

PARENTIAL KNOWLEDGE, PERSPECTIVE AND CAREGIVING SKILLS FOR CHILDREN WITH CONGENITAL HEART DISEASE IN VIETNAM

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Abstract

Background: This study examined the relationship between disease awareness, disposition, and caregiving capacity in parents of children with congenital heart disease in selected Vietnamese communities.

Methods: A multi-phase study was conducted with 275 parents using simple random sampling. Statistical analyses included frequency, percentage, mean calculation, Pearson's correlation coefficient and regression analysis.

Results: Parents demonstrated high awareness of prevention but moderate awareness of complications. While they showed strong support and collaboration, acceptance of the condition was comparatively lower. Caregiving competency was generally high, particularly in medication adherence, but weaker in managing physical activity. No significant correlation was found between disease awareness and either disposition or

Key words: Disease awareness; Disposition; Caregiving competency; Congenital heart disease; Parents.

caregiving competency. However, disposition was significantly associated with caregiving competency, with acknowledgment of role and support and collaboration emerging as significant predictors.

Conclusion: Parental disposition and caregiving skills significantly impact children's health. Developing structured training programs is crucial to enhance caregiving competency.

1. Introduction

Congenital heart disease (CHD) is the most common congenital disorder, affecting approximately 0.8% to 1.2% of live births worldwide (Wu et al., 2020). In Southeast Asia, prevalence rates vary, with some studies reporting up to 9.34 per 1,000 births (Van Der Bom et al., 2011). Advances in medical care have significantly improved survival rates, yet CHD remains a major public health concern, particularly in low- and middle-income countries (LMICs) like Vietnam, where access to specialized care is limited.

Vietnam faces many challenges in pediatric cardiology, including delayed diagnoses and restricted access to specialized treatment (Phuc et al., 2015). Although there is increasing interest in supporting CHD surgical programs in LMIC countries, early diagnosis and timely treatment of CHD is only routinely available to children born in developed countries (El Rassi et al., 2020; Saxena, 2019). For example, a study at Da Nang Hospital for Women and Children reported a CHD birth prevalence rate of 20.09 per 1,000 births, accounting for 52.3% of all congenital anomalies identified (Giang et al., 2020). Additionally, research also suggests a possible link between CHD prevalence and Agent Orange exposure, particularly in heavily affected regions like Vietnam (Giang et al., 2020). Despite these findings, national data on CHD prevalence remain scarce, making it difficult to assess the true burden of the disease and its impact on families.

Managing CHD requires long-term medical care, adherence to treatment regimens, and lifestyle adjustments. However, many Vietnamese parents lack the necessary knowledge and resources, increasing the risk of complications and psychological distress (Bouma & Mulder, 2017). Socioeconomic disparities and healthcare limitations further challenge parental caregiving, underscoring the need for targeted education and support programs. Health literacy plays a vital role in CHD management, as it influences treatment adherence and decision-making, particularly in LMICs (Burns et al., 2022). In Vietnam, where many caregivers have limited formal education, assessing how parents acquire and apply health information is essential for improving outcomes. By identifying key knowledge gaps and barriers, this study seeks to inform the development of culturally appropriate educational interventions that empower parents and enhance the quality of life for children with CHD.

Understanding congenital heart disease (CHD) is crucial for parents to pro-

vide effective care for their children. Disease knowledge includes awareness of the causes, symptoms, and available treatments for CHD, as well as the potential complications that may arise (Bouma & Mulder, 2017; Liu et al., 2019). Reliable sources such as the Centers for Disease Control and Prevention (CDC), the American Heart Association (AHA), and the National Heart, Lung, and Blood Institute (NHLBI) offer essential information on CHD prevalence, risk factors, and management strategies (Lopez et al., 2022). Early recognition of symptoms—such as shortness of breath, fatigue, and chest pain—enables timely medical intervention (Rajani & Klein, 2020). Additionally, parents should be aware of treatment options, which may range from medication to surgical procedures, and the importance of lifestyle modifications for long-term disease management (Tomasoni et al., 2019). Preventative measures, including maintaining a healthy lifestyle, can help reduce complications, while understanding possible risks like heart failure or arrhythmias allows parents to take proactive steps in their child's care (Wong, 2014).

