RESEARCH ARTICLE

Effect of remote transitional care for epilepsy patients based on trans-theoretical model and mobile health

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Received: August 20, 2025; **accepted:** January 2, 2026.

Epilepsy, a common neurological disorder affecting approximately 70 million people worldwide, is characterized by recurrent epileptic seizures that seriously impact patients' health and quality of life. The transition from adolescence to adulthood is a critical stage for patients with epilepsy who need to shift from a parent-centered management model to an individual-centered management model. This transition involves more than just the transfer of medical care. It also includes improving patients' ability to self-manage, helping them adjust psychologically, and adjusting family and social support. However, the current traditional nursing model is unable to meet the growing self-management needs of patients during this transitional period. This study proposed an epilepsy transition care program that incorporated the trans-theoretical model (TTM) and mobile health (mHealth) to enhance patients' adherence to treatment and reduce the risk of seizures. 140 epileptic patients were chosen, and 70 patients each were split into experimental and control groups at random. The nursing program including mobile health and the trans-theoretical paradigm was practiced by the experimental group, while a conventional nursing curriculum was followed by the control group. After 6 months of intervention, the experimental group was significantly better than the control group in information management ability, medication management ability, attack management ability, lifestyle management ability, and security management ability ($P < 0.05$). Meanwhile, the experimental group also scored considerably higher than the control group in terms of self-management capacity and transition preparedness level ($P < 0.05$). Furthermore, the experimental group showed a considerable decrease in seizure frequency with the number of seizure-free patients rising from 35 to 53. However, the number of seizure free individuals in the control group was only 37 ($P < 0.05$). A telecare program based on the transtheoretical model and mobile health technology showed significant effectiveness in improving self-management abilities, transition readiness, and self-efficacy among epilepsy patients. The program also effectively reduced the frequency of epileptic seizures.

Keywords: epilepsy; transition; remote care; trans-theoretical model; mHealth.

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Introduction

Approximately 70 million people worldwide suffer from epilepsy, a common neurological disorder. Recurrent seizures are their main characteristic, and they have a very negative impact on patients' health and well-being. For individuals with epilepsy, the transition from adolescence to adulthood can present several challenges. During this stage, patients must shift from a parent-centered approach to care to a self-centered approach [1, 2]. This transition involves not only the transfer of medical care, but also the enhancement of the patient's self-management (SM) ability, psychological adjustment, and the adjustment of family and

social support. Studies have shown that the lack of effective transitional care can lead to reduced treatment adherence, poor disease control, decreased quality of life, and even increased risk of seizures in adolescents [3, 4]. In the transitional care of epilepsy patients, traditional care models are often difficult to meet the growing SM needs of patients. The fast growth of mobile health (mHealth) in recent years has led to a steady increase in interest in care solutions based on wireless communication technologies and mobile devices. By providing convenient and personalized health management tools, mHealth technology can effectively support patients' SM, enhance the interaction between patients and care providers, and improve the efficiency and quality of care.

Current mHealth technologies are widely used in healthcare. Given the suboptimal outcomes observed among adolescents and young people in low- and middle-income countries across the continuum of HIV prevention and care, Goldstein *et al*. conducted a comprehensive analysis to assess the effectiveness of mobile health interventions at various stages of HIV care and found that most studies suffered from methodological limitations, leading to inconsistent and inconclusive results [5]. Alam *et al*. proposed a survey methodology based on technology acceptance modeling and perceived reliability for the adoption of mHealth services (mHealth-S) by older women in Bangladesh. The findings indicated that mHealth adoption was significantly impacted by perceived utility, perceived dependability, pricing value, and technological anxiety, but mHealth-S adoption was unaffected by ease of use [6]. Akingbade *et al*. proposed an mHealth-based intervention for psychological problems in women undergoing cancer chemotherapy to provide a comprehensive assessment of the available evidence through a systematic search of relevant databases and meta-analysis. The results demonstrated that patients' quality of life was considerably enhanced by the mHealth intervention [7]. The trans-theoretical model (TTM) is a comprehensive theoretical framework for behavior modification that offers tailored treatments and highlights the many phases of a person's behavior change process. It has been widely utilized to treat a number of chronic illnesses. For anemia in women of reproductive age in low- and middle-income nations, Khanna *et al*. suggested a community-based nutrition intervention strategy based on the precede-proceed paradigm and TTM. The methodology provided a nutritional intervention package through a multichannel communication approach and showed significant improvement in ferritin levels and a significant reduction in anemia by about 15% after the intervention [8]. Abbood *et al*. proposed a TTM-based intervention approach through a simple randomized sample to assess the role of TTM in enhancing the behavior of blood glucose level control in diabetic patients and found that the transtheoretical model of change was effective in enhancing blood glucose level control behavior in diabetic patients [9]. Liu *et al*. proposed a basic TTM-based dietary intervention approach to address malnutrition and sarcopenia in maintenance hemodialysis patients. The results showed that patients who received the TTM-based dietary intervention showed significant improvement in the prevalence of sarcopenia, malnutrition rate, and proportion of extracorporeal water compared to the control group with conventional dietary intervention [10].

