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Technical Note

Effects of warm nursing based on cognitive-behaviour theory in treatment of children with respiratory tract infection

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Abstract: The respiratory tract infections (RTIs) are common diseases in pediatrics, and children are most susceptible to them. Herbal remedies such as Xiao'er Qing Qiao granules are common treatment option that can significantly improve symptoms in children. The effects of warm nursing based on cognitive-behaviour theory on the treatment of children with RTI using Xiao'er Qing Qiao granules for the efficacy of treatment and for soothing the emotions of their families were explored. A hundred and twenty children with RTI were comprehensively evaluated. They were divided into the observation group (warm nursing based on cognitive-behaviour theory) and control group (routine nursing) with 60 cases in each group. The nursing quality was evaluated based on patient compliance, length of hospital stay, recovery effect, nursing satisfaction, generalised anxiety disorder-7 (GAD-7) scale and Mishel uncertainty illness scale (MUIS). The observation group receiving cognitive-behavioural warm care was significantly better than the control group (P>0.05). The GAD-7 scores and MUIS scores in the two groups improved significantly compared to their length of admission in hospital, although improvement in the observation group was more significant (P<0.05). It is concluded that the treatment with warm nursing based on cognitive-behaviour theory is significantly advantageous and has high clinical nursing value.

Keywords: respiratory tract infections, cognitive behaviour theory, Xiao'er Qing Qiao granules

INTRODUCTION

The respiratory tract infections (RTIs) are common diseases in pediatrics,, and children are susceptible to them [1]. The etiology of RTIs can be viral (e.g. adenovirus, influenza A, influenza B

and respiratory syncytial virus) or bacterial (e.g. haemophilus influenza type b and streptococcus pneumonia) [2, 3]. Acute RTI is one of the leading causes of childhood mortality. Globally, lower RTIs cause 704,000 deaths, and more than 2 million children under five years of age die from pneumonia in the developing world [4]. Timely treatment after seeking medical attention yields better results. Herbal remedies such as Xiao'er Qing Qiao granules (formerly Xiao'er Jin Qiao granules) are common treatment option that can significantly improve symptoms in children [5-7]. Lu et al [8]. found that the Xiao'er Qing Qiao granules played its role in the treatment of children with acute RTI mainly by regulating phosphatidyl-inositol 3-kinase/serine-threonine kinase signalling pathway and mitogen-activated protein kinase signalling pathway [8]. However, Xiao'er Qing Qiao granules contain a large number of herbal ingredients (e.g. neochlorogenic acid, cryptochlorogenic acid and forsythiaside A) and have a slightly bitter taste [9, 10]. Additionally, young children have poor compliance, which poses some obstacles in the clinical treatment and corresponding nursing care associated with Xiao'er Qing Qiao granules. Furthermore, the lack of scientific and systematic understanding of the disease and healthcare among family members of affected children can lead to anxiety during the treatment process, requiring healthcare professionals to provide guidance and education [11, 12].

Therefore, it is necessary for the nursing staff to explore new nursing methods to enhance overall effectiveness in their recovery. Cognitive-behavioural theory is a novel psychological theory that integrates behavioural and cognitive theories. It advocates changing individuals' negative cognition by changing subjective content such as thinking and providing effective behavioural guidance [13, 14]. Warm nursing is an extension of routine nursing, adopting a more humane nursing model that focuses on the patient and provides more emotional support to achieve a humanised approach to nursing care [15]. In a clinical study patients with breast cancer on radiotherapy underwent nurse-led cognitive-behaviour therapy for 6 weeks. The results demonstrated that the life quality and fatigue level of the experimental group significantly improved more than that of the control group [16]. Zeng et al. [17] explored the impacts of humanised nursing on the life quality and the family satisfaction of patients with advanced lung cancer. Following the nursing care, the humanised group saw a much-reduced incidence of problems and an effective rate of pain alleviation than the control group. Furthermore, the humanised group's family satisfaction levels were greater than those of the control group. The current study aims to explore the clinical value of warm nursing based on cognitive-behavioural theory for children with RTIs and treated with Xiao'er Qing Qiao granules.