Beyond medical knowledge, parents' emotional disposition and caregiving competency play a significant role in managing CHD. Acceptance of the condition, acknowledgment of caregiving responsibilities, and collaboration with healthcare providers are key factors that enhance caregiving effectiveness (Knowles et al., 2021). Research highlights the importance of psychological support and education in helping parents cope with their child's condition, fostering resilience and reducing emotional distress (Chowdhury et al., 2021). Effective caregiving extends beyond medical adherence to include post-surgical care, proper nutrition, medication management, and emergency preparedness (Boelsma et al., 2021). Family-centered care and multidisciplinary healthcare collaboration ensure that parents receive adequate guidance and support (Maneeekunwong et al., 2022). By strengthening disease awareness and caregiving skills, parents can improve both their child's well-being and their own ability to navigate the challenges of CHD.

To better understand the caregiving experience, this study is informed by the theory of structure of caring (Swanson, 1991). This framework conceptualizes caring as a nurturing relationship rooted in commitment and responsibility, structured around five interrelated processes, namely maintaining belief, knowing, being-with, doing-for, and enabling. Maintaining belief refers to a caregiver's trust in an individual's ability to endure life challenges. Knowing involves understanding a person's experiences within their unique context. Being-with emphasizes emotional presence, reinforcing the caregiver-patient bond. Doing-for entails actions performed on behalf of the other, while enabling supports self-care and independence. Applying this framework helps contextualize parental caregiving in CHD and offers a lens for evaluating their knowledge, concerns, and caregiving practices.

Based on previous literature, the present study aims to evaluate the level of CHD-related knowledge among Vietnamese parents, identify key challenges and

concerns in caregiving practices, and examine the influence of socioeconomic and healthcare access factors on parental caregiving. By addressing these aspects, the study seeks to provide evidence-based recommendations for enhancing parental education and support systems in Vietnam. The findings will offer valuable insights for healthcare providers, policymakers, and researchers working to improve support structures for families managing CHD in resource-limited settings.

2. Objectives

2.1 To assess the level of CHD awareness among parents, specifically comparing their understanding of disease prevention versus complications.

2.2 To evaluate parental disposition toward their child's condition, with a focus on identifying levels of support, collaboration, and condition acceptance.

2.3 To determine the level of parental caregiving competency, particularly highlighting strengths in medication adherence and gaps in managing physical activity.

3. Methods

3.1. Research design

This study employed a multi-phase design: Phase 1 was a descriptive study assessing disease awareness, disposition, and caregiving competency using a structured questionnaire. Phase 2 was a correlational study examining relationships between these variables among parents of children with congenital heart disease in Vietnam.

3.2. Setting and samples

The study was conducted in selected communities across Vietnam, including the Mekong Delta, Central Highlands, and Central Coast regions. Participants included parents of children with CHD, aged 0-18 years, from the selected regions, who could read and write and were willing to participate. The sample size, estimated at 275 using G Power software, was selected via simple random sampling to ensure equal selection chances.

3.3. Measurement

A self-administered questionnaire was developed by the researcher, divided into three parts: disease awareness (26 items across five domains), disposition (15 items across three domains), and caregiving competency (30 items across six

domains). The questionnaire was translated into Vietnamese, back-translated, and validated by experts (Sousa & Rojjanasirat, 2011), with a pilot test yielding a Cronbach's alpha of 0.805.

3.4. Data Collection and Tools

Part I of the questionnaire pertains to the disease awareness on congenital heart disease with 26 items to assess the following 5 domains namely: 1) disease with 5 items, 2) symptoms with 6 items, 3) treatment with 5 items, 4) prevention with 5 items, and 5) complications with 5 items. Part II of the questionnaire pertains to the disposition among parents of children with congenital heart disease with 15 items to assess the following 3 domains namely: 1) acceptance of condition with 5 items, 2) acknowledgement of role with 5 items, and 3) support and collaboration with 5 items. Part III of the questionnaire was answered utilizing a 5-point Likert scale with selections ranging from 1 to 5 which correspond to the respondents' perceived disposition with the following numerical value, mean value, and equivalent verbal interpretation. Part IV of the questionnaire was answered utilizing a 5-point Likert scale with selections ranging from 1 to 5 which correspond to the respondents' perceived caregiving competency with the following numerical value, mean value, and equivalent verbal interpretation.

Inclusion criteria: This study includes parents of children (aged 0-18 years) diagnosed with congenital heart disease (CHD) who reside in selected regions of Vietnam, specifically the Mekong Delta (Dong Thap, Ca Mau), Central Highlands (Lam Dong, Dak Lak), and Central Coast (Phu Yen, Ninh Thuan). Eligible participants must be able to read and write and must be willing to participate in the study. **Exclusion Criteria:** Parents are excluded if their child has additional comorbidities beyond CHD or if they are unable to complete the study due to illness, injury, or other personal circumstances.

