



Research Paper

Impact of SERVQUAL on Day Care Satisfaction — Role of Family Participation

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Abstract

This study examines the impact of the five SERVQUAL dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) on satisfaction in day care center services and the moderating role of family participation. Data from 302 valid responses were analyzed using confirmatory factor analysis (CFA), hierarchical multiple regression, and moderation analysis. The results show that all five SERVQUAL dimensions have a positive and significant impact on satisfaction, with Reliability ($b = 0.81$) and Assurance ($b = 0.81$) being the strongest predictors. The analysis also confirms that family participation positively moderates the effects of Tangibility, Responsiveness, and Empathy. The R^2 of the final model is 0.68, indicating that 68% of the variance in satisfaction is explained by the model. These findings emphasize the importance of family-centered care, suggesting that day care centers should focus on improving service visibility, consistency, and emotional support. Practical strategies include real-time feedback systems, family engagement platforms, and transparent care updates to enhance satisfaction for both users and family members.

Keywords: SERVQUAL, Family Participation, Satisfaction, Day Care Centers, Service Quality, Reliability, Responsiveness, Assurance, Empathy

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I. Introduction

With the intensification of the global aging trend, the demand for day care services for the elderly continues to rise. Day care centers have become a crucial support system that helps older adults maintain their daily living abilities. These institutions not only provide essential care and health management services for the elderly but also alleviate the caregiving burden on family members. As a result, they serve as a vital link between families, elderly users, and service providers. Against this backdrop, how to enhance the service quality of day care centers and meet the expectations and needs of both elderly users and their family members has become a key issue for managers and administrators of these institutions.

In the field of service management, the measurement of service quality has always been a significant research topic. Parasuraman, Zeithaml, and Berry proposed the widely recognized SERVQUAL model, which offers an effective analytical framework for assessing service quality. This model categorizes service quality into five key dimensions: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. These five dimensions have been extensively applied in the context of service quality research in various industries, including healthcare, education, retail, and finance. In healthcare services, these dimensions have demonstrated a high level of applicability and explanatory power.

However, the service context of day care centers presents unique challenges. Unlike other service industries, the primary users of day care services are elderly individuals, but the actual decision-makers and evaluators of service experiences are often their family members. Family members not only participate in the service selection process but also supervise the quality of services through periodic visits and feedback. Their perception of service quality can significantly influence the elderly users' evaluation of satisfaction. The level of family participation not only determines their sensitivity to the quality of service but may also affect their criteria for satisfaction. For instance, family members who frequently visit the center tend to pay more attention to the Tangibility (e.g., the cleanliness of facilities) and Responsiveness (e.g., the speed of response from staff) of services. On the other hand, family members with low levels of participation are more likely to rely on Reliability (e.g., service accuracy) and Assurance (e.g., staff professionalism and safety) to assess service quality.

Despite its importance, most existing studies have focused on the direct impact of service quality on satisfaction, with relatively few studies considering the moderating role of family participation in this process. Specifically, there is a lack of systematic empirical analysis on whether the frequency, depth of participation, and feedback behavior of family members affect the strength of the relationship between the five dimensions of service quality and satisfaction. In reality, family participation may alter the relative importance of different service dimensions in influencing satisfaction. For example, when family members frequently participate in service delivery, they are more sensitive to the visibility of services (e.g., Tangibility) and immediate responses (e.g., Responsiveness) from service personnel. Conversely, when family members rarely participate, they tend to rely more on the stability of services (e.g., Reliability) and the professionalism of staff (e.g., Assurance), as these attributes provide them with a sense of security.

Based on this research background, this study aims to explore the impact of the five dimensions of the SERVQUAL model on the satisfaction of users at day care centers and to examine the moderating effect of family participation. Unlike traditional single-variable studies, this research not only investigates the direct effects of service quality but also explores whether high and low levels of family participation alter the explanatory power of the five dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) on user satisfaction.

The significance of this study can be discussed from three key perspectives. First, on the theoretical level, this study fills the theoretical gap regarding family participation as a moderating variable, extends the applicability of the SERVQUAL model, and provides empirical evidence for the relationships among service quality, satisfaction, and family participation. Second, on the practical level, the findings of this study can assist managers and decision-makers of day care centers in adjusting service processes, facility design, and personnel management according to the participation characteristics of family members. This can provide a foundation for the development of personalized service design in day care centers. Finally, on the policy level, the results of this study can provide reference information for long-term care policy makers, helping governments to understand the role of family members and develop more targeted allocation of care resources and support measures.

In summary, the primary objective of this study is to explore how the five SERVQUAL dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) influence satisfaction in day care centers, while further examining the moderating role of family participation. Using survey data and multiple regression analysis, this study will delve into how the participation behaviors of family members affect the relationships between the five service dimensions and satisfaction. The ultimate goal is to provide specific recommendations for optimizing day care services and management innovation, while offering insights for future research.

II. Literature Review

2.1 The Origin and Development of the SERVQUAL Model

The origin of the SERVQUAL model can be traced back to the 1980s, a period marked by the rapid development of the service industry. The increasing importance of services in the global economy highlighted the need for a comprehensive method to measure service quality. Unlike the measurement of product quality, which relies on tangible characteristics, the unique attributes of services—intangibility, heterogeneity, and perishability—make it more challenging to evaluate service quality. To address this issue, Parasuraman, Zeithaml, and Berry introduced the Service Quality Gap Model (GAP Model) in 1985. The GAP model emphasizes the role of the gap between customer expectations and customer perceptions as the core determinant of service quality.

Building on the GAP model, the three scholars further developed the SERVQUAL model to operationalize the measurement of service quality (Parasuraman, Zeithaml, & Berry, 1988). The SERVQUAL model identifies five key dimensions of service quality, namely Tangibility, Reliability, Responsiveness, Assurance, and Empathy. These five dimensions provide managers and researchers with a standardized framework for measuring service quality that can be adapted across various industries.

At the heart of the SERVQUAL model is the idea that customer satisfaction arises from the comparison between expected and perceived service quality. When perceived service quality exceeds expectations, customers feel satisfied; when it falls short, dissatisfaction occurs. This idea is rooted in the Expectation-Disconfirmation Theory proposed by Oliver (1980). The theory posits that when expectations are not met, cognitive and emotional responses are triggered, influencing customer satisfaction. Parasuraman et al. applied this theory to service management, identifying five types of service quality gaps that can occur between service providers and customers. For example, a gap may exist if managers' perceptions of customer needs are inaccurate or if the actions of service personnel fail to meet customer expectations. These gaps ultimately shape customer perceptions of service quality.

In its early applications, the SERVQUAL model was primarily used in financial services, retail, and hospitality industries, where customer interaction plays a crucial role. Over time, researchers discovered that the model could also be applied in healthcare, education, and elderly care services (Babakus & Mangold, 1992). Within the context of healthcare services, where patient needs and family involvement are paramount, the SERVQUAL model's five dimensions demonstrated high explanatory power and adaptability (Carman, 1990).

The interpretation of the five dimensions varies across different industries. In retail and financial services, Tangibility refers to the store's physical layout, design, and technological sophistication. However, in the context of healthcare and day care centers, Tangibility emphasizes the cleanliness of the environment, the comfort of the facilities, and the accessibility of space. For example, elderly individuals' perceptions of the "clean and comfortable facilities" in a day care center significantly affect their satisfaction (Shahin & Samea, 2010).