METHODS

Research Subjects

A comprehensive evaluation and analysis were conducted on 120 children with RTIs who received treatment at Lixin County People's Hospital from June 2022 to June 2023. The children were randomly assigned to an observation group (given warm nursing based on cognitive-behavioural theory) and a control group (given conventional nursing), with 60 cases in each group. In the control group there were 38 males and 22 females aged 3-12 years (average age of 8.05±2.64 years). In the observation group there were 36 males and 24 females aged 3-13 years (average age of 7.85±2.85 years). There were no significant differences observed in the baseline characteristics between the two groups ($P > 0.05$), indicating comparability between the two groups. The research

study was approved by the Ethics Committee of Lixin County People's Hospital (Approval No. LCH202112003).

Inclusion criteria: (1) Patients aged between 3-14 years, regardless of gender; (2) Patients diagnosed with RTIs; (3) Children without congenital diseases related to the respiratory or circulatory systems; (4) Family members who understood the specific content of this study and signed an informed consent form

Exclusion criteria: (1) Patients with concomitant lower RTIs or other infectious diseases; (2) Children with visual or hearing impairments; (3) Family members with mental illnesses, cognitive impairments or educational levels below secondary school.

Methodology

In the control group symptomatic supportive treatment was administered based on the children's symptoms, and individualised doses of Xiao'er Qing Qiao granules were given. Conventional nursing care was provided, including informing family members about the correct use of medications, closely monitoring and communicating with the attending physician about changes in the child's condition and treatment effectiveness. Healthcare professionals were orgamised to provide routine disease knowledge education to family members regarding RTIs and alleviating their anxiety. In nursing procedures emphasis was placed on comforting and interacting with the child, and careful guidance was provided to ensure the child's cooperation with the treatment.

In the observation group symptomatic supportive therapy was provided based on the children's symptoms, and individualised doses of Xiao'er Qing Qiao granules were given. The nursing model consisted of warm nursing based on cognitive-behavioural theory in addition to conventional nursing care. The specific implementation was as follows:

Formation of specialised nursing team

A senior nurse with rich nursing experience was selected as the team leader and three pediatric specialty nurses were selected as team members. The pediatric nursing supervisor provided specialised training in warm nursing based on cognitive-behavioural theory, including the study and practice of relevant knowledge and nursing methods for susceptible diseases in children. After training and assessment, the nursing measures were implemented in the clinical setting. Specific measures included:

①**Creating an enjoyable atmosphere in the pediatric ward:** Decorating the walls and bedside areas with animated posters and handcrafted reports, and providing children's toys and books in common areas. Family members were encouraged to bring toys the child likes and which were appropriate in size, to increase the child's familiarity with the new environment of the ward.

②**Conducting 'seasonal epidemic lectures' within the department**: These lectures lasted for one hour and were delivered by the attending physician, who shared information with family members about the epidemiological characteristics, etiology, treatment and prognosis of prevalent diseases in children during the season. The nursing team leader provided information on children's diet, medication, temperature reduction and daily care, while specialty nurses demonstrated these practices. The lectures incorporated informative videos and live nursing demonstrations, and included a 30-minute interactive question and answer session, allowing family members to participate, ask questions and receive professional answers in a timely manner.

③**Creating electronic health education manuals**: After the lectures, staff members could create electronic versions of health education handbooks, which could be distributed through platforms

such as WeChat's official account, allowing family members to review and learn from them and share with others.

④**Using software such as PowerPoint to create animated slideshows:** The slides presented a complete day of correct and healthy habits including morning routines, breakfast, entertainment, lunch, nap time, healthy activities, dinner and bedtime. Interactive sessions and simulated scenarios with the slides were conducted together with the children.

⑤Nursing staff interacted with the children to establish a good rapport and create a foundation for subsequent treatment and care. For example, nursing staff simulated the diagnosis and treatment process of RTIs through games, praised the children and provided small rewards. This aimed to reduce fear and unfamiliarity with the new environment and treatment and enhance the children's compliance.