3.5. Ethical Considerations

Ethical approval was obtained from the Ethics Review Committee of Trinity University of Asia. Participants were provided with detailed information about the study, including its purpose, procedures, and potential risks and benefits. Informed consent was obtained before participation. The study adhered to ethical principles of non-maleficence, beneficence, autonomy, and confidentiality to protect participants' rights and well-being.

3.6. Statistical Analysis

Data was analyzed using SPSS (Version 13). Descriptive statistics (means and standard deviations) were computed to summarize disease awareness, dispo-

sition, and caregiving competency. Pearson's correlation analysis examined relationships between these variables, while multiple regression analysis identified significant predictors of caregiving competency.

4. Results

4.1. Level of Disease Awareness Among Parents of Children with CHD

Table 1. Mean, standard deviation (SD), and interpretation of disease awareness levels in CHD symptoms among parents

Parental awareness of CHD was evaluated across symptoms, treatment, prevention, and complications, with the results summarized in Table 1.

Parents demonstrated a generally high level of awareness about CHD, with an overall disease awareness score of 3.82.

Awareness was strongest regarding CHD symptoms, particularly common signs such as cough, wheezing, and difficulty breathing (mean = 3.90), while less recognized symptoms, such as newborns not crying or having pale skin, had slightly lower awareness (mean = 3.83). Similarly, parents exhibited high awareness of CHD treatments, including heart surgery and transplantation (mean = 3.84), though knowledge of catheter insertion and heart grafting was slightly lower (mean = 3.82). Preventive measures were the most well-understood aspect of CHD, with parents demonstrating strong awareness of proper diet and avoiding harmful substances (mean = 4.01), while contraception, which plays a more indirect role in CHD prevention, received the lowest score in this category (mean = 3.93). In contrast, awareness of CHD complications was comparatively moderate, with the highest recognition for heart infections (mean = 3.55) and the lowest for heart failure (mean = 3.43), suggesting a gap in knowledge regarding complications. While parents showed strong overall awareness of CHD, the findings highlight the need for further education, particularly on CHD complications.

4.2. Parental Disposition in Caring for Children with CHD

Table 2 shows the mean values, SD, and verbal interpretations of parents' dispositions towards caring for children with CHD in selected communities in Vietnam. Parents generally exhibited a positive attitude toward their child's CHD, with an overall acceptance score of 4.59. Trust in medical treatment and belief in the child's potential received the highest rating (4.70), while fully accepting the child's condition had the lowest (4.37), indicating that some parents may need more time or support for complete acceptance. In terms of acknowledging their role, parents demonstrated a strong sense of responsibility (4.73), though recognizing necessary lifestyle changes scored slightly lower (4.60), resulting in an overall role awareness score of 4.66. Support and collaboration received the highest overall rating (4.71), with strong support from healthcare providers, family, and friends (ranging from 4.67 to 4.73). However, the low-

Table 1. Mean, standard deviation (SD), and interpretation of disease awareness levels in CHD symptoms among parents

Item Descriptions	Mean	Verbal Interpretation
Symptoms		
1. Newborns may not cry and have pale skin.	3.83	Agree / High Awareness
2. Cough and recurring wheezing.	3.93	Agree / High Awareness
3. Pallor, sweating, and coldness.	3.88	Agree / High Awareness
4. Rapid breathing, shortness of breath, and concave chest	3.93	Agree / High Awareness
5. Recurrent pneumonia or respiratory infections.	3.88	Agree / High Awareness
6. Physical and mental developmental delays.	3.93	Agree / High Awareness
Overall Rating	3.90	Agree/ High awareness
Treatment		
Treatable with medications.	3.82	Agree / High Awareness
Treatable with heart transplant.	3.87	Agree / High Awareness
Treatable with catheter insertion.	3.82	Agree / High Awareness
Treatable with heart surgery.	3.87	Agree / High Awareness
Treatable with heart grafting.	3.82	Agree / High Awareness
Overall Rating	3.84	Agree/ High awareness
Prevention		
Preventable with contraception.	3.93	Agree / High Awareness
Preventable with vaccination.	4.01	Agree / High Awareness
Preventable with proper diet.	4.06	Agree / High Awareness
Preventable with screening and health monitoring.	4.01	Agree / High Awareness
Preventable by avoiding harmful substances.	4.06	Agree / High Awareness
Overall Rating	4.01	Agree/ High awareness
Complication		
Arrhythmic disorders as a complication.	3.49	Neither Agree Nor Disagree / Moderate Awareness

