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Original Article

Discharge planning for children with ventricular septal defect and pulmonary arterial hypertension in China

Xiaoxiao Wu ^a, Qingyin Li ^a, Jingli Chen ^{b,*}^a Nursing department, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Xicheng District, Beijing 100037, China^b School of Nursing, Peking Union Medical College, Shijingshan District, Beijing 100144, China

ARTICLE INFO

Article history:

Received 23 August 2014

Received in revised form

27 April 2015

Accepted 29 April 2015

Available online 13 May 2015

Keywords:

Discharge planning

Pulmonary arterial hypertension

Ventricular septal defect

ABSTRACT

Objective: To evaluate the effectiveness of discharge planning on maternal caring knowledge, maternal caring behavior, maternal discharge readiness and the rehospitalization of children with ventricular septal defect and pulmonary arterial hypertension (VSD-PAH).

Background: Children with congenital heart disease (CHD) with pulmonary arterial hypertension (PAH) have more complications after surgery than those without PAH. Discharge planning is an effective strategy to help children leave the hospital safely, and receive appropriate care after discharge.

Methods: A quasi-experimental design was used. Sixty children and their mothers were recruited and divided into two groups: the control group received conventional care, the intervention group received both conventional care and additional discharge planning care.

Results: (1) After admission, maternal caring knowledge between the two groups was similar. (2) At discharge, maternal discharge readiness, maternal caring knowledge and maternal caring behavior in the intervention group was significantly higher compared to the control group ($t = 3.35, p = 0.001$; $F = 84.74, p < 0.001$; $F = 23.82, p < 0.001$). This difference persisted after discharge, and was evident at one month and three months after discharge. (3) However, no significant difference in the readmission rate of children after discharge was evident between the two groups.

Conclusions: Discharge planning improves the maternal discharge readiness, maternal caring knowledge and maternal caring behaviors. However, this planning did not reduce the readmission rate of children with CHD-PAH.

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* Corresponding author.

E-mail address: jingli204@sina.com (J. Chen).

Peer review under responsibility of Chinese Nursing Association.

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1. Introduction

In China, about 15,000 babies are born with congenital heart disease every year [1]. Significant advances in the field of pediatric cardiology and cardiac surgery, together with improvements in other advanced technologies, such as extracorporeal membrane oxygenation (ECMO) and heart transplantation, have resulted in a growing population of children living with congenital heart disease (CHD) [2]. However, CHD with pulmonary arterial hypertension (PAH) is still a challenge for medical professionals. PAH is a serious progressive condition with a poor prognosis if it is not identified and treated early [3].

PAH is a common complication of CHD, and most often occurs in patients with a ventricular septal defect (VSD) [4]. Cardiac surgical patients presenting with pre-existing PAH are at a higher risk for postoperative complications than those without PAH [5]. Additionally, the mortality rate of children with both VSD and PAH is 2.6 times higher than those without PAH. It is important to note that the morbidity rate of children with PAH is much higher in China than western countries, perhaps due to imperfect medical conditions, in which many children are not diagnosed until they have obvious symptoms [6].

CHD presents medical management challenges throughout the lifespan of the patient [7]. Recently, the transition from hospital care to home care has added a huge burden for the families caring for their children [8], and the child's rehabilitation can be affected by the caregiver's skillset [9]. In China, nurses and doctors rarely keep track of the children after they are discharged and rarely offer interventions for mothers caring for these children at home [10]. Discharge education is typically provided on the day of discharge. However, asking parents to absorb and comprehend all of the information about how to care for their children in this brief interval can be challenging [11]. Discharge planning, as an extension of the nursing service, can help to deliver patient-centered care to patients' homes [12]. Many studies about discharge planning in pediatric nursing have shown that it can improve maternal confidence and maternal caring knowledge before discharge, reduce the readmission rate of the children, and promote a mother's caring competency [13–16].

For this study, we hypothesized that the discharge preparation, maternal caring knowledge and maternal caring behavior of mothers in the intervention group will be higher than that in the control group. This increased preparedness will then be reflected with a decreased rate of readmission in the intervention group. The results of our study confirmed the first part of this hypothesis.

2. Methods

2.1. Ethical considerations

This study has been carried out in accordance with *The Code of Ethics of the World Medical Association*. Formal written consent

was obtained from each participant before data collection. Participants could quit the study at any time.

2.2. Study population

This study was conducted in a first-class hospital specialized to treat cardiovascular disease in China, using a quasi-experimental design. The sample size was calculated using a pairwise t-test based on Yang's study. Additional patients were included to account for attrition. We recruited 60 children with VSD with PAH and their mothers, with 30 mother–child pairs in the control and 30 in the intervention group. In order to avoid cross contamination, participants in the intervention group were enrolled from June to August, 2013, and the participants in the control group were recruited from September to November, 2013.

The inclusion criteria for children were: 1) medical diagnosed of VSD with PAH; 2) without other congenital defects; 3) 0–6 years of age; and 4) neither of the parents were healthcare professionals. The inclusion criteria for mothers were: 1) primary caregiver of the children; 2) capable of communicating in Chinese; and 3) without any cognitive disability.

2.3. Intervention

Mothers in the control group received the discharge service currently offered as the standard of care. This discharge service included education from the charge nurse on the day of discharge regarding how to take any prescribed medication after they return home.

The discharge planning service for the mothers in the intervention group included two phases: (1) in the hospital: six one-on-one lessons in the afternoon with the aid of an education booklet, starting on the day of admission, and daily over the course of the time they were in the hospital; (2) after discharge: follow up was provided by researchers via telephone calls at one week, one month, two months, and three months after discharge. During these phone calls, researchers provided additional counseling and advice.

During the first phase in the hospital, every training session of every mother was recorded, and we ensured that all content of the trainings were mastered by the mothers. If a mother did not have time one afternoon, the class was delayed until the next afternoon. The educational contents covered six parts: (1) The structure of a normal heart, the abnormal structure of their child's heart and how the doctors are going to treat the child, 30 min. (2) Tips for physical activity, which include activity intensity, patterns of activity and how to choose an activity place for children after discharge, 30 min. (3) How to feed the child after surgery, how to choose appropriate food for the child, and how to adjust the intake volume when the child has a fever, 40 min. (4) How to bath the child after surgery, how to prevent infection, how to use the pigeon breast therapeutic apparatus (an instrument to prevent pigeon breast deformity after open heart surgery for children) and scar tissue, 40 min. (5) The effects and side effects of the drugs, and how to take them, 40 min. (6) What to do when the child has a fever or diarrhea, and when to see the doctor, 30 min. After each class, a researcher asked questions to evaluate the educating effect. Mothers who answered 90%

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