Observation indicators

Compliance of the children: Compliance includes medication, adherence to nursing procedures, dietary adherence and healthy lifestyle habits. Medication adherence is measured by the average time of daily medication intake. Adherence to nursing procedures is assessed based on the nurse's evaluation scores for nursing procedures. Dietary adherence is measured by average duration of crying during mealtimes. Adherence to healthy lifestyle habits is measured by the child's participation in activities. Shorter medication and meal times, higher evaluation scores for nursing procedures, and longer participation in healthy lifestyle habits indicate better compliance.

Treatment effectiveness of children: Treatment effectiveness includes fever resolution time, cough resolution time, runny nose resolution time and length of hospital stay.

Psychological anxiety and disease awareness of family members: Psychological anxiety levels of family members were assessed using the generalised anxiety disorder-7 (GAD-7) scale [18], which includes seven items with scores ranging from 0 to 3 and a total score range of 0-21. Higher scores indicate higher levels of anxiety. Disease awareness of family members was assessed using Mishel uncertainty illness scale (MUIS) [19], which includes 32 items with scores ranging from 1 to 5 and a total score range of 32-160. Higher scores indicate lower levels of disease awareness.

Satisfaction with nursing care: A self-designed questionnaire on inpatient nursing satisfaction, with a total score of 100, was used to measure satisfaction. Scores below 60 indicate dissatisfaction, scores between 60-80 indicate moderate satisfaction, and scores above 80 indicate high satisfaction. Nursing satisfaction rate was calculated as [(number of very satisfied + number of satisfied)/total number of respondents] × 100%.

Statistical analysis

The data were analysed using the statistical software SPSS 22.0. The count units were expressed as number and percentage (n, %). For continuous variables, the mean ± standard deviation was used to represent the data. If they followed a normal distribution, the independent samples t-test was used for comparison. If they did not follow a normal distribution, the MannWhitney U test was used. A significance level of $P<0.05$ was considered statistically significant.

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RESULTS

Compliance

In terms of compliance, the observation group of children receiving warm nursing based on cognitive-behavioural theory showed better medication adherence, adherence to nursing procedures, dietary adherence, and adherence to healthy lifestyle habits compared to the control group receiving conventional nursing (P<0.05) (Table 1).

Table 1. Children's compliance status（$\bar{x}$±s, point）

Group	Time of taking medicine (min.)	Nursing procedure score (points)	Participation in healthy lifestyle habits (min.)
Observation (n=60)	8.13±4.17	84.55±8.34	40.87±12.65
Control (n=60)	12.37±6.46	72.64±7.28	27.51±11.46
t	6.12	10.04	8.67
P	<0.001	<0.001	<0.001

Treatment Effectiveness

The children in the observation group had shorter fever, shorter cough resolution time, and shorter length of hospital stay compared to the control group (P<0.05). There was no significant difference between the two groups in terms of runny nose resolution time (Table 2).

Table 2. Treatment effectiveness of pediatric patients（$\bar{x}$±s, point）

Group	Antipyretic time (day.)	Time for disappearance of runny nose (day.)	Cough disappearance time (day.)	Hospital stay (day.)
Observation (n=60)	2.13±0.52	3.73±1.22	4.66±1.34	6.34±2.68
Control (n=60)	2.93±0.82	3.91±1.38	5.54±1.71	7.54±2.27
t	1.98	1.29	2.37	2.82
P	0.037	0.199	0.020	0.014

Psychological Anxiety and Disease Awareness of Family Members and Nursing Satisfaction

At admission there was no significant difference in the GAD-7 and MUIS scores of the families of children in both groups. After nursing intervention, there was a significant improvement in the families of both groups, with a more significant improvement observed in the families of children in the observation group receiving warm nursing compared to those in the control group (Table 3). The nursing satisfaction rate was higher in the observation group compared to the control group (Table 4).

