing based on the IKAP model on self-management and psychological well-being in prostate cancer patients: a retrospective study

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Abstract

Background: This study aims to evaluate the impact of the model of information-knowledge-attitude-practice (IKAP) nursing model on the self-management and psychological well-being in patients diagnosed with prostate cancer. **Methods:** From existing case records, a retrospective analysis was conducted using clinical data from 95 prostate cancer patients treated at our hospital from January 2022 to December 2023. Based on the different care methods recorded, the study included 50 patients in the observation group (IKAP-based nursing) and 45 patients in the control group (conventional intervention). The study compared the differences in self-management abilities and psychological well-being between the two groups. **Results:** Post-intervention, the observation group showed significantly higher self-management scores across all dimensions compared to the control group ($p < 0.05$); Additionally, the Hamilton Anxiety (HAMA) and Hamilton Depression (HAMD) scores in the observation group were significantly lower than those in the control group ($p < 0.05$); the quality of life scores in all dimensions were significantly higher in the observation group ($p < 0.05$); no significant differences were observed between the two groups in the incidence of cancer-related symptoms such as infection, fatigue and hematuria ($p > 0.05$). The observation group also reported higher overall satisfaction compared to the control group ($p < 0.05$). **Conclusions:** These findings suggest that the application of the IKAP nursing model can significantly enhance self-care abilities and alleviate psychological distress in prostate cancer patients, warranting its broader integration into clinical practice.

Keywords

Prostate cancer; IKAP model; Self-management; Psychological status

1. Introduction

Prostate cancer is one of the most common malignancies in older males, particularly in west developed countries, where it ranks second in terms of mortality among all cancers [1]. The incidence of prostate cancer has been rising annually, influenced by factors such as changes in lifestyles, dietary habits, environmental conditions, occupational risks and demographic aging [2, 3]. Prostate cancer patients often experience psychological and physical distress, which can negatively affect their quality of life. Surgery is the primary treatment for prostate cancer patients, though some patients may develop postoperative complications such as urinary incontinence. This condition can lead to negative emotional outcomes and create psychological burdens, further complicating medical interventions and the recovery [4, 5]. Consequently, improving self-management and psychological well-being in prostate cancer patients has become a critical issue in clinical nursing.

The information-knowledge-attitude-practice (IKAP)

framework has been utilized for over five decades, originating in the 1960s [6]. This model involves four interrelated stages: gathering information, acquiring knowledge, generating attitudes and forming practices. The IKAP model, initially proposed by Professor Mayo of Harvard University in the 1950s, provides a systematic approach to educating patients [7]. By focusing on “information” and “knowledge”, the model helps patients better understand their conditions and raise disease awareness. Additionally, it emphasizes the importance of “attitude” and “practice” in fostering a positive outlook and improving self-care capabilities [8]. The IKAP framework has been effectively applied in managing chronic conditions such as diabetes [9] and hypertension, as well as in the care of cancers, including gastric and breast cancer [10].

The scientific issue: Prostate cancer patients face numerous challenges during treatment, including the complexity of the disease, treatment side effects and psychological stress. These factors significantly affect patients’ self-management and psychological well-being, thereby influencing treatment outcomes

and quality of life. However, traditional nursing models often focus primarily on addressing the disease itself, neglecting the need for self-management support and psychological care. Therefore, this study aims to explore the impact of nursing interventions based on the Information-Knowledge-Attitude-Practice (IKAP) model on the self-management abilities and psychological state of prostate cancer patients. The goal is to provide a theoretical foundation and practical guidance for enhancing prostate cancer care.

Theoretical Foundation of the IKAP Model: The IKAP model is a comprehensive health education framework that emphasizes the interactive relationship between information acquisition, knowledge enhancement, attitude change and practical application. Originally developed for chronic disease management and health promotion, research indicates that systematic education and support can significantly improve patients' self-management abilities, leading to better health outcomes. For example, the IKAP model has been successfully applied in the management of diabetes and hypertension, helping patients understand their conditions, master self-management skills and improve both their psychological well-being and quality of life [11].

In the context of prostate cancer care, the IKAP model's theoretical framework is reflected in the following components: **Information Acquisition:** Providing relevant information about prostate cancer and its treatment to help patients understand their disease and management strategies. **Knowledge Enhancement:** Systematic education to deepen patients' understanding of disease management and enhance self-management capabilities. For instance, studies show that educating patients about managing treatment side effects can effectively reduce anxiety [12]. **Attitude Change:** Positive psychological interventions to help patients develop a constructive health outlook, increasing their engagement in disease management. **Practical Application:** Translating knowledge into actionable steps, encouraging patients to implement self-management strategies in daily life to improve both physical and mental health.

The central issue of this study is whether nursing interventions based on the IKAP model can improve the self-management abilities and psychological state of prostate cancer patients. Specifically, the study addresses two key areas: **Self-management ability:** The patient's capacity to manage the disease in daily life, including understanding the condition, monitoring symptoms and adhering to treatment plans. **Psychological state:** The patient's emotional responses during treatment, including anxiety, depression and overall quality of life. By comparing clinical data from an experimental group (50 patients receiving IKAP-based nursing interventions) and a control group (45 patients receiving routine nursing care), this study aims to assess the effectiveness of the IKAP model in enhancing self-management and psychological outcomes.

Innovation and Significance of the Study: **First Systematic Evaluation:** This study may be the first to systematically evaluate the application of the IKAP model in the care of prostate cancer patients. While the IKAP model has been applied in other contexts, its use in prostate cancer care remains limited. This study addresses this gap and lays the groundwork for future research and clinical application. In-

tegration of Theory and Practice: The IKAP model emphasizes the interaction between information, knowledge, attitude and practice, offering a comprehensive nursing intervention plan. Through structured education and psychological support, the model helps patients progress in acquiring information, enhancing knowledge, changing attitudes and applying practices, thereby improving self-management and psychological health. **Patient-Centered Nursing:** This study adopts a patient-centered approach, focusing on individualized interventions that address the specific needs of patients. This approach not only aligns with modern nursing trends but also offers insights for the care of other cancer patients. **Data Support and Clinical Application:** This study provides empirical data from a retrospective analysis of 95 prostate cancer patients. The results will offer evidence for clinical nursing practice, assisting healthcare providers in better addressing self-management and psychological challenges in prostate cancer care.

