

Investigation and Analysis of Hand Rehabilitation Exercise in Patients with Upper Limb Diseases

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Abstract: As the main motor organ of the human upper limb, the hand can carry out various fine activities. However, many accidents and diseases will lead to the impairment of the motor function of the hand. To better understand the current situation and needs of hand rehabilitation exercise of patients with upper limb and limb diseases, a questionnaire survey was conducted in the form of random sampling to understand the current situation of patients' rehabilitation and put forward corresponding countermeasures, which is conducive to improving the effectiveness of hand rehabilitation exercise and the development of rehabilitation equipment.

Keywords: Rehabilitation exercise; Rehabilitation equipment; Upper limb disease

1. Introduction

The WHO report in 2020 shows that 16 million people are suffering from stroke every year in the world, including nearly 5 million deaths and 5 million disabled [1]. China Stroke Center Report 2020 shows that stroke is the first cause of disability-adjusted life years (DALYs) in China [2]. It is worth noting that after active treatment, 80% of stroke patients still suffer from impairment of upper limb function in varying degrees [3], and nearly 1/3 of stroke patients still suffer from severe dysfunction of the upper limb after active rehabilitation treatment for more than half a year, specifically manifested as paralysis, loss of autonomous movement, abnormal muscle tension and somatosensory changes, which seriously affect the ability to move [4-5]. Promoting the recovery of upper limb function of stroke patients has become an important component of clinical rehabilitation treatment centers [6].

The hand function is the main function of the human body, accounting for about 60% of the total function of the human body, while the hand function accounts for 90% of the upper limb function of the human body. Its importance is self-evident. There are many causes of hand dysfunction, including stroke, brain injury, cerebral palsy, spinal cord injury, hand injury, central nervous system injury, etc. Squeeze and trauma are also important causes of hand dysfunction. In addition to the special cases of hand loss or complete atrophy and death of hand nerves caused by trauma, the rehabilitation of hand dysfunction is one of the key research directions in China. China has a large population base, tends to be aging, and the scale of the hand dysfunction group is huge. Based on the current medical level in China, finger joint rehabilitation cannot achieve one-to-one training, and the demand for finger joint rehabilitation is large, so it is imperative to promote the research and development of rehabilitation devices.

2. Research Objectives and Methods

2.1 Research objectives

The survey adopts a random sampling method. From October 2022 to January 2023, we conducted a questionnaire survey on patients with upper limb and limb diseases such as the Department of Surgery and Rehabilitation Medicine in 47 public hospitals above the municipal level in Guangxi.

2.2 Survey and research methods

The questionnaire was independently designed based on referring to Wang Yue and other relevant documents [7-12]. The survey includes five parts in total, including ① Basic information about the respondents: gender, age range, and purchasing power. ② Awareness of post-injury rehabilitation exercise: whether to understand and use relevant rehabilitation medical equipment and the choice of the rehabilitation treatment site. ③ Selection of rehabilitation products: understand the ways of rehabilitation medical devices, the functions of hand rehabilitation trainers, and the impact of different factors on the purchase of rehabilitation devices by the respondents. ④ Anticipated effect and time of rehabilitation: The interviewees are appealing for the use of rehabilitation medical devices until they reach their treatment expectations and the length of the treatment period. ⑤ The current situation of actual rehabilitation exercise: the respondents' personal experience after using the rehabilitation medical device (whether it is effective, recovery status), which aspect of the rehabilitation medical device they think needs to be improved most, and put forward suggestions for relevant treatment based on their use.

Survey method: The interns of rehabilitation treatment technology, nursing, and medical laboratory technology in Guangxi (the cooperative internship site of various specialties of Youjiang Medical University for Nationalities) were selected as the investigators, and they were entrusted to conduct face-to-face interviews and fill in the questionnaire for patients with limb diseases in the internal and external departments and rehabilitation medicine departments of the internship unit. The members of the investigation and research team used their internship opportunities to conduct key research on relevant situations in the internship unit.

Questionnaire recovery and statistics: 650 questionnaires were distributed and 650 were recovered, of which 637 were valid, with an effective rate of 98.0%. All data are established by Epidata 3.1 software, processed by SPSS 21.0 statistical software, and the counting data are described by frequency and composition ratio.

