

Survey on the current status of discharge readiness of parents of children with liver transplantation and analysis of influencing factors



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ABSTRACT

Background: The objective of this study is to gain insight into the present state of discharge preparedness among parents of pediatric liver transplant recipients, as well as to examine the many variables that contribute to this readiness.

Methods: This is a cross-sectional analytic study. The researchers employed a convenience sampling technique to gather data from 103 parents with children who underwent liver transplants. The data was collected using a general information questionnaire and a Chinese version of the Discharge Readiness Scale. To examine the factors that influenced the discharge readiness of parents in this population, the researchers conducted a multiple linear regression analysis.

Results: The study found that the mean total readiness to discharge score for parents of children who underwent liver transplants was 83 ± 35.5 . Multiple linear regression analysis revealed that several factors significantly influenced the readiness to discharge of these parents. These factors included the average monthly family income, daily nursing hours, whether the child was an only child, and whether the child experienced postoperative complications. The statistical significance of these factors was determined to be $P < 0.05$.

Conclusion: The discharge preparedness of parents of pediatric liver transplant recipients is found to be poor, indicating a need for healthcare providers to adopt focused interventions aimed at enhancing the quality of discharge orientation services.

Keywords: pediatric liver transplantation; readiness for discharge; social support; influencing factors.

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INTRODUCTION

Liver transplantation (LT) is widely recognized as the only efficacious approach for managing certain medical illnesses in children, including cholestatic diseases, hereditary metabolic abnormalities, acute liver failure, and hepatic cancers.¹⁻³ Liver transplantation is a surgical procedure that involves the replacement of a diseased or damaged liver with a healthy liver from a deceased or living.⁴ The advancements in adult liver transplantation technology and the growing need to treat children with end-stage liver disease have led to significant progress in pediatric liver transplantation.^{5,6} Consequently, an increasing number of children with end-stage liver disease have been successfully treated. The quick rehabilitation surgery approach in clinical settings, coupled with limited medical resources, has resulted in an expedited turnover of hospital beds and a reduction in the average length of

hospital stay for pediatric liver transplant patients.^{7,8} The duration of hospitalization for pediatric liver transplant recipients has been reduced due to incomplete recovery at the time of discharge.

Consequently, there is an increased demand for parental education regarding the appropriate measures to prepare children for discharge. There has been a growing need for parents who serve as primary caregivers to possess information about their child's discharge readiness.^{9,10} The implementation of a comprehensive discharge preparation evaluation for parents has the potential to enhance the transition process from hospital to home, mitigate the occurrence of post-discharge difficulties, and diminish rates of re-visit and readmission.¹¹⁻¹³ There is currently no information available on the discharge readiness of parents of children who have had liver transplants in China. This research aims to examine the present state

of discharge readiness among these parents and assess the variables that impact this readiness. The findings of this study will serve as a reference point for therapeutic interventions aimed at enhancing the discharge readiness requirements of parents of children who have undergone liver transplants.

METHODS

Materials

This is a cross-sectional analytic study of 103 parents of children with liver transplants who were admitted to the organ transplantation unit of a tertiary care hospital in Guangxi between January 2020 and January 2023. The convenience sample approach was used to identify these cases. The inclusion criteria for this study were as follows: (1) the children had undergone their initial liver transplantation and were subsequently hospitalized; (2) the primary caregiver-child relationship was limited

to either the mother or the father; (3) in cases where both parents were involved in caregiving, the parent who had assumed this responsibility for a longer duration was chosen; (4) the parents demonstrated practical communication skills; and (5) the parents provided informed consent to participate in the study. The exclusion criteria for this study were as follows: (1) individuals who discontinued treatment or passed away while their children were hospitalized; (2) individuals who had additional significant organic pathologies during the postoperative period of their children; (3) individuals whose parents faced communication barriers due to their educational background or language proficiency; and (4) individuals whose parents voluntarily withdrew from the study before its completion. The ethics committee of the hospital approved the research.

