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Effectiveness of The Application of Rehabilitation and Home Nursing Rehabilitation Among Children With Cerebral Palsy: A Comparative Analysis

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Abstract: Objective:To evaluate the effects of Tele-rehabilitation nursing on patients with Cerebral Palsy. Methods:Database such as Cochrane Library,PubMed,Web of Science,CNKI, and Wanfang were searched to retrieve effects on Tele-rehabilitation for Cerebral Palsy.Then carried out comparative study between Tele-rehabilitation nursing and home nursing children with cerebal palsy on three areas, Activities of Daily Living,Fine Motor Movement and Gross Motor Movement. 30 subjects were divided in to controlled group and observed group-the subjects in controlled group received the Tele-rehablitation nursing, and the observed group received routine home nursing .Results: after analyzing the data, the results of the comparative research,supported the effectiveness of telerehabilitation on improving the function of Activities of Daily Living,Fine Motor Movement and Gross Moto Movement ($P<0.05$) .It failed to support the effectiveness of improvement of Lying Position and Turning-Over, reflex, body structure and function, and activity, etc($P>0.05$).

Keywords: Tele-rehabilitation; ADL,Fine Motor Movement Gross Motor Movement.

Introduction

Cerebral Palsy Cerebral palsy (CP) is a group of persistent central motor and postural development disorder and activity restriction syndrome. This syndrome is caused by non progressive brain injury of developing fetus or infants. The investigation shows that the clinical manifestations are mainly motor disorder and postural abnormality, which are often combined with health problems such as epilepsy, convulsion, intellectual disorder, speech disorder and emotional disorder. Research on 12 provinces in China shows that the incidence rate of cerebral palsy is 2.48 per thousand in China, and 4 million ~500 million children with cerebral palsy. At present, there is no complete cure for cerebral palsy. Only long-term rehabilitation treatment and nursing can reduce the degree of limb deformity and improve the quality of life of children with cerebral palsy [1]. We should follow the ICF-CY framework, multi-disciplinary and multi-level explore the rehabilitation evaluation methods of cerebral palsy, accurately understand the physical function of children, and effectively guide clinical rehabilitation However, in the form of normalization of epidemic prevention and control, some parents of children with cerebral palsy have a certain fear of inpatient rehabilitation nursing. This psychology will lead some parents of children to give up inpatient rehabilitation care, which will affect the effect of children's rehabilitation. These disabled children need scientific and effective long-term rehabilitation, which requires the support of Tele-rehabilitation nursing technology to improve and improve children's functions as much as possible [2]

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Literature Review

Different from the general clinical specialty, the rehabilitation nursing of children with cerebral palsy has strong remote realization value with the support of modern communication technology. Home nursing in foreign countries developed earlier, and the content of home nursing and health care in Europe has been included in the government health care system. Family rehabilitation in the United States and Britain emphasizes treating the family as a unit and requires a family health care model combining hospital and family [3]. Virtual reality (VR) is used in children's family rehabilitation treatment. The research results show that children can obtain better rehabilitation effect. The immersive experience, diversified and personalized phased controllable rehabilitation game training provided by VR can increase the enthusiasm of patients' rehabilitation training and avoid the fatigue caused by the repetition and dryness of traditional rehabilitation training [4].

Cerebral palsy is a disease worthy of attention, because cerebral palsy in addition to backward motor development and abnormal posture [5]. In addition to the main clinical manifestations, it is often accompanied by intellectual impairment, abnormal vision, hearing loss, language impairment, epilepsy and abnormal cognitive behavior [6]. The above symptoms seriously affect the daily life activities and social communication ability of children with cerebral palsy, further affect their quality of life, prevent them from entering the mainstream society, and cause a great burden on the family and society [7]. If a child with cerebral palsy wants to enter the mainstream society and enjoy fair treatment in school, in addition to being able to carry out daily life activities, such as eating, drinking, toilet, bathing, self-management of urination and urination, walking and other basic daily life activities, he must also have many functions such as cognition, understanding and social communication. All these are called the functional independence of children with cerebral palsy. [2].If children with cerebral palsy have these functional independence, they can integrate well into the mainstream society and their quality of life will be improved accordingly. Therefore, how to improve the functional independence and quality of life of children with cerebral palsy and make them truly integrate into the mainstream society is an important topic of modern cerebral palsy rehabilitation research [8].

