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Satisfaction with Home Accessibility Modifications among Families with Disabilities in China: A Cross-sectional Study

Jin Chen[1], Jing Lu[2], Jingru Shan[1], Zhenkun Xu[3]*

1. School of Rehabilitation, Jiangsu Medical College, Yancheng, Jiangsu, 224005, China
2. Yancheng Disabled Persons' Federation, Yancheng, Jiangsu, 224005, China
3. Centre for Rehabilitation and Special Needs Studies, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur, Malaysia

Corresponding author: Zhenkun Xu, xzk1818@126.com

Abstract: Home accessibility modification programs have expanded rapidly in China, yet factors influencing beneficiary satisfaction remain understudied. This cross-sectional survey examined 1,705 persons with disabilities who completed home modifi cations in Yancheng City, Jiangsu Province (2022–2024). Mean overall satisfaction was 4.5 out of 5.0. Ordinal logistic regression revealed that service process variables—particularly personal participation (OR=12.627), timeline reasonableness (OR=7.79), and information adequacy (OR=7.72)—were the primary determinants of satisfaction, while demographic factors showed no signifi cant associations. These fi ndings suggest that service process experience, especially personal participation, constitutes the core determinant of satisfaction, supporting a shift from construction-oriented to experience-oriented service delivery.

Keywords: Home Modification; Disability; Satisfaction; Ordinal Logistic Regression; Public Service

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1. Introduction

Disability represents a significant global health and social challenge. According to the World Health Organization, approximately 1.3 billion people—representing 16% of the global population—currently experience signifi cant disabilities [1]. According to national estimates, the number of persons with disabilities in China exceeds 85 million, encompassing diverse disability types, including physical, sensory, intellectual, and multiple disabilities [2]. This number continues to grow due to aging populations, the increasing prevalence of chronic diseases, and various environmental factors. The home environment plays a crucial role in the daily functioning, independence, and quality of life of persons with disabilities [3, 4]. However, many residential dwellings were not originally designed with accessibility in mind, creating substantial barriers that limit mobility, safety, and participation in daily activities [5]. Home modifi cations, defi ned as structural changes made to residences to improve accessibility and safety, have emerged as a critical intervention strategy to address these environmental barriers [6]. These modifi cations may include the installation of ramps, widening of doorways, bathroom adaptations, and the addition of assistive devices such as grab bars and stairlifts. Research has demonstrated that appropriate home modifications can significantly reduce caregiving hours, enhance independence, decrease fall risks, and improve overall well-being among persons with disabilities [7, 8].

While considerable attention has been devoted to the implementation and functional outcomes of home modification programs, relatively limited research has focused on recipient satisfaction—a critical indicator of intervention success and quality [9]. Existing studies have primarily examined objective measures such as accessibility improvements and functional performance gains, while the subjective experiences and satisfaction levels of beneficiaries remain underexplored [10]. Furthermore, most existing satisfaction research has been conducted in Western developed countries, with limited evidence from developing nations where contextual factors—including housing structures, cultural preferences, policy frameworks, and socioeconomic conditions—may substantially influence modification outcomes and satisfaction [11]. In China, substantial policy efforts have been made to promote home accessibility modifications. During the 14th Five-Year Plan period (2021-2025), the government completed barrier-free renovations for over 1.28 million households with severely disabled members, surpassing the original target [12]. Despite this significant investment, systematic evaluation of beneficiary satisfaction with these modifications remains scarce. Understanding satisfaction levels and their determinants is essential for improving program design, resource allocation, and service delivery to better meet the diverse needs of persons with disabilities and their families.

Against this backdrop, Yancheng City, Jiangsu Province, located in the Yangtze River Delta of eastern China, provides a representative case of local implementation in an economically developed region. As an important city in this region, it actively promoted home accessibility modifications and completed 1,148 household renovations in 2024, adopting a personalized “one household, one plan” approach. Examining this city is particularly meaningful, as it reflects the current shift in accessibility work from emphasizing task completion and coverage expansion toward improving service quality and user-centered outcomes. Accordingly, this study examined satisfaction with home accessibility modifications among households with disabilities and identified factors associated with satisfaction. We employed a cross-sectional survey design utilizing a structured questionnaire that incorporated validated satisfaction measurement instruments adapted for the local context. Data were analyzed using ordinal logistic regression to identify key determinants of satisfaction. The findings of this study are expected to provide empirical evidence for policymakers and practitioners to optimize home modification programs, enhance service quality, and ultimately improve the living conditions and well-being of persons with disabilities.