Data collection procedures

The researcher ensured the authenticity of the questionnaire by providing a comprehensive explanation of the study's purpose, the anticipated time commitment, and the confidentiality measures in place for the research subjects. Additionally, the researcher assured the participants that they had the right to decline participation or withdraw from the study at any point without any negative consequences on the subsequent treatment of the children. The questionnaires were administered by a researcher who had received standardized training. Before administering the questionnaires, informed consent was obtained from the participants of the study. On the 10th day of postoperative hospitalization, the study subjects completed the General Information Questionnaire and the Social Support Scale.

Additionally, the Readiness for Discharge Scale was completed by the children 4 hours before their discharge. Following the completion of each questionnaire, the researcher diligently examined and validated each questionnaire. Additionally, the researcher communicated with the study participants to confirm and rectify any potential omissions or errors identified within the surveys. In this research, a total of 108 questionnaires were issued, out of which

103 valid questionnaires were retrieved. The effective recovery rate was calculated to be 95.37%.

Research tools

1. General Information Questionnaire: The researchers developed a customized general information questionnaire. This study incorporates many demographic factors about children, such as gender, age, medical payment method, whether they were born as singletons or multiples, and the presence of any postoperative difficulties. The demographic characteristics of the child's parents include their gender, age, ethnicity, level of education, employment, location of residence, daily nursing hours, and average monthly family income.
2. The development of the Chinese version of the Readiness for Hospital Discharge Scale (RHDS) was undertaken by Marianne, an American academic.¹⁴ Marianne, an American academic, established the Chinese iteration of the RHDS and subsequently refined it by Lin You-hua, a Chinese researcher.¹⁵ The Revised Health Decision Scale (RHDS) has three dimensions: personal status, adaptability, and anticipatory support. Each dimension is measured using a certain number of questions: personal status includes three items, adaptability includes five items, and anticipatory support includes four items. In all, the RHDS consists of 12 items. Each item is assigned a value ranging from 0 to 10 points, resulting in a total score range of 0 to 120. The scale's Cronbach's alpha coefficient, measuring 0.890, provides a more accurate representation of an individual's preparedness for hospital release. There is a positive correlation between the overall score on the scale and the level of preparation for hospital discharge.¹⁶ The present study responded to the readiness of liver transplant parents to be discharged from the hospital using scores on 12 items and three dimensions of this scale.

Data analysis

The researchers employed a double-masked data entry method and utilized

SPSS 21.0 software for data analysis. Measures that adhered to a normal distribution were computed using the mean (X) plus or minus the standard deviation (S). In contrast, measures that deviated from a normal distribution were computed using the median plus or minus the interquartile range. The influencing factors were examined through stepwise regression using multiple linear regression, with statistical significance indicated by a p-value less than 0.05.

RESULTS

Baseline Characteristics of the Samples

The study participants reported an average age of children at (11±29) months and an average age of parents at (31.7±8) years. The provided information may be seen in [Table 1](#).

Parental Preparedness for Hospital Discharge in Children Undergoing Liver Transplantation

The comprehensive score indicating the level of preparedness for parents of children who have had liver transplants was found to be (83±35.5). This score was derived from three distinct dimensions: personal status (22±9), adaptability (33±15), and anticipatory support (28±9).

Multifactorial analysis

A multifactorial analysis was conducted to assess the discharge preparedness of parents of children liver transplant recipients. The present study employs the "personal status dimension" as the dependent variable. It utilizes the stepwise regression method of multiple linear regression to examine the factors that influence the personal status dimension. The findings indicate a positive correlation between changes in the personal status dimension and variables such as monthly household income, place of residence, and physical condition. The coefficient of determination, denoted as R², is equal to 0.819. Additionally, the standardized regression coefficient indicates that the personal status dimension is most significantly influenced by the average monthly family income, with a coefficient value of 0.571. As seen in [Table 2](#).