TTM and mHealth are currently widely used in the medical field to improve the long-term prognosis of patients. However, there are fewer studies on nursing care for epilepsy transition to meet the rehabilitation and health needs of patients in transition. Currently, the traditional nursing model is inadequate to meet the growing SM needs of patients during the transition period. Studies have shown that inadequate transitional care can result in reduced treatment compliance, poor disease management, diminished quality of life, and an elevated risk of epileptic seizures. It is urgent to develop a nursing model that can effectively support patient SM and improve transition readiness and

self-efficacy. This study aimed to enhance the efficacy of transitional care for patients with epilepsy to ultimately reduce the incidence of seizures. The study proposed a telecare program grounded in TTM and mHealth to explore the potential benefits in enhancing patients' SM ability, transition preparation level, and self-efficacy (SE). This study combined TTM and mHealth to design a comprehensive telecare program, where TTM provided a theoretical basis for individualized interventions, while mHealth technology improved the convenience and accessibility of care. The proposed program enabled patients to access care and support anytime, anywhere. The results of this study would provide a new theoretical and practical basis for transitional care for epilepsy patients to improve patients' long-term prognosis and serve as a reference for transitional care for patients with other chronic diseases.

Materials and methods

Research subjects and grouping

A total of 140 epileptic patients including 64 males and 76 females aged from 12 to 18 years old from the clinic of Zhoukou First People's Hospital (Zhoukou, Henan, China) between January 2023 and December 2024 were included in this study. The inclusion criteria were the patient having at least two unprovoked or reflex seizures occurring more than 24 hours apart or one unprovoked or reflex seizure with a recurrence risk in the next 10 years equivalent to the recurrence risk after two unprovoked seizures at least greater than 60%, a diagnosis of a specific epilepsy syndrome, having drug-resistant epilepsy, and having the illness for at least six months and not experienced any seizures recently. The exclusion criteria were the patients with speech disorders, mental deficiencies, chronic diseases such as diabetes, and unable to use a smartphone. All patients were divided evenly into the experimental group (EG) and the control group (CG) at random with 33 males and 37 females in the EG and 31 males and 39 females in the CG. The patients were additionally divided into 3 age groups as 12 - 14, 15 - 16, and 17 - 18 years old groups in both EG and CG. There were 42 cases of focal seizures in the EG and 38 cases in the CG with no significant difference in the types of epileptic seizures between the groups. Further, the patients were grouped based on the duration of disease as less than 1 year, 1 - 3 years, 3 - 5 years, and greater than 5 years groups in both EG and CG. 57 patients in the EG and 62 patients in the CG were taking medication, while 13 patients in the EG and 8 patients in the CG were not taking medication. The frequency of seizures was divided into three categories including no attack, once every six months, and more than once every six months. There were 35 patients in the EG and 38 patients in the CG showing no seizure attack, 18 patients in the EG and 12 patients in the CG showing seizure attack once every six months, and 17 patients in the EG and 19 patients in the CG showing seizure attacks more than once every six months. There was no significant difference in the frequency of seizures between the two groups. All procedures of this research were approved by the Ethics Committee of Zhoukou Vocational and Technical College (Zhoukou, Henan, China) with the approval number of 22123. The written informed consent forms were obtained from all participants and their guardians.

Intervention methods in both EG and CG

A tele-epilepsy transitional care program based on TTM and mHealth was implemented in EG, which included individualized intervention care and collective intervention care. Individualized intervention care included that, after the patient completed personal information in the WeChat applet, the program would assign the patient to a healthcare team including a physician, a nurse, and a psychologist. The nurse would explain the use of the mini program to the patient to ensure that the patient could correctly fill in the seizure, medication, and mood logs. After the start of the nursing intervention, the patient was assessed once a week by the nurse for the stage of behavioral change before the individualized intervention being developed and implemented

accordingly [11, 12]. Collective intervention included the organization and uploading disease-related educational materials weekly to the mini program in WeChat group for patients to view and study [13, 14]. The number of patients in each stage was counted every two weeks, and online lectures and discussions were conducted when the participant's number in a certain stage exceeded 10 patients. The action and maintenance phases were intervened once every two weeks and extended to once a month. Personalized intervention and collective intervention were carried out simultaneously and continued until the end of the treatment course. TTM divided the process of individual behavior changes into five progressive stages including pre-intention stage, intention stage, preparation stage, action stage (AS), and maintenance stage. The pre-intention stage referred to individuals who were unaware of the necessity to change their current behaviors related to epilepsy management or who were aware of the problem but had no intention to change. These individuals did not include "changing their behavior" in their plans for the next six months and might even resist the idea that their behavior needed to change. The intention stage referred to an individual who was clearly aware of the need to change their behavior, recognized the importance of change, and was considering acting within the next six months. However, they had not yet developed a specific plan and were still in the "thinking and balancing" stage. They were easily influenced by "change costs" such as concerns about the time-consuming nature of SM and fear of making mistakes and hesitating. The preparation stage referred to an individual who completed the transformation from "intention to change" to "preparation for action". This individual clearly defined specific actions to be taken within the next 30 days and developed a preliminary plan. However, the behavior was not yet stable such as not occurring at a fixed frequency or not being executed continuously. External support was still needed to confirm the plan's feasibility. The action phase referred to someone who turned a plan into action and had consistently behaved this way for less than 6 months. Initially, behavioral changes appeared such as the regular execution of SM tasks. However, these changes still required external intervention to maintain and were easily interrupted by external factors such as academic pressure and emotional fluctuations. Self-efficacy that meant confidence in being able to persist in behavior was gradually improving. The maintenance phase referred to a change in behavior that was steadily implemented for more than 6 months. The behavior was fully internalized as a daily habit. The individual could autonomously respond to potential triggers that could cause an interruption such as going out or experiencing emotional anxiety. The behavior could be maintained without relying on external intervention. The risk of recurrence (returning to the original bad behavior) was significantly reduced, and the individual could even actively share experience to help others. Meanwhile, the CG applied a routine nursing program for intervention. The nurses uploaded educational materials weekly for the patients to learn, and patients filled out the epilepsy logbook once a week [15, 16]. Online group lectures were held every 2 weeks for a total of 5 sessions. Group lectures were no longer held in the later stages of the intervention, but telephone follow-ups were conducted in the fourth week of each month to check on patients and correct problems [17, 18].