Significance of the Study: The implementation of this study has significant clinical and social implications. First, nursing interventions based on the IKAP model will provide more comprehensive care for prostate cancer patients, enhancing their self-management and psychological adaptation. Second, the findings will contribute to optimizing the nursing model for prostate cancer, advancing the nursing discipline. Finally, this research can serve as a reference for the care of other chronic disease patients, expanding the application of the IKAP model and promoting its broader clinical use. This study applies IKAP model-based nursing to prostate cancer care, aiming to evaluate its impact on disease self-management, psychological state and quality of life, with the goal of guiding nursing practices and rehabilitation efforts for the disease. Based on this, this study applied IKAP model-based nursing to prostate cancer patients and observed the effects of such nursing measures on patients' disease self-management ability, psychological state, quality of life and other aspects, aiming to further guide the nursing and rehabilitation of the disease.

2. Materials and methods

2.1 Patient and general information

Sample Size Calculation and Grouping Method:

$$n = \pi_t \times (1 - \pi_t) \times \pi_c \times (1 - \pi_c) / [(\pi_t - \pi_c - \Delta)] \times (\mu_{\alpha/2} + \mu_{\beta})^2$$

Explanation of Parameters and Sources:

π_t and π_c : These represent the expected event rates (such as adverse reactions or effective treatment rates) in the experimental group (inhalational anesthesia combined with intravenous anesthesia) and the control group (inhalational anesthesia only), respectively.

Source: These values are typically derived from previous literature, clinical data, or pilot study results. Relevant literature should be reviewed to determine these two proportions and ensure the accuracy of the estimates.

Δ (Delta): This represents the minimum acceptable difference in event rates between the experimental group and the control group. In other words, it is the effect size the

researchers aim to detect.

Source: The researchers determine this value based on clinical significance and relevant literature, typically setting a reasonable minimum difference based on clinical practice and patient needs.

$\mu_{\alpha/2}$ and μ_{β} : $\mu_{\alpha/2}$: The Z-value related to the significance level (α), typically taken as 1.96 for a two-sided test with $\alpha = 0.05$. μ_{β} : The Z-value related to the statistical power ($1 - \beta$) of the test, typically taken as 0.84 for $\beta = 0.2$ (indicating 80% power).

Source: These values are based on standard statistical principles, with the selection of α and β reflecting the researchers' tolerance for Type I and Type II errors.

Calculation Steps:

1. Determine Event Rates: Through literature review or preliminary data collection, determine the values of π_t and π_c .

2. Set Acceptable Effect Size: Based on clinical significance or research objectives, determine the value of Δ .

3. Select Significance Level and Power: Set the values of α and β and select the appropriate Z-values (typically 1.96 and 0.84).

4. Substitute Parameters into the Formula: Substitute all known parameters into the formula to calculate the required sample size per group, denoted as n .

This retrospective cohort study aims to evaluate fixed variables as primary efficacy outcome indicators. A superiority design with a (1:1.1) ratio was adopted, with parameters set as $\alpha = 0.025$ (one-sided), $\beta = 0.20$ (one-sided), and $\Delta = 5\%$. Based on these parameters and the primary efficacy outcome indicators, the required sample size for the control group was determined through public disclosure, resulting in 38 patients. Considering a 20% dropout rate, the control group required 45 patients, and the experimental group required 50 patients. Ultimately, the study included 50 patients in the experimental group and 45 patients in the control group, who were assigned to their respective study groups based on the recorded treatment methods.

From existing case records, clinical data of 95 patients with prostate cancer treated at our hospital the between January 2022 and December 2023 were retrospectively included. They were grouped according to the different care methods recorded, with 50 patients in the observation group and 45 patients in the control group. Exclusion criteria: (1) Patients with blurred consciousness and mental disorders; (2) Patients with tumor metastasis; (3) Patients with severe organ dysfunction such as liver and kidney; (4) The patient had poor treatment compliance and did not actively cooperate.

2.2 Interventions

As a retrospective study, the intervention methods were already recorded in existing case records.

Control group patients received routine care, including dietary guidance, disease education, regular telephone follow-up and other routine care.

(1) Dietary Guidance: A dietary plan tailored to prostate cancer patients was developed, emphasizing antioxidant-rich foods such as fresh fruits, vegetables and nuts. Patients were encouraged to reduce the intake of high-fat foods and red

meat. Their dietary habits were regularly assessed to ensure adherence to the recommended plan.

(2) Disease Education: Regular health lectures on prostate cancer were organized, covering topics such as pathology, physiology, treatment and prognosis. Educational materials, including handouts and brochures, were distributed to patients and their families to provide fundamental knowledge about prostate cancer. Additionally, face-to-face interviews and small group discussions were held to address any questions.

(3) Regular Telephone Follow-ups: Monthly telephone follow-ups were conducted to inquire about patients' treatment progress, symptom changes and psychological well-being. Feedback was recorded, and appropriate advice and support were provided based on the patients' needs.

The observation group received continuous care guided by IKAP theory in addition to the routine care provided to the control group. In brief, the nursing interventions were structured around four key principles: information collection, knowledge acquisition, attitude generation and practice formation.

Information Collection: Nurses gathered patients' basic information, psychological status, social support and health information needs through standardized questionnaires at the first contact. Regular communication with patients was maintained to address their concerns, and patient information files were created to track changes in physical and mental status for future interventions.

Knowledge Acquisition: A systematic education plan was developed, which delivered health information in stages, covering disease management, nutrition, exercise and more. Multimedia tools such as videos and PowerPoint presentations were used, along with on-site demonstrations, to guide patients in learning and mastering pelvic floor exercises. Each follow-up visit involved knowledge quizzes or group discussions to reinforce patients' understanding.

Attitude Development: Psychological interventions, including cognitive-behavioral therapy, were employed to help patients adjust their perceptions of the disease and develop a positive health mindset. Communication platforms like WeChat groups and emails were used to share success stories and motivate patients. Nurses regularly assessed patients' psychological states using tools like self-assessment anxiety and depression scales, adjusting interventions based on the results.

Practice Formation: During each follow-up visit, nurses worked with patients to adjust individualized health management plans, ensuring they were tailored to each patient's specific needs. Patients were encouraged to set concrete health behavior goals (e.g., daily walking time, water intake) and their progress was regularly reviewed. Group activities were promoted to foster patient interaction and support, enhancing their sense of involvement and motivation.

In this study, several strategies were employed to enhance the effectiveness and reliability of the interventions, including nurse training, monitoring of intervention adherence and ensuring patients received standardized educational materials. Specifically, as follows:

1. Nurse IKAP Care Intervention Training:

Course Design: A comprehensive training course was developed, covering the basic theory of the IKAP model, specific nursing intervention methods, and key care points for

prostate cancer patients. The course included the following modules: Overview of the IKAP Model: Introducing the four dimensions (Information, Knowledge, Attitude and Practice) and their application in nursing. Prostate Cancer Knowledge: Covering disease physiology, treatment plans, the importance of self-management and psychological support. Nursing Skills Training: Teaching nurses to implement IKAP-based interventions, including patient education, psychological counseling and health promotion.