2. Methods

2.1 Study Design and Participants

A cross-sectional survey design was employed targeting persons with disabilities who completed home accessibility modifications in Yancheng City, Jiangsu Province, between 2022 and 2024.

Inclusion criteria were: (1) completion of home accessibility modification within the study period; (2) sufficient cognitive and communication capacity to understand questionnaire content and provide valid responses; and (3) informed consent to participate. Exclusion criteria were: (1) severe cognitive impairment precluding survey participation; (2) relocation from the modified residence after completion; and (3) modification completion outside the specified timeframe. The study was conducted with support and coordination from the Yancheng Disabled Persons’ Federation.

The study was approved by the Ethics Committee of Jiangsu Medical College (202509-PJ-015).

2.2 Survey Instrument

A purpose-designed questionnaire was developed through literature review, expert consultation, and pilot testing with iterative refinement to ensure content validity and applicability. The instrument comprised two sections.

The first section captured sociodemographic characteristics and housing information, including: gender, educational attainment (primary school, junior high school, senior high school or above), disability grade (grades I-IV per national standards, with I representing most severe), modification subsidy amount (six categories from <1,000 to >5,000 yuan), housing type (commercial housing, rental housing, rural homestead housing, other), housing construction era, and living arrangement (alone, with spouse, with children, with parents, other).

The second section assessed satisfaction across seven dimensions using five-point Likert scales (1=very dissatisfied to 5=very satisfied): (1) modification product quality; (2) construction staff service attitude; (3) information acquisition adequacy; (4) modification content/options diversity; (5) personal participation degree; (6) modification timeline reasonableness; and (7)

overall satisfaction. Overall satisfaction served as the dependent variable in regression analyses.

2.3 Data Collection

Data collection employed a combination of in-person home visits and telephone interviews, coordinated through the Yancheng Disabled Persons' Federation. For participants with mobility limitations or residing in remote areas, telephone interviews were conducted; for those able to participate in face-to-face interviews, trained investigators administered questionnaires during home visits. All investigators received standardized training on questionnaire content and interview techniques to ensure data collection consistency.

Rigorous data cleaning and verification procedures were implemented: (1) completeness checks with exclusion of questionnaires with extensive missing data; (2) logical consistency verification, flagging severe contradictions between dimensional and overall satisfaction ratings; (3) exclusion of response patterns exhibiting obvious regularities (e.g., identical responses across all items); and (4) outlier review with telephone callback confirmation when necessary.

2.4 Statistical Analysis

Statistical analyses were performed using Jamovi version 2.6.26. Categorical variables were described using frequencies and percentages; continuous variables were summarized as means with standard deviations. With overall satisfaction (five ordered categories) as the dependent variable, ordinal logistic regression (proportional odds model) was employed to identify associated factors [13, 14].

Prior to modeling, multicollinearity among independent variables was assessed using variance inflation factors (VIF), with VIF<10 indicating absence of serious multicollinearity. Following model estimation, the parallel lines assumption (proportional odds assumption) was tested. This assumption requires that regression coefficients remain constant across different cut-points of the ordinal dependent variable; violation ($p<0.05$) would necessitate alternative approaches such as multinomial logistic regression. Effect sizes were expressed as odds ratios (OR) with 95% confidence intervals (CI). All tests were two-sided with significance level $\alpha=0.05$.

3. Results

3.1 Sample Characteristics

Of 1,924 questionnaires distributed, 1,705 valid responses were obtained after excluding incomplete, logically inconsistent, and pattern-response questionnaires, yielding an effective response rate of 88.6%.

Table 1 presents sample characteristics. The sample was predominantly male (61.11%) with low educational attainment—primary school education constituted the majority (69.09%), followed by junior high school (26.39%), with senior high school or above representing only 4.52%. This distribution reflects the generally lower educational levels characteristic of rural disabled populations in China. Housing was overwhelmingly rural homestead properties (92.49%), consistent with Yancheng's demographic composition. Living arrangements varied, with spousal cohabitation most common (49.85%) and sole residence accounting for 10.50%—the latter group potentially experiencing greater urgency for accessibility modifications due to absence of immediate assistance.

Disability grade distribution showed grade II predominant (56.72%), with grades I and II combined (severe disabilities) comprising 71.85% of the sample, aligning with policy priorities for severe disability populations. Modification subsidy amounts were relatively evenly distributed, with the 2,000-3,000 yuan range most common (22.35%), reflecting the individualized "one household, one policy" implementation approach. Mean overall satisfaction was 4.5 (SD=0.7) on the five-point scale, indicating generally positive evaluation of modification services.