Clinical indicators and data collection

Prior to the intervention, general information of the patients was collected including gender, age, epilepsy history, and medication. Patients' SM ability was assessed before and after the intervention using the epilepsy SM scale (ESMS) (https://www.epilepsy.com). Epilepsy transition preparation level was assessed using the SM (https://www.childneurologysociety.org) and transition to adulthood treatment questionnaire. Patient SE was assessed using the chronic disease management SE scale (https://www.cdsmp.org). The number of seizures during the intervention was recorded. Data were collected at three time points as before intervention (baseline period), 3 months after intervention (mid-term), and 6 months after intervention (end-stage). For the

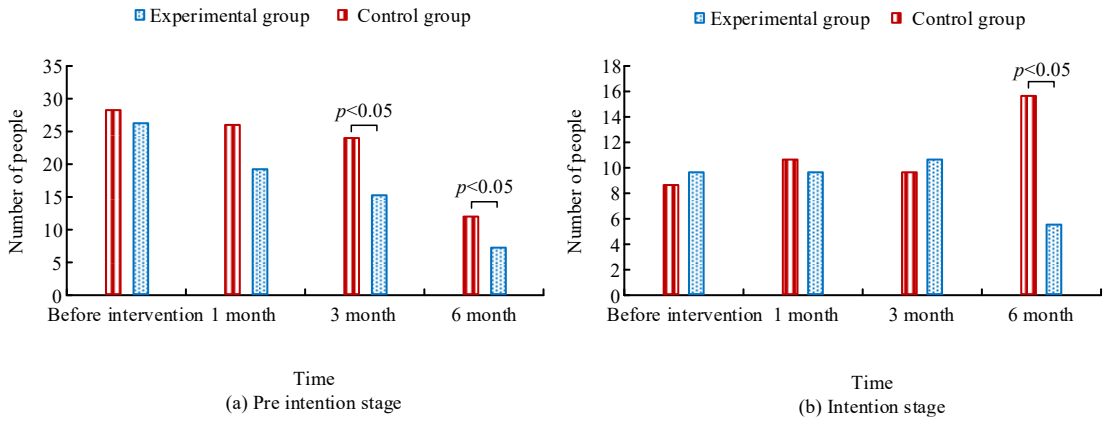

Figure 1. Pre-intentional stage and intention stage between groups.

"stages of SM behavior," a behavior stage assessment questionnaire was used, which was sent weekly through a WeChat mini program to record the number of patients in each stage and count the total number of patients. ESMS was used to evaluate SM ability by collecting scores in five dimensions including information, medication, seizures, lifestyle, and safety management. The "transition preparation level" used SM and adult transition therapy questionnaires to collect data of medication management, medical participation, disease knowledge, and health responsibility. The "SE level" used the chronic disease management SE scale to collect scores on disease symptoms and common management dimensions. The frequency of epilepsy seizures was recorded by counting the total number of seizures and the number of patients without seizures through the mini program seizure log, combined with outpatient follow-up confirmation. A nursing satisfaction questionnaire was used to collect scores on overall satisfaction, practicality of educational materials, and response speed of medical staff.

Statistical analysis

SPSS 26.0 software (IBM, Armonk, New York, USA) was employed for statistical analysis of this research. The Mann-Whitney U test (MWUT) was applied for categorical data, while the chi-square test was used for the others [19, 20]. The t-test was used for normal distribution data, while MWUT was carried out for nonnormal distribution data. Repeated data was evaluated using the linear mixed effects model. The Bonferroni method was also utilized at different time points within the group to control for one category error rate. *P* value less than 0.05 was considered as statistically significant difference.

Results and discussion

Stages of self-managed behavior

The results of experimental and control groups' pre-intentional and deliberate stages prior to and following the intervention demonstrated that there was no statistically significant difference in the number of pre-intentional stages in both groups. However, after 3 months of intervention, the number of pre-intentional stages in both groups decreased to 14 and 25, respectively ($P < 0.05$). After 6 months of intervention, the number of pre-intentional stages was further reduced to 6 and 13 with statistically significant difference between groups ($P < 0.05$) (Figure 1a). Further, there was no statistically significant difference in the number of intentional stage between the groups before the intervention. After 6 months of intervention, the patient's quantity in the experimental group in the intentional stage decreased to 5 with a statistically significant difference between the groups ($P < 0.05$) (Figure 1b).