However, most of the distance nursing of children with cerebral palsy (usually conducted by their parents) do not have professional technology and knowledge. Therefore, determining the corresponding feedback mechanism between nursing technicians and distance nurses can ensure the effectiveness, time and accuracy of rehabilitation nursing projects to a great extent. [9]After implementing the three combination rehabilitation model for children, combining modern medical rehabilitation, traditional medical rehabilitation and family rehabilitation nursing. After the children were discharged from hospital, they regularly trained their parents, and made regular follow-up and regular evaluation. The results showed that the stability of long-term curative effect of children undergoing family rehabilitation was better than that of children without family rehabilitation[10] . Experts trained children's parents and special education teachers, and implemented the family rehabilitation model of combining medical education, so that children can not only obtain functional rehabilitation training, but also learn cultural knowledge. After 3 months of treatment, children's gross motor function and fine motor function have been significantly improved. Family rehabilitation has a great impact on the rehabilitation of children with cerebral palsy, so the impact of Tele-rehabilitation nursing on the specific evaluation indexes of children with cerebral palsy has become an urgent problem to be solved [11].

The rehabilitation nursing of cerebral palsy mainly includes sports rehabilitation nursing, as well as intelligent rehabilitation nursing and functional rehabilitation nursing [10]. The main methods are as follows:(1). Exercise rehabilitation: through trunk exercise and supplemented by equipment rehabilitation exercise, through joint activities to reduce dystonia, relieve the phenomenon of increased muscle tension, and improve motor function. If there is speech dysfunction, speech training, rehabilitation training, and oral muscle training can effectively improve the symptoms of dysarthria caused by elevated muscle tone;(2). Cognitive exercise: mainly include memory exercise and calculation exercise to improve cognitive function and symptoms, etc. Through homework and related cognitive tests, some cognitive dysfunction caused by cerebral palsy can be effectively improved;(3). Functional exercise: mainly focus on functional exercise in daily activities, so that the human body

can restore motor function, behavioral function, adapt to life or society, return to society or integrate into society, and be able to carry out daily life and work. [10]

Description of the Study Area:

30 children aged between 3-6 with cerebral palsy who met the inclusion criteria from January 2021 to December 2021 in the Third Affiliated Hospital of Jiamusi University were selected.The performance of participants were similar before the experiment.

The intervention group received Tele-rehabilitation nursing, including Tele-rehabilitation nursing environment assessment, Tele-rehabilitation nursing guidance and remote nursing feedback. Through online one-to-one rehabilitation nursing guidance, wechat consultation and nail live broadcast, Methods of making micro video: (1) The environmental assessment of Tele-rehabilitation nursing shall be carried out, and the environmental transformation shall be carried out when necessary. The space is spacious, bright and barrier free, which is suitable for rehabilitation nursing training. The main rehabilitation nursing staff of the family shall master the specific nursing points and precautions, integrate the concepts and methods of rehabilitation nursing into the family life and children's daily activities, and guide the parents to master the rehabilitation training through remote training Methods. (2) Tele-rehabilitation nursing guidance: formulate a plan, formulate a nursing scheme according to the actual situation of children, and formulate specific nursing measures, including physical structure and function guidance, daily living ability guidance, activity participation guidance scheme and parent training scheme. Each part has corresponding nursing objectives. (3) Determine the corresponding feedback mechanism between nursing technicians and remote caregivers.

The control group received home rehabilitation nursing. The specific contents are formulated by the nursing staff according to the evaluation indexes and rehabilitated

After three months, the rehabilitation nursing evaluation was carried out again for the intervention group and the control group. The score changes of rehabilitation nursing evaluation results were compared, and the correlation between the changes of rehabilitation nursing indexes was analyzed.

Before the experiment, the investigator explained the experiment process, significance and method to the parents of the children . And guide the parents of the children to fill in the informed consent form. Through observation, children with similar performance discharge were selected for experiment, and they were divided into experimental group and control group. Collect relevant data through evaluation after three months.

Variables	Unit	Data source
Activities of Daily Living Score.	100	Clinical Measurement.
Fine Motor Comparison Score	100	Clinical Measurement.
Gross Motor (GMFM-88) Scores	100	

Table 1:Variable Unit and Data Source.