Table 1. Demographic Characteristics of Study Participants (n=1,705).

Variable	Category	n	%
Sex	Male	1042	61.11
	Female	663	38.89
Education level	Primary school	1178	69.09
	Middle school	450	26.39
	High school or above	77	4.52

Variable	Category	n	%
Housing type	Commercial housing	100	5.86
	Rental housing	10	0.59
	Rural homestead housing	1577	92.49
	Other	18	1.06
Living arrangement	Living alone	179	10.50
	With spouse	850	49.85
	With children	341	20.00
	With parents	335	19.65
Disability grade	Grade 1 (most severe)	258	15.13
	Grade 2	967	56.72
	Grade 3	303	17.77
	Grade 4 (least severe)	177	10.38
Modification subsidy (CNY)	<1,000	283	16.60
	1,000-2,000	341	20.00
	2,000-3,000	381	22.35
	3,000-4,000	361	21.17
	4,000-5,000	149	8.74
	>5,000	190	11.14

Note. CNY = Chinese yuan (Renminbi)

3.2 Multicollinearity Diagnostics

Multicollinearity assessment results are presented in Table 2. All VIF values were below 10, ranging from 1.02 (education, living arrangement, disability grade) to 3.59 (information adequacy satisfaction), with tolerance values between 0.278 and 0.985. These results indicate no serious multicollinearity, supporting simultaneous inclusion of all variables in the regression model. Notably, satisfaction-related variables exhibited relatively higher VIF values (3.26-3.59), reflecting expected inter-correlations among satisfaction dimensions consistent with service quality theory. Demographic variables demonstrated lower VIF values (1.02-1.04), indicating strong independence among these characteristics.

Table 2. Multicollinearity Diagnostics for Each Factor.

Variable	VIF	Tolerance
Education level	1.02	0.980
Housing type	1.04	0.961
housing construction period	1.03	0.971
Living arrangement	1.02	0.980
Disability grade	1.02	0.980
Modification subsidy amount	1.02	0.980
Modification product quality satisfaction	3.39	0.295
Staff service attitude satisfaction	3.52	0.284
Information adequacy satisfaction	3.59	0.278
Modification options diversity satisfaction	3.30	0.303
Personal participation satisfaction	3.48	0.287
Timeline reasonableness satisfaction	3.26	0.307

Note: VIF, variance inflation factor; A VIF value of less than 10 indicates the absence of serious multicollinearity.

3.3 Parallel Lines Assumption Test

The proportional odds (parallel lines) assumption was assessed before fitting the ordinal logistic regression model (Table 3). The test of parallel lines was non-significant (χ^2 = 14.809, df =12, p=0.252), indicating no evidence against the proportional

odds assumption. Therefore, the ordinal logistic regression model was considered appropriate, implying that the estimated effects of predictors are assumed to be constant across the cumulative logits (i.e., across outcome cut-points).

Table 3. Test of the Proportional Odds (Parallel Lines) Assumption.

Model	−2 Log Likelihood	Chi-square	df	p
Null hypothesis	209.221	-	-	-
Final model	194.412	14.809	12	0.252

Note: A non-significant result ($p > 0.05$) indicates that the proportional odds (parallel lines) assumption is not violated

3.4 Ordinal Logistic Regression Results

Table 4 presents the ordinal logistic regression results. The model demonstrated excellent overall fit (McFadden R^2=0.890), indicating strong explanatory power for overall satisfaction variance. Among demographic and household characteristic variables, none achieved statistical significance: education level (p=0.850), housing type (p=0.747), housing construction period (p=0.330), living arrangement (p=0.983), disability grade (p=0.182), and modification subsidy amount (p=0.596) all showed no significant associations with overall satisfaction. These findings suggest that, after controlling for other factors, background characteristics are not primary determinants of satisfaction.

In contrast, service process variables demonstrated significant positive associations with overall satisfaction. Personal participation satisfaction exhibited the strongest effect (OR=12.63, p<0.001), indicating that each one-unit increase in participation satisfaction was associated with 12.6-fold higher odds of reporting higher overall satisfaction. Timeline reasonableness satisfaction (OR=7.79, p<0.001) and information adequacy satisfaction (OR=7.72, p<0.001) showed similarly strong effects. Modification options diversity satisfaction (OR=5.52, p<0.001) and staff service attitude satisfaction (OR=3.12, p=0.016) also achieved significance. Notably, modification product quality satisfaction did not reach statistical significance (OR=0.36, p=0.091). This finding, while counterintuitive, may reflect the high baseline quality level achieved across modifications, resulting in insufficient variance to discriminate satisfaction levels.