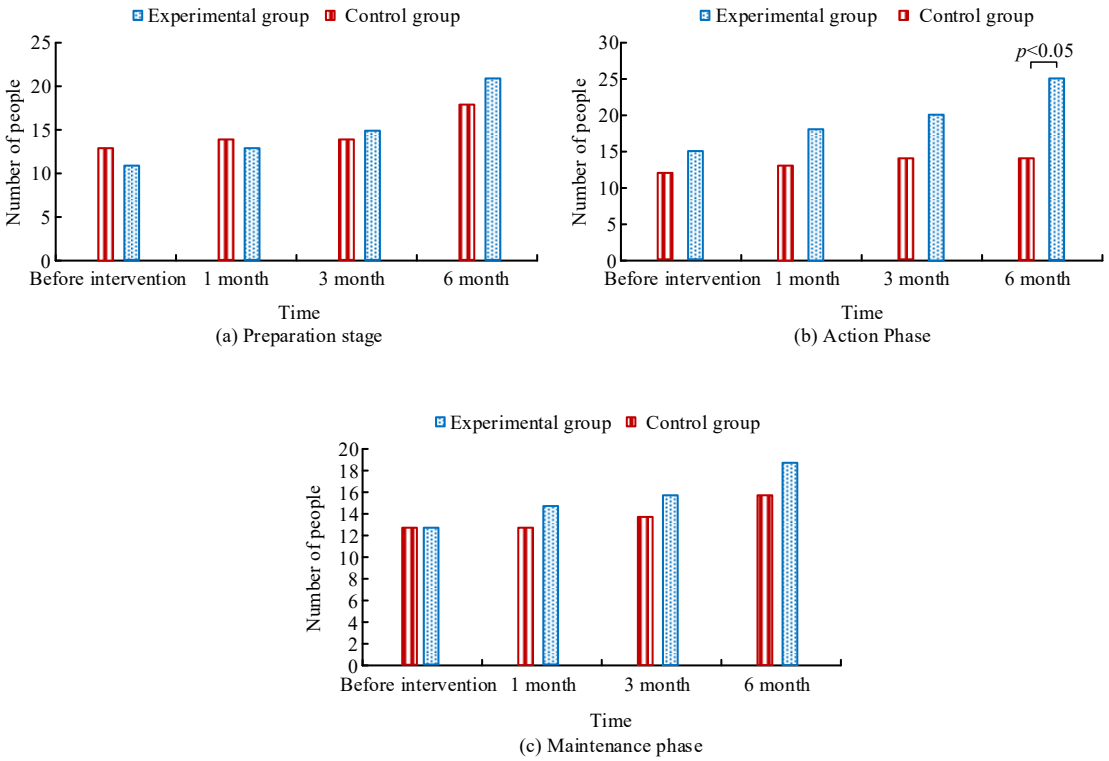

Figure 2. Changes in the number of personnel in the preparation, operation, and maintenance phases between groups.

The changes in the patient's quantity in the preparation stage, action stage (AS), and maintenance stage showed that there was no statistically significant difference in the patient's quantity in the preparation stage between the groups before the intervention. After 6 months of intervention, the patient's quantity in the preparation stage in both groups rose to 20 and 17, respectively with no statistically significant difference (Figure 2a). There was no statistically significant difference in the patient's quantity in the AS between the groups before the intervention. The patient's quantity in the AS in the two groups after 6 months of intervention rose to 24 and 13, respectively with statistically significant difference between the groups ($P < 0.05$) (Figure 2b). There was no statistically significant difference in the patient's quantity in the maintenance stage between the groups before and after the intervention (Figure 2c). These results indicated that the remote transitional care program based on TTM and mHealth could effectively encourage positive changes in SM behavior among epilepsy patients. The number of patients in the pre-intention stage decreased, while the number of patients in the intention stage significantly decreased and the number of patients in the AS significantly increased, which was closely related to the personalized TTM intervention design. By evaluating patients' behavior stages on a weekly basis, providing targeted disease knowledge, and developing a tiered management plan, it could help patients transition from "no intention to change" to "proactive action". In the previous intention stage, adverse outcome cases during the transition period of epilepsy were promoted to enhance cognition, while, in the intention stage, management goals were jointly developed with medical staff. Moreover, in the AS, behavior was strengthened through achievement reminders. These measures all met the needs of patients at different stages. However, the control group only used general educational materials and fixed lectures, lacking stage adaptability, so the effect of behavior stage transformation was

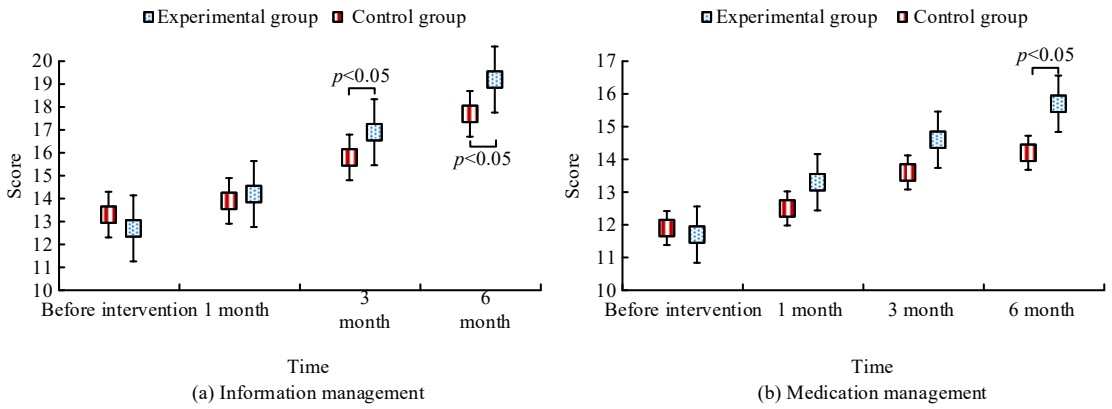

Figure 3. Information and drug management capacities between groups.