Activities of Daily Living

Activities of daily living are composed of self-care ability, mobility ability and cognitive communication ability. Including eating, grooming, bathing, dressing, controlling urination, indoor and outdoor movement, going to the toilet, getting on and off the car, going up and down stairs, daily life communication, safety. Through a comprehensive assessment of the child's self-care ability, consciousness, games and memory ability can determine which movements the child cannot complete independently and how much help is needed. This quantitative evaluation is an important part of determining training goals and training plans[11].

Fine Motor Movement

Fine motor refers to the activity of the small muscle groups in the hand, which is the action that is sent by the higher nerve center of the human brain to complete the action. Unlike other descending spinal cord pathways for muscle contraction, the signals that stimulate and control fine movements of the fingers do not originate in the brainstem at the top of the spinal cord, but in the highest area of the brain, the strips of the cortex, which across the brain, somewhat like a hairband, is called the motor cortex. The motor cortex sends signals directly to the fingers, which control the fine movements of the hand. It also exerts indirect effects on movement by sending other signals to four motor pathway centers in the brainstem, which in turn cause the muscles to contract appropriately[12]. Different parts of the motor cortex are assigned to control different parts of the body. The key to the assignment is how finely that part of the body is to be moved. The finer the movements, the larger the corresponding brain regions that innervate them. It can be seen that the development of the human brain and the development of fine motor are inseparable, and we can promote the development of children's hand-eye coordination through fine motor practice. The activity of the fingers can stimulate the finger movement centers in the cerebral cortex, thereby improving intelligence. Therefore, children with intellectual disabilities can stimulate the vast areas of the brain through fine motor training, and can continuously correct and improve the fineness of finger movements through brain thinking and eye observation. The cooperation of eyes, hands and brain can greatly improve and promote cerebral palsy The development of hand-eye coordination in children[13].

Gross Motor Movement

Gross Motor Movement or gross muscle movement, is the use of individual functions, combined with gross muscle movement, to improve individual motor function and promote physical and mental development with planned and systematic body movements.

The study found that the gross motor development level of children with cerebral palsy is not always in a stagnant state, but through the intervention of certain rehabilitation methods and their own development, the level of gross motor development can be gradually improved. Rehabilitation nursing evaluation of children with cerebral palsy can not only grasp the The disability level of the children provides objective indicators for judging the effect, and more importantly, it provides a basis for formulating rehabilitation treatment plans. The gross motor development quotient did not increase, indicating that it cannot sensitively reflect the improvement of the gross motor development of children. The assessment of gross motor development in children with cerebral palsy is very detailed and sensitive. At present, this assessment in China mostly adopts the exercise assessment item in the comprehensive development assessment of children, and the developmental quotient is often used as the standard for the judgment of the rehabilitation effect of children with cerebral palsy[14].

The patients were evaluated with the evaluation tools-ADL Scale, GMFM Scale, and Peabody Scales- related to the rehabilitation of cerebral palsy. Statistical methods: SPSS software was used to analyze the data. Continuous variables and

normal distribution were described by mean and standard deviation ($x \pm s$). The differences in rehabilitation nursing evaluation between the intervention group and the control group were compared by independent sample t-test; the differences in scores before and after intervention were compared by paired sample t-test and Chi-test.

ADL	Telerehabilitation	Home rehabilitation	t -value
Body Structure and Function	11.37±3.42	11.19±4.72	1.42
Activity	31.06±3.27	34.82±2.62	1.25
Participation	35.93±4.11	23.72±3.91	3.31*
ADL Score	78.36±3.12	69.73±3.65	9.67*

*$p<0.05$.

Table 2 Comparison of ADL Scores After 3 Months

The independent sample t-test was performed on the ADL scores of the telerehabilitation group and the family rehabilitation group after 3 months. The results showed that the participation dimension and total score of the telerehabilitation group were significantly higher than those of the family rehabilitation group.There were no significant differences in body structure and function and activity dimensions.

It can be found that the telerehabilitation nursing model used in the experimental group will have a positive effect on the daily living ability of children with cerebral palsy. Especially in terms of engagement; the average score in the control group was lower than the score in the experimental group. Therefore, in the future tele-nursing work, it can be emphasized that tele-rehabilitation nursing has an obvious positive effect on the participation dimension of daily living ability of children with cerebral palsy. It is suggested that telerehabilitation care can be used to improve the activities of daily living and participation in children with cerebral palsy. However, in terms of body structure, function, and activities, the effect of telerehabilitation nursing is not obvious. The practices of body structure, function, and activities needs years rehabilitation period to show the remarkable differences of children with cerebral palsy, and the significant effects between home nursing and telerehabilitation nursing shows little difference in 3 months experimental period.