Table 4. Ordinal Logistic Regression Results.

Variable	B	SE	Wald χ^2	p	OR (95% CI)
Education level	-0.076	0.400	0.036	0.850	0.93 (0.42-2.03)
Housing type	0.147	0.455	0.104	0.747	1.16 (0.48-2.83)
Housing construction period	0.257	0.264	0.948	0.330	1.29 (0.77-2.17)
Living arrangement	-0.005	0.249	0.000	0.983	1.00 (0.61-1.62)
Disability grade	-0.357	0.268	1.777	0.182	0.70 (0.41-1.18)
Modification subsidy	0.073	0.137	0.282	0.596	1.08 (0.82-1.41)
Modification product quality satisfaction	-1.022	0.604	2.861	0.091	0.36 (0.11-1.18)
Staff service attitude satisfaction	1.136	0.470	5.845	0.016*	3.12 (1.24-7.83)
Information adequacy satisfaction	2.044	0.529	14.951	<0.001**	7.72 (2.74-21.77)
Modification options diversity satisfaction	1.709	0.461	13.746	<0.001**	5.52 (2.24-13.64)
Personal participation satisfaction	2.536	0.490	26.740	<0.001**	12.63 (4.83-33.01)
Timeline reasonableness satisfaction	2.053	0.452	20.601	<0.001**	7.79 (3.21-18.90)

Note: B = log-odds coefficient; SE = standard error; OR = odds ratio; CI = confidence interval. *p<0.05, **p<0.001; McFadden R^2=0.890

4. Discussion

This cross-sectional study examined the factors influencing satisfaction with home accessibility modifications among 1,705 persons with disabilities in Yancheng City, China. The ordinal logistic regression analysis revealed that demographic and household characteristic variables did not demonstrate statistically significant associations with overall satisfaction. In

contrast, service process-related variables exhibited substantial effects. Personal participation satisfaction emerged as the most influential factor, followed by construction timeline reasonableness, Information adequacy, Modification options diversity, and Staff service attitude. The model demonstrated excellent explanatory power (McFadden R^2=0.890), indicating that service process quality rather than beneficiary background characteristics serves as the primary determinant of satisfaction with home accessibility modifications.

4.1 The Pivotal Role of Personal Participation

The finding that personal participation satisfaction exerted the strongest influence on overall satisfaction (OR=12.627) aligns with the international paradigm shift toward person-centered care in disability services [15, 16]. A systematic review by Park et al. demonstrated strong evidence for the positive effects of person-centered rehabilitation on occupational performance and service satisfaction [17]. The concept of person-centered care (PCC) provides a valuable theoretical framework for understanding satisfaction with disability services. PCC emphasizes respect for individuals' values, preferences, and expressed needs, as well as the provision of adequate information and involvement in decision-making [18, 19]. In the home modification context, Aplin et al. found that when persons with disabilities and their family members actively participate in modification planning, their acceptance and satisfaction with outcomes improve substantially [9]. Studies utilizing the Canadian Occupational Performance Measure (COPM) have documented that client-centered home modification programs can elevate satisfaction scores from 1.77 at baseline to 8.77 post-intervention [20].

The pronounced effect of personal participation can be understood through multiple theoretical perspectives. First, persons with disabilities possess the most intimate knowledge of their functional limitations and daily living requirements; their involvement ensures that modification plans are personalized and appropriate [10]. Second, the participation process itself confers empowerment effects, strengthening self-efficacy and sense of environmental control [21]. Third, participatory decision-making facilitates trust-building between service providers and recipients, mitigating dissatisfaction arising from information asymmetry [22].

4.2 Information Transparency and Process Management

Information adequacy satisfaction (OR=7.72) and construction timeline reasonableness satisfaction (OR=7.79) demonstrated comparably large effects on overall satisfaction, highlighting the importance of service transparency and temporal management in shaping satisfaction outcomes. Rathert et al. identified information provision and education as one of the eight core dimensions of person-centered care [23]; adequate information communication reduces uncertainty and anxiety among service recipients while enhancing predictability of the service process. In the home modification context, persons with disabilities and their families require clear information regarding modification content, implementation procedures, expected outcomes, and potential limitations to make informed decisions and form realistic expectations.