Table 2. Mean, SD, and interpretation of disposition levels among parents

Item Descriptions	Mean	Interpretation		
Acceptance of condition				
1. Acceptance of child's condition	4.37	Agree/Good disposition		
2. Rejection of superstitious or punishment beliefs	4.59	Strongly disposition	Agree/Very	Good
3. Non-isolation of child due to condition	4.61	Strongly disposition	Agree/Very	Good
4. Belief in child's potential with support	4.70	Strongly disposition	Agree/Very	Good
5. Trust in medical treatment	4.70	Strongly disposition	Agree/Very	Good
Overall Rating	4.59	Strongly disposition	Agree/Very	Good
Acknowledgement of Role				
Belief in personal responsibility for child's care	4.73	Strongly disposition	Agree/Very	Good
Importance of enhancing caregiving abilities	4.70	Strongly disposition	Agree/Very	Good
Acceptance of lifestyle changes for better caregiving	4.60	Strongly disposition	Agree/Very	Good
Determination to meet child's needs	4.61	Strongly disposition	Agree/Very	Good
Commitment to improving child's quality of life	4.64	Strongly disposition	Agree/Very	Good
Overall Rating	4.66	Strongly	Agree/Very	Good

		disposition		
Support and Collaboration				
Feeling supported by healthcare provider	4.73	Strongly disposition	Agree/Very	Good
Comfort in seeking clarification from healthcare provider	4.67	Strongly disposition	Agree/Very	Good
Belief in strong support system from family and friends	4.73	Strongly disposition	Agree/Very	Good
Healthcare provider listen to concerns in treatment planning	4.71	Strongly disposition	Agree/Very	Good
Determination to understand child's condition and treatment options	4.70	Strongly disposition	Agree/Very	Good
Overall Rating	4.71	Strongly disposition	Agree/Very	Good
Overall Rating of parents' dispositions:		4.65	Strongly Agree / Very	Good disposition

est score in this category (4.67) was for seeking clarification from healthcare providers, suggesting a potential area for improvement. Among the three domains, "support and collaboration" was rated the highest, while "acceptance of condition" had the lowest score, indicating that while parents receive strong external support and recognize their caregiving role, some may still be adjusting to their child's condition. These findings highlight the crucial role of healthcare professionals and family support in managing CHD.

4.3 Caregiving Competency of Parents of Children with CHD

Table 3. Mean, SD, and interpretation of caregiving competency among parents

Item Descriptions	Mean	Interpretation		
Care after surgery				
1. Positioning for better circulation	4.44	Often/ Good competency		
2. Massaging to reduce fatigue	4.42	Often/ Good competency		
3. Using a kettle to keep warm	4.36	Often/ Good competency		
4. Providing comfort and monitoring pain	4.55	Always/ competency	Very	Good
5. Monitoring vital signs and reporting changes	4.53	Always/ competency	Very	Good
Overall Rating	4.46	Always/ competency	Very	Good
Nutritional care				
Preparing a low-salt, high-fiber diet	4.31	Often/ Good competency		
Offering a variety of foods for nutrition	4.33	Often/ Good competency		
Dividing meals into liquid to solid stages	4.30	Often/ Good competency		
Following doctor's diet instructions	4.53	Always/ competency	Very	Good
Gradually introducing food in small amounts	4.36	Often/ Good competency		

Table 3 summarizes the caregiving competency levels of parents of children with CHD in Vietnam, categorized by care aspects. Parents demonstrated strong overall competency in caregiving for children with CHD, with an overall rating of 4.36. The highest competency was observed in medication compliance (4.63), particularly in following prescribed dosages (4.71) and administering medicine on time (4.68). Emergency care was another area of strength, with parents excelling in recognizing unusual symptoms and seeking medical help (4.63), resulting in an overall emergency care score of 4.52. Post-surgery care also showed high competency (4.46), especially in providing comfort and monitoring pain (4.55), though keeping the child warm had the lowest score (4.36).

Nutritional care was well-managed (4.37), with parents following prescribed diets (4.53), but they faced challenges in preparing a low-salt, high-fiber diet (4.31). Competency in physical activity was generally good (4.09), yet avoiding competitive sports with heavy training had the lowest score (3.35), indicating a need for further guidance. Similarly, oral care was an area for improvement (4.11), with parents performing well in consulting doctors about oral health (4.26) but showing lower adherence to regular dental checkups (3.92). While parents generally exhibit strong caregiving skills, targeted education on physical activity safety and oral care could enhance their competency further.

4.4 Relationship Between Disease Awareness, Disposition, and Caregiving Competency

Table 4 shows no significant relationship between disease awareness and caregiving competence among parents of children with CHD. Correlation coefficients ranged from 0.007 to 0.075, with p-values above 0.05, leading us to accept the null hypothesis (H_0). In contrast, a significant relationship was found between parents' disposition and caregiving competence. The correlation coefficients for "acceptance of the condition", "acknowledgement of role", and "support and collaboration" ranged from 0.510 to 0.616, with p-values below 0.001. These results suggest that parents who accept their child's condition, acknowledge their caregiving role, and collaborate with healthcare providers exhibit higher caregiving competence. This highlights the importance of supporting parents' emotional well-being to enhance their caregiving abilities.