Reliability in the hospitality industry usually refers to the accuracy of reservations and the consistency of service delivery. However, in healthcare, it is manifested in terms of consistency and stability of service. This includes aspects like whether daily health checkups are conducted on time and whether standard operating procedures (SOPs) are followed in caregiving tasks (Andaleeb, 2001). Given the heightened vulnerability of elderly users, their dependence on consistent and predictable services is greater than that of general customers, making Reliability a crucial dimension in healthcare and elderly care contexts.

Responsiveness reflects the speed and willingness of service staff to address customer inquiries and requests. In healthcare and elderly care, it plays a vital role in ensuring the timely provision of emergency care and rapid response to the needs of elderly users. If an elderly person requires urgent assistance, the ability of caregivers to respond quickly is critical not only for the user's satisfaction but also for their health and safety.

Assurance relates to the service provider's ability to instill trust and confidence through competence, courtesy, and professionalism. In healthcare, this dimension reflects the expertise and skills of caregivers, as well as their ability to provide a safe and secure caregiving environment. For example, the presence of certified health professionals and the availability of emergency response mechanisms can enhance the perception of Assurance (Andaleeb, 2001).

Finally, Empathy refers to the capacity of service providers to offer personalized care and attention. In the context of elderly care, this includes understanding the individual needs of users and providing tailored care. Empathy is especially significant in elder care since emotional support and compassionate care are critical to the well-being of elderly users. Carman (1990) argues that in healthcare, Empathy can be measured by the extent to which caregivers listen, understand, and respond to the unique needs of patients and their families.

Although widely used, the SERVQUAL model has been subject to academic criticism and practical challenges. Some scholars argue that the five dimensions may not be applicable in all service contexts. For instance, in digital or contactless services, the relevance of Tangibility and Responsiveness may be limited (Brady & Cronin, 2001). Moreover, the measurement approach of the expectation-perception gap has been criticized due to the dynamic nature of customer expectations, which can change over time. Cronin and Taylor (1992) suggested that measuring only perceived service quality, rather than the gap between expectation and perception, could produce more stable results. As a response, they proposed the SERVPERF model, which focuses solely on customers' perceptions of actual service quality. This approach simplifies the data collection process and enhances the reliability and validity of measurement outcomes (Cronin & Taylor, 1994).

Despite these critiques, the SERVQUAL model remains a classical tool for measuring service quality. It is particularly useful in healthcare and elderly care services, where both elderly users and their family members play important roles. Family members often act as both users and evaluators of the service, providing feedback on care quality and making decisions regarding care options. As a result, researchers have begun to examine how family participation moderates the relationship between the five dimensions of service quality and satisfaction (Donabedian, 1988).

2.2 Relevance of SERVQUAL to Day Care Centers

The development of the SERVQUAL model, from the GAP model to its refinement into the five key dimensions, reflects the ongoing evolution of service quality measurement. Within day care centers, the application of SERVQUAL has special significance. Not only does the model help managers understand the service needs of elderly users, but it also provides insight into how family involvement shapes service quality perceptions. The roles of family members are crucial, as they participate in service selection, monitor care quality, and provide direct feedback.

Given this context, this study extends the SERVQUAL model by introducing family participation as a moderating variable. While past research has focused on direct relationships between service quality and satisfaction, this study will explore how family participation affects the relationships between Tangibility, Reliability, Responsiveness, Assurance, and Empathy and user satisfaction. This approach provides a new perspective on how service quality can be optimized in day care centers. By analyzing the moderating effect of family participation, this study aims to offer practical insights for improving service design, family interaction, and user satisfaction in elderly care settings.

2.3 The Impact of the Five SERVQUAL Dimensions on Satisfaction

In the field of service management, the relationship between service quality and satisfaction has long been a critical research topic. Within this context, the SERVQUAL model proposed by Parasuraman, Zeithaml, and Berry in 1988 has become a key framework for measuring service quality. This model identifies five core dimensions of service quality: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. These five dimensions have been widely validated in empirical studies across various industries, including retail, healthcare, education, and day care services. In the context of day care centers, these five dimensions not only affect the actual experience of elderly users but also influence the satisfaction and trust of family members.

Tangibility, as the most observable dimension, refers to physical facilities, environmental cleanliness, and the appearance of service personnel. In a day care center, factors such as clean and comfortable environments, modern equipment, and professional staff appearance directly impact users' first impressions, which in turn influence their overall satisfaction. According to Oliver's (1980) Expectation-Disconfirmation Theory, when users' expectations are met or exceeded by their actual experience, satisfaction is significantly enhanced. Tangible evidence, such as clean facilities, well-maintained equipment, and modern safety systems, not only increases family members' trust but also alleviates their concerns regarding the health and safety of elderly users. For family members, these "evidence of quality" serve as key indicators for evaluating the quality of service. This explains why Tangibility has a greater impact on family satisfaction when family members frequently visit and observe the service environment.

Reliability focuses on the consistency and accuracy of service delivery. In day care centers, reliability refers to aspects like the on-time provision of meals, stability of daily health checkups, and accuracy of activity scheduling. Since family members cannot be present at all times, they have a higher reliance on the center's operational stability. The SERVPERF model proposed by Cronin and Taylor (1992) emphasizes that perceived service quality should be used as a measure of service quality, rather than the gap between expectations and perceptions. This view highlights that family members are more concerned with actual service performance than with pre-service expectations. In the context of day care, a stable operational process and clear daily schedules reduce the uncertainty and anxiety of family members, thereby enhancing their satisfaction.

Responsiveness refers to the timeliness and helpfulness of service personnel, which is particularly crucial when handling the immediate needs and emergency situations of elderly users. When service personnel are able to respond promptly to user requests and emergencies, family members develop a stronger sense of trust and safety in the care center. According to the Service Encounter Theory proposed by Fisk et al., (1992), real-time interactions and timely responses play a pivotal role in shaping customer satisfaction. In the context of day care centers, prompt service response is not only linked to user safety but also affects the trust of family members. For instance, if family members receive real-time updates on health check results and service progress, their satisfaction significantly increases. To enhance this effect, many centers have introduced real-time feedback systems and family notification platforms. These mechanisms improve service transparency and meet family members' demand for timely information, thereby increasing both user and family satisfaction.

Assurance encompasses the professional knowledge, skills, and trustworthiness of service personnel. In a day care center, this dimension becomes particularly critical due to the health-related risks faced by elderly users. Family members are often concerned with whether service personnel possess professional nursing certifications, whether the center has an emergency response mechanism, and whether a safety assurance system is in place. While Buttle (1996) argued that Assurance and Reliability sometimes overlap (as professionalism and consistency are closely related), Assurance is more directly linked to the psychological safety of family members. This dimension reflects family members' expectations that the care center can respond effectively in the event of a health emergency. By displaying staff credentials and first-aid certifications, centers can enhance family members' trust and confidence, which in turn increases satisfaction.

