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A Study on the Multifactorial Causal Relationships of Discharge Readiness Among Women Delivering Vaginally: A Configuration Perspective

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Abstract

Objective

Using fuzzy set qualitative comparative analysis (fsQCA), this study identified the necessary conditions for high discharge readiness among women who gave birth vaginally from a configuration perspective, analyzed the sufficiency configurations, and identified multiple equivalent configurations that result in high discharge readiness. Methods: This cross-sectional study recruited women who delivered vaginally at a tertiary hospital in Zunyi City between April 2025 and December 2025. By assessing individual demographic characteristics, the severity of perineal tears, scores on various dimensions of comfort, the quality of discharge instructions, and discharge readiness, the fsQCA method was used to explore the primary factors influencing discharge readiness among women who delivered vaginally.

Methods

This study employed a cross-sectional design and recruited women who had given birth vaginally at a tertiary hospital in Zunyi City between April and December 2025. By assessing individual demographic characteristics, the severity of perineal tears, scores on various dimensions of comfort, the quality of discharge instructions, and discharge readiness, the fsQCA method was used to identify the primary factors influencing discharge readiness among women who had given birth vaginally.

Results

The necessity analysis revealed that the consistency of each individual antecedent condition—including the severity of perineal injury, physical comfort, psychological comfort, sociocultural comfort, environmental comfort, and the quality of discharge instructions—was below the 0.90 threshold; thus, no single condition was found to be a necessary prerequisite for high discharge readiness. The adequacy analysis identified five high-discharge-readiness configurations (H1–H5), with an overall solution consistency of 0.816 and an overall solution coverage of 0.612, explaining 61.2% of the cases with high discharge readiness. Among these, the H4 pathway (high physiological comfort + high psychological comfort + high sociocultural comfort + high environmental comfort + high injury severity) is the core pathway, covering 39.7% of patients with high readiness (primitive coverage = 0.397, unique coverage = 0.041, consistency = 0.866). Configuration analysis indicates that psychological comfort and sociocultural comfort are core conditions widely present across all pathways, while physiological comfort and psychological comfort may co-occur (H4) or substitute for one another (H1).

Conclusion

High readiness for discharge among women who have given birth vaginally does not depend on a single dimension of comfort, but is driven by a combination of factors, including physiological, environmental, and psychosocial-cultural dimensions. This suggests that clinical interventions should be tailored based on the specific comfort profiles of individual mothers. The findings of this study can help obstetric healthcare providers prioritize the identification of weak dimensions in mothers' readiness-for-discharge profiles, develop personalized intervention strategies, and optimize the quality of guidance provided regarding readiness for discharge and transitional care.

Introduction

Readiness for Hospital Discharge refers to the process by which healthcare professionals conduct a comprehensive assessment of a patient's physical, psychological, and social well-being to determine whether the patient is capable of leaving the healthcare facility, returning home, and safely transitioning to self-care. During vaginal delivery, the incidence of perineal tears is as high as 85% or more[1, 2], and this injury can affect a mother's recovery through pain-mediated psychophysiological mechanisms; the incidence of perineal wound pain within 24 hours postpartum reaches 83.1%[3, 4]. Pain may trigger negative physical and psychological reactions, such as anxiety and sleep disturbances, by activating the sympathetic-adrenal-medullary axis[5]. Korkaba's Theory of Comfort states that comfort is a holistic experience encompassing four dimensions—physiological, psychological, sociocultural, and environmental—and that a state of discomfort significantly impairs an individual's ability to care for themselves and their adherence to rehabilitation[6]. Women who have given birth vaginally face unique challenges in preparing for discharge due to perineal tears, pain, and limited mobility; accurately assessing their readiness for discharge is crucial for ensuring the safety of both mothers and infants and promoting postpartum recovery[7]. However, traditional regression methods focus only on the independent effects of individual factors, neglecting the synergistic, substitutive, or inhibitory relationships among factors, and thus have limited explanatory power[8-11]. This study employs the Fuzzy Set Qualitative Comparative Analysis method to identify the configuration effects between the severity of perineal tears in women who give birth vaginally and the various dimensions of discharge readiness and comfort, as well as the quality of discharge instructions, thereby providing a basis for developing targeted discharge preparation strategies.