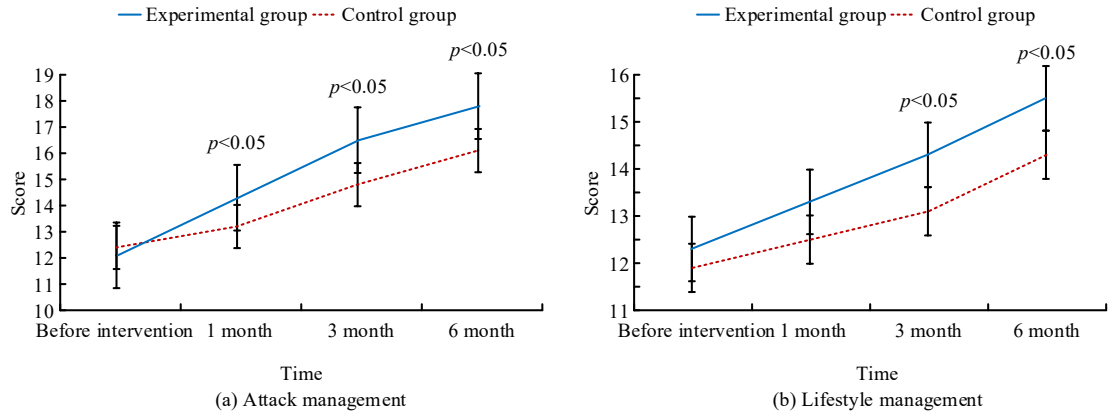

Figure 4. Attack management and lifestyle management between groups.

weak. There was no significant difference in the number of patients during the maintenance phase, which was due to the shorter six-month intervention period. The maintenance phase required stable behavior for over 6 months, so the follow-up period must be extended for further observation.

Self-management ability

The information and drug management capacity of the experimental and control groups before and after the intervention showed that there was no statistically significant difference in information management ability between the groups before intervention. After 3 months of intervention, the information management abilities of the two groups were 16.9 ± 2.8 and 15.7 ± 3.6, respectively ($P < 0.05$), while after 6 months of intervention, information management abilities were 19.2 ± 3.5 and 17.7 ± 2.9, respectively ($P < 0.05$) (Figure 3a). There was no statistically significant difference in medication management ability between the groups before intervention. After 6 months of intervention, the medication management abilities of the two groups were 15.9 ± 2.7 and 14.2 ± 2.3, respectively ($P < 0.05$) (Figure 3b). Attack management and lifestyle management before and after intervention showed that there was no statistically significant difference in the attack management ability between the groups before the intervention. After 3 months of intervention, the attack management abilities of the two groups were 16.5 ± 3.1 and 14.8 ± 2.9, respectively ($P < 0.05$). After 6 months of intervention, the attack management abilities

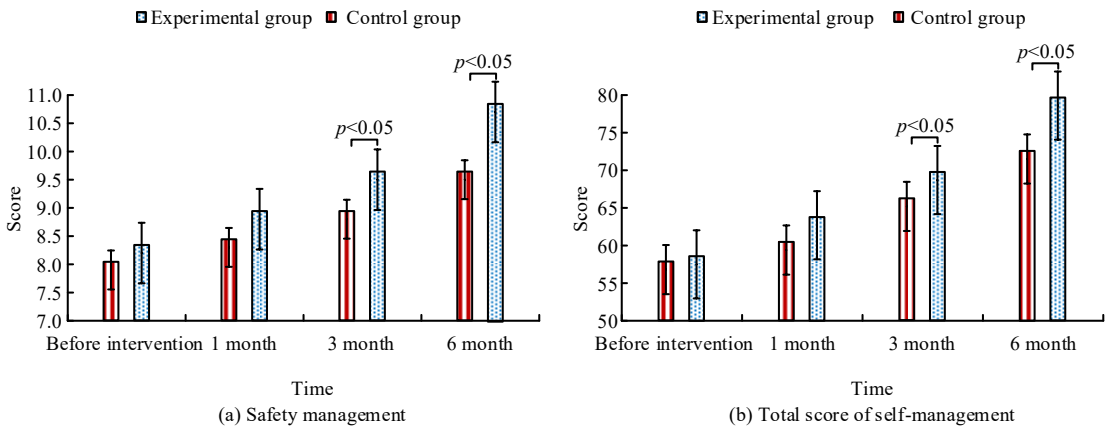

Figure 5. Total score of safety management and SM ability between groups.