Empathy is the most emotional of the five dimensions, focusing on the caregiver's attention to individual needs and personalized care. In long-term care services, where interpersonal interaction is essential, the role of Empathy becomes even more prominent. The Emotional Interaction Model proposed by Fisk et al., (1992) highlights the crucial role of emotional support in service experiences. Family members expect caregivers to engage in emotional communication and personalized support with elderly users. For instance, family members feel more satisfied when they see caregivers talking with elderly users, encouraging them to participate in activities, and providing companionship and emotional support. The presence of empathy affects not only the emotional well-being of elderly users but also shapes family members' trust and satisfaction. Empathy, therefore, plays a vital role in family members' perceptions of service quality, affecting their decisions to continue using the service or to recommend it to others.

The five dimensions of the SERVQUAL model have multi-level impacts on satisfaction in the context of day care centers. Among these dimensions, Tangibility and Responsiveness have the most significant influence on satisfaction when family participation is high, as these dimensions are more visible and can be easily observed during family visits. On the other hand, Reliability and Assurance have a greater impact in situations where family participation is low, as these dimensions involve the stability of service processes and the center's professional

capacity, both of which help to build trust. Finally, Empathy affects not only the subjective experience of elderly users but also the family's trust and satisfaction with the center. These findings offer practical guidance for improving service design and management at day care centers.

By implementing these measures, care centers can increase user and family satisfaction, foster family loyalty, and strengthen their competitive position and brand influence.

Based on the literature review, this study proposes the following hypotheses regarding the relationships between the five dimensions of the SERVQUAL model and satisfaction in day care centers:

H1: The five SERVQUAL dimensions have a significant positive impact on satisfaction.

H1a: Tangibility has a significant positive impact on satisfaction.

H1b: Reliability has a significant positive impact on satisfaction.

H1c: Responsiveness has a significant positive impact on satisfaction.

H1d: Assurance has a significant positive impact on satisfaction.

H1e: Empathy has a significant positive impact on satisfaction.

The testing of these hypotheses will provide empirical support for the applicability of the SERVQUAL model in day care centers and will further explore the moderating effect of family participation. The analysis aims to provide insights into service design, process improvement, and management strategies for day care centers, ultimately improving satisfaction among both elderly users and their family members.

2.4 The Moderating Effect of Family Participation

In the context of day care center services, family members play a critical role as not only decision-makers but also participants and supervisors. Their participation behavior and frequency influence not only their trust and satisfaction with the services but also moderate the impact of the five SERVQUAL dimensions on satisfaction. The frequency of family participation (such as visit frequency) and the depth of their participation (such as attending care meetings and providing feedback) shape their focus on Tangibility, Reliability, Responsiveness, Assurance, and Empathy, thereby affecting the formation of satisfaction.

According to Chen et al., (2020), family participation significantly influences family members' satisfaction with day care center services. When family members' participation frequency increases, their focus on visible service quality (such as Tangibility and Responsiveness) becomes more pronounced. This is because these service features are highly visible and perceptible. Conversely, Yang et al. (2022) found that when family participation frequency is low, family members rely more on Reliability and Assurance to assess service quality. Since these family members cannot frequently supervise the service process, they are more likely to evaluate satisfaction based on the stability and professionalism of the service.

Chen et al., (2012) further emphasized that family participation can be categorized into frequency of participation and depth of participation. Frequency of participation refers to how often family members visit the day care center (weekly, monthly, etc.). This frequency influences family members' perception of the timeliness and visibility of the service. In contrast, the depth of participation refers to whether family members participate in care meetings, feedback sessions, and service-related decision-making. This deeper form of participation affects family members' experience of personalization and emotional interaction within the service. This viewpoint is highly consistent with the dimensions of Empathy and Assurance in the SERVQUAL model.

When family members have a high frequency of participation, they can directly observe and perceive the service process and outcomes, leading to heightened sensitivity toward Tangibility and Responsiveness. This phenomenon was confirmed by Chen et al., (2020), who found that when family members frequently visit day care centers, their expectation standards increase. As a result, they become more critical of the modernity of facilities, the cleanliness of the environment, and the timeliness of the service. This also explains why Responsiveness has a greater impact on satisfaction for highly participatory family members. In a high-participation context, family members directly observe whether caregivers respond promptly to the needs of elderly users. For example, if an elderly person requests help, family members assess whether caregivers respond immediately or delay assistance, with this responsiveness serving as a key criterion for evaluating satisfaction.

In contrast, family members with low participation frequency rely on stable service outcomes and reliable service standards to evaluate satisfaction, as they cannot observe the service process in real-time. Yang et al. (2022) found that in situations where family members do not frequently visit the center, they depend on predictable service outcomes (e.g., the on-time provision of daily meals and the accuracy of health checkups) as indicators of service quality. Since these family members are not present to directly observe service adjustments, they rely on service outcomes to build trust. If the center experiences delays or errors in service delivery, these family members experience heightened dissatisfaction, as they lack transparency into the causes of the problem. This phenomenon was also validated through the Family Involvement Questionnaire for Long-Term Care (FIQ-LTC) developed by Chen et al., (2012), which quantifies family involvement in the care process.

Participation depth refers to family members' involvement in service decision-making, feedback sessions, and direct interaction with care processes. This aspect of participation plays a key role in amplifying the influence

of Empathy and Assurance. Chen et al., (2020) proposed that when family members participate more deeply, they are more likely to observe caregiver-user emotional interactions. Family members who attend care meetings or participate in family feedback sessions can directly witness whether caregivers engage in emotional support behaviors, such as conversing with elderly users, encouraging them to participate in activities, and providing personalized attention. When family members perceive that caregivers are emotionally attentive to elderly users, their satisfaction increases significantly. This phenomenon highlights how empathy gains prominence in situations where family members actively participate in the service process.

When family participation is low, Assurance plays a more critical role in shaping family members' trust and satisfaction. Yang et al. (2022) found that when family members are unable to participate in the service process, they place greater reliance on the center's credentials and professional certifications. For instance, if family members receive assurance about the center's staff qualifications and emergency response procedures, their trust and satisfaction increase. To enhance this effect, many care centers send regular safety reports to family members, including updates on emergency preparedness drills and health and safety assessments. Such measures increase family members' trust and alleviate their anxiety about the aspects of the service that they cannot directly observe.

Family participation serves as a moderating variable that influences the impact of the five SERVQUAL dimensions on satisfaction. Specifically, family participation changes the importance of certain dimensions for family members, depending on the context of participation. When family participation is high, the impact of Tangibility and Responsiveness on satisfaction is strengthened, as these dimensions are highly visible and immediately perceptible. In contrast, in low-participation contexts, family members place more importance on Reliability and Assurance, as they rely on the stability and professionalism of the service in the absence of direct observation. Meanwhile, the impact of Empathy becomes more significant when family members are deeply involved in the service process, as they can directly perceive caregivers' emotional support behaviors.

These insights highlight the need for day care centers to adopt differentiated service strategies for family members with varying participation levels. For high-participation family members, centers should focus on enhancing Tangibility and Responsiveness by improving real-time feedback mechanisms, communication platforms, and service transparency. For low-participation family members, it is essential to emphasize Reliability and Assurance, which can be achieved by strengthening process stability, safety protocols, and staff training. Lastly, promoting empathy-based care can be achieved by encouraging caregivers to engage in emotional interaction with elderly users, thereby increasing family satisfaction. Based on the above literature review, the following research hypotheses are proposed:

H2: Family participation moderates the relationship between the five SERVQUAL dimensions and satisfaction.

