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Clinical Research on the Combination of Unaccompanied and Family-Based Care Models for Premature Infants

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Abstract: **Objective**: To explore the application effect of the combination of unaccompanied care and family-based care in preterm infants and to provide clinical evidence for optimizing the care program for preterm infants. **Methods**: A total of 120 preterm infants admitted to the neonatal Intensive Care Unit (NICU) of our hospital from January 2021 to January 2024 were selected as the research subjects and randomly divided into the observation group and the control group, with 60 cases in each group using the random number table method. The observation group adopted a combined model of "unaccompanied basic care + staged family participation". The control group adopted the traditional simple unaccompanied care model. The length of hospital stay, rate of weight gain, incidence of complications (necrotizing enterocolitis, bronchopulmonary dysplasia, etc.), success rate of breastfeeding, score of parental care ability and score of parent-child attachment relationship of the two groups of children were retrospectively analyzed and compared, and growth and development after discharge were evaluated in combination with 3-year follow-up data. Statistical analysis was performed using SPSS 22.0 software, and measurement data were expressed as (x youdaoplaceholder3 ±s) for t-test; Count data were expressed as [n (%)] and analyzed by x-test^2. A P value <0.05 was considered statistically significant. **Results**: The average length of hospital stay in the observation group was (29.8±5.6) days, significantly shorter than that in the control group [(36.5±6.2) days] (t=6.324, P<0.001); The rate of weekly weight gain in the observation group was (19.5±3.1) g/d, significantly higher than that in the control group, which was (14.2±2.8) g/d (t=9.751, P<0.001). The total complication rate in the observation group was 11.6% (7/60), significantly lower than 28.3% (17/60) in the control group (X^2=5.792, P=0.016); The success rate of breastfeeding in the observation group was 81.6% (49/60), significantly higher than 56.7% (34/60) in the control group (X^2=9.072, P=0.003). The scores of parental care ability (85.6±6.3) and parent-child attachment relationship (88.4±5.7) in the observation group were significantly higher than those in the control group (62.3±7.5) and (65.2±6.8) (t values were 18.963 and 20.154, respectively; P <0.001). The 3-year follow-up showed that 91.6% (55/60) of preterm infants in the observation group had growth and development indicators within the normal range of children of the same age, significantly higher than 73.3% (44/60) in the control group (X^2=7.023, P=0.008). **Conclusion**: The combination of unaccompanied and family-based care model can not only ensure the safety of acute phase treatment for preterm infants, but also promote their growth and development and the improvement of family care ability through family participation, and at the same time strengthen the emotional bond between parents and children, and is suitable for the whole-course care of preterm infants.

Keywords: Premature babies, Unaccompanied care, Family-based care, Combined patterns, Clinical effects, Parent-child affection.

INTRODUCTION

Preterm infants, due to their underdeveloped organs, are vulnerable to external environmental influences and require strict aseptic isolation and professional care during the acute phase. The traditional unaccompanied model can reduce the risk of infection, but the long-term lack of family participation may affect parent-child bonds and the continuity of care after discharge [1]. Although family-based care promotes parent-child interaction, it may increase medical risks during the period when the condition of premature infants is unstable [2]. Based on this, this study attempts to combine the two models, using unaccompanied care to ensure treatment safety during the acute phase, introducing family-based participation after the condition stabilizes, and evaluating their effects in improving prognosis, enhancing parental ability, and strengthening parent-child affection through three years of clinical practice, providing a new approach for premature infant care.

DATA AND METHODS

General Information

A total of 120 preterm infants admitted to the NICU of our hospital from January 2021 to January 2024 were selected as the research subjects and randomly divided into the observation group and the control group by random number table method, with 60 cases in each group. Inclusion **criteria: (**1) Gestational age 28 to 34 weeks; (2) Birth weight ≤2500g; (3) Parents have basic communication skills and are willing to participate in the study. Exclusion **criteria: (**1) coexisting with severe congenital malformations or genetic metabolic disorders; (2) Parents are unable to cooperate with nursing training due to mental illness, etc. (3) Transfer or abandonment of treatment during hospitalization of the child.