The study used the stepwise regression technique of multiple linear regression

Table 1. Baseline Characteristics of the Samples

Variables	Number of cases (n)	Percentage (%)
Gender of child	Male	58.3
	Female	41.7
Any complications	Yes	17.5
	No	82.5
Only child	Yes	33
	No	67
Gender of caregiver	Male	39.8
	Female	60.2
Parent's Education	Junior high school and below	46.6
	College and below	28.2
	Undergraduate and above	25.2
Daily care hours	6~12h	51.5
	>12h	48.5
Parent's Careers	Un-employee	15.5
	Farmer	9.7
	Workers	20.4
	Private firm	23.3
	Business unit	31.1
Ethnic group	Han ethnic group	86.4
	National Minority	15.6
Current address	Countryside	43.7
	Cities and towns	56.3
Methods of payment of medical expenses	City and countryside health insurance	48.5
	City and town medical insurance	51.5
Average monthly household income (\$)	0-3000	20.4
	3000-5000	37.9
	>5000	41.7

Table 2. Results of multiple linear regression analysis of factors influencing the personal status dimension

Factor	Regression coefficient	Standard error	Standardized regression coefficient	t	p	95% CI
Monthly household income	4.175	0.473	0.571	8.83	0.000	3.237 - 5.113
Current address	2.966	0.719	0.267	4.128	0.000	1.54 - 4.391
Condition	1.323	0.347	0.193	3.81	0.000	0.634 - 2.012

to examine the variables that influence the adaptability dimension, with the adaptability dimension being the dependent variable. There was a positive correlation seen between changes in the adaptability dimension and both the average monthly family income and whether or not the kid was born alone. Conversely, a negative correlation was found between changes in the adaptability dimension and the daily nursing hours. The coefficient of determination, denoted as R^2 , was 0.773. Additionally, the standardized regression coefficient indicated that the variable representing average monthly family income had the highest magnitude of influence (0.655) on the adaptive ability dimension. As seen in [Table 3](#).

The present study employed the stepwise regression method of multiple linear regression to examine the factors influencing the anticipatory support dimension, which was selected as the dependent variable. The findings revealed a positive correlation between changes in the anticipatory support dimension and monthly household income, while a negative correlation was observed with daily nursing hours and complications. The coefficient of determination, denoted as R^2 , was 0.827. Additionally, the standardized regression coefficients indicated that the anticipatory support dimension was most significantly influenced by the average monthly family income, with a coefficient value of 0.731. As seen in [Table 4](#).

The study used the stepwise multiple linear regression technique to examine the variables that influence the overall discharge readiness score, with the total discharge readiness score as the dependent variable. The study found a positive correlation between changes in the overall discharge readiness score, the average monthly family income, and whether or not the patient was born alone. On the other hand, there was a negative correlation between changes in the total discharge readiness score, the daily nursing time, and the presence of problems. The coefficient of determination, denoted as R^2 , was 0.835. Additionally, the standardized regression coefficients indicated that monthly family income, with a value of 0.703, had the most

Table 3. Results of multiple linear regression analysis of factors influencing adaptive capacity dimension

Factor	Regression coefficient	Standard error	Standardized regression coefficient	t	p	95% CI
Monthly household income	7.782	0.78	0.655	9.973	0.000	6.234 - 9.33
Daily care hours	-5.159	1.184	-0.286	-4.356	0.000	-7.509 - (-2.809)
Only child or not	1.958	0.92	0.102	2.128	0.036	0.132 - 3.783

Table 4. Results of multiple linear regression analysis of factors influencing the dimension of anticipatory support

Factor	Regression coefficient	Standard error	Standardized regression coefficient	t	p	95% CI
Average monthly household income	7.451	0.588	0.731	12.678	0.000	6.285 - 8.617
Daily care hours	-3.892	0.887	-0.251	-4.385	0.000	-5.653 - (-2.131)
Complications	-1.833	0.866	-0.09	-2.116	0.037	-3.552 - (-0.115)