Fine Motor Comparison Score and Analysis.

Table 2 Peabody Fine Motor Comparison After 3 Months

Fine Motor	Telerehabilitation.	Home rehabilitate	T-Value
Reflex	5.24±2.77	4.61±2.84	4.78
Posture	26.41±2.83	22.13±2.04	5.72*
Movement	79.38±3.91	63.32±2.75	14.65*
Physical Manipulation	21.65±2.42	16.25±2.79	5.34*

Grasping	18.97±2.37	12.16±2.06	6.28**
Eye Movement	72.09±2.35	59.67±2.44	13.72**

*p<0.05，**p<0.01.

An independent sample t-test was performed on the Peabody fine motor scores of the telerehabilitation group and the home rehabilitation group after 3 months. There was no significant difference in scores between the two groups. It can be found that the telerehabilitation nursing model used in the experimental group will have a positive effect on the fine motor of children with cerebral palsy.

Especially in posture, movement, physical manipulation, grasping, and visual movement. The average score of the control group was lower than that of the experimental group. Therefore, in the future tele-nursing work, it can be emphasized that tele-rehabilitation nursing has an obvious positive effect on the fine motor of children with cerebral palsy. It is suggested that telerehabilitation care can be used to improve the fine motor function of children with cerebral palsy. However, in terms of reflexes in fine motor, the effect of telerehabilitation nursing is not obvious.

Table 3 Comparison of Gross Motor (GMFM-88) Scores After 3 Months

Gross Motor	Telerehabilitation（%）	Home Reabilitation（%）	χ^2
Lying position and turning over.	82	79	14.11
Posture sitting	76	71	10.18**
Crawling and kneeling	52	47	13.57**
Standing	57	49	14.12**
Walking, running,jumping	28	23	6.88**
Total	59	53.8	11.24**

**p<0.01.

Chi-square test was performed on the gross motor GMFM-88 scores of the tele-rehabilitation group and the family rehabilitation group after 3 months, and it was found that the tele-rehabilitation group had significantly higher scores in posture sitting, crawling and kneeling, standing, walking and running and jumping, and the total score. In the family rehabilitation group, there was no significant difference between the two groups in the scores of lying position and turning over.

It can be found that the telerehabilitation nursing model used in the experimental group will have a positive effect on the gross movement of children with cerebral palsy. Especially in sitting, crawling and kneeling, standing, walking and running and jumping.

Therefore, in the future tele-nursing work, it can be emphasized that tele-rehabilitation nursing has an obvious positive effect on the gross movement of children with cerebral palsy. It is suggested that telerehabilitation care can be used to improve gross motor function in children with cerebral palsy. However, the effect of telerehabilitation nursing in the lying position and turning over during gross exercise is not obvious.

Results and Discussion

Telerehabilitation nursing has obvious advantages over home rehabilitation nursing. Because traditional rehabilitation nursing is mostly practiced in the treatment room, after receiving traditional rehabilitation, although the patient's function has improved in the training room and can fully or partially achieve activities of daily living, the vast majority of patients leave the treatment room after leaving the treatment room. , it is difficult to maintain the therapeutic effect and meet the needs of their daily activities. Tele-rehabilitation nursing technology should be used in rehabilitation, and tele-rehabilitation nursing can make up for this defect to a large extent, help children recover part of their motor functions, and improve their ability to live independently.

In recent years, telerehabilitation nursing technology has been gradually promoted in the exercise rehabilitation of children with cerebral palsy, and its rehabilitation effect is also relatively obvious. The results of the horizon indicated that telerehabilitation nursing, as a novel rehabilitation nursing method, could improve the motor skills of children with cerebral palsy, mainly in the improvement of fine motor and gross motor. At the same time, the research supports that telerehabilitation nursing can improve the cognitive ability of children with cerebral palsy and can improve the children's daily life ability. At the same time, the research can be further verified by large-sample randomized controlled experiments, and then provide evidence-based basis for clinical nursing and guide the nursing plan for children with cerebral palsy.

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