2. Nursing Team Training Methods:

Lectures and Seminars: Specialized lectures were held regularly, with expert guest speakers sharing the latest research and practical insights on the IKAP model and prostate cancer nursing. **Group discussions** allowed nursing staff to share experiences and challenges. **Simulated Training:** Communication skills and the ability to address patients' emotions were enhanced through role-playing and case-based simulations, helping nurses apply theoretical knowledge in real-life situations. **Online Learning Platform:** An online learning system was provided, enabling nurses to access courses, video tutorials, e-books and other resources flexibly. **Field Visits and Exchanges:** Site visits to hospitals where the IKAP model was successfully implemented allowed nurses to learn from best practices. **Interdisciplinary collaboration** was encouraged through expert participation from fields like psychology and nutrition. **Continuous Education and Evaluation:** A system for ongoing education was established, ensuring that nurses' knowledge and skills were periodically assessed and updated. **Feedback and evaluations** helped to improve nursing practices.

3. Monitoring of Intervention Adherence:

Standard Operating Procedures: Detailed care intervention procedures were developed, covering intervention timing, content, methods and documentation requirements to ensure consistency across nurses. **Regular Monitoring and Feedback:** A regular monitoring mechanism was established. Nurses were required to complete an intervention record after each IKAP-based nursing session, documenting the interventions and outcomes. These records were periodically audited to evaluate adherence. **Patient Feedback Collection:** Patient satisfaction surveys, interviews, or questionnaires were used to collect feedback on the interventions, providing valuable insights for further improving nursing practices. **Ongoing Education and Supervision:** Nurses showing lower performance were given additional training. Regular team meetings allowed staff to share successful cases and lessons learned, promoting best practices.

4. Ensuring Patients Receive Standardized Materials:

Preparation of Standardized Educational Materials: A series of standardized materials was developed to ensure consistency in the information provided to all patients, including: **Patient Manual:** Covers basic prostate cancer knowledge, treatment plans, self-management techniques and psychological support resources. **Infographics and Brochures:** Simple, visual materials that help patients understand the four dimensions of the IKAP model and its importance in self-management. **Video Materials:** Training videos to help patients understand nursing interventions and self-management methods.

Distribution and Explanation of Materials: At the start of the intervention, nurses distributed these materials and explained

each item to ensure patient understanding. Nurses also encouraged patients to ask questions and provided clarifications as needed.

Evaluation of Material Effectiveness: After the intervention, patient understanding and acceptance of the educational materials were evaluated through surveys or interviews, helping to optimize the content and format of the materials.

The duration of the intervention for patients in both groups was 3 months.

2.3 Primary outcome

As a retrospective study, the outcome indicators results were already recorded in existing case records.

2.3.1 Self-management effectiveness

The Self-Efficacy for Understanding and Practicing Health Principles (SUPPH) was used to assess the degree of self-efficacy in prostate cancer patients before and after intervention. The scale comprises three primary dimensions: alleviation of stress, cultivation of optimism and enhancement of decision-making skills. In total, there are 28 items. Each item is assigned a score ranging from 1 to 5, resulting in a total score of 140 points. A higher score indicates a greater sense of self-effectiveness.

Reliability: The internal consistency of the SUPPH scale is typically evaluated using Cronbach's alpha. A value above 0.70 is generally considered indicative of good internal consistency. SUPPH has high reliability and validity. The Cronbach's alpha coefficient was calculated to be 0.849 ± 0.970 .

Validity: The validity of this scale is confirmed through expert reviews and pilot testing to ensure its applicability to the specific patient population.

Validation: Previous studies have shown that the SUPPH scale is effective in prostate cancer patients, accurately reflecting their self-management abilities.

2.3.2 Anxiety and depression

Prostate cancer patients' levels of anxiety and depression were evaluated before and after intervention using the 24th edition of the Hamilton Anxiety Scale (HAMA) and the Hamilton Depression Scale (HAMD), respectively.

HAMA scale consisting of 14 questions, a total score of 7 signifies normalcy, whereas a number between 7 and 14 suggests the presence of anxiety in the patient. Anxiety is indicated by a score between 14 and 29. A total score over 29 indicates severe anxiety.

Reliability: The Cronbach's α coefficient of the HAMA scale typically ranges between 0.80 and 0.95, indicating good internal consistency.

Validity: The HAMA scale has been extensively validated in numerous studies, demonstrating its ability to effectively differentiate levels of anxiety and to be compared with other anxiety assessment tools such as GAD-7 (Generalized Anxiety Disorder scale).

Validation: The application of the HAMA scale in prostate cancer patients has been validated, confirming its ability to assess anxiety related to the disease.

HAMD scale consists of 24 questions, with a total score of 8

indicating a typical outcome. Potential depression is indicated by a score ranging from 8 to 20. Depression is indicated by a score of 21 to 35, and a total score beyond 35 denotes severe depression.

Reliability: The Cronbach's α coefficient of the HAMD scale is typically above 0.80, generally ranging between 0.85 and 0.90, indicating high reliability.

Validity: This scale is widely used and has been validated across various clinical populations, demonstrating its ability to assess depressive symptoms effectively.

Validation: In the context of prostate cancer patients, the validity of the HAMD scale has also been confirmed, as it accurately reflects the depressive state of these patients.

2.3.3 Quality of life

The patients' quality of life was evaluated using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30), encompassing six dimensions: physiological function, psychological function, physical pain, emotional function, social function and mental health, both prior to and following treatment. The higher the score means the better of the quality of life.

2.3.4 Changes in cancer-related symptoms

Record and compare the occurrence of cancer-related symptoms such as infection, fatigue, hematuria and hydronephrosis.

2.3.5 Satisfaction

The hospital utilized a nurse satisfaction survey scale to assess the level of nursing satisfaction after intervention of two groups. The scale comprised ten items that covered various dimensions including work attitude, nursing impact and nursing technology. Each item was assessed on a scale from 0 to 10, and the maximum score for ten projects is 100 points, with scores ≥ 90 indicating very satisfied, scores between 70 and 89 indicating satisfied, scores between 60–69 indicating generally satisfied, and scores below 60 indicating dissatisfied. Satisfaction = Very satisfied + Satisfied + Generally satisfied. The scale exhibited a Cronbach's alpha coefficient of 0.763.

2.4 Statistical analysis

All the data in this study were confirmed by more than two medical staff and entered into the computer. All the data in this study were processed by SPSS 25.0 (IBM, Armonk, NY, USA) statistical analysis software. The measurement data were expressed by $(\bar{x} \pm s)$, and the count data were expressed by percentage (%). The general demographic data of the two groups were statistically described by descriptive analysis, and the constituent ratio of the two groups was compared by χ^2 test, the comparison between the two groups before intervention and after intervention was compared with t test. $p < 0.05$ indicated a statistically significant difference.

3. Results

3.1 Clinical data

The general information of the two groups is shown in Table 1, with no significant differences between the groups ($p > 0.05$).

3.2 Self-management efficacy

After intervention, all dimensions the self-management scores of the observation group were significantly higher than those of the control group (Fig. 1, $p < 0.05$).

3.3 HAMA and HAMD scores

After intervention, the HAMA and HAMD scores of the observation group were significantly lower than those of the control group (Fig. 2, $p < 0.05$).

3.4 Quality of life

After intervention, the observation group had significantly higher scores in all dimensions of quality of life than the control group (Figs. 3,4, $p < 0.05$).

3.5 Cancer-related symptoms change

No significant differences were found in the occurrence rates of cancer-related symptoms between the two groups after intervention (Table 2, $p > 0.05$).

3.6 Satisfaction

The overall satisfaction of patients in the observation group was generally higher than that in the control group (Table 3, $p < 0.05$).

4. Discussion

Prostate cancer is one of the most common malignancies in the field of urological surgery, with its primary clinical manifestations including frequent urination, urgent urination and hematuria. This type of cancer is predominantly diagnosed in elderly men [13, 14]. For patients in the intermediate and advanced stages, the mortality rate is significantly elevated, posing a substantial risk to life expectancy and quality of life [15]. Moreover, prostate cancer patients often experience both mental and physical challenges, which can complicate their treatment and recovery process. Consequently, enhancing the nursing support through tailored health education is critical in improving both the psychological and physical well-being of these patients and their families [16].

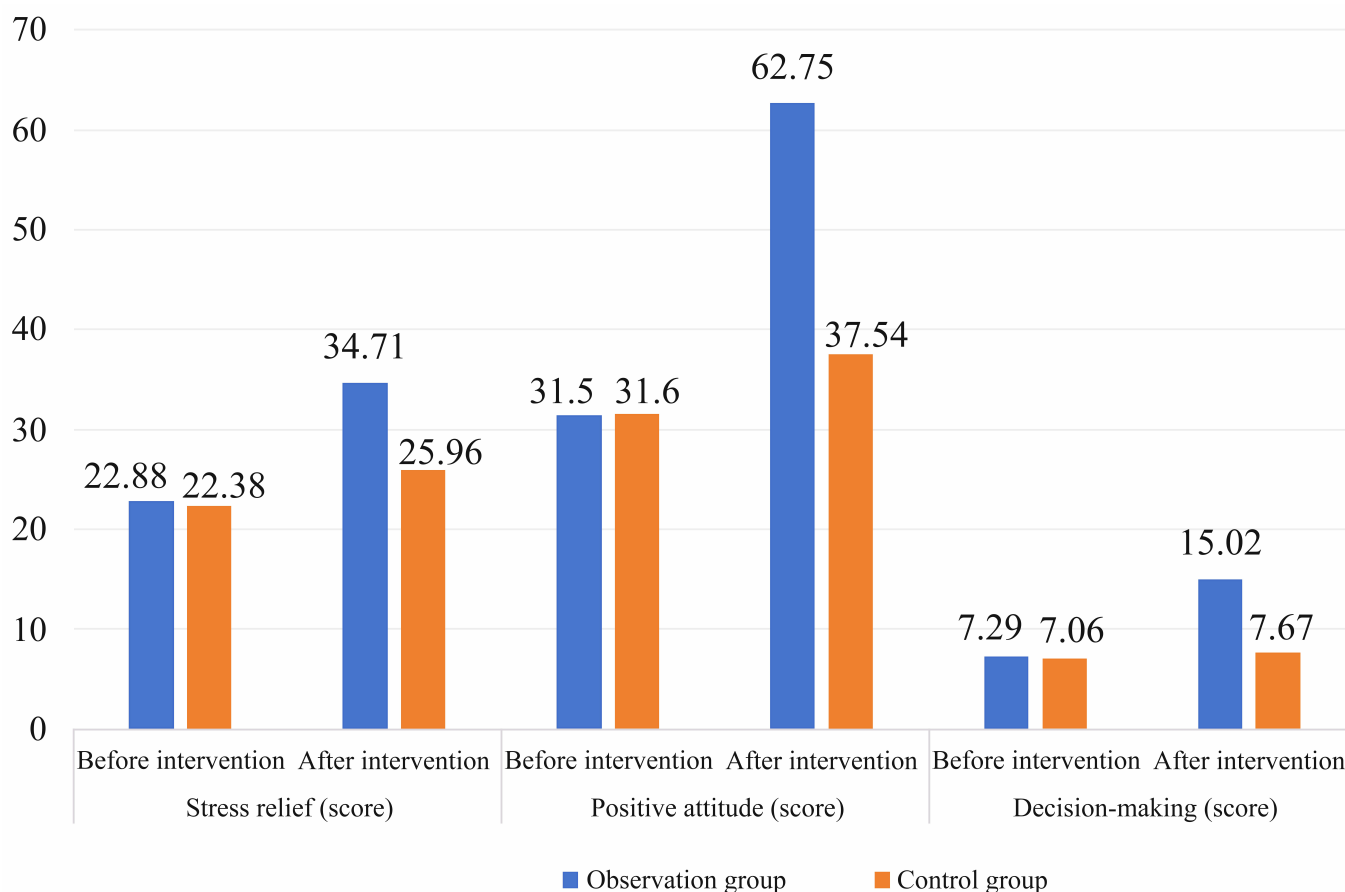
In recent years, there has been a significant shift in the clinical nursing practices, moving from a traditional biomedical model to a more comprehensive bio-psychological medical model. The IKAP model provides a systematic nursing approach to nursing, focusing on systematic data collection about patients' needs and circumstances, enhancing patient awareness, modifying beliefs and encouraging the development of positive behaviors [17]. After gathering diverse patient information and needs, a thorough evaluation was conducted to offer personalized guidance based on the results of this assessment. The objective was to enhance patients' understanding of prostate cancer and increase their engagement in rehabilitation activities. The instructions were specifically designed to actively facilitate a shift in patients' perspectives and to encourage the development of new behavioral patterns.

In this study, prostate cancer patients who received nursing care based on the IKAP model showed significantly higher

TABLE 1. Comparison of clinical data between the two groups.

Project	Observation group (n = 50)	Control group (n = 45)	t/χ^2	p
Age (yr)	47.38 ± 9.28	48.19 ± 8.60	0.444	0.658
Marital status				
Married	41 (82.00%)	35 (77.78%)	0.264	0.607
Unmarried	9 (18.00%)	10 (22.22%)		
BMI	22.59 ± 3.71	23.33 ± 2.67	1.109	0.270
PSA at diagnosis (ng/mL)	9.34 ± 1.63	10.03 ± 1.97	1.865	0.065
Staging of carcinoma				
Stage I	5 (10.00%)	7 (15.56%)	1.689	0.639
Stage II	22 (44.00%)	18 (40.00%)		
Stage III	20 (40.00%)	15 (33.33%)		
Stage IV	3 (6.00%)	5 (11.11%)		

BMI: Body Mass Index; PSA: Prostate-Specific Antigen.

**FIGURE 1. Comparison of self-management efficacy between the two groups.**

self-management scores than the control group across all assessed dimensions. This result suggests that the use of the IKAP model significantly improved the patients' self-management efficacy and ability to care for themselves. This aligns with findings from Ling Yin *et al.* [6], whose study on gastric cancer demonstrated that IKAP-centered nursing could enhance the self-care skills in patients with gastric cancer. The primary mechanism behind these positive outcomes lies in the personalized approach inherent to the

IKAP model. By tailoring care to the individual patient's needs, the model helps boost patient awareness, increase their confidence and promote active participation in their treatment and rehabilitation. These outcomes collectively contribute to enhancing patients' capacity for self-care [18, 19]. The effectiveness of the IKAP model in improving self-management abilities can be attributed to several key factors: (1) Information Acquisition and Knowledge Dissemination: Knowledge Education and Information

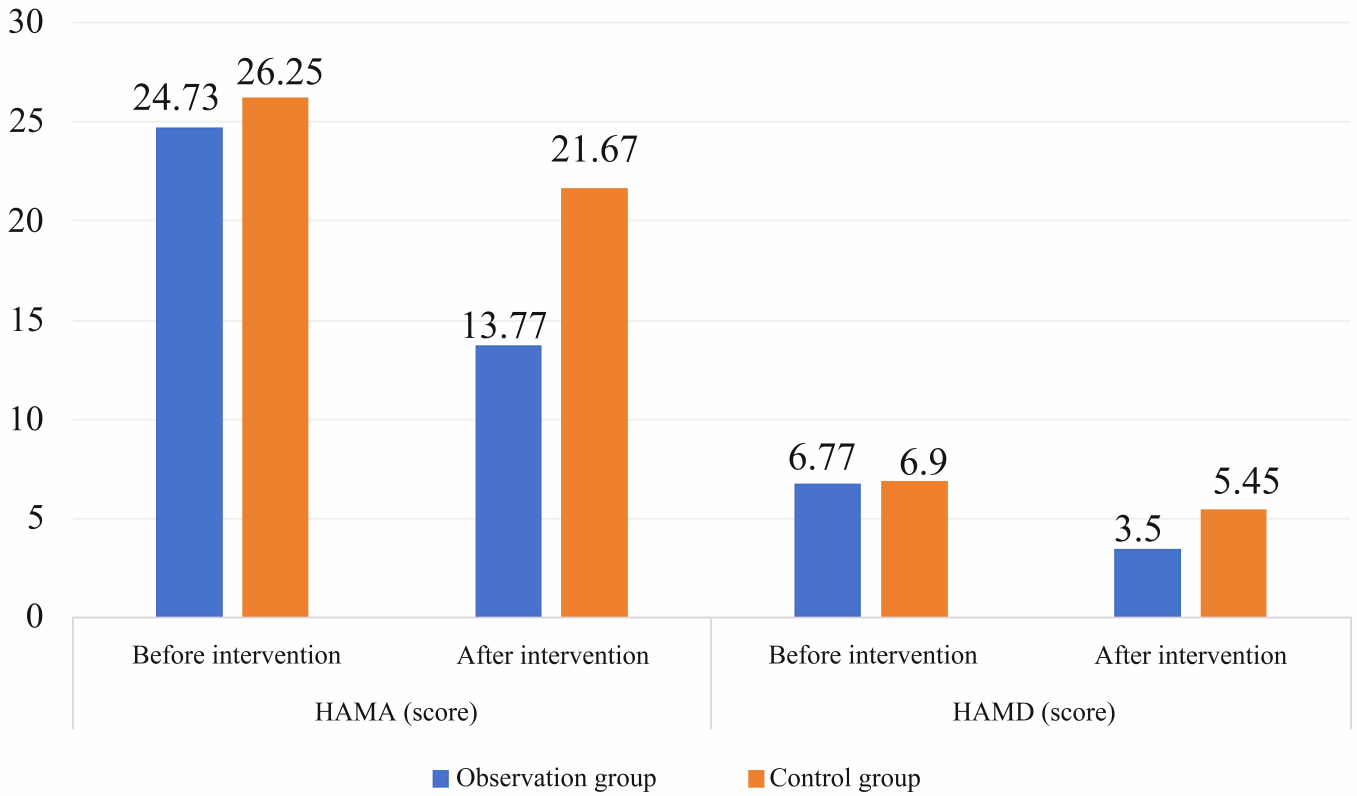


FIGURE 2. Comparison of HAMA and HAMD scores between the two groups. HAMA: Hamilton Anxiety; HAMD: Hamilton Depression.

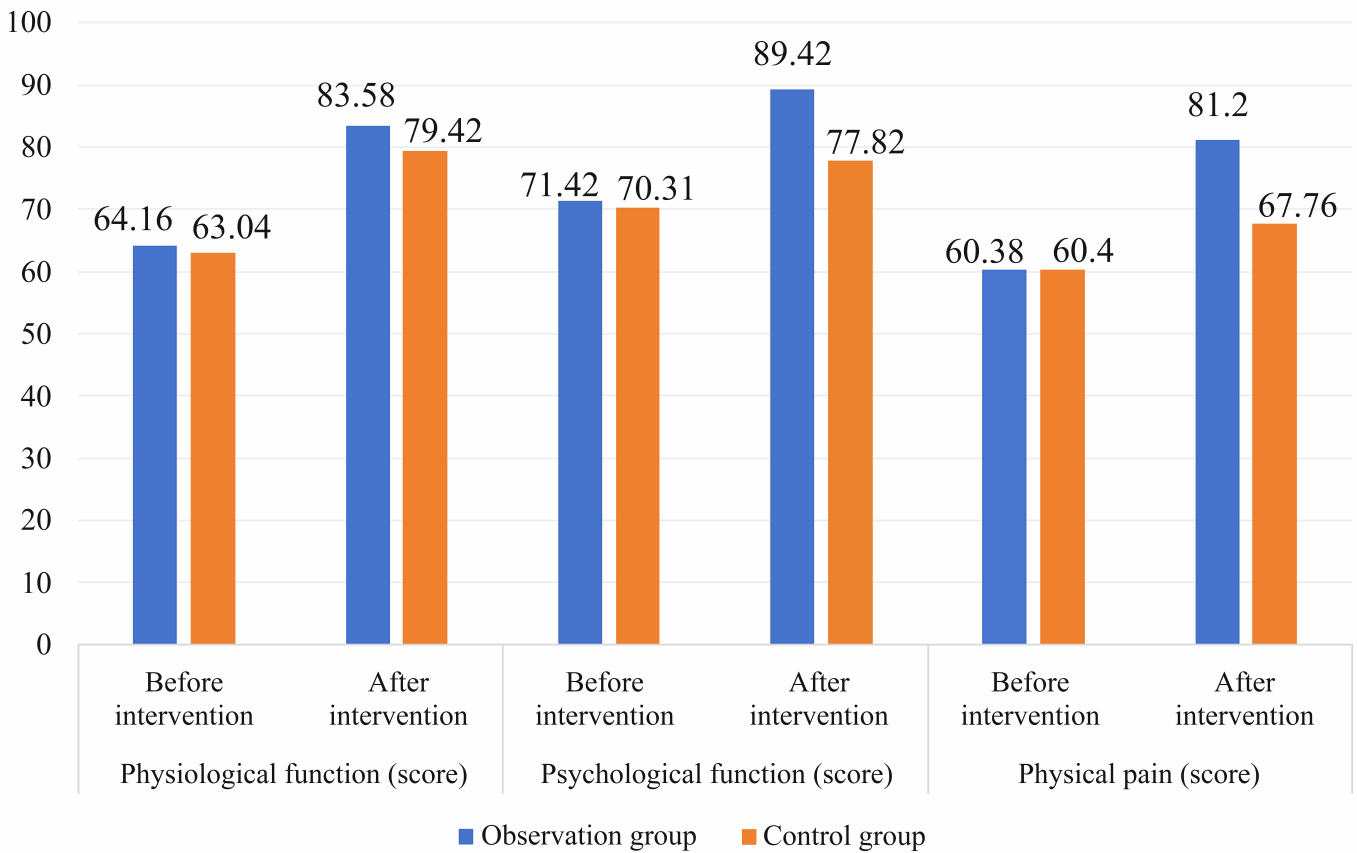


FIGURE 3. Comparison of quality of life between the two groups.

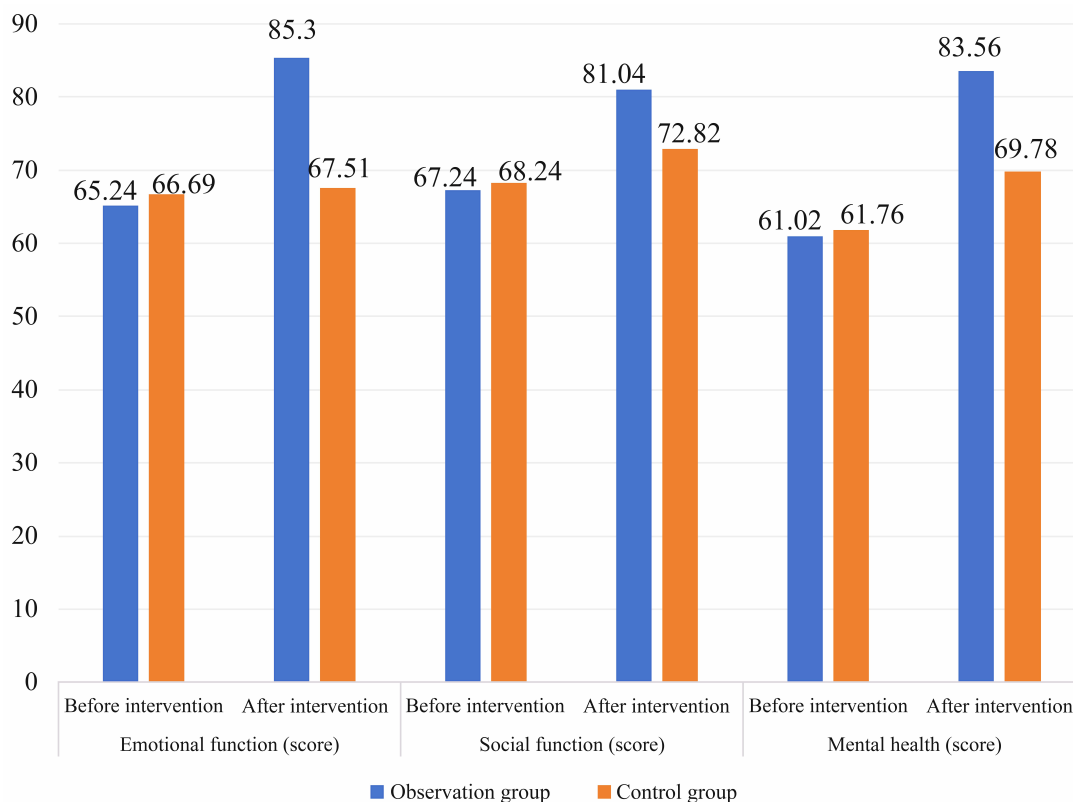


FIGURE 4. Comparison of quality of life between the two groups.

TABLE 2. Comparison of cancer-related symptoms change (n (%)).

Symptoms	Observation group (n = 50)	Control group (n = 45)	χ^2	<i>p</i>
Malnutrition	1 (2.00)	5 (11.11)	1.771	0.261
Infection	1 (2.00)	3 (6.67)		
Fatigue	0	4 (8.89)		
Hematuria	2 (4.00)	4 (8.89)		

TABLE 3. Comparison of satisfaction of two groups (n (%)).

Satisfaction situation	Observation group (n = 50)	Control group (n = 45)	χ^2	<i>p</i>
Very satisfied	29 (58.00)	11 (24.44)	17.987	0.001
Satisfied	10 (20.00)	17 (37.78)		
Generally satisfied	9 (18.00)	5 (11.11)		
Dissatisfied	2 (4.00)	12 (26.67)		

Provision: The IKAP model emphasizes the systematic and comprehensive delivery of disease-related information. This ensures that patients gain a clear understanding of their condition, including the pathophysiology of prostate cancer, treatment options, potential side effects and the importance of managing their condition. This knowledge equips patients with the tools needed to better manage their disease. Reducing Misunderstanding and Anxiety: A critical aspect of the model is reducing anxiety by ensuring that patients receive accurate, relevant information. When patients are well-informed, their

understanding of their condition improves, which in turn alleviates misconceptions and reduces anxiety related to the unknown aspects of their disease. (2) Enhancing Patient Engagement: Active Participation in Decision-Making: The IKAP model encourages patients to take an active role in their treatment decisions. This includes discussing potential treatment options, making informed choices and actively participating in the creation of self-management strategies. Such involvement increases the patients' investment in their own care, fostering a stronger sense of responsibility and

ownership over their health. **Establishing Self-Management Plans:** The model also encourages patients to develop practical, achievable self-management plans, which are tailored to their specific needs. These plans outline clear steps and goals, which enhance the likelihood of successful self-management. **(3) Improving Self-Efficacy: Skills Training and Practice:** Beyond knowledge acquisition, the IKAP model integrates training in essential self-management skills. These may include skills related to diet management, exercise, medication adherence and emotional regulation techniques. By providing hands-on training and opportunities for patients to practice these skills, their self-efficacy is significantly enhanced. **Positive Feedback:** Positive reinforcement from healthcare providers throughout the self-management process plays a crucial role in boosting patients' confidence. By recognizing and celebrating progress, healthcare providers help patients maintain motivation, encouraging them to continue their self-management efforts. **(4) Building a Support System: Social Support:** The IKAP model also emphasizes the importance of social support. By encouraging patients to participate in group discussions or mutual assistance activities, the model facilitates communication among patients, fostering a sense of community and shared experience. This social network provides emotional support, which is essential in maintaining motivation and managing the emotional challenges of living with cancer. **Family Involvement:** A significant strength of the IKAP model is its inclusion of the patient's family in the care process. Healthcare providers actively involve family members, helping them understand the patient's needs and how they can best offer support. This creates a strong, supportive network, which is critical to ensuring the long-term success of self-management strategies.

In addition to improvements in the anxiety, depression and quality of life of the patients showed significant enhancement compared to the control group. Quality of life is now widely recognized as a crucial metric for evaluating the effectiveness of cancer treatments and care [20]. The adoption of IKAP-based nursing in cancer care has gained increasing recognition for its ability to not only improve patients' quality of life and emotional well-being, but also for contributing to favorable clinical outcomes [21, 22]. The continuous care provided through the IKAP model is characterized by being thorough, detailed, and well-structured, ensuring that information is delivered in an understandable and patient-friendly manner. The systematic approach of the IKAP method involves careful planning and targeted care that encourages patients to actively engage in managing their illness. This process not only helps improve their problem-solving skills, but also enhances their confidence in dealing with their condition.

Analysis of the Reasons for IKAP Nursing's Improvement of Psychological State: **(1) Enhancing Disease Cognition: Information Acquisition:** One of the core components of the IKAP model is the provision of comprehensive and systematic disease knowledge. By helping patients understand the pathology, physiology and treatment options for prostate cancer, the model reduces patients' fear and anxiety stemming from the unknown. A better understanding of their disease can alleviate distress, enabling patients to face their condition

with greater confidence. **Knowledge Dissemination:** As patients learn more about their illness, they can approach it with a stronger sense of control. This increased understanding empowers patients, making them feel more confident in managing their health and reducing emotional distress [23]. **(2) Improving Self-Efficacy: Skill Enhancement:** The IKAP model emphasizes self-management training and skill development, which significantly improves patients' self-efficacy. Self-efficacy refers to the belief in one's ability to manage a specific task or cope with challenges. By acquiring self-management skills (e.g., managing diet, exercise, emotional regulation), patients feel more capable in handling their illness, which in turn improves their psychological state [24]. **Goal Setting:** Healthcare providers assist patients in setting realistic and achievable goals related to their self-management. The accomplishment of these small goals provides a sense of achievement and helps build self-confidence and motivation. Each success fosters greater psychological resilience. **(3) Facilitating Emotional Support: Emotional Communication:** Effective emotional communication between patients and healthcare providers is a cornerstone of the IKAP model. By encouraging patients to express their psychological and emotional experiences, healthcare providers can offer tailored support, which helps reduce anxiety and depressive symptoms [25]. **Mutual Support Groups:** The model also promotes the formation of support groups, allowing patients to share their experiences and coping strategies. This social interaction helps foster a sense of community and emotional security, which plays a significant role in improving their mental health. The peer support generated in these groups provides both emotional comfort and a platform for learning effective coping strategies. **(4) Ongoing Feedback and Support: Regular Assessment:** The IKAP model places great importance on the regular assessment and feedback of patients' psychological states. Healthcare providers closely monitor changes in patients' emotional and psychological health and offer timely interventions to address any emerging issues. This continuous attention reassures patients and reinforces their sense of being cared for, which improves overall psychological well-being [26]. **Positive Encouragement:** Consistent positive feedback from healthcare providers motivates patients to maintain a positive mindset and strengthens their determination to cope with the disease.

After the intervention, there were no significant differences between the two groups in the incidence of cancer-related symptoms such as infection, fatigue and hematuria. Several factors may explain this finding: **(1) Sample Characteristics:** The baseline characteristics of patients in both groups, such as age, gender and disease stage, were likely similar, leading to no significant differences in the incidence of physical symptoms. These baseline factors may have influenced the outcomes related to physical symptoms, making it difficult to detect any meaningful differences between the groups. **(2) Nature of the Intervention:** The IKAP model's nursing intervention primarily focused on psychological support, self-management training and education about the disease, rather than directly targeting the management of physical symptoms. While the model significantly improved patients' psychological state and self-management ability, its impact on the physiological management of symptoms (e.g., infection, fatigue, hematuria) may

have been limited. (3) Complexity of Symptom Management: Cancer-related symptoms are influenced by a multitude of factors, including the patient's physiological state, treatment regimen and psychological condition. Even though the IKAP model improved psychological health and self-management skills, these factors do not necessarily have a direct impact on physical symptoms. The complex nature of symptom management may require additional interventions, including medical treatments and specific symptom-focused care. (4) Limitations of Intervention Duration: The intervention duration in this study was three months, which may not have been long enough to observe changes in physical symptoms, particularly those that require extended periods of monitoring and management. Long-term interventions may be necessary to see improvements in symptoms such as fatigue or hematuria.

In this study, the SUPPH, HAMA and HAMD scales were employed to assess patients' psychological states, including anxiety, depression and overall psychological health. These scales are well-established, demonstrating high reliability and validity in clinical settings, particularly for prostate cancer patients. Their use in this research provides solid scientific evidence to evaluate the impact of nursing interventions, ensuring that the results are both reliable and valid. By referencing the validation of these scales, the credibility of the research is further strengthened, enhancing the generalizability of the findings to a broader patient population.

Rationale for the 3-Month Intervention Period: (1) Adequate Time to Observe Effects: A 3-month period allows enough time for patients to absorb and benefit from the nursing interventions, especially those focused on improving self-management and psychological health. Previous research has shown that changes in health behavior typically require sustained, long-term interventions. For example, Jiang Qingjian found that longer intervention durations led to more significant improvements in self-management [27]. This period was considered sufficient to observe meaningful psychological and behavioral changes in the participants. (2) Alignment with Intervention Goals: The IKAP model of nursing emphasizes knowledge dissemination, attitude change and skills acquisition. Research by Zhu Xuejiao suggests that learning and behavior change processes require time to solidify—often taking several weeks or months. A 3-month period allows sufficient time for patients to acquire and consolidate self-management knowledge and to adapt psychologically to their condition [28]. This timeframe is particularly conducive to fostering long-lasting changes in behavior and mental health. (3) Time Needed for Psychological Improvement: Psychological improvements are often gradual and may not be immediately visible. According to psychological research, the effects of interventions designed to improve mental health typically take time to manifest. As noted in previous studies, patients often need several weeks or even months to perceive and experience noticeable changes in their psychological state [29]. Thus, a 3-month period provides adequate time for patients to process and adapt to psychological interventions, ultimately enhancing their emotional well-being and coping mechanisms.

Conducting a retrospective analysis requires rigorous ethical standards to ensure patient confidentiality and data privacy. Several measures were taken to safeguard patient rights

throughout the study: (1) Data Collection and Handling: During data collection, all patient information was anonymized. Personal identifiers, such as names, identification numbers and contact details, were removed. Each patient was assigned a unique code to track their data throughout the analysis process without revealing their identity. Aggregated data was used for analysis rather than individual patient data, ensuring that patients could not be identified from the study's results. (2) Informed Consent and Ethical Review: Prior to initiating the study, the research proposal was reviewed and approved by the hospital's ethics committee to ensure compliance with ethical guidelines. This review included an evaluation of the procedures for protecting patient privacy and ensuring ethical standards were upheld. Informed consent was obtained from all participants or their legal representatives before using their data for retrospective analysis. Participants were explicitly informed about the use of their data for research purposes, with an emphasis on safeguarding their privacy and rights. (3) Research Reporting and Publication: In the process of preparing the research report and publishing the findings, great care was taken to anonymize all data. No information that could identify individual patients was included in the final report or publication. By adhering to these ethical guidelines, the research upholds the privacy and rights of the patients while ensuring that the findings remain credible and ethically sound.

Limitations of the IKAP Model in Symptom Management: (1) Focus on Psychological and Educational Interventions: The IKAP model primarily emphasizes information dissemination, knowledge acquisition, attitude change and practical application. While effective in improving psychological health and self-management, it may be less effective in directly addressing physiological symptoms. (2) Lack of Personalized Interventions: If the interventions are not tailored to individual patients' specific symptoms and needs, their impact on symptom management may be limited. The absence of personalized care may reduce the model's overall effectiveness in managing cancer-related symptoms. (3) Insufficient Symptom Monitoring: The IKAP model may lack continuous monitoring of cancer-related symptoms, potentially delaying timely medical intervention when symptoms worsen or emerge. (4) Inadequate Multidisciplinary Collaboration: Effective cancer care requires collaboration among doctors, nurses and other healthcare professionals. If the IKAP model fails to integrate the efforts of the healthcare team, it could hinder the effectiveness of symptom management.

Study Limitations: Sample Size and Single-Center Design. This study was conducted at a single hospital with a relatively small sample size, which may limit the generalizability of the findings. Furthermore, the study lacked sufficient investigation into general patient characteristics, such as comorbidities, which could affect the results. Lack of Research on Recurrence Factors. The study did not explore the factors influencing recurrence rates in patients. Incorporating such data would enhance understanding of how the interventions impact recurrence in prostate cancer patients. Selection Bias in Retrospective Analysis. As a retrospective study, selection bias is inherent and may affect the validity of the findings. Unexplored Risk Factors for Post-Surgical Complications. This study did not thoroughly examine the risk factors for postop-

erative complications. Further research on this topic could improve surgical and clinical management. Future research should include larger, multicenter studies with a more diverse patient population. These studies should also explore risk factors for postoperative complications and recurrence, ultimately enhancing the accuracy and comprehensiveness of research findings.

Comparison Between the IKAP Model and Orem's Self-Care Model: (1) Fundamental Concepts: Orem's Self-Care Model emphasizes the patient's ability to engage in self-care, focusing on their initiative and independence in health maintenance and disease management [30]. In contrast, the IKAP model prioritizes the transmission of information and knowledge acquisition, aiming to improve self-management through education and support. (2) Scope of Application: Orem's Model is primarily used in self-care education for patients with chronic diseases. IKAP Model focuses more on improving psychological well-being and encouraging active patient involvement. (3) Intervention Methods: Orem's Model involves specific self-care activities, such as managing diet, exercise and medication adherence [31]. IKAP Model: Intervenes by improving patients' knowledge and skills, which in turn enhances their confidence and ability to manage their disease.

The IKAP model offers significant advantages, particularly in enhancing the self-management and psychological well-being of prostate cancer patients. It excels in areas such as information delivery and knowledge acquisition. Unlike other nursing models, the IKAP model emphasizes patient involvement and psychological support, making it particularly suitable for chronic disease management. Future research could explore integrating various nursing models to create a more comprehensive approach to patient care. Combining different models could optimize both the physiological and psychological aspects of care, leading to more holistic patient outcomes.

5. Conclusions

To sum up, self-management intervention program for prostate cancer patients using the IKAP model leads to favorable outcomes, enhancing self-management skills, boosting confidence, mitigating the adverse effects of the illness, and ultimately improving overall well-being.

AVAILABILITY OF DATA AND MATERIALS

The authors declare that all data supporting the findings of this study are available within the paper and any raw data can be obtained from the corresponding author upon request.

AUTHOR CONTRIBUTIONS

FLL and BYZ—designed the study and carried them out; prepared the manuscript for publication and reviewed the draft of the manuscript. FLL, BYZ, HY, STL and HZY—supervised the data collection. FLL, BYZ, HY, STL and HZY—analyzed the data. FLL, BYZ, HY and HZY—interpreted the data. All authors have read and approved the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics Committee of the Second Affiliated Hospital of Wenzhou Medical University (Approval no. 2023-K-332-01). Written informed consent was obtained from a legally authorized representative for anonymized patient information to be published in this article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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