1 Materials and Methods

1.1 Research Design

This study was conducted from April 2025 to December 2025 in the obstetrics ward of a tertiary hospital in Zunyi City, Guizhou Province, China. The study participants were women who had given birth vaginally and were hospitalized postpartum. Using cluster sampling, we selected women who were within 12 hours of discharge to accurately assess their readiness for discharge. Inclusion criteria: women who delivered vaginally; age ≥ 18 years; informed consent and voluntary participation. Exclusion Criteria:

women with severe obstetric complications requiring transfer to the ICU for further treatment; □ women with cognitive impairment, mental disorders, or visual or hearing impairments who are unable to complete the questionnaire independently or with assistance. Participants fully understood the purpose, content, and procedures of the study and had the right to withdraw at any time.

The sample size estimation was based on the requirements of the fsQCA methodology. This study included six conditional variables: degree of perineal injury, physical comfort, psychological comfort, sociocultural comfort, environmental comfort, and quality of discharge instructions. The number of theoretical truth table combinations is $2^6 = 64$. According to the fsQCA methodology, the number of conditional variables in a large-sample study should be limited to 6–12, and the number of cases should be significantly greater than the number of truth table combinations to ensure a thorough analysis of subset relationships. The final plan was to recruit 320 cases, which is approximately five times the number of truth table combinations, thereby meeting the requirements for large-sample configuration analysis. After excluding 12 women who were transferred to other hospitals, 15 women who refused to participate, 4 women with communication or reading difficulties, and 29 women whose questionnaires were incomplete, the final analysis sample consisted of 260 women who had given birth vaginally.

The type of perineal injury was clearly documented in the delivery record by the obstetrician in accordance with the perineal tear classification standards outlined in *Obstetrics and Gynecology*. In this study, perineal injuries during vaginal delivery were primarily Grade II lacerations and episiotomies. Since no Grade III or higher lacerations were observed in this study, Table 1 lists only the types of injuries that actually occurred.

1.2 Theoretical Framework

This study constructed an analytical framework based on Kolcaba's Theory of Comfort[12]. This theory posits that achieving a comfortable outcome for patients is the core goal of nursing practice. It aims to facilitate a holistic health experience by meeting patients' needs across four dimensions—physiological, psychological and mental, sociocultural, and environmental—and can be applied in the field of labor and delivery nursing to guide the assessment of maternal comfort and the design of interventions[13]. The labor support protocol developed by Unutkan et al.[14]based on this theory resulted in a significant improvement in labor comfort ($p = 0.002$) and a significant reduction in pain scores ($p < 0.001$) among women in the intervention group. The development of the Labor Analgesia and Maternal Comfort Scale also provides empirical evidence for applying this theory to the assessment of comfort among women in labor[15]. Accordingly, this study identifies perineal trauma as the primary stressor, uses the four dimensions of comfort as the core variables for assessing the internal state of parturients, and considers readiness for discharge as the behavioral manifestation of comfort in a clinical setting.

1.3 Research Tools

The basic information collected from the mothers included age, height, number of pregnancies and births, total duration of labor, educational level, maternal BMI, household income, and health insurance

type. The study questionnaire covered discharge instructions, comfort level, and preparedness for discharge.

The survey on maternal comfort utilized the Chinese version of the General Comfort Questionnaire (GCQ), which was localized and revised by Zhu Lixia et al. [16], with a Cronbach's alpha coefficient of 0.907 and good validity. The original version of this questionnaire was developed and validated by Kolcaba et al.[17] (1992). A questionnaire was distributed prior to discharge for assessment. It consisted of four dimensions—environmental, sociocultural, psychological, and physiological—and 30 items. Each item was scored using a 4-point scale (1–4 points): for positive items, "strongly agree" was scored as 4 points and "strongly disagree" as 1 point; for negative items, "strongly disagree" was scored as 4 points and "strongly agree" as 1 point. The total score ranges from 30 to 120 points; a higher score indicates a higher level of comfort.

Readiness for hospital discharge among new mothers was assessed using the Chinese version of the Readiness for Hospital Discharge Study—New Mother Form (RHDS-NMF), adapted by Chen et al.[18], with questionnaires administered prior to discharge. The original version of this questionnaire was developed and validated by Weiss et al.[19] (2006). The scale consists of four dimensions and 19 items. The first item (physical condition) is a true/false question and is not included in the total score; the remaining items are scored on a scale of 0 to 10, where 0 indicates "completely unaware" or "not at all prepared," and 10 indicates "fully aware" and "already prepared." Items 3 and 6 are reverse-scored items; postpartum women should select the appropriate score based on their actual circumstances. The sum of the four dimensions constitutes the total score on the scale; a higher total score indicates a higher level of readiness for discharge, The Chinese version of the RHDS-NMF has a Cronbach's alpha coefficient of 0.901 and a content validity index of 0.98, indicating good reliability and validity.