3. Analysis of Survey Results

3.1 Basic information of the respondents

The basic information of the respondents is shown in Table 1. The gender ratio of the respondents is about 2:1. The respondents are under 40 years old, accounting for 12%, 40-69 years old, 66%, and over 70 years old, accounting for 22%. Most of the respondents are concentrated in the range of 40-79 years old, mostly in the transition stage of the middle-aged and the elderly. The purchasing power of the respondents is generally low, and the purchasing power of the respondents is below 3000 yuan, accounting for 86% of the total population.

3.2 Awareness of rehabilitation exercise after injury

3.2.1 Do you know and use relevant rehabilitation medical devices

The survey results show that 57% of the respondents have a certain understanding of rehabilitation products, and 22% of the patients think they know, while only 22% do not know. It can be seen from the analysis that more than three-quarters of the respondents are involved in rehabilitation medical products. Moreover, 78% of the respondents have contacted and used rehabilitation training equipment, and only 22% have not contacted them. It shows that rehabilitation training is becoming more and more familiar.

3.2.2 Site Selection for rehabilitation treatment

According to the survey, 44% of the respondents prefer to use rehabilitation equipment in the hospital and have professional medical staff to help with rehabilitation treatment; Another 43% hope to have rehabilitation training accompanied by their families, and the remaining 13% hope to use rehabilitation training equipment at home to recover their physical functions. It can be seen that people prefer to use rehabilitation training equipment under the guidance of professionals.

3.3 Selection of rehabilitation products

3.3.1 Ways for Respondents to understand rehabilitation products

According to the survey, 53% of respondents learned from the recommendation of professionals, 43%

of respondents learned from the advertising of rehabilitation equipment, and only 4% of respondents learned from offline stores.

3.3.2 Functions of hand rehabilitation trainer

According to the survey, the respondents' focus on the function of the product is "enhancing hand muscle strength", which accounts for 74%. It shows that the recovery of muscle strength is the key to promoting the recovery of hand function for the majority of people, and the expected goal cannot be achieved in physical therapy and traditional rehabilitation training. Patients are more expected to use rehabilitation equipment to train hand muscle strength; "Improving flexibility" accounts for 20%, indicating that most people can not achieve fine hand ability in simple training, and need to use rehabilitation equipment to improve the flexibility of the patient's hand movement function and improve the patient's ability of daily life; "Prevention of spasms" and "relaxation of muscles" account for only 4% and 2% respectively, indicating that very few people need rehabilitation equipment to complete these two functions.

3.3.3 Influence of different factors on the Purchase of rehabilitation equipment by respondents

According to the survey, the influence of rehabilitation devices on the purchase of respondents is 82% and 78% in terms of "product performance" and "product configuration", indicating that most people value the role and use of rehabilitation devices in treatment and whether they can meet the needs of patients in training; "Method of use" accounts for 65%, indicating that most people have certain requirements for the ease of use of rehabilitation equipment; "Product appearance" and "product brand" account for 34% and 40%, indicating that a few people pay attention to appearance and brand, as shown in Figure 1.

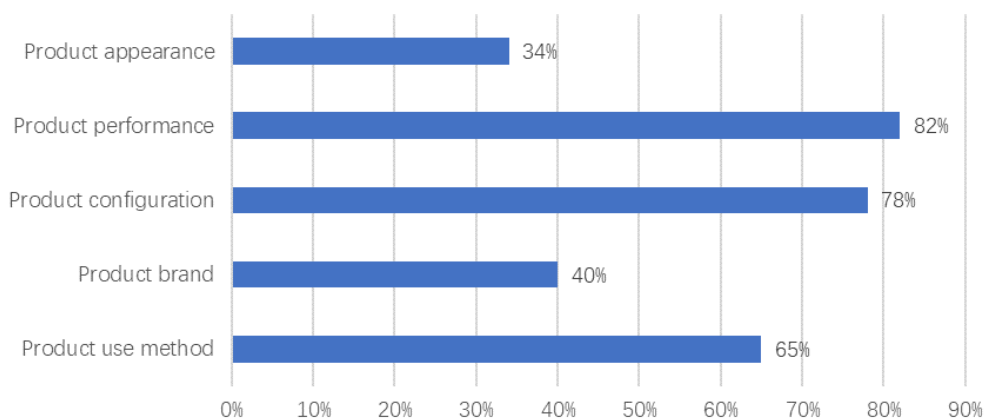


Figure 1: Effect of Different Factors on Respondents' Purchase of Rehabilitation Equipment