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Table 3. Family members' scores of psychological anxiety and illness awareness（$\bar{x}$ ±s point）

	GAD-7 score		MUIS score	
Group	before	after	before	after
Observation (n=60)	14.65±3.43	7.61±1.55	92.66±18.97	43.52±6.57
Control (n=60)	13.84±2.81	10.84±2.02	88.89±16.54	66.26±5.39
t	0.39	7.52	1.15	12.69
P	0.699	< 0.001	0.252	< 0.001

Table 4. Nursing satisfaction

Group	Very satisfied n (value)	Good n (value)	Unsatisfied n (value)	Nursing satisfaction (%)
Observation (n=60)	45 (75.00)	12 (20.00)	3 (5.00)	95.00
Control (n=60)	36 (60.00)	14 (22.33)	10 (16.67)	82.33
χ^2	-			4.227
P	-			0.040

DISCUSSION

Due to an immature immune system, children are susceptible to respiratory system diseases, and RTIs are said to be the most common among them. Research shows that children under 5 years old have the highest prevalence rate for RTIs, and children under 14 years old are considered a vulnerable population [20]. During the course of RTI, children may experience a decline in their diet quality, leading to a decrease in nutritional status and varying degrees of impairment of lung function. Therefore, timely diagnosis and treatment is crucial [21]. Currently, symptomatic supportive treatment is the conventional approach, and Xiao'er Qing Qiao granules have shown excellent efficacy. However, due to their nature, some children may have aversion to taking them, which creates certain obstacles to their diagnosis and treatment. Insufficient understanding of the disease and prolonged treatment process can also cause varying degrees of anxiety among parents. Under these circumstances, traditional nursing approaches have limited effectiveness, necessitating the adoption of new nursing methods.

Cognitive-behavioural theory is a fundamental theory that has received significant attention in the development of nursing approaches. It not only emphasises improving disease awareness but also focuses on providing corresponding behavioural guidance, which can significantly enhance nursing effectiveness [22]. The results of this study demonstrate the significant effectiveness of implementing warm nursing measures based on cognitive-behavioural theory. First, in terms of compliance and treatment effectiveness, the nursing approach employed in the observation group led to significantly better adherence to medication, nursing procedures, dietary guidelines, and healthy lifestyle habits compared to the control group. This can be attributed to the following reasons: 1) The transformation of the pediatric ward into a child-friendly environment allows children to alleviate fear and unfamiliarity, quickly familiarises them with the ward, and feels more

comfortable; 2) Healthcare professionals establish emotional connections with children through simulated games, which helps alleviate fear and unfamiliarity to some extent. This contributes to better compliance with medication, nursing procedures, dietary guidelines and healthy lifestyle habits. Improved compliance significantly enhances treatment effectiveness, as evidenced by a shorter fever and cough resolution time and a shorter length of hospital stay in the observation group, in which warm nursing as per cognitive-behavioural theory is implemented. Increased compliance allows for a more tangible response to treatment effectiveness. Additionally, the 'seasonal epidemic lecture' activities improve the dietary and activity habits of parents, which in turn positively affects the treatment outcomes of the children. These findings align with previous research conducted by Shengnan et al. [23],

This study also demonstrates significant changes in GAD-7 and MUIS scores of parents in both groups after admission, with the observation group showing significantly higher changes than the control group. This indicates that after admission, with the dissemination of disease knowledge, parents' understanding of the disease significantly improves, which leads to a significant reduction in anxiety among the children's family members. The seasonal epidemic lecture activities and the distribution of articles through public account, along with on-site Q&A sessions to address parents' concerns, eliminate their doubts about the disease and provide them with a more tangible experience. Once parents have a clear understanding of the epidemiological characteristics, etiology, treatment and prognosis of the disease, they are aware, appreciative and cooperative with the healthcare professionals. As a result, the treatment outcomes of the children improve and this feedback reduces parental anxiety. Ultimately, this is reflected in the nursing satisfaction at discharge, with the observation group exhibiting a high level of satisfaction, which serves as a solid affirmation of the effectiveness of warm nursing based on cognitive-behavioural theory.

CONCLUSIONS

Interventions of warm nursing based on cognitive-behavioural theory have shown significant improvements in compliance and treatment outcomes for children with RTIs. This approach holds great clinical value as it enhances disease awareness among family members through multidimensional measures and effectively alleviates their psychological anxiety. Therefore, the application of this nursing approach is worthy of promotion and implementation in clinical practice.

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