Discharge instructions were evaluated using the Chinese version of the Quality of Discharge Teaching Scale—New Mother Form (OB-QDTS) developed by Li et al.[20]. The original version of this questionnaire was developed and validated by Weiss et al. [21](2007). It comprises 3 dimensions and a total of 27 items. A 0–10-point rating scale was used, where 0 indicates "not at all" and 10 indicates "very much/excellent"; a score below 7.0 indicates inadequate quality of discharge instructions, 7.0–7.9 indicates moderate quality, 8.0–8.9 indicates high quality, and 9.0–10.0 indicates very high quality. The Cronbach's alpha coefficient for the Chinese version of the OB-QDTS total scale was 0.953, while the Cronbach's alpha coefficients for each dimension were 0.976 and 0.943, respectively;

1.4 Data Collection

Data collection is performed by obstetric nurses who hold valid practice licenses. To ensure methodological consistency and uniformity in data collection, all obstetric nurses who voluntarily participated in this study underwent a 3-hour standardized pre-service training session, which was led and organized by the department's nursing manager. The training covers: interpretation of subject inclusion and exclusion criteria, standard procedures for the informed consent process, standardized

procedures for administering questionnaires, and ethical requirements for research data management. Patients who met the inclusion criteria were screened and contacted by a study nurse within 12 hours prior to discharge. Researchers fully informed patients of the study's objectives, participation procedures, confidentiality measures, and the principle of voluntary participation using a standardized script, and obtained their signed written informed consent. The distribution of the questionnaire follows the principle of "priority given to independent completion." Suggestive prompts or explanatory interventions were avoided throughout the process to minimize tester bias. After data collection was completed, the research nurse verified the completeness and logical consistency of the questionnaires on the spot. The data were anonymized using unique identification codes and entered into a secure electronic database. To ensure data quality, a double-entry method was employed, in which two researchers independently entered all data; any discrepancies were resolved through cross-validation.

1.5 Data Analysis

Data analysis was performed using SPSS 29.0 and fsQCA 4.1 software. First, descriptive statistical analyses were performed using SPSS 29.0, including frequency, percentage, mean, and standard deviation (SD). Missing values were checked for all variables prior to formal analysis. Since the proportion of missing values for all key variables in this study did not exceed 3%, the column deletion method was used. There were no statistically significant differences in the distribution of demographic characteristics between the samples before and after deletion ($p > 0.05$), indicating that the data exhibited completely random missing values. FsQCA version 4.1 was used to conduct the analysis, and the results were reported in accordance with the guidelines provided by Ragin and Fiss [22]. The raw data is converted into set membership scores in the 0–1 range using a calibration function. For continuous variables, three qualitative anchors were set based on the direct calibration method[23]: The 95th percentile corresponds to full membership (value of 1.0), the 50th percentile corresponds to the cutoff point (value of 0.5), and the 5th percentile corresponds to full non-membership (value of 0). To prevent cases with a membership score exactly equal to 0.5 from being automatically excluded by the software because of being at the point of maximum fuzziness, a uniform bias of 0.001 was added to all calibrated conditional variables, adjusting them to 0.501[24]. Based on the calibrated membership data, a necessity analysis and a sufficiency analysis were performed. By calculating the consistency index and the coverage index, the association configurations associated with the presence and absence of the outcome were ultimately identified.

After fsQCA calibration, assess the necessity of each antecedent variable for discharge readiness and then conduct a thorough analysis. If the value of the antecedent variable is greater than 0.90, it is considered necessary. A truth table with sufficient analytical depth was constructed, with consistency set to 0.8 and frequency set to 2, ensuring that at least 75% to 80% of the observed cases were retained. Variables that appear in both the minimal solution and intermediate solutions are classified as core constraints, while variables that appear only in the intermediate solutions are classified as boundary constraints. When solution consistency is met or exceeded, it indicates that the model is informative.