H2a: Family participation moderates the relationship between Tangibility and satisfaction.

H2b: Family participation moderates the relationship between Reliability and satisfaction.

H2c: Family participation moderates the relationship between Responsiveness and satisfaction.

H2d: Family participation moderates the relationship between Assurance and satisfaction.

H2e: Family participation moderates the relationship between Empathy and satisfaction.

These hypotheses will be tested to determine how family participation affects the relative importance of each SERVQUAL dimension on satisfaction. The findings will offer valuable insights into service design, process improvement, and family engagement strategies for day care centers. By identifying the critical role of family participation, this study aims to provide practical recommendations for tailoring care services to meet the diverse needs of family members and enhance satisfaction among elderly users and their families.

III. Methodology

3.1 Proposed Research Framework

This study aims to explore the relationship between the five SERVQUAL dimensions and satisfaction, while also examining the moderating effect of family participation. Based on the research objectives and prior literature, a conceptual framework has been developed (Figure 1). The framework identifies the five SERVQUAL dimensions as independent variables, family participation as a moderating variable, and satisfaction as the dependent variable.

To achieve these objectives, the study employs a three-step analytical approach. First, Pearson correlation analysis is conducted to examine the associations between the five SERVQUAL dimensions and satisfaction within the sample. This analysis provides an initial understanding of the relationships between the core variables.

Next, a stepwise regression analysis is performed to further explore the direct relationships between the five SERVQUAL dimensions and satisfaction. The stepwise method identifies the most significant predictors of satisfaction and provides insights into the relative importance of each dimension. This method allows for the removal of less significant predictors, ensuring a more parsimonious model.

Finally, to test the moderating effect of family participation, this study utilizes the PROCESS macro for SPSS developed by Hayes (2018). Specifically, Model 1 from the PROCESS macro is used to test the moderation

effect, with 5,000 bootstrap resamples to ensure robust results. The bootstrapping approach provides a more reliable estimation of the confidence intervals for the indirect effects, especially when dealing with small to medium-sized samples.

The proposed research model is shown in Figure 1. In this model, the five SERVQUAL dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) are the independent variables, family participation serves as the moderating variable, and satisfaction is the dependent variable.

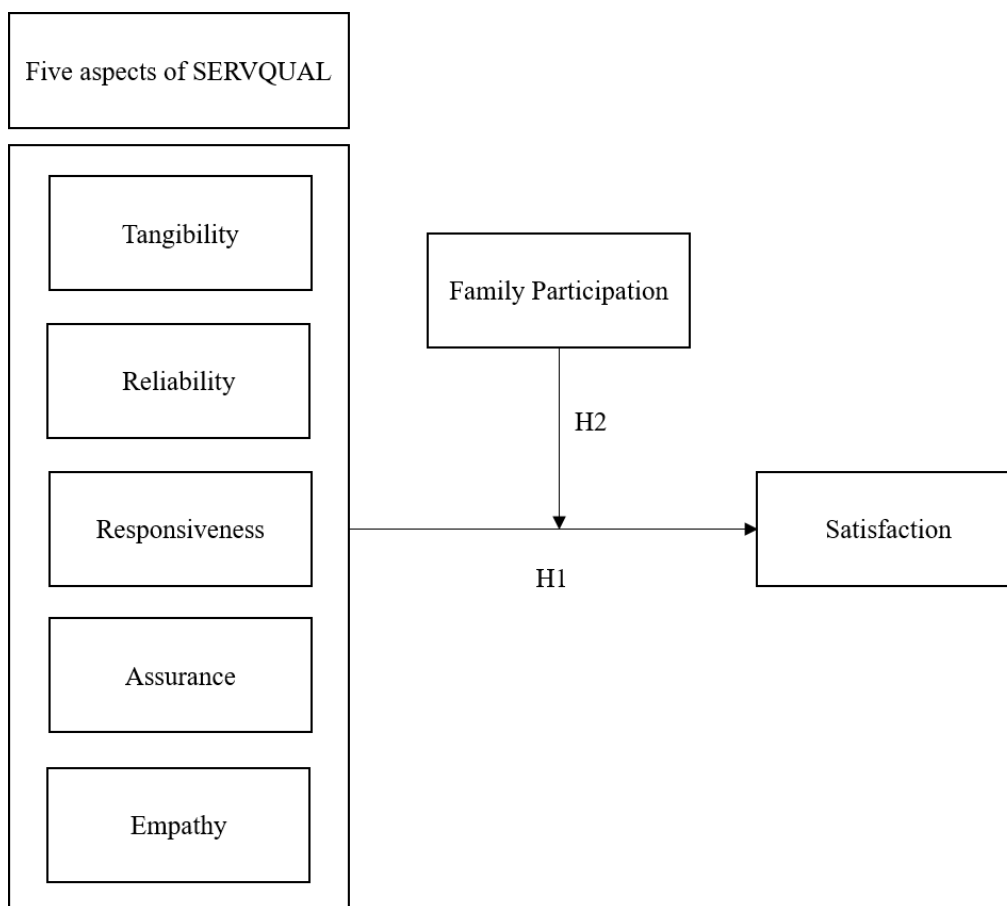


Figure 1. Conceptual framework

The research model illustrates how the SERVQUAL dimensions impact satisfaction directly, while the level of family participation moderates these relationships. Specifically, it is expected that Tangibility and Responsiveness will have a stronger influence on satisfaction when family participation is high, while Reliability and Assurance will play a more significant role when family participation is low. Empathy is expected to have a greater influence on satisfaction when family participation depth is high (e.g., family members participate in care meetings or give feedback).

This analytical approach provides a comprehensive view of how different types of family participation shape the effects of the five SERVQUAL dimensions on satisfaction. The results of this study will offer empirical evidence for service design, process improvement, and family engagement strategies for day care centers.

3.2 Sample and Data Collection

This study investigates the impact of the five SERVQUAL dimensions on satisfaction with family participation as a moderating factor. Data collection was conducted using a Google Forms survey, and the collected data was analyzed using statistical methods. To derive the research results, the study utilized descriptive statistics, independent samples t-test, correlation analysis, and regression analysis. These methods aimed to test the research hypotheses and evaluate the overall model fit regarding the relationships between the key variables.

A questionnaire served as the primary data collection tool. Initially, the questionnaire was developed by incorporating insights from relevant literature. To ensure the clarity and appropriateness of the questions, a pilot test was conducted, during which 50 questionnaires were distributed. Based on feedback from respondents, necessary revisions were made to improve the questionnaire's clarity and structure. The primary goal of the pilot test was to evaluate the distribution and pattern of the responses and refine the questionnaire accordingly. The

final version of the questionnaire was distributed to the target respondents via email and Google Forms. The questionnaire was sent three times at two-week intervals to encourage responses. As a result, the study received a total of 305 responses. After a thorough review of the responses, 302 valid responses were retained, resulting in an impressive valid response rate of 99%.

To gain a comprehensive understanding of the research sample, the respondents were classified into six categories: personnel attributes, gender, age, education, occupation, and the client’s living situation. The detailed demographic information is shown in Table 1 below.