were 17.8 ± 3.6 and 16.1 ± 3.1, respectively ($P < 0.05$) (Figure 4a). There was no statistically significant difference in the lifestyle management ability between the groups before the intervention. After 3 months of intervention, the lifestyle management abilities of the two groups were 14.3 ± 2.6 and 13.1 ± 2.0, respectively ($P < 0.05$). After 6 months of intervention, lifestyle management abilities were 15.5 ± 2.9 and 14.3 ± 2.5, respectively ($P < 0.05$) (Figure 4b). The total scores of safety management and SM ability before and after the intervention demonstrated that there was no statistically significant difference between the safety management competence of the groups before the intervention. After 6 months of intervention, the safety management abilities of the two groups were 10.7 ± 2.5 and 9.5 ± 2.1, respectively ($P < 0.05$) (Figure 5a). There was no statistically significant difference in the total score of SM ability between the groups before the intervention. After 6 months of intervention, the SM abilities of the two groups were 78.6 ± 10.7 and 71.5 ± 10.1, respectively ($P < 0.05$) (Figure 5b). The result confirmed that nursing programs based on TTM and mHealth could comprehensively improve the SM ability of epilepsy patients. The mini program log module of mHealth tool allowed patients to conveniently record medication, seizures, and emotional situations. The data visualization function helped patients intuitively understand their own management effectiveness and enhance management initiative. Meanwhile, TTM phased intervention provided support for different abilities and weaknesses. It improved medication management ability, provided medication reminders, and analyzed reasons for missed doses from the AS. These features helped patients develop regular medication habits. The improvement of safety management capabilities was due to the guidance provided during the maintenance phase, which enabled patients to master methods to avoid risks. The control group only relied on paper logs and general guidance, and patients lacked real-time feedback and personalized support with limited improvement in management ability. The results were consistent with the previous report that suggested that the combination of dynamic assessment and personalized intervention could effectively enhance patients' SM behavior and improve their management abilities [18].

Transition preparation level and SE level

The level of transition preparation referred to how ready epilepsy patients were to make the shift from a parent-led disease management model to an individual SM model during the transition from adolescence to adulthood. It was a key indicator for measuring whether patients could smoothly adapt to the adult medical system and independently cope with disease management tasks. The concept of self-efficacy

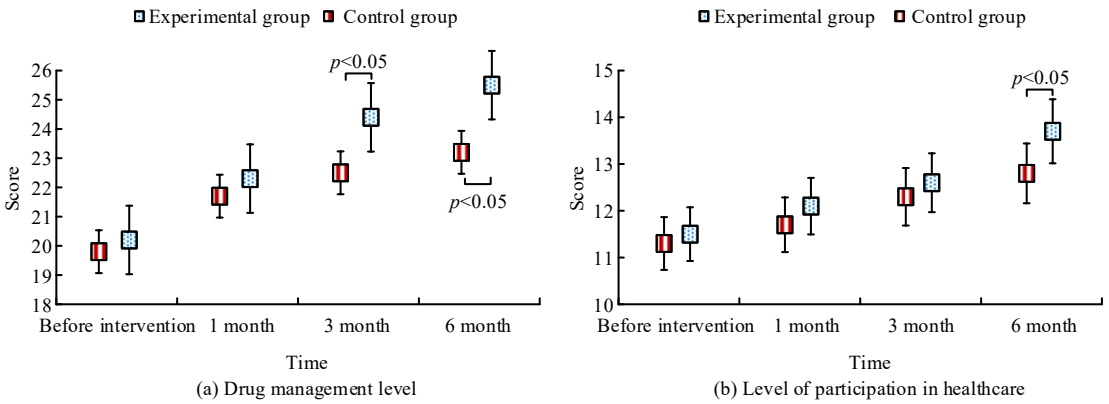

Figure 6. Drug management and health care participation levels between the groups.

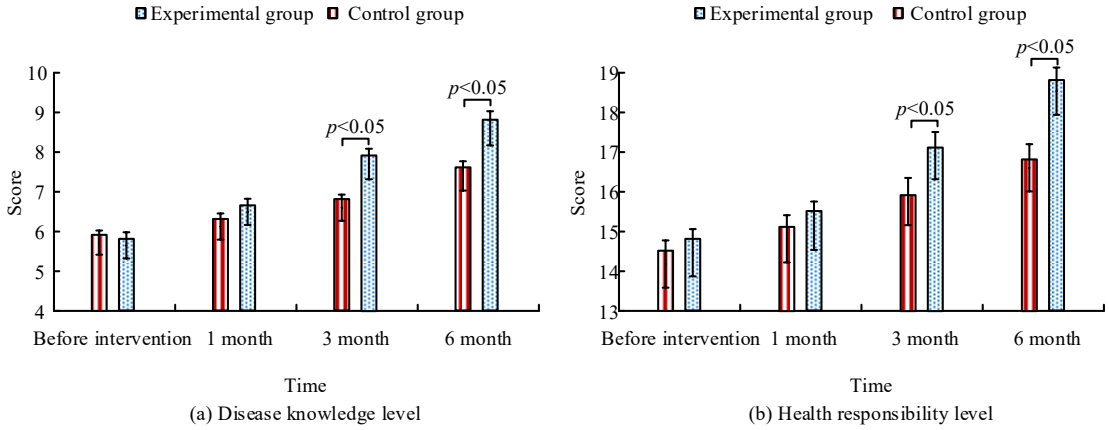

Figure 7. Levels of disease knowledge and health responsibility between groups.

originated from social learning theory and referred to the subjective confidence level of epilepsy patients in their ability to successfully complete disease management-related tasks and control disease progression. The levels of medication management and healthcare participation in the experimental group and control group before and after the intervention showed that, prior to the intervention, there was no statistically significant difference in the degree of medication management between the groups. After 6 months of intervention, the levels of medication management in the two groups were 25.5 ± 5.6 and 23.2 ± 5.2, respectively (P < 0.05) (Figure 6a). There was no statistically significant difference between the groups in the degree of healthcare engagement. However, after 6 months of intervention, the levels of healthcare participation in both groups were 13.7 ± 2.0 and 12.8 ± 1.7, respectively (P < 0.05) (Figure 6b). The level of disease knowledge and level of health responsibility showed that there was no statistically significant difference in levels of disease knowledge between the groups before intervention. After 6 months of intervention, the levels of disease knowledge of the two groups were 8.6 ± 1.7 and 7.4 ± 1.4, respectively (P < 0.05) (Figure 7a). There was no statistically significant difference in the total score of level of health responsibility between the groups before intervention. After 6 months of intervention, the levels of health responsibility of the two groups were 18.6 ± 3.9 and 16.6 ± 3.2, respectively (P < 0.05) (Figure 7b). The SE of disease symptom management and disease commonality management before and after the intervention

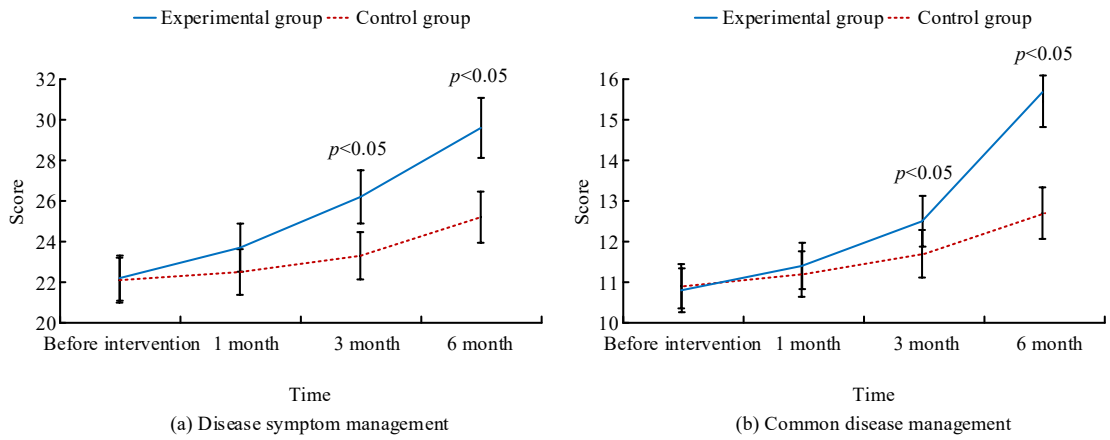

Figure 8. Self-efficacy of disease symptom management and disease commonality management between groups.

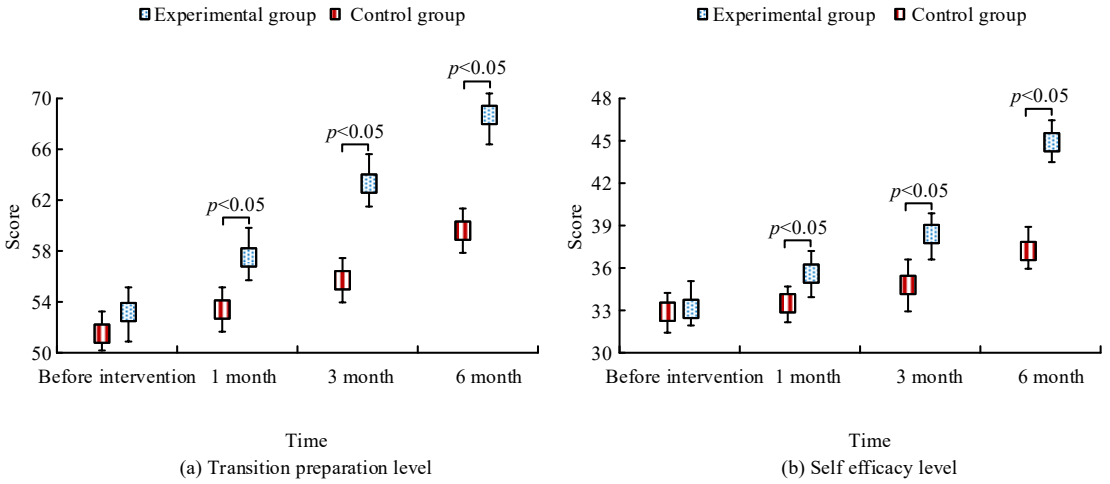

Figure 9. Transition preparation level and SE level between groups.