1.6 Potential Sources of Bias

Several measures were taken to enhance internal validity and reduce bias. The cluster sampling method minimized selection bias, while the use of scales validated for reliability and validity and data collectors who had undergone standardized training reduced the risk of information bias.

1.7 Ethics Approval and Informed Consent

This study was conducted in accordance with the Declaration of Helsinki, and the study protocol was approved by the Ethics Committee of the Affiliated Hospital of Zunyi Medical University (Approval No. KLL-2025-092). All participants were informed of the study design and provided written informed consent. All data were kept confidential, and participants were informed of their right to voluntarily withdraw from the study at any time.

2 Results

2.1 Demographic Characteristics

A total of 260 women who gave birth vaginally participated in the study. As shown in Table 1, the participants' mean age was 29.59 years (standard deviation = 4.47 years). In terms of educational attainment, 83.46% (n = 217) had completed high school or junior high school, while only 4.62% (n = 12) held a master's degree or higher. In terms of monthly income, 41.54% (n = 108) reported earning between 4,000 and 8,000 RMB, while 36.92% (n = 96) reported earning less than 4,000 RMB. The average score for discharge readiness was 121.39 (standard deviation = 41.39), indicating insufficient discharge readiness. Specifically, the average score for the "Personal Physical Condition" subscale was 26.43 (standard deviation = 9.69), the average score for the "Knowledge" subscale was 46.02 (standard deviation = 17.06), and the average score for the "Coping Ability" subscale was 49.07 (standard deviation = 16.08). See Table 1 for more detailed information.

Table 1
Demographic characteristics of participants (n = 260)

Variables	Dimension	N(%)/Mean ± Standard Deviation
Age		29.59 ± 4.47
Height		159.23 ± 4.72
Parity	1	161(61.92%)
	>1	99(38.08%)
Types of Injuries	First-degree perineal laceration	89(34.23%)
	No perineal injury	89(34.23%)
	Episiotomy and Second-Degree Perineal Tear	82(31.54%)
Total Labor and Delivery Time		8.19 ± 3.90
BMI	< 18.5	16(6.15%)
	18.5–24.9	165(63.46%)
	> 25	79(30.39%)
Length of Hospital Stay	4.6 ± 1.58	
Monthly Household Income	<2000	31(11.92%)
	2001–4000	65(25%)
	4001–8000	108(41.54%)
	>8000	56(21.54%)
Health Insurance Type	Urban and Rural Residents' Medical Insurance	116(44.61%)
	Employee Health Insurance	127(48.85%)
	Self-funded	17(6.54%)
Pain Score 24 Hours Postpartum	7.23 ± 0.67	
Cold Compress for the Perineum	Yes	142(54.62%)
	None	118(45.38%)
Attend a Prenatal Class	Yes	116(44.62%)
	None	144(55.38%)

Variables	Dimension	N(%)/Mean ± Standard Deviation
Level of Education	Junior high school and below	43(16.54%)
	Vocational High School or High School	64(24.62%)
	Associate's or Bachelor's degree	141(54.23%)
	Master’s degree or higher	12(4.61%)

2.2 Calibration of Conditional and Outcome Variables

To calibrate the outcome variable “readiness for discharge,” three membership score anchors were established: 0.95 (full membership in the “high readiness for discharge” set), 0.5 (the intersection point, representing the state of maximum fuzziness), and 0.05 (complete non-membership). For the calibration of the antecedent variables, following Fiss’s[25]methodological recommendations regarding differential calibration strategies, the following settings were established based on the measurement characteristics and theoretical directions of action of each variable:

For the severity of perineal injury (conditional variable A), positive thresholds were set based on clinical grading criteria (belonging to the “severe injury” set): perineal incision and second-degree perineal laceration corresponded to 0.95 (entirely within the set), first-degree perineal laceration corresponded to 0.5 (the cutoff point), and no perineal injury corresponded to 0.05 (entirely outside the set).

For discharge instructions (conditional variable B), the mean-anchored method was used: the sample mean was set as the crossover point (0.5), the maximum value on the scale (completely comfortable) was assigned a membership value of 0.95 (full membership), and the minimum value on the scale (completely uncomfortable) was assigned a membership value of 0.05 (no membership).

For the comfort level (conditional variable C), the mean-anchoring method was used: the sample mean was set as the midpoint (0.5), the maximum value of the scale (completely comfortable) was assigned a membership value of 0.95, and the minimum value of the scale (completely uncomfortable) was assigned a membership value of 0.05. The results are presented in Table 2.