Table 1 Demographic Information of the Data

Variables	Item	Samples
Personnel Attributes	Case owner	90(30%)
	Family members	182(60%)
	Day care center staff	30(10%)
Gender	Men	118 (39.1%)
	Women	184 (60.9%)
Age	Under 40 years old	154(51%)
	41-50 years old	48 (15.9%)
	51-60 years old	24 (7.9%)
	61-70 years old	62(20.5%)
	Over 71 years old	14 (4.7%)
Education	Senior high school	24 (7.9%)
	College	72 (23.8%)
	University	124 (41.1%)
	Master	82 (27.2 %)
Occupation	Manufacturing	120 (39.7%)
	Service industry	102 (33.8%)
	Students	60 (19.9%)
	Soldiers, civil servants and teachers	20 (6.6%)
Client’s living situation	Completely self-care	112 (37.1%)
	Handle half of it	134 (44.4%)
	Completely unable to take care of myself	56 (18.5%)

Source: Compiled by this study

The demographic information presented in Table 1 provides a comprehensive overview of the respondents. The largest category of personnel attributes is family members (60%), followed by case owners (30%) and day care center staff (10%). Most respondents are women (60.9%). The majority of respondents are aged under 40 years old (51%), with the next largest age group being those aged 61-70 years old (20.5%). Regarding education, most respondents have a university degree (41.1%) or a master's degree (27.2%), indicating that the respondents have relatively high educational attainment. The largest proportion of respondents by occupation is from the manufacturing industry (39.7%), followed by those working in the service industry (33.8%). Regarding the client's living situation, 44.4% of clients are able to handle half of their daily living needs, while 37.1% can fully self-care, and 18.5% are completely unable to take care of themselves. The demographic composition of the sample provides a strong basis for understanding how different personnel groups (case owners, family members, and staff) evaluate SERVQUAL dimensions and satisfaction. By collecting data from a diverse range of respondents, the study aims to enhance the generalizability and robustness of its findings.

IV. Finding

4.1 Reliability and Validity Analysis Results

This study employed a carefully designed questionnaire to ensure reliability and validity. The questionnaire was developed based on a comprehensive review of prior literature and utilized established theoretical frameworks from previous studies. Key theoretical components suitable for the study's background and scope were selected to construct the questionnaire. The core constructs in this study include the five SERVQUAL dimensions and satisfaction. The items for each of the five SERVQUAL dimensions were adapted from previous validated scales:

Tangibility and Reliability were adapted from Parasuraman et al. (1988). Responsiveness was adapted from Parasuraman et al. (1988) and Babakus & Mangold (1992). Assurance was adapted from Parasuraman et al. (1988) and Andaleeb (2001). Empathy was adapted from Parasuraman et al. (1988) and Carman (1990). To ensure the reliability of the measurements, a Confirmatory Factor Analysis (CFA) was conducted. The composite reliability (CR) and Cronbach's alpha were used to assess the reliability of each construct. The results, as displayed in Table 2, indicate that all CR and Cronbach's alpha values exceeded the recommended threshold of 0.7 (Hayes, 2018), demonstrating high reliability.

In addition, tests for convergent and discriminant validity were performed to evaluate the dimensionality of the constructs. The factor loadings for all items on their respective factors were significant, with all loadings

exceeding the cut-off of 0.60, which indicates sufficient convergence. The average variance extracted (AVE) for each factor was also higher than 0.50, supporting the claim of strong convergent validity (Nunnally, 1967). These results provide strong support for the factor solution's validity. During the CFA process, any problematic items were removed to ensure optimal model fit. The Cronbach's alpha values for all constructs remained above 0.80, as follows: Tangibility: 0.90 · Reliability: 0.82, Responsiveness: 0.80, Assurance: 0.80, Empathy: 0.82, Family Participation: 0.89, Satisfaction: 0.93. These results indicate that the scales have strong convergent validity and high internal consistency. The final confirmatory factor analysis was conducted using a total of 302 valid samples, and the results are presented in Table 2.

Table 2 Results of Confirmatory Factor Analysis (N = 302)

Factors	Item	Factor loading	S.E.	CR	AVE	Cronbach's α
Tangibility	Tan1	0.87	0.82	0.93	0.59	0.90
	Tan2	0.85	0.77			
	Tan3	0.87	0.79			
	Tan4	0.88	0.90			
	Tan5	0.78	0.69			
Reliability	Rel1	0.89	0.77	0.94	0.62	0.82
	Rel2	0.90	0.80			
	Rel3	0.78	0.80			
	Rel4	0.89	0.83			
Responsiveness	Res1	0.86	0.70	0.93	0.60	0.80
	Res2	0.72	0.90			
	Res3	0.79	0.85			
	Res4	0.81	0.89			
Assurance	ASS1	0.78	0.69	0.92	0.43	0.80
	ASS 2	0.92	0.73			
	ASS 3	0.66	0.72			
	ASS 4	0.78	0.70			
Empathy	Emp1	0.78	0.86	0.88	0.54	0.82
	Emp2	0.92	0.73			
	Emp3	0.88	0.91			
Family Participation	FI1	0.92	0.87	0.79	0.42	0.89
	FI 2	0.85	0.77			
	FI 3	0.73	0.88			
Satisfaction	FP1	0.88	0.90	0.93	0.52	0.93
	FP2	0.89	0.78			
	FP3	0.90	0.91			

Notes. T-values for n = 302 samples; CR, composite reliability; SE, standard error; AVE, average variance extracted.

The results of the confirmatory factor analysis (CFA) demonstrate that the measurement scales used in this study are both reliable and valid. The CFA results validate the theoretical constructs for the SERVQUAL dimensions, family participation, and satisfaction. These findings support the continued use of these measurement items for subsequent statistical analyses, such as regression analysis and moderation testing. By establishing the reliability and validity of the measurement model, this study provides a strong foundation for examining the relationships between SERVQUAL dimensions, family participation, and satisfaction. These results enable the subsequent testing of hypotheses, ensuring that the results are robust, accurate, and reliable for decision-making in day care center service quality management.

4.2 Correlation Analysis

Table 3 presents the means, standard deviations, and correlation coefficients for all variables in the study. As expected, all variables exhibit positive and statistically significant correlations with each other, supporting the anticipated relationships based on the theoretical framework. The results show that the relationships between the five SERVQUAL dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy), family participation (Involvement), and satisfaction are all significant at $p < 0.01$. This provides strong empirical support for the proposed hypotheses and the conceptual model. Notably, the results also reveal that the direct relationships

between the SERVQUAL dimensions and satisfaction are stronger than the indirect relationships, which is consistent with the theoretical model.

Table 3 Descriptive Statistics and Correlation Matrix (N = 302)

	Mean	SD	1	2	3	4	5	6	7
1.Tangibility	3.59	0.68	1	0.67**	0.77**	0.69**	0.60**	0.42**	0.62**
2.Reliability	3.56	0.62		1	0.77**	0.78**	0.66**	0.72**	0.74**
3.Assurance	3.63	0.54			1	0.81**	0.79**	0.564**	0.79**
4.Empathy	3.61	0.61				1	0.82**	0.56**	0.77**
5.Responsiveness	3.57	0.61					1	0.49**	0.68**
6.Family Participation	3.64	0.55						1	0.81**
7.Satisfaction	3.77	0.51							1

Notes. SD: Standard Deviation; ** p < 0.01

The correlation analysis provides strong empirical support for the proposed research model. All five SERVQUAL dimensions are positively and significantly related to Satisfaction, supporting the primary hypothesis (H1). In addition, the strong relationship between Family Participation and Satisfaction (r = 0.81) supports the view that family involvement enhances the perception of service quality. These findings have important implications for the management of day care centers. For instance, managers should recognize that family members who are more involved in the care process are more likely to hold the center to higher standards, especially with regard to Assurance and Tangibility. Efforts to increase the visibility of service quality (e.g., facility cleanliness, equipment upgrades, and staff certification) and improve staff responsiveness can have a significant positive impact on satisfaction.