demonstrated that there was no statistically significant difference in the SE of disease symptom management between the groups. After 6 months of intervention, the SE of disease symptom management of the two groups were 29.6 ± 4.1 and 25.2 ± 3.5, respectively ($P < 0.05$) (Figure 8a). There was no statistically significant difference in the SE of disease commonality management between the groups before intervention. After 6 months of intervention, the SE of disease commonality management of the two groups were 15.6 ± 2.9 and 12.7 ± 2.4, respectively (P < 0.05) (Figure 8b). The transition preparation and SE levels before and after the intervention showed that there was no statistically significant difference in transition preparation level between the groups before intervention. After 6 months of intervention, the transition preparation levels of the two groups were 68.7 ± 10.7 and 59.6 ± 10.0, respectively (P < 0.05) (Figure 9a). There was no statistically significant difference in SE level between the groups before intervention. After 6 months of intervention, the SE levels of the two groups were 44.9 ± 5.2 and 37.2 ± 4.6, respectively ($P < 0.05$) (Figure 9b). The results indicated that this nursing plan could effectively improve the transition preparation level and SE level of epilepsy patients. The improvement of transition preparation level was due to the promotion of

the "Adult Medical Process Guide" in the mini program and the simulation training of medical scenarios, which helped patients master skills such as independent follow-up and disease description. Meanwhile, the weekly health responsibility check-in strengthened patients' management initiative and met their transition needs from "parent-led" to "individual autonomy". The improved SE level was related to periodic feedback and positive incentives. Weekly behavioral execution feedback allowed patients to experience the effectiveness of management. Electronic badge that designated patients as "management experts" enhanced self-identity and increased confidence in "being able to manage well". The control group lacked targeted transitional guidance and confidence building measures, so the improvement in related levels was not significant. These findings were consistent with those of Dubey *et al*. who studied the improvement of patient self-efficacy through mHealth technology and suggested that convenient intervention tools and positive feedback could effectively enhance patients' confidence in disease management [20]. Additionally, improving transition preparation levels provided objective support for SE levels, forming a virtuous cycle.

Seizure frequency and satisfaction

Regarding seizure frequency, after one month of intervention, 45 patients in the experimental group experienced no seizures compared to 34 patients in the control group, while 15 people in experimental group and 20 people in control group had one episode. 10 people in experimental group and 16 people in control group had more than one episode in one month. After 3 months of intervention, 49 people in experimental group and 36 people in control group had no seizures, while 13 people in experimental group and 20 people in control group had 1 to 3 episodes per month. 8 people in experimental group and 14 people in control group had more than 3 episodes per month. After 6 months of intervention, 53 people in experimental group and 37 people in control group had no seizures. 9 people in experimental group and 22 people in control group had 1 to 6 episodes per month, while 8 people in experimental group and 11 people in control group had more than 6 episodes per month. There were no significant differences between the two groups after one and three months of intervention. After 6 months of intervention, the difference between the two groups was significant ($P < 0.05$). In terms of disease knowledge, the average score of experimental group was 8.3 ± 1.5, while the average score of control group was 7.2 ± 1.1 ($P < 0.05$). In terms of nursing knowledge, the average scores of experimental and control groups were 8.4 ± 1.2 and 7.6 ± 1.4, respectively ($P < 0.05$). The average scores of medication adherence for experimental and control groups were 8.1 ± 0.9 and 7.7 ± 1.2, respectively ($P < 0.05$). The average scores of professional image of nursing staff in experimental group was 8.5 ± 1.4, while it was 7.9 ± 1.7 in control group ($P < 0.05$). In terms of the attitude of nursing staff, the average score of experimental group was 8.8 ± 1.1 and the average score of control group was 8.3 ± 1.4 ($P < 0.05$). The auxiliary measures for nursing staff showed that the average score for experimental group was 9.0 ± 0.7 and the average score for control group was 8.8 ± 1.0 with no significant difference. In terms of nursing effectiveness evaluation, the average scores of experimental and control groups were 8.5 ± 1.3 and 8.0 ± 1.1, respectively ($P < 0.05$). The average scores of service satisfaction in experimental and control groups were 8.2 ± 1.7 and 7.9 ± 1.5 with no significant difference. These results indicated that nursing programs based on TTM and mHealth could effectively reduce the frequency of epileptic seizures and improve patient satisfaction. The reduction in seizure frequency was a direct result of improvements in self-management skills, transition readiness, and self-efficacy levels. Regular medication intake reduced instances of missed doses, while improved epilepsy management skills enabled patients to respond promptly to the early signs of a seizure. Moreover, high SE level promoted long-term adherence to standardized management, all of which could reduce the risk

of epileptic seizures. The patient satisfaction was relatively high, which was partly due to the convenience of the mini program that allowed patients to record and consult at any time. It was also due to personalized interventions that met patients' needs at different stages. The control group lacked real-time support and personalized design, resulting in higher frequency of attacks and lower patient satisfaction compared to the experimental group. It should be noted that this study did not include psychological factors such as family support and social pressure, which might limit the interpretation of the results. Further research is needed to explore the impact of these factors.

Conclusion

This study compared the effectiveness of the TTM and mHealth based telecare program with the conventional care program and confirmed the significant benefits of the care program in enhancing SM ability, transition preparation level, and SE of epilepsy patients during the transition period. In addition, the program effectively reduced the frequency of seizures and increased patient satisfaction with the care program. Individualized intervention based on TTM could effectively promote the transformation of patients from the unconscious stage to the conscious stage, enhanced patients' SE, and promoted long-term behavioral change. The application of mHealth technology improved the convenience and accessibility of care, enhanced the interaction between patients and care providers, promoted multidisciplinary collaboration, and improved the efficiency and quality of care. However, the study did not focus on the influence of psychosocial factors on care outcomes, which might lead to some limitations in the results. Future study should combine methods such as community-based care model and family care model to explore more effective care programs.

Acknowledgements

This study was supported by 2025 Henan Provincial Association for Science and Technology Think Tank Project (Grant No. HNKJZK-2025-136B) and the 8th "Outstanding Central Plains" Social Practice Project for College Students in Henan Province.

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