Table 2
Conditional Assignment and Calibration Parameters for fsQCA

Conditions	Design	95th percentile	Median	5th percentile
Readiness for Discharge	Total Score	180	127.7	56.36
	Personal Status	40	26	11.8
	Knowledge	70	48.95	15.5
	Resilience	70	49.4	21.195
Severity of Perineal Injury	1 = Episiotomy and Second-Degree Perineal Tear	2	1	0
	2 = First-degree perineal laceration			
	3 = No perineal injury			
Comfort Level	Total Score	98.1	84	69
	Physiological	16.1	12	6
	Psychological	36	29	23
	Sociocultural	27	22	19
	Environmental	25	20	15
Discharge Instructions	Total Score	240	216.35	137.6

2.3 Analysis of the Necessity of a Single Condition

The results of the necessity analysis showed that the influence of each antecedent condition—including perineal injury, physical comfort, psychological comfort, sociocultural comfort, environmental comfort, and the quality of discharge instructions—on the construct of discharge readiness did not exceed the consistency threshold of 0.900, indicating that there are no necessary conditions constituting discharge readiness. These findings confirm that readiness for discharge is the result of the complex interplay of multiple contributing factors, rather than being determined by a single factor. See Table 3 for specific results.

Table 3
Necessity Analysis of Antecedent Conditions Influencing Readiness for Discharge

Prerequisites	High Level of Readiness for Discharge		~High Level of Readiness for Discharge	
	Consistency	Coverage	Consistency	Coverage
Perineal Injury	0.609	0.611	0.585	0.612
~Perineal Injury	0.613	0.586	0.628	0.627
Physical Comfort	0.799	0.702	0.601	0.551
~Physical Comfort	0.489	0.540	0.675	0.778
Psychological Comfort	0.761	0.762	0.531	0.556
~Psychological Comfort	0.556	0.532	0.773	0.772
Sociocultural Comfort	0.803	0.778	0.548	0.554
~Sociocultural Comfort	0.541	0.534	0.781	0.805
Environmental Comfort	0.677	0.740	0.522	0.596
~Environmental Comfort	0.630	0.558	0.773	0.714
Discharge Instructions	0.665	0.578	0.702	0.637
~Discharge Instructions	0.582	0.652	0.535	0.626

Note: “~” indicates negation.

2.4 Analysis of the Adequacy of Hospital Discharge Preparation to Identify Configurations with High Discharge Readiness

The adequacy analysis showed that the five high-readiness configurations collectively accounted for 61.2% of patients exhibiting high readiness for discharge (overall coverage = 0.612, overall consistency = 0.816), with readiness scores exceeding 85(Table 4). The most significant factor explaining high discharge readiness was the H4 pathway, which includes physical, psychological, sociocultural, and environmental comfort and severity of injury, accounting for 39.7% of patients with high readiness (original coverage = 0.397, unique coverage = 0.041, consistency = 0.866). Furthermore, the results of H1 and H4 indicate that physiological and psychological comfort can occur together (H4), but that physiological comfort can also be replaced by psychological comfort (H1).

Table 4
Analysis of Adequacy of Discharge Readiness

Prerequisites	**High Discharge Readiness Configuration**					**Non-High Discharge Readiness Configuration**	
Path	H1	H2	H3	H4	H5	NH1	NH2
Physical Comfort	⊗		⊗	●	●	⊗	
Psychological Comfort	●	⊗	⊗	●	●	●	●
Sociocultural Comfort	⊗	●	●	●	●	●	●
Environmental Comfort	⊗	⊗		●		●	●
Severity of Injury	●	●	●	●	●	⊗	●
Quality of Discharge Instructions		⊗(small)			●(small)	●(small)	
Original Coverage	0.243	0.266	0.264	0.397	0.357	0.297	0.345
Unique Coverage	0.014	0.012	0.014	0.041	0.009	0.001	0.002
Consistency	0.852	0.853	0.849	0.866	0.865	0.847	0.866
Consistency of the Overall Solution	0.816						
Overall Solution Coverage	0.612						

Note: ● = Core condition exists; ⊗ = Core condition does not exist; ● (small) = Boundary condition exists; ⊗ (small) = Boundary condition does not exist; a blank indicates “irrelevant” and has no effect on the configuration.

2.5 Interpretation of Results

The high discharge readiness score revealed five equivalent configuration pathways, which can be categorized into three types: Alternative configurations (H1–H3) indicate that, even when physiological or psychological comfort is insufficient, increased clinical attention in cases of higher injury severity may form synergistic configurations with other conditions. Specifically, H1 substitutes psychological comfort for insufficient external support, while H2 and H3 substitute sociocultural comfort for psychological functioning, thereby validating the equivalent substitutability of psychological and social factors. The comprehensive configuration (H4) is the ideal setup for all five factors at their maximum levels, producing a cumulative effect of comfort; the guidance-enhanced configuration (H5) indicates that discharge instructions are equivalent to environmental comfort features, allowing for flexible selection of intervention priorities based on available resources.

The two configurations that do not prioritize discharge readiness provide reference suppression modes: the “Low Injury–Low Physiological” (NH1) mode indicates that a “mild condition–light management” approach may lead to inadequate physiological management, which cannot be compensated for by high psychosocial comfort; the guidance-dependent model (NH2) indicates that discharge instructions exhibit a significant threshold effect when all other conditions are met; the absence of such instructions may limit the level of preparedness. The data above indicate that the severity of injury serves as a contextual factor that triggers clinical care attention; physical comfort is a foundational condition in the configuration; psychological and sociocultural comfort are interchangeable; and the role of discharge instructions depends on the configuration of other conditions.

3 Conclusions and Discussion

This study employed the fsQCA method to provide different combinations of explanations for the factors influencing a mother’s readiness for discharge, with the aim of identifying the antecedent conditions that affect the readiness for discharge among mothers who gave birth vaginally. The results showed that, in the scenario analysis, the severity of injury appeared as a core condition in all scenarios with high discharge readiness, but its direction of influence must be understood in conjunction with other conditions. When a high level of injury severity coexists with high clinical priority and high comfort (e.g., the H4 configuration), readiness for discharge is high; conversely, when a low level of injury severity coexists with low physiological comfort (the NH1 configuration), readiness for discharge is low. This suggests that the severity of injury itself is not an independent “promoting” or “inhibiting” factor, but rather produces a configuration effect by activating the allocation of clinical care resources in conjunction with other conditions. Studies have shown that women who have given birth vaginally are in a critical phase of physiological recovery, during which they are often troubled by perineal tears and pain, which may negatively affect their readiness for discharge[26]. As the severity of the injury increases, the women’s physical function becomes relatively limited, and pain has a more severe adverse impact on their ability to perform daily activities[27]. However, conclusions regarding the impact of injury severity on the level of readiness for discharge are inconsistent. This study indicates that the interaction between injury severity and the level of clinical concern, as well as the combined effects of physiological comfort, psychological comfort, sociocultural comfort, environmental comfort, and discharge instructions, are key factors influencing the level of readiness for discharge.

The necessity analysis indicates that there is no single prerequisite for high discharge readiness; rather, high discharge readiness requires the convergence of multiple conditions and does not depend on a single factor. Furthermore, psychological and sociocultural comfort were widely present as core conditions across all high-readiness-for-discharge configurations, suggesting that these two factors may be key dimensions driving improvements in mothers’ readiness for discharge. Previous intervention studies[28–30] have also shown that comfort interventions targeting psychological and sociocultural dimensions help alleviate postpartum anxiety and enhance self-efficacy, which is consistent with the clustering patterns identified in this study. Understanding the mechanisms underlying these effects

enables us to take appropriate measures, selecting psychological interventions or social support as core strategies based on the characteristics of different childbearing women[31], thereby alleviating anxiety about discharge and enhancing their readiness.

Owing to limitations in data collection, the sample in this study consisted solely of data from women who gave birth at a single medical institution, resulting in a limited sample size. Future research should expand the sample size to include more women from different regions, with different modes of delivery, and from diverse socioeconomic backgrounds, and further analyze the role of contextual factors, such as the allocation of medical resources and institutional culture, in improving discharge readiness. Additionally, conducting longitudinal studies in the future will help elucidate the mechanisms underlying dynamic changes in discharge readiness and provide a basis for determining the optimal timing for interventions.

Declarations

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Availability of data and materials

The data set generated during the study are available from the corresponding author on reasonable request.

Consent for publication

Not applicable.

Declaration of competing interest

The authors declare that they have no known financial interests or relationships that could influence the publication of these findings.

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