3.4 Expected effect and time of rehabilitation

According to the survey, 59% of the respondents hope that through the use of rehabilitation training equipment, they can control their hands to pick up objects and help complete daily life needs such as washing their face; Another 27% of respondents hoped that their hands could control more delicate activities such as using chopsticks to clip beans; Only a few people hope that the fingers can recover to such coarse movements as autonomous bending and straightening. In terms of time, 35% of respondents hope to achieve the expected treatment effect within 3 months; The expected time of 31% of patients is 6 months; 34% of the samples are aged 1 year or more. It can be seen that patients have great expectations for the treatment effect of rehabilitation training equipment. According to the doctor's suggestion, patients using rehabilitation medical devices need to persist in training every day, at least once a day, or even more, for 30-40 minutes each time, according to their ability, and pay attention to appropriate rest.

3.5 Current situation of actual rehabilitation exercise

3.5.1 Actual Effect of rehabilitation exercise

According to the respondents who have used rehabilitation equipment, 84% of the population think that there is a certain recovery effect after using rehabilitation equipment, and only 16% of the population think that there is no obvious recovery effect before and after using rehabilitation equipment. According

to the patient's description, the recovery effect after using rehabilitation equipment mainly includes the following aspects: "can do simple actions", "improve the activity ability of finger joints", "improve the control of opponents", "increase the strength of hands", Therefore, it is shown that patients use rehabilitation equipment for rehabilitation exercise, which has a little effect on the rehabilitation of hand diseases. However, due to the different degrees of illness, the number of rehabilitation exercises, and the different equipment used, the recovery effect will vary to different degrees.

3.5.2 What aspects of rehabilitation equipment need to be improved

According to the survey results, 99.84% of the patients are "easy to operate", which indicates that the current use of rehabilitation devices is too complicated and professional, and can not achieve the effect of taking and using at will for most adults. Patients prefer to use simple rehabilitation devices; The "price economy" accounts for 83.51%, indicating that most people think that the current price of rehabilitation equipment is too high and does not meet the ideal price; "Simple operation" accounts for 99.84%, indicating that the function of rehabilitation equipment is relatively single and can not meet the needs of most people for rehabilitation training; "Shape and appearance" account for 34.22%, indicating that only a few people pay more attention to the appearance of rehabilitation appliances.

4. Conclusion

The results of this survey show that in the process of rehabilitation treatment, most patients use rehabilitation training equipment to assist in training. Therefore, rehabilitation medical equipment has reached a certain popularity among patients and their families. At the same time, the statistical data shows that the function of rehabilitation treatment is the most important in the consumer behavior of rehabilitation medical devices, which helps us to fully explore the market.

First of all, there are few ways to sell more professional hand rehabilitation devices on the market at present. Therefore, the exercise of stroke hand rehabilitation and the purchase of rehabilitation medical products for patients need to be carried out under the guidance of professional doctors and technicians. The understanding of rehabilitation medical products lacks systematic information.

Secondly, in the interview with patients with hand diseases, we can see that time and recovery effects are the most important reference factors. In the recovery period after surgery, patients need to invest a lot of time to carry out rehabilitation training. The assistance of other family members can effectively help patients to carry out systematic rehabilitation training. Although most family members have a positive attitude towards the rehabilitation training of patients, in fact, in reality, the use of rehabilitation training instruments by patients can not accurately judge the effect, even because the effect of exercise is not significant, or the recovery period is too long, resulting in the stagnation of rehabilitation training.

5. Suggestions

First of all, rehabilitation medical devices need to establish a complete market system, and carry out qualification certification for the professionalism of relevant institutions involved in rehabilitation exercise to ensure that the projects carried out by relevant institutions are scientific and reasonable; Secondly, popularize the knowledge related to stroke rehabilitation as much as possible, broaden the channels of publicity, do a good job of relevant training, and organize the training by the rehabilitation departments of the hospital; Finally, the price of hand rehabilitation medical equipment is not easy to be inflated. It needs to be adjusted on the premise of ensuring the cost so that people can use affordable and effective medical equipment for rehabilitation training.

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