This analysis also highlights the need to focus on family engagement strategies, as higher levels of family participation are linked to better perceptions of service quality and satisfaction. Real-time communication platforms and family feedback systems could enhance family engagement and ultimately improve customer satisfaction. The next step in the analysis will be to examine the moderating role of family participation on the relationship between the five SERVQUAL dimensions and satisfaction. This will be achieved through regression analysis and moderation analysis using the PROCESS macro (Model 1), as proposed in the research methodology.

4.3 Hierarchical Multiple Regression Analysis

To explore the relationship between the five SERVQUAL dimensions and satisfaction, this study employed hierarchical multiple regression analysis. The control variables included personnel attributes, gender, age, education, occupation, and the client's living situation. The five SERVQUAL dimensions were used as independent variables, while satisfaction was the dependent variable. Additionally, family participation was introduced as a moderating variable to assess its influence on the relationship between SERVQUAL dimensions and satisfaction. The results of the hierarchical multiple regression analysis are presented in Table 4, which includes results from six models (M1 to M6). Each model incrementally adds one of the five SERVQUAL dimensions and family participation to evaluate their respective effects on satisfaction.

The results of the hierarchical multiple regression analysis provide strong support for the research hypotheses (H1a, H1b, H1c, H1d, and H1e). All five SERVQUAL dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) have significant and positive effects on satisfaction. Reliability and Assurance have the strongest influence on satisfaction, which suggests that the consistency of service and the professional competence of staff play crucial roles in shaping satisfaction.

Additionally, the analysis highlights the significant role of family participation in enhancing satisfaction. This finding aligns with the view that family involvement influences the perception of service quality. Family participation has the largest standardized coefficient (b = 0.84, p < 0.001), suggesting that higher levels of family engagement result in stronger satisfaction. This finding emphasizes the need for service providers to engage family members actively and foster family-centered care strategies.

Table 4 Hierarchical multiple regression for five aspects of SERVQUAL and satisfaction

	Satisfaction					
	M1	M2	M3	M4	M5	M6
Control variables						
Personnel Attributes	-0.02	-0.01	0.02	-0.09	0.02	0.07
Gender	0.08	0.09	-0.03	0.07	-0.03	0.02
Age	-0.22**	0.12*	-0.01	-0.04	-0.01	0.03
Education	-0.03	0.07	0.03	0.03	0.03	0.14*
Occupation	0.13	0.12	0.13*	-0.01	0.13*	-0.03

Client's living situation	0.08	-0.05	0.08	0.09	0.08	-0.09
Independent variables						
Tangibility	0.65**					
Reliability		0.81**				
Responsiveness			0.77**			
Assurance				0.81**		
Empathy					0.77**	
Family Participation						0.84**
R ²	0.47	0.59	0.61	0.66	0.61	0.68
Adj-R ²	0.46	0.58	0.60	0.65	0.60	0.67
F	37.1	60.2	66.2	80.1	66.2	86.8
Change in R ²	0.47	0.59	0.61	0.68	0.61	0.68

Notes. ** $p < 0.01$, * $p < 0.05$.

The hierarchical regression analysis reveals that all five SERVQUAL dimensions have a positive and statistically significant impact on satisfaction. Moreover, family participation plays a critical role in boosting satisfaction. The R² for the final model (Model 6) reaches 0.68, indicating that the model explains 68% of the variance in satisfaction. This result provides a strong foundation for subsequent moderation analysis, which will assess whether family participation moderates the effects of the SERVQUAL dimensions on satisfaction. The results suggest that managers should focus on improving the five dimensions of service quality while also enhancing opportunities for family engagement. Day care centers can achieve this by incorporating real-time feedback systems, family involvement programs, and transparent communication platforms. These strategies will help increase user and family satisfaction, build trust, and promote positive word-of-mouth referrals.

4.4 Moderation Effect Analysis Results

The moderation effect analysis was conducted to examine whether family participation moderates the relationship between the five SERVQUAL dimensions and satisfaction. The analysis follows the causal steps method proposed by Baron and Kenny (1986), which does not require formal quantification of indirect effects or the use of inferential tests. To assess the indirect effects in the moderation model, we applied the bootstrap approach with 5,000 resamples (Preacher & Hayes, 2008). This method allows for the estimation of the lower limit (LLCI) and upper limit (ULCI) of the 95% confidence interval for the indirect effects. If the confidence interval does not contain zero, the moderating effect is deemed statistically significant.

The results of the moderation analysis are presented in Figures 2 to 6, which visually depict the interaction effects for each of the five SERVQUAL dimensions. The analysis shows a positive interaction effect for all five dimensions, confirming that family participation enhances the strength of the relationship between each SERVQUAL dimension and satisfaction. The results provide strong evidence for the research hypotheses H2a, H2b, H2c, H2d, and H2e, which propose that family participation positively moderates the relationships between each SERVQUAL dimension (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) and satisfaction. All five hypotheses (H2a, H2b, H2c, H2d, and H2e) are fully supported, confirming that family participation strengthens the positive relationship between each SERVQUAL dimension and satisfaction. The findings of this analysis support the idea that active family participation strengthens the effects of Tangibility, Reliability, Responsiveness, Assurance, and Empathy on satisfaction. By developing services that cater to family members' needs, day care centers can achieve higher levels of user satisfaction, family trust, and loyalty.

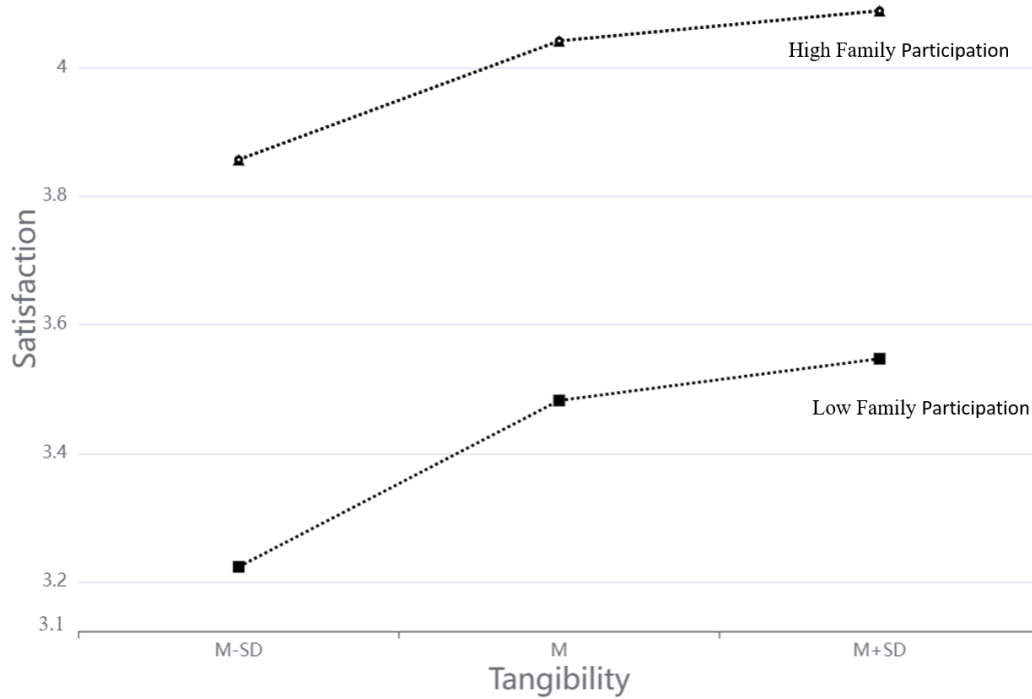


Figure 2. The Moderating Effect of Family Participation on the Relationship between Tangibility and Satisfaction

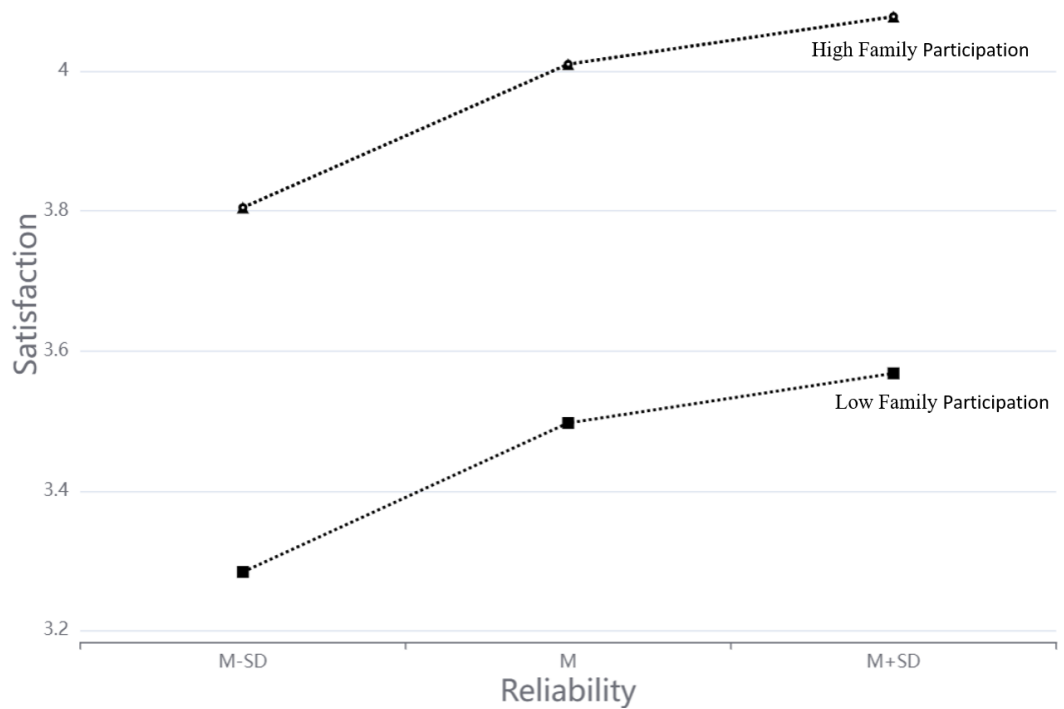


Figure 3. The Moderating Effect of Family Participation on the Relationship between Reliability and Satisfaction

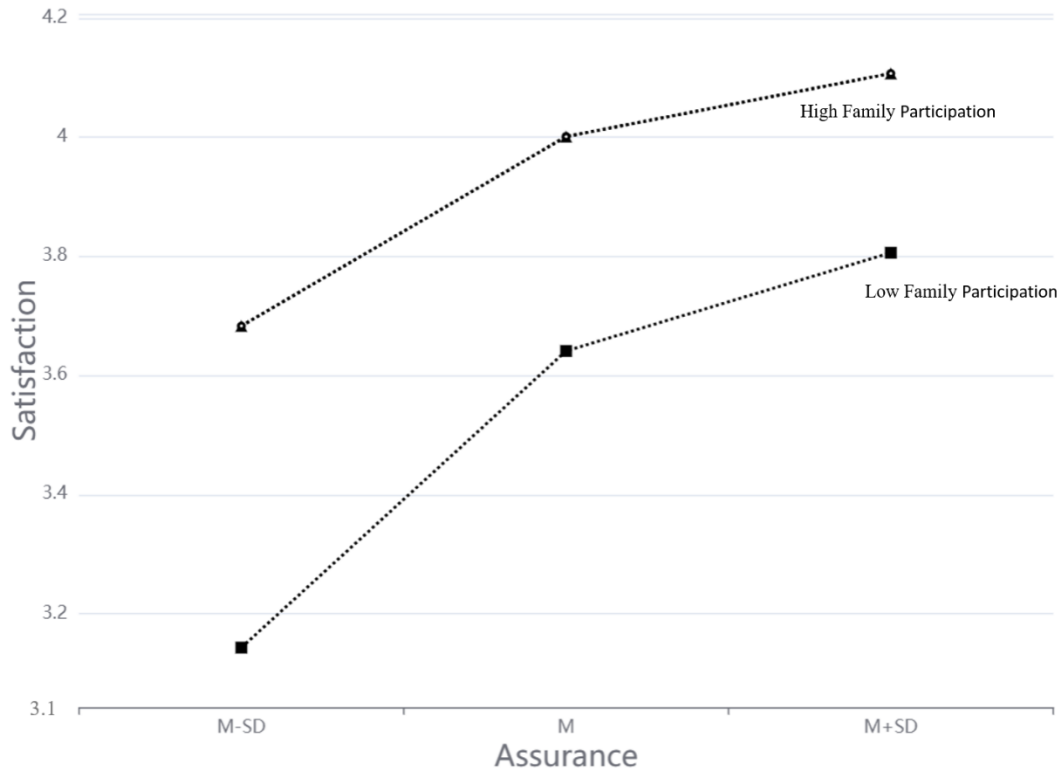


Figure 4. The Moderating Effect of Family Participation on the Relationship between Assurance and Satisfaction