4.5 Linear relationship between the assessed disease awareness and disposition with caregiving competency among parents of children with CHD.

Table 5 shows that the correlation between disease awareness and disposition is 0.018 ($p = 0.769$), and the correlation between disease awareness and caregiving competency is 0.047 ($p = 0.434$). Since both p-values are greater than 0.05,

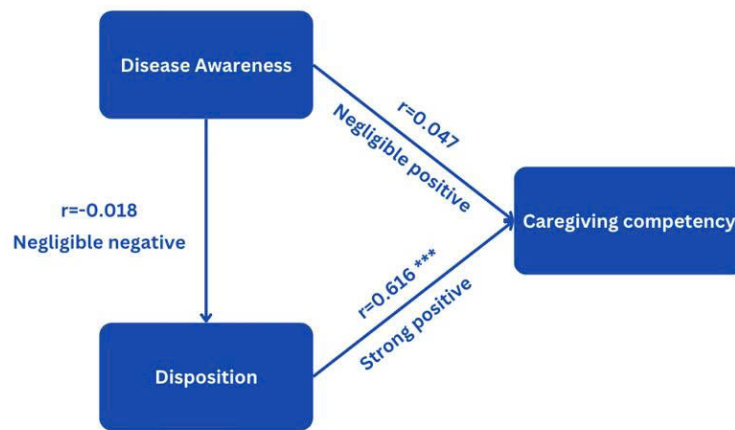
Table 4. Correlation between Disease Awareness and Caregiving Competency

Variables	Caregiving Competency		Variables	Caregiving Competency	
	Computed r	p-value		Computed r	p-value
Disease Awareness			Assessed Disposition		
A. Disease	0.059	0.333	A. Acceptance of the Condition	0.510	< 0.001
B. Symptoms	0.048	0.430	B. Acknowledgement of Role	0.557	< 0.001
C. Treatment	0.075	0.216	C. Support and Collaboration	0.559	< 0.001
D. Prevention	0.031	0.614			
E. Complications	0.007	0.912			
Disease Awareness	0.047	0.434	Disposition	0.616	< 0.001

Ensuring good oral hygiene	4.17	Often/ Good competency		
Taking my child for regular dental checkups	3.92	Always/	Very	Good
		competency		
Consulting with doctors about oral health	4.26	Often/ Good competency		
Avoiding shared utensils or toothbrushes	4.04	Often/ Good competency		
Overall Rating	4.11	Often/ Good competency		
Caring in an emergency situation				
Moving the child to a cool, dry place for comfort	4.45	Sometimes/ Fair competency		
Taking the child to a medical facility if conditions don't improve	4.38	Often/ Good competency		
Taking the child to the doctor if unusual symptoms occur	4.63	Always/	Very	Good
		competency		
Carrying necessary medicines when traveling	4.55	Often/ Good competency		
Loosening the child's clothes and seeking medical help immediately.	4.61	Often/ Good competency		
Overall Rating	4.52	Always/	Very	Good
		competency		
Overall Rating of caregiving competency	4.36	Often/ Good competency		

Table 5. Correlation between the assessed disease awareness and disposition with caregiving competency

Variables	Pearson r	P value	Conclusion
Disease awareness - Disposition	0.018	0.769	Not Significant
Disease awareness - Caregiving competency	0.047	0.434	Not Significant
Disposition - Caregiving competency	0.616	< .001	Significant



Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 4. Correlation between disease awareness, disposition, and caregiving competency in parents of children with CHD

we accept the null hypothesis for both, indicating no significant relationship between disease awareness and either disposition or caregiving competency. However, there is a significant positive correlation between disposition and caregiving competency ($r = 0.616$, $p < 0.001$), suggesting a strong relationship between these two variables.

4.6 Predictive Relationship Between Disease Awareness, Disposition, and Caregiving Competency

Table 6 indicates that perceived illness has weak and non-significant relationships with caregiving competence, explaining only 0.77% of the variance. In contrast, acknowledgement of role and support and collaboration are significant predictors, with the model accounting for 38.6% of caregiving competency variation, suggesting their crucial role in enhancing caregiving competence.

5 Discussion

This study examined the relationship between disease awareness, disposition, and caregiving competency among parents of children with CHD. The findings suggest that while parents exhibