ORIGINAL RESEARCH

Efficacy of SBAR combined with CICAR Communication Mode in Enhancing CT Hydration Effect and Nursing Satisfaction in Elderly Patients with Low Education

Fang Xiang, MM; You Xia, MM; Bingchan Xie, MM; Huan Huang, BM

ABSTRACT

Objective • To explore the effect of nurse-patient communication using the SBAR and CICAR communication mode on CT hydration effectiveness and nursing satisfaction in elderly patients with low education.

Methods • From December 2020 to April 2023, 120 elderly patients with low education who underwent chest examinations in our hospital's imaging department were selected. Divide into an observation group and a control group using clinical randomized controlled trial design principles. Both groups of patients received the same diagnosis and treatment plan and nursing measures during hospitalization. The control group received traditional nursing care, while the observation group used the SBAR combined with CICAR communication template for nurse patient communication. After completing all intervention measures, the patient's state anxiety level and satisfaction with nursing work were re evaluated, and the enhanced CT examination status, enhanced CT examination knowledge awareness, psychological status, and their impact relationship were compared between the two groups of patients.

Results • The heart rate, preparation time, examination time, anxiety score, depression score, and satisfaction of the observation group were better than those of the control group during examination, with statistical significance ($P < .05$); The scores related to the understanding of enhanced CT examination, preparation and precautions before the examination, proper posture during the examination, and post-examination precautions in the observation group were significantly higher than those in the control group ($P < .05$). The understanding of CT examination knowledge has a negative impact on the CT examination status and psychological state ($P < .05$), and the hydration effect of enhanced CT in patients ($P < .05$).

Conclusion • Nurse-patient communication using the SBAR and CICAR communication mode improved CT hydration effectiveness and nursing satisfaction in elderly patients with low education. This mode enhanced patient understanding, preparation, and adherence to CT examination protocols, leading to better outcomes and reduced anxiety and depression levels. (*Altern Ther Health Med.* 2023;29(8):440-446).

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INTRODUCTION

The use of iodine-containing contrast agents is increasingly widespread with the rapid development of imaging technology and vascular intervention diagnosis and treatment. This has led to increased attention towards contrast-induced nephropathy (CIN).[1] The risk factors for CIN are believed to include age, diabetes, underlying kidney disease, cardiac insufficiency, and education level.[2,3] The overall incidence of CIN in the general population undergoing percutaneous coronary intervention ranges from 1.5% to 13%, but can be as high as 50% in high-risk populations. CIN can prolong hospitalization time, increase medical expenses, and is associated with higher mortality rates during hospitalization and long-term adverse events.[4] Iodine-containing contrast agents are widely used in contrast-enhanced CT scans, particularly in elderly patients with specific medical needs. Low-educated elderly individuals are at a higher risk of developing CIN after exposure to contrast agents.[5] Low-educated elderly patients present a unique challenge in clinical practice due to their advanced age that affects their ability to maintain normal communication. As a result, clinical nursing personnel face difficulties in carrying out their daily nursing responsibilities.[6] It is essential for nursing staff to ensure that elderly patients with low education

receive high-quality nursing services during their illness in order to improve their job satisfaction and that of their relatives. This requires nursing staff to enhance patient acceptance, compliance with medical advice, and family satisfaction through alternative communication methods.[7] These methods aim to improve the quality of care for low-educated elderly patients and establish effective communication to enhance their treatment experience, increase their resilience, and alleviate their fear of nursing staff. SBAR is a common way of communicating and handling events based on evidence, starting from event development and processing procedures.[8] As a structured and standardized communication method,[9] SBAR communication mode is a standardized and evidence-based communication method that avoids omissions, is clear and concise, and is easy to express The advantage of easy to grasp is the standardized communication model proposed by the World Health Organization, which has been used in the US Navy's nuclear port vessels and aviation industry to ensure accurate information transmission in emergency situations.[10]

The CICARE communication model refers to the application of Connect, Introduce, Communicate, Ask, Response, Exit, and six initial steps to guide nurses in utilizing treatment and nursing time. Through step-by-step and interconnected six steps, nurses communicate with patients to accelerate the transformation of humanistic theoretical knowledge into practical applications.[11] Good nurse patient communication is the foundation and prerequisite for establishing a harmonious nurse patient relationship. Some studies have pointed out that 80% of nurse patient disputes in clinical practice are caused by poor communication. With continuous clinical research, it has been found that CICARE, as a process oriented communication method, guides nursing staff to communicate with patients in a step-by-step and interconnected manner through nursing and treatment time.[12] Compared to the conventional nurse patient communication model, the CICARE communication model steps and templates the communication content, making nurse patient communication appear standardized and orderly, unaffected by the professional skills, communication skills, and personality characteristics of nurses, and easy to remember, gradually forming good nurse patient communication habits.[13] The CICARE communication model starts from appropriately addressing the patient in the first step (Connect), to introducing oneself to the patient in the second step (Introduce), then gradually explaining the purpose of diagnosis, treatment, nursing procedures, or communication to the patient (Communication), then asking if the patient has any questions (Ask), providing answers (Response), and finally politely exiting the ward (Fxit) to end the communication. The entire process is patient centered, showcasing the nurses' high humanistic cultivation and laying a solid foundation for establishing a harmonious nurse patient relationship. The application of these two methods (SBAR and CICAR) can fully dispel patients' unfamiliarity with treatment,[14] actively and proactively cooperate with nursing staff to complete relevant nursing work, enhance patients' enthusiasm for treatment, and facilitate subsequent clinical work. In view of this, this article aims to explore the impact of SBAR combined with CICAR communication mode on enhancing CT hydration effect and nursing satisfaction in the care of elderly patients with low education. The following is an explanation.

In conclusion, this study aims to examine the efficacy of the combined SBAR and CICAR communication models in enhancing CT hydration and nursing satisfaction among elderly patients with low educational levels. By contrasting this communication mode's impact on the CT examination process between the observation and control groups, we aim to highlight potential improvements in CT examination efficiency, patient understanding, emotional well-being, and overall nursing satisfaction.

MATERIALS AND METHODS

General Information

We selected 120 elderly patients aged over 70 years who underwent enhanced CT scans in our hospital from December 2020 to April 2023 and had a lower education level than high school. 60 males and 60 females; Age range from 70 to 85 years, with an average age of (77 ± 6) years; Cardiac creatinine (Scr) (68 ± 26) μmol/L. There were 45 cases of diabetes (37.50%) and 198 cases of hypertension (36.36%). The lesion locations were 41 in the chest, 34 in the abdomen, 21 in the head, 17 in the neck, and 7 in the other areas. All patients with dialysis history, suspected thyroid disease, history of epilepsy, previous history of iodine allergy or allergic constitution, liver dysfunction, acute myocardial infarction within 24 hours before angiography, hypotension, cardiogenic shock, left ventricular ejection fraction ≤ 0.45, and poorly controlled hypertension and diabetes were excluded. All patients ' urinary routine test and renal function were within the normal range. The patients were randomly divided into an observation group of 60 cases and a control group of 60 cases. Randomization methods such as random sampling or random number tables should be used to ensure that each patient has an equal chance of being assigned to the observation or control group. Comparing the general demography data of the two groups of patients, the results showed that there was no statistically significant difference between the two groups in terms of age, education, blood pressure, blood sugar, etc. ($P > .05$), as shown in Table 1.

Table 1. General Information of Patients

Parameter	Observation group	Control group	*P* value
Age (years)	77±5	75±4	.553
Male/Female	36/24	31/29	.631
Body weight (kg)	70±20	67±15	.995
Education level (n,%)	20	29	.307
Illiterate or semi illiterate	17	9	
Primary school	10	8	
Junior high school	3	4	
Systolic blood pressure (mm Hg)	137±29	141±24	.307
Diastolic blood pressure (mm Hg)	78±20	82±16	.314
Blood glucose (mmol/L)	5±3	5±3	.521
Scr (μmol/L)	67±30	70±32	.239
Ccr (ml/min)	66±18	68±23	.468

Inclusion and exclusion criteria

The rationale for inclusion and exclusion criteria is to ensure the study's accuracy and reliability and protect the study subjects' safety and rights.

Inclusion criteria: 1. Patients aged 60 years and above; 2. Patients with low education level, i.e. education level of junior high school or below; 3. Patients requiring iodography enhanced CT scan; 4. The patient and his family have known and agreed to participate in the study.

Exclusion criteria: 1. Patients under 60 years of age; 2. Patients with high school education or above; 3. Patients with severe cardiac, liver and renal insufficiency; 4. Patients who have recently undergone other surgical or therapeutic interventions; 5. Patients with malignant tumors or severe immune system diseases; 6. Patients who withdrew from the study during the study.

Intervention methods

Control group. Implementing traditional nursing, patients receive health education, dietary guidance, daily care, medication care, and disease monitoring during hospitalization.

Observation group. On the basis of the control group, the examination method of CICARE combined with SBAR communication mode was adopted. The observation group implements the CICARE joint SBAR communication model. CICARE: a. Establish a communication and observation group: the group members are composed of nursing supervisors with strong communication skills and deep qualifications in the department, and carry out standardized training according to the CICARE standard. b. Skill training: Ensure that nursing staff can quickly and effectively carry out standardized communication in established scenarios, avoid ineffective communication, simulate adverse events, and improve their ability to handle nurse-patient disputes. c. Establish an assessment team: Based on the actual situation of communication mode, assess the daily work quality of nursing staff, and make timely corrections for those who fail the assessment to improve communication skills. d. Extension: CICARE: In the later follow-up work, nursing staff still need to implement the CICARE communication model to improve communication efficiency, reduce follow-up time, and improve nursing quality.

SBAR communication mode: a. Training: Before carrying out various tasks, the department needs to collect SBAR-related treatments, including clinical application effects at home and abroad, relevant knowledge, communication methods and concepts, etc. Through playing videos, business learning explanations, professional theoretical knowledge training for medical staff, and conducting situational teaching simulations, repeated training and summary are conducted to address the problems encountered in learning, General practitioners can only be officially applied in clinical practice after passing the assessment. b. Design communication content. By asking the parents of the child to understand the current symptoms, age, gender, name, and description of the patient's condition, grasp the patient's basic and medical record information: understand whether the child has any predisposing factors or causes of the disease, and whether there is a past history; Understand the vital signs, mental state, disease grading, and potential risks of the child; Start the follow-up treatment work with information, implement targeted treatment, communicate with the attending physician to facilitate the follow-up treatment work, post the disease grade card on the patient's bedside or bed for easy identification by the attending physician, and take it down until the patient's vital signs are stable, so as to provide help for clinical treatment.

Observation indicators

Knowledge awareness of CT examination. A self-made questionnaire was used, which included the significance of CT examination (5 items), preparation and precautions before examination (6 items), correct posture during examination (5 items), and precautions for patients (5 items) after examination (6 items). The internal consistency was 0.856. 1 point for correct answer, 0 point for incorrect or non answer.

Psychological state. Anxiety was evaluated using the Self Assessment Anxiety Scale (SAS), which consists of 20 items, with a 4-level threshold of 50 points for each item. A score of 50 or above indicates anxiety, and the higher the score, the more obvious the anxiety. The internal consistency was 0.931. Using the Depression Self Assessment Scale (SDS) to assess depressive status, the dividing line is 53 points, with a score of 53 or above indicating the presence of depression, and an internal consistency index of 0.784.

Nursing satisfaction. includes four dimensions: nurse patient communication, nursing services, nursing systems, and nursing environment. Cronbach's coefficient of the scale α It is 0.95, with good reliability and structural validity, and is widely used by Chinese researchers to measure inpatient satisfaction. This study evaluates patient satisfaction after completing all interventions on the day of discharge.

CIN diagnosis. The most commonly used definition for CIN is an increase in absolute value of Scr > 44.2 μmol/L or an increase in Scr > 25% of the baseline value within 48-72 hours after angiography, or a decrease in Ccr > 25% of the baseline value, excluding long-term peritoneal dialysis or hemodialysis patients and other factors that cause acute renal function damage (cholesterol embolism, thrombosis, ischemia, use of other nephrotoxic drugs).

Statistical analysis

Use Statistical Product and Service Solutions (SPSS) 19.0 software (IBM, Armonk, NY, USA) to process and analyze the data. Using descriptive statistical analysis methods, calculate the number of patients, mean, standard deviation, median, minimum, and maximum values for continuous variables; Calculate the frequency and percentage of categorical variable. For the difference between the observation group and each control group, the chi square or Fisher exact test will be used for the categorical variable; For continuous variables, independent sample *t* tests or non parametric methods are used for testing based on the data distribution type and

Table 2. Two sets of enhanced CT examination results

Group	n	Heart rate (time / min)	Preparation time (min)	Testing time (s)
Observation group	60	78.59 ± 6.38	3.98 ± 1.69	96.49 ± 15.49
Control group	60	85.96 ± 7.35	8.49 ± 3.68	169.49 ± 35.49
t		4.361	6.575	11.146
P value		.000	.000	.000

Table 3. Comparison of two groups of enhanced CT examination knowledge awareness (points)

Group	n	Inspection significance	Preparation and precautions before inspection	Correct posture during examination	Disease cognition	Precautions after inspection
Observation group	60	3.58 ± 1.15	3.64 ± 1.24	3.78±1.16	3.59±1.09	3.68±1.16
Control group	60	2.15 ± 0.52	2.16 ± 0.68	2.23±0.78	2.12±0.66	2.24±0.67
t		6.686	6.139	6.455	6.743	6.294
P value		.000	.000	.000	.000	.000

Table 4. Comparison of compliance between two groups after nursing care [n, (%)]

Group	n	Complete compliance	Partial compliance	Non-compliance	Total compliance rate
Observation group	60	29	23	8	52(86.67)
Control group	60	33	25	2	58(96.67)
χ^2					3.927
P value					<.05

Table 5. Comparison of psychological status scores between two groups (points)

Group	n	SAS score	SDS score
Observation group	60	45.68 ± 10.24	42.68 ± 10.68
Control group	60	58.68 ± 10.47	59.68 ± 10.27
t		5.083	6.552
P value		.000	.000

homogeneity of variance results. The measurement data conforming to normal distribution are described by means of mean ± standard deviation ($\bar{x} \pm s$), and the number of counting data cases and percentage (%) are expressed. $P < .05$ indicates a statistically significant difference.

RESULTS

Comparison of enhanced CT examination results between groups.Table 1 shows that parameters include age, gender distribution (male/female), body weight, education level, systolic and diastolic blood pressure, blood glucose, serum creatinine (Scr), and creatinine clearance rate (Ccr). The heart rate, preparation time, and examination time of the observation group were lower than those of the control group during the examination, with statistical significance ($P < .05$), as shown in Table 2 and Figure 1.

Comparison of enhanced CT examination knowledge awareness between two groups The significance of enhanced CT examination, preparation and precautions before examination, correct posture during examination, disease cognition, and postoperative precautions scores in the observation group were higher than those in the control group, with statistical significance ($P < .05$), as shown in Table 3 and Figure 2.

Comparison of compliance between two groups

The observation and control groups each had 60 patients. The observation group had a total compliance rate of 86.67%, with 29 patients showing complete compliance, 23 patients showing partial compliance, and 8 patients showing non-compliance. On the other hand, the control group had a total compliance rate of 96.67%, with 33 patients showing complete compliance, 25 patients showing partial compliance, and 2 patients showing non-compliance. The compliance rate of the observation group was higher than that of the control group, and the difference was statistically significant ($P < .05$), as shown in Table 4.

Figure 1. Two sets of enhanced CT examination results

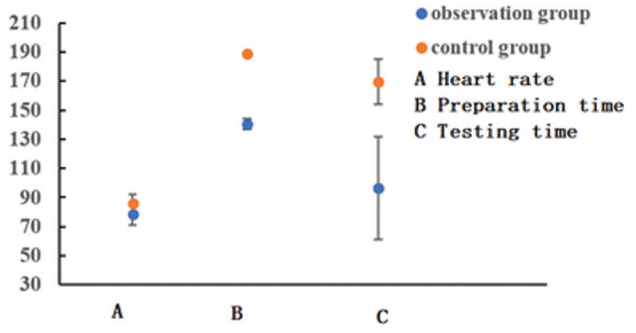


Figure 2. Comparison of two groups of enhanced CT examination knowledge awareness

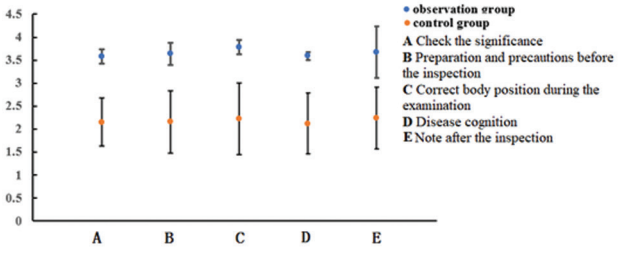
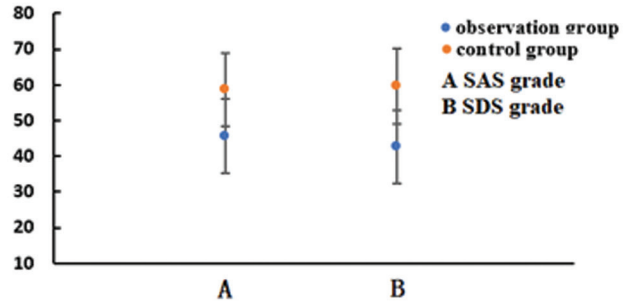


Figure 3. Comparison of psychological status scores between two groups



Comparison of psychological status scores between two groups

The observation group showed significantly lower scores in both anxiety (SAS score: 45.68 ± 10.24) and depression (SDS score: 42.68 ± 10.68) compared to the control group (SAS score: 58.68 ± 10.47, SDS score: 59.68 ± 10.27). The SAS and SDS scores of the observation group were lower than those of the control group, and the difference was statistically significant ($P < .05$), as shown in Table 5 and Figure 3.

Table 6. Comparison of satisfaction between two groups of patients (total score and dimensions of nursing services, communication, systems, and nursing environment)

Entry	Control group	Observation group	Mean difference	*t*	*P* value
Total score	129.24 ± 3.18	133.43 ± 3.36	-4.19	-6.37	<.001
Nursing service	31.40 ± 1.53	32.24 ± 1.45	-0.84	-2.82	.006
Nursing Patient Communication	48.30 ± 1.82	51.08 ± 1.58	-2.78	-8.11	<.001
Nursing system	31.84 ± 1.49	32.30 ± 1.42	-0.47	-1.60	.114
Nursing environment	31.84 ± 1.49	31.84 ± 1.49	-0.78	-	.78

Table 7. Comparison of Ccr before and after examination in two groups

Group	Before inspection	Day 1 after inspection	On the 3rd day after inspection	On the 7th day after inspection
Observation group	66 ± 18	66 ± 26	56 ± 23	63 ± 27
Control group	68 ± 23	62 ± 16	50 ± 21	55 ± 30
P	>.05	>.05	<.05	<.05

Figure 4. Comparison of satisfaction between two groups of patients

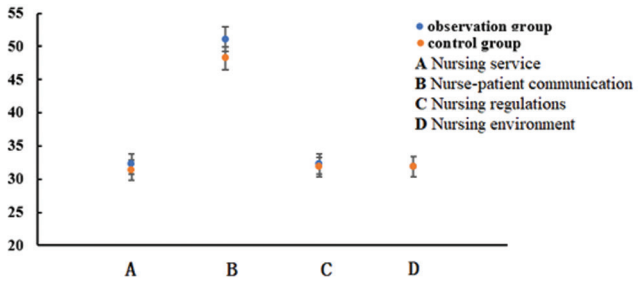


Table 8. The impact of CT examination knowledge awareness on CT examination status and psychological state

X	Relation	Y	Unstandardized Coefficients	SE	Z(CR)	*P* value	Standardized Coefficients
CT examination awareness	Influence	CT examination status	-2.528	0.867	-2.917	.004	-0.418
CT examination awareness	Influence	Psychological state	-3.711	1.641	-2.261	.024	-0.928
CT examination status	Influence	Enhanced CT hydration effect	0.016	0.01	1.675	.094	0.64
Psychological state	Influence	Enhanced CT hydration effect	0.022	0.016	1.385	.166	0.559
CT examination awareness	Measure	Inspection significance	1	-	-	-	0.779
CT examination awareness	Measure	Precautions after inspection	0.994	0.155	6.409	.000	0.748
CT examination awareness	Measure	Disease cognition	1.041	0.149	6.984	.000	0.802
CT examination awareness	Measure	Correct posture during examination	1.003	0.165	6.095	.000	0.717
CT examination awareness	Measure	Preparation and precautions before inspection	1.081	0.161	6.713	.000	0.777
CT examination status	Measure	Inspection time	7.626	1.055	7.231	.000	0.926
CT examination status	Measure	Preparation time	0.553	0.083	6.67	.000	0.849
CT examination status	Measure	Heart rate during examination	1	-	-	-	0.709
Enhanced CT hydration effect	Measure	Ccr	6.643	3.848	1.726	.084	0.994
Psychological state	Measure	SDS	1.471	0.747	1.969	.049	0.395
Psychological state	Measure	SAS	1				0.297

Patient Satisfaction

The results revealed a significant difference between the observation group and the control group in terms of total satisfaction score, nursing service, and nurse-patient communication dimensions, with the observation group scoring higher ($P < .05$). However, there was no statistically significant difference between the two groups in terms of nursing environment scores ($P > .05$) (Table 6, Figure 4).

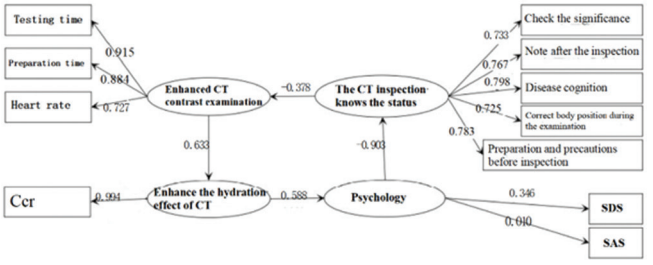
Enhanced CT hydration effect

In terms of the CT hydration effect, the control group showed a significant decrease in Ccr on the 3rd and 7th day after the examination compared to before the examination ($P < .05$). The observation group also exhibited a significant decrease in Ccr on the 3rd day after the examination ($P < .05$), but returned to the pre-examination level on the 7th day. There was no statistically significant difference in Ccr between the two groups before and on the first day after the examination ($P > .05$). On the third and seventh days after the examination, the Ccr of the observation group was significantly higher than that of the control group ($P < .05$)

Impact relationship

The structural equation model coefficients revealed that CT examination knowledge awareness had a negative impact on CT examination status and psychological state ($P < .05$). However, the impact of CT examination status and psychological state on the enhanced CT hydration effect was not statistically significant ($P > .05$) (Table 8, Figure 5).

Figure 5. The impact of CT examination knowledge awareness on CT examination status and psychological state



DISCUSSION

Enhanced CT examination is an essential radiological method in clinical diagnosis and treatment due to its fast scanning, non-invasive nature, and high resolution. However, the accuracy of CT examinations can be influenced by factors such as patient age and educational level. To ensure the accuracy of CT examinations, radiologists need to undergo skill training, improve communication with patients, guide patients in understanding the knowledge related to enhanced CT, and maintain the highest level of proficiency.[15]

The implementation of the SBAR combined with CICAR communication model requires regular training for medical staff to improve their professional skills, conduct examinations

and evaluations of imaging equipment, and avoid any errors or insufficient work ability that may affect CT examination results. This not only increases the workload for medical staff but also delays patient diagnosis and prolongs the duration of treatment. In severe cases, it can even jeopardize patient safety. Therefore, it is necessary to provide professional skill training, establish protective measures in the radiology department, and maintain proper handover records. Additionally, the implementation of SBAR and CICAR communication model standards should be followed. This involves strengthening communication with patients based on clinical experience, informing patients that no one will accompany them during the examination, enhancing health education in the radiology department, and improving patients' ability to manage their own conditions and trust in the examination process.[16]

There are two common types of communication in the SBAR and CICAR communication model: verbal and nonverbal communication. Verbal communication allows radiologists to use their professional knowledge and experience to inform patients about the correct examination methods, results, and effects, thereby enhancing patient compliance and treatment information. Nonverbal communication involves using appropriate actions and eye contact to make patients feel familiar and comfortable during the examination process, thereby improving patient compliance and efficiency. Patients should also be informed about the correct breathing mode during chest and abdomen CT examinations, as unstable respiratory rates can lead to blurred image data and artifacts, thus affecting the quality of clinical diagnosis.[17] In this study, the combination of the CICAR communication model and the SBAR resulted in lower heart rate, preparation time, and examination time during CT examinations in the observation group compared to the control group. This combined intervention method is patient-centered and effectively informs patients about various precautions for CT examinations, resulting in improved efficiency and quality. Moreover, the observation group demonstrated better understanding of CT examinations compared to the control group. This is because the intervention mode of SBAR combined with CICAR communication mode focuses on health education, correct guidance, and psychological assistance, which helps address patient concerns and facilitate diagnosis and treatment. The observation group also exhibited significantly better psychological states, with lower anxiety and depression scores compared to the control group. The SBAR combined with CICAR communication model alleviates psychological burdens for low-educated elderly patients, enhancing their disease cognition and understanding of CT examination methods, ultimately improving the quality and effectiveness of enhanced CT examinations.[18]

In this study, the Ccr index of the observation group was higher than that of the control group, which once again indicates that the SBAR combined with CICAR communication mode has a significant improvement in the hydration effect of enhanced CT examination patients, avoiding poor hydration effect caused by patient lack of cooperation. Related studies have also pointed out that during the process of chest CT examination, factors such as unstable heart rate can lead to a decrease in the quality of enhanced CT scans. Therefore, it is necessary to provide correct guidance and demonstration to patients, improve their psychological state, and enhance the quality of enhanced CT scans. From the structural equation model, it can be seen that enhancing CT examination knowledge awareness has a negative impact on enhancing CT examination and psychological state. This is because the higher the patient's CT examination knowledge awareness score, the higher the patient's cooperation, adherence to medical advice, and other aspects, the more negative emotions can be reduced, and the examination time and preparation time can be reduced.[19,20] In clinical practice, attention should be paid to the possibility that the patient's preparation time, examination time, etc. may be too short, which may lead to negative emotions or lack of cooperation for enhanced CT examination, resulting in low quality impact. Of course, as this study is a small sample, single center study, further evidence from large samples and multiple centers is needed.

This study has several limitations that should be acknowledged. Firstly, the study employed a relatively small sample size from a single center, which may limit the generalizability of the findings and introduce selection bias. Secondly, the study design lacked randomization in assigning patients to the observation and control groups, potentially introducing confounding factors that could affect the study's internal validity. Lastly, the study did not consider other potentially confounding factors, such as comorbidities, drug use, and lifestyle habits, which may have influenced the results but were not controlled for.

In conclusion, the SBAR combined with CICAR communication mode significantly improves the hydration effect of enhanced CT examinations in low-educated and elderly patients. It reduces examination time, stabilizes respiratory and heart rates, improves awareness of CT examination content, reduces negative emotions, and enhances the hydration effect of CT examinations.

CONFLICT OF INTEREST

The authors have no potential conflicts of interest to report relevant to this article.

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