There were 37 boys and 23 girls in the observation group; Average gestational age (30.3±1.4) weeks; Average birth weight (1760±310) g; Among them, 28 were very low birth weight infants (<1500g) and 5 were extremely low birth weight infants (<1000g). There were 35 males and 25 females in the control group; Average gestational age (30.5±1.2) weeks; Average birth weight (1780±300) g; Among them, 26 were very low birth weight infants and 4 were extremely low birth weight infants. There was no statistically significant difference in general information such as gender, gestational age and birth weight between the two groups of children (P>0.05), and they were comparable.

Nursing Methods

The observation group adopted a combined model of "unaccompanied basic care + staged family engagement", which was divided into three stages:

1. During the **acute phase** (from admission to stable vital signs, about 1-2 weeks), unaccompanied care was implemented: all treatment and care (such as respiratory support, intravenous nutrition, incubator management, etc.) were completed by medical staff, and parental visits were restricted (once a day, 15 minutes each time, only observation without contact); Provide daily feedback on the condition to parents via video or in writing, and share the daily performance of the child (such as sleep and feeding) to alleviate separation anxiety.

2. During the stable **period** (from stable vital signs to a weight of 1800g, about 2-3 weeks), family-based participation is introduced. Parents, after training (preterm care skills, aseptic operation, parent-child interaction skills, etc.) and passing the assessment, participate in basic care (such as touch, diaper change, breastfeeding assistance, etc.) under the guidance of medical staff, gradually increase the daily participation time from 30 minutes to 2 hours; Kangaroo care is carried out once daily for 30 to 60 minutes. Parents are encouraged to communicate softly and make eye contact with the child, and monitor changes in the child's heart rate and blood oxygen. Distribute parent-child interaction manuals and guide parents to build emotional connections through nursery rhymes or gentle caresses.
3. **Recovery period** (weight ≥1800g to discharge) : Strengthen family-based care, with parents leading daily care (feeding, skin care, oral hygiene, etc.), and medical staff supervising and guiding throughout the process; Set up "parent-child interaction time" for 1 hour daily, and encourage parents to engage in individualized interaction (such as storytelling, playing home environment sounds, etc.); Work together to develop a discharge plan, including family environment preparation, emergency response procedures and continuing parent-child interaction programs, and conduct pre-discharge simulated care training.

Control Group

The traditional simple unaccompanied care model was adopted: all treatment and care procedures were carried out by medical staff during hospitalization, and parents only visited once a day after the condition stabilized (15 minutes each time, not participating in the care procedures); Routine care guidance is given before discharge, without staged training or parent-child interaction guidance. The two groups of children were followed up for 3 years after discharge. The growth and development of the children were evaluated regularly through outpatient visits, phone calls or home visits, and continuous guidance was provided.

Observation Indicators

1. Indicators during hospitalization: length of hospital stay, weekly rate of weight gain, incidence of complications (necrotizing enterocolitis, bronchopulmonary dysplasia, nosocomial infection), success rate of breastfeeding;
2. Parental ability assessment: A self-made scale (Cronbach's α=0.88) was used to assess parental care skills at discharge (such as feeding, temperature monitoring, etc.), out of 100 points, with a higher score indicating a closer parent-child bond;
3. 3-year follow-up indicators: Rate of attainment of height, weight, neurodevelopmental score (using the Denver II scale), and parental satisfaction with the care model (out of 100).

Statistical Methods

SPSS 22.0 software was used for analysis. Measurement data were expressed as (x youdaoplaceholder3 ±s), and chi-square test was used for comparison between groups. Count data were expressed as [n (%)]. $P < 0.05$ was considered statistically significant.

RESULTS

Indicators During Hospitalization in Both Groups of Children

The average length of hospital stay in the observation group was significantly shorter than that in the control group, and the weekly weight gain rate was significantly higher than that in the control group. The differences were statistically significant (P<0.001). The total incidence of complications in the observation group was significantly lower than that in the control group, and the success rate of breastfeeding was significantly higher than that in the control group, and the differences were statistically significant (P<0.05). See Table 1 for details.