Table 5. Results of multiple linear regression analysis of factors influencing total discharge readiness score

Factor	Regression coefficient	Standard error	Standardized regression coefficient	t	p	95% CI
Average monthly household income	20.299	1.635	0.703	12.419	0.000	17.056 - 23.543
Daily care hours	-12.494	2.469	-0.285	-5.059	0.000	-17.395 - (-7.594)
Only child or not	3.942	1.927	0.085	2.046	0.043	0.118 - 7.767
Complications	-4.889	2.418	-0.085	-2.022	0.046	-9.689 - (-0.9)

significant impact on the overall discharge preparedness score. As seen in [Table 5](#).

DISCUSSION

The present state of preparation for discharge among parents of children liver transplant recipients

The research conducted by Wu Juan et al. revealed that the degree of preparation for discharge among parents of pediatric liver transplant patients was generally low, as shown by a mean total score of 83 ± 35.5 .¹⁷ This score was lower than the mean total score of 97.00 ± 14.00 among mothers of deficient birth weight infants. The study found that the total discharge readiness score of mothers with deficient birth mass children (97.00 ± 14.00) was comparatively lower than the total discharge readiness score of mothers with preterm infants in the study conducted by Wu Juan et al. (87.30 ± 7.08) and the total discharge readiness score reported in the study by Zhang Cui et al. (87.30 ± 7.08) for mothers of preterm infants.¹⁸ The primary factors were examined and evaluated.

The study revealed that liver transplantation is often conducted on younger individuals, with children under the age of one constituting 54.4% of the participants in this research. Parents express apprehension regarding the

premature discharge of their children who have undergone liver transplantation, as they are concerned about the absence of ongoing healthcare system support. They worry about effectively managing potential fluctuations in their children's health status. Consequently, they exhibit a reluctance to actively engage in preparations for their children's discharge from the hospital, preferring instead to extend their hospital stay to closely monitor their children's condition, even after stabilization has occurred.

There exists a notable deficiency in the understanding of parents with children who have had liver transplantation on the appropriate home care practices after the surgical procedure. The number provided by the user.¹⁹ Parents of children who have had liver transplantation have a shallow level of knowledge of post-transplantation home care. Following liver transplantation, pediatric patients need to adhere to a prolonged regimen of immunosuppressive medications, maintain strict dietary management, and undergo frequent monitoring of drug concentration levels. The user provides the numerical value.²⁰ Parents of pediatric liver transplant recipients express concerns over their perceived lack of professional expertise in delivering adequate home care for their

children upon release from the medical facility.

As a consequence of legal and ethical constraints in China, a significant proportion of liver transplant donors for pediatric patients are sourced from one parent.²¹ In situations where the donor is the primary caregiver, the caregiver experiences both personal physical discomfort and the responsibility of caring for the child. This leads to heightened psychological stress and physical strain, as well as an inadequate level of physical readiness for the child's discharge from the hospital. In essence, the author proposes several recommendations for healthcare professionals to address the knowledge gaps among parents in need of liver transplantation. These suggestions include organizing regular knowledge seminars, creating informative brochures, and enhancing the knowledge base regarding pediatric liver transplantation.

Additionally, for parents who face challenges accessing timely medical support, establishing communication platforms such as WeChat groups and public accounts is advised to disseminate liver transplantation-related information and offer remote consultation services. Furthermore, when the primary caregiver is the donor, providing additional

support and alleviating their caregiving responsibilities is crucial. This approach aims to lessen the burden of care for this particular group of parents. When the primary caregiver is the donor, it is imperative to provide more attention to these parents about nursing care to reduce their caregiving load and effectively prepare them for hospital release.