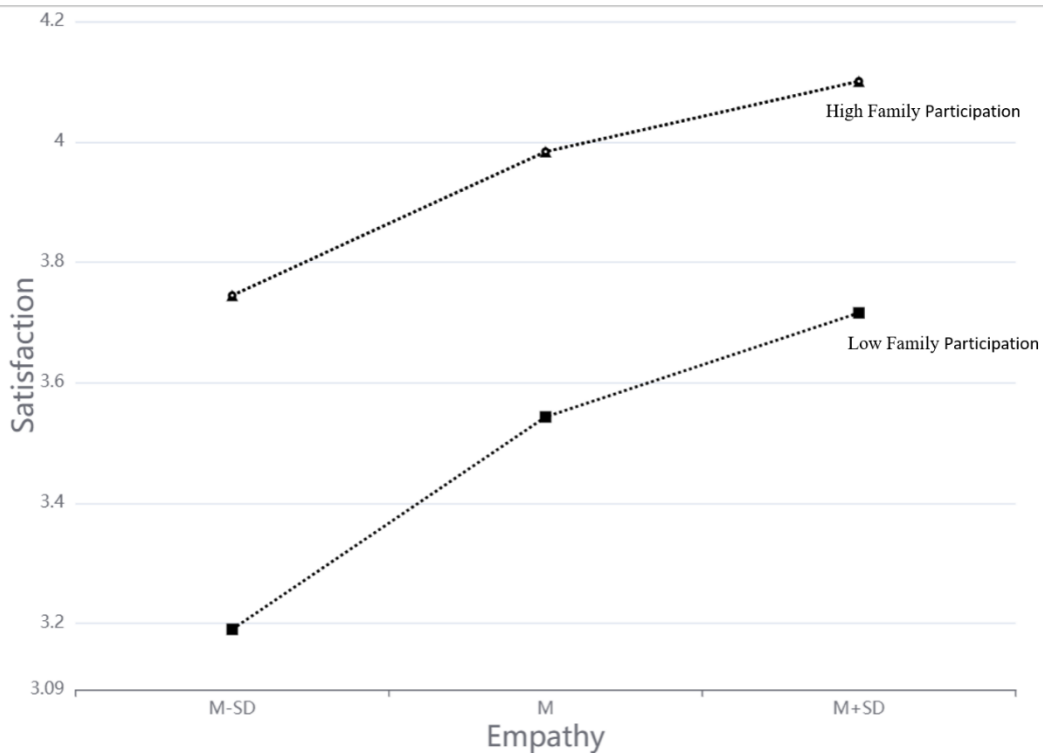


Figure 5. The Moderating Effect of Family Participation on the Relationship between Empathy and Satisfaction

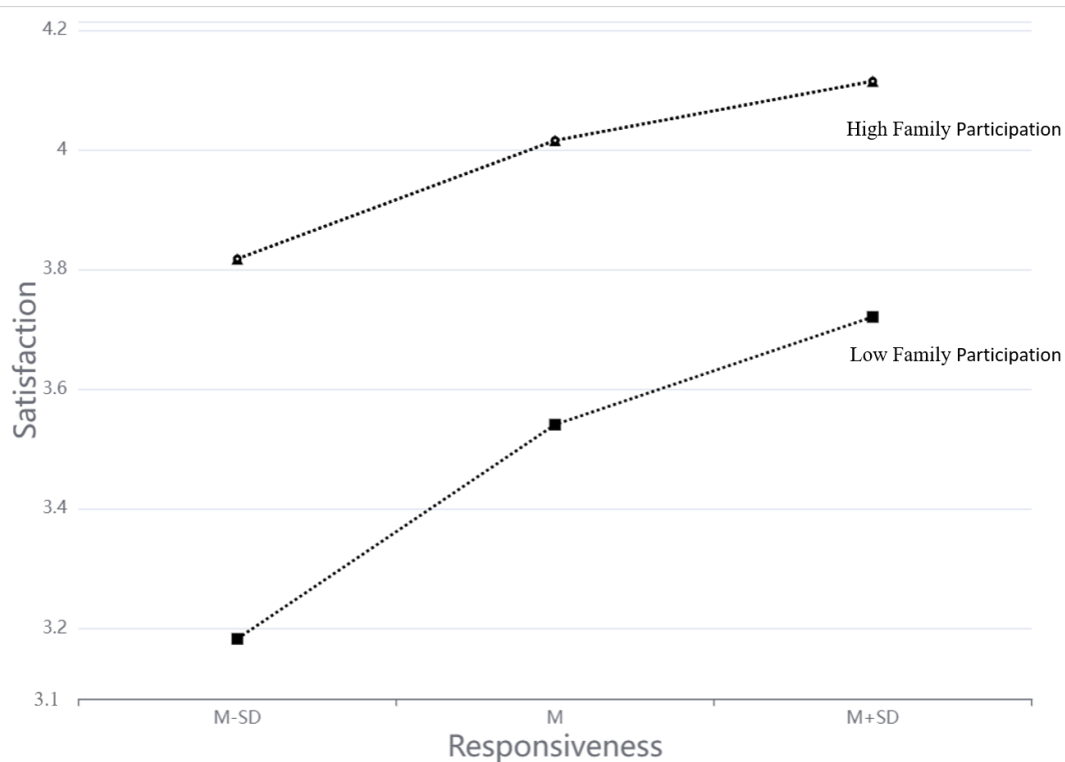


Figure 6. The Moderating Effect of Family Participation on the Relationship between Responsiveness and Satisfaction

V. Conclusion and Recommendation

5.1 Conclusion

This study explored the impact of the five SERVQUAL dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) on satisfaction in the context of day care center services. The study also examined the moderating role of family participation in these relationships. Through a comprehensive analysis involving hierarchical multiple regression and moderation effect analysis, several key insights were revealed.

(1). Direct Impact of SERVQUAL Dimensions on Satisfaction

The results confirm that all five SERVQUAL dimensions have a positive and statistically significant influence on satisfaction. Each dimension demonstrates a unique role in shaping how family members and users evaluate service quality. Tangibility ($b = 0.65, p < 0.001$) emphasizes the importance of physical aspects such as cleanliness, facilities, and equipment. Reliability ($b = 0.81, p < 0.001$) highlights the need for consistent and dependable service in caregiving processes. Responsiveness ($b = 0.77, p < 0.001$) emphasizes the speed and agility of caregivers in meeting users' urgent needs. Assurance ($b = 0.81, p < 0.001$) reflects the value of having well-trained and competent staff in providing care. Empathy ($b = 0.77, p < 0.001$) signifies the role of personalized care and emotional support in enhancing satisfaction.

(2). Role of Family Participation

The analysis also highlights the importance of family participation in moderating the relationships between the SERVQUAL dimensions and satisfaction. Family participation significantly enhances the positive effects of Tangibility, Reliability, Responsiveness, Assurance, and Empathy on satisfaction. The findings confirm the following hypotheses:

H2a: Family participation moderates the relationship between Tangibility and satisfaction.

H2b: Family participation moderates the relationship between Reliability and satisfaction.

H2c: Family participation moderates the relationship between Responsiveness and satisfaction.

H2d: Family participation moderates the relationship between Assurance and satisfaction.

H2e: Family participation moderates the relationship between Empathy and satisfaction.

The moderation analysis reveals that family members who are more actively engaged in the care process have a stronger perception of service quality. Highly engaged family members are more sensitive to Tangibility and Responsiveness, while low-engagement family members focus on the consistency and trustworthiness of

services (Reliability and Assurance).

5.2 Recommendation

Policymakers and regulatory bodies overseeing long-term care services should consider the following policy recommendations: Require day care centers to implement family engagement systems, such as real-time service updates. Mandate certification and qualification transparency, ensuring all care staff display evidence of training and credentials. Support government funding or incentives for centers that achieve family engagement targets.

This study suggests potential avenues for future research: Explore the role of psychological safety and its influence on family trust and satisfaction. Analyze the mediation effects of emotional experience in the SERVQUAL-satisfaction relationship. Apply this model to different care settings (e.g., home care, residential care) to assess generalizability.

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