The significant influence of timeline reasonableness on satisfaction likely reflects the unique circumstances of persons with disabilities. Construction activities may substantially disrupt daily living routines; prolonged construction periods extend the duration of inconvenience and compound living difficulties. Experience from developed countries suggests that professionalized home modification services typically incorporate explicit time commitments and progress management mechanisms. For instance, the United Kingdom's Disabled Facilities Grant (DFG) program mandates that local authorities complete assessment and approval processes within specified timeframes [24]; Sweden's housing adaptation grant program emphasizes synchronization between modification timing and the evolving needs of persons with disabilities [25].

4.3 Service Content and Personnel Attitudes

The significant positive effect of modification options diversity satisfaction (OR=5.52) on overall satisfaction indicates that providing diversified, selectable modification plans constitutes an important pathway for enhancing satisfaction. Collaborative goal-setting approaches, which allow clients to participate in selecting intervention options, have been shown to improve outcomes across disability services [26]. Individuals with different disability types, severity levels, and living habits exhibit markedly different requirements for accessibility modifications. Research evidence suggests that while standardized modification menus facilitate administrative management and implementation, they may inadequately address the individualized needs of persons with disabilities [27]. Japan's Long-Term Care Insurance system permits beneficiaries to

autonomously select modification items within stipulated allowance limits, a flexibility that contributes to improved service matching and satisfaction [28].

Although the OR value for staff service attitude satisfaction was relatively smaller (OR=3.12), it nonetheless achieved statistical significance, reflecting the foundational role of humanized service in satisfaction formation. Research demonstrates that service provider attitudes and communication styles directly influence service recipients' emotional experiences and overall evaluations [29]. For persons with disabilities, disrespectful or discriminatory remarks encountered during the construction process may cause psychological harm, potentially negating the positive effects of material modifications Consequently, strengthening disability awareness training and service standard education for construction personnel should constitute an essential component of project quality management.

Based on the above research findings, this study proposes the following policy recommendations. First, establish and strengthen participation mechanisms for persons with disabilities. Institutionalized channels for disability participation should be established across assessment, plan design, and implementation phases, ensuring that rights to information, expression, and choice are effectively protected. Introduction of occupational therapists and other professionals to conduct needs assessments could facilitate the transition from uniform provision to customized delivery [30]. Second, enhance information disclosure and process transparency. Project information disclosure systems should be established to provide clear, comprehensible modification plan explanations to persons with disabilities and their families, with explicit timeline arrangements, quality standards, progress reporting, and problem feedback mechanisms. Third, enrich modification content options. Building on guaranteed basic modification items, diversified modification plan menus should be developed according to different disability types and need characteristics, affording beneficiaries greater selection space. Fourth, strengthen service workforce development. Disability equality awareness training should be provided for construction personnel, service attitudes should be incorporated into project assessment indicators, and the humanization level of services should be enhanced.

4.4 Limitations

Several limitations should be acknowledged. First, the cross-sectional design precludes establishing causal relationships between variables; future research could employ longitudinal designs to examine dynamic changes in satisfaction before and after modifications and their influencing factors. Second, study participants were drawn from a single region, potentially limiting generalizability; future research could expand to multi-regional, multi-type samples to enhance external validity. Third, satisfaction was measured using a self-developed scale; although content validity was established through expert consultation and pilot testing, systematic reliability and validity testing remains to be conducted. Future studies could adapt internationally validated instruments such as the Dimensions of Home Measure (DOHM) for local application [31]. Fourth, this study did not incorporate objective outcome indicators such as post-modification functional improvement or changes in activities of daily living capacity; future research could integrate subjective and objective evaluation indicators for comprehensive analysis.

5. Conclusion

This study of 1,705 persons with disabilities in eastern China demonstrates that service process experience—particularly personal participation, timeline reasonableness, information adequacy, and modification options diversity—constitutes the core determinant of satisfaction with home accessibility modifications. Demographic and household characteristics showed no significant associations, while traditional product quality failed to differentiate satisfaction levels, likely reflecting achieved baseline standards. These findings support a paradigm transition from construction-oriented to experience-oriented quality evaluation in disability services. Policy and practice should prioritize information transparency, meaningful user participation, service personalization, and timeline management while institutionalizing satisfaction-based feedback for continuous improvement. By attending to the process dimensions that most influence recipient experience, home accessibility modification programs can achieve genuine quality enhancement beyond quantitative expansion.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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