An Analysis of Factors Influencing the Discharge Readiness of Parents of Pediatric Liver Transplant Recipients

As identified in this research, the primary determinants that influenced the limited preparedness of parents of pediatric liver transplant recipients were as follows: There exists an inverse relationship between the average monthly family income and the parents' preparedness for hospital release. The financial burden becomes more significant for families with lower average monthly incomes when confronted with different treatment expenses, such as the expenditures associated with liver transplantation surgery, medical expenses, nutritional expenses, and so on.²² Upon the child's release from the medical facility, the parents are still responsible for covering the expenses associated with postoperative medicines and follow-up exams.²³ Parents are less prepared for hospital release due to their optimistic anticipation of an expeditious departure. Conversely, they need more confidence in their financial resources, which hinders their ability to proceed with the discharge process.

The parents' preparedness to be released from the hospital decreases as the duration of daily care increases. There is a direct correlation between the duration of parental involvement in the daily care of their hospitalized children and the subsequent increase in their physical load, decrease in energy levels, and deterioration of their overall health condition.²⁴ Upon release, parents who provided long-term care for their children had a higher likelihood of experiencing exhaustion and diminished physical strength, resulting in a comparatively lower level of preparedness for discharge when compared to parents who showed higher energy levels.

The preparedness for hospital release was more significant among parents with only children than parents with many children. Given that the majority of pediatric liver transplant recipients were of a younger age, it may be inferred that they exhibited a greater need for parental support and attention. Parents can devote their undivided attention and care to a child when a kid is the only offspring. Conversely, in situations where a child has siblings, parents are required to allocate their caregiving responsibilities among several children, increasing the overall care burden.

Parents of children who have postoperative problems demonstrate a lower level of preparedness when it comes to the discharge process from the hospital. Parents of children who have difficulties after liver transplantation exhibit heightened anxiety for the recurrence of their child's disease and demonstrate increased reliance on the healthcare system in comparison to parents whose children do not encounter such issues.²⁵ Parents residing in rural or remote regions express concerns regarding their access to prompt medical assistance if their child experiences complications, such as acute rejection, after being discharged from the hospital. These parents possess an increased demand for post-discharge medical care. In conclusion, it is recommended that healthcare professionals enhance the dissemination of information about liver transplantation among parents of pediatric patients undergoing this procedure.

Additionally, they should offer timely guidance on discharge preparation for parents whose children experience postoperative complications. It is crucial to prioritize these parents' physical and mental well-being and tailor discharge instructions to accommodate individuals from diverse backgrounds. These measures aim to enhance the parents' readiness for hospital discharge.

Therefore, this study has several limitations, such as the sample size of this study was only from one hospital with limited sample representativeness, and only explored the survey of the current status of discharge readiness of parents of children with liver transplants and the analysis of the influencing factors, which

should involve more in-depth studies and multi-center large-sample studies in the future.

CONCLUSION

The evaluation of the preparedness of parents of children who have had liver transplantation has significant consequences for the provision of discharge instructions, ensuring the continuity of care, and tracking the post-transplant progress of these children. Clinical personnel must take into account many factors that impact the preparedness of children to be discharged after liver transplantation and provide personalized treatment recommendations. Furthermore, these treatments must be designed to engage parents from varied backgrounds to enhance their efficacy effectively. This study closely examined the discharge readiness dynamics of parents of children who underwent transplantation. Specifically, it focused on the changes in readiness of parents of children who received liver transplants as they transitioned from hospital to at-home care. The aim was to establish a reference point for future follow-up care of children who have undergone liver transplantation. Given the disease's unique characteristics and limited timeframe, this investigation was carried out with a single-center sampling approach and a limited number of samples. Future research should consider employing a multi-center sampling strategy to enhance the diversity and representativeness of the sample population.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTION

All members have contributed equally to the writing of this manuscript.

ETHICAL CONSIDERATIONS

This study was reviewed and agreed to be conducted by the Medical Ethics Committee of the First Affiliated Hospital of Guangxi Medical University.

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