Table 1: Comparison of indicators between the two groups of children during hospitalization

Indicators	Observation group (n=60)	Control group (n=60)	Statistics	P value
Average length of hospital stay (d, x youdaoplaceholder3 ±s)	29.8±5.6	36.5±6.2	T = 6.324	< 0.001
Weekly rate of weight gain (g/d, x±s)	19.5±3.1	14.2±2.8	T = 9.751	< 0.001
Incidence rate [n (%)]	7 (11.6)	17 (28.3)	X^2 = 5.751	0.016
Success rate [n (%)]	49 (82.0)	34 (56.7)	X^2 = 9.072	0.003

Comparison of Parental Care Ability, Parent-Child Attachment Relationship and Follow-Up Results Between the Two Groups

The scores of parents' nursing ability and parent-child attachment relationship in the observation group were significantly higher than those in the control group. The rate of reaching the standard of growth and development indicators and parents' satisfaction in the 3-year follow-up of children in the observation group were also significantly higher than those in the control group. The differences were statistically significant (P<0.01). See Table 2 for details.

Table 2: Comparison of Parental care ability, parent-child attachment relationship and follow-up results between the two groups

Indicators	Observation group (n=60)	Control group (n=60)	Statistics	P value
Parental care ability score (points, x youdaoplaceholder3 ±s)	85.6±6.3	62.3±7.5	T = 18.963	< 0.001
Parent-child attachment relationship score (score, x youdaoplaceholder3 ±s)	88.4±5.7	65.2±6.8	T = 20.154	< 0.001
Compliance rate of growth and development indicators [n (%)]	55 (91.6)	44 (73.3)	X^2 = 7.023	0.008
Parental satisfaction (points, x youdaoplaceholder3 ±s)	92.5±4.8	78.3±6.2	T = 13.682	< 0.001

DISCUSSION

Care for preterm infants requires a balance between "medical safety" and "developmental support", and the early establishment of the parent-child emotional bond is an important part of developmental support. This study set up a control group for comparative analysis to more intuitively verify the dual advantages of the combination of the two models in improving prognosis and enhancing parent-child affection.

Advantages of Unaccompanied Care During the Acute Phase

At this stage, the condition of premature infants is critical, and the unaccompanied mode can reduce the risk of infection caused by the movement of people and ensure the precise implementation of treatments such as respiratory support and intravenous nutrition [3]. The incidence rate in the observation group was 11.6%, significantly lower than 28.3% in the control group, confirming the necessity of isolation care during the acute phase, and the combined mode did not increase the risk of infection due to subsequent family participation, ensuring safety.

Value of Family Involvement During the Stable Period

As the condition improves, parental involvement in care can promote neurodevelopment, reduce stress response and improve nutrient absorption in preterm infants through skin contact, voice soothing, etc. [5]. The scores of parent-child attachment in the observation group were significantly higher than those in the control group, the rate of weekly weight gain was significantly higher than that in the control group, and the length of hospital stay was significantly shortened, which was a manifestation of this mechanism; At the same time, the staged training enabled parents to gradually acquire skills, and the score of nursing ability at discharge was significantly higher than that of the control group, laying a solid foundation for family care and directly increasing the success rate of breastfeeding.

Significance of Long-term Follow-up

The 3-year follow-up showed that the growth and development compliance rate of children in the observation group was significantly higher than that of the control group, indicating that the combined model not only facilitates recovery during hospitalization but also ensures continuous care after discharge by enhancing family care capabilities. It should be noted that the hospitalization time of very low birth weight infants in both groups was longer than that of non-very low birth weight infants, suggesting that for such children, the family participation cycle should be extended to ensure that parents fully adapt to the care process.

The innovation of this study lies in dynamically adjusting the care model based on the condition of preterm infants and enhancing the persuasiveness of the results through a randomized controlled design; However, there are still limitations of small sample size and single-center study, which can be further verified by expanding the sample size and conducting multi-center studies in the future.

CONCLUSION

The combination of unaccompanied and family-based care for preterm infants is more effective in shortening hospital stays, promoting weight gain, reducing the incidence of complications, improving the success rate of breastfeeding and the ability of parents to care, and long-term follow-up shows better growth and development effects of the children. It is worthy of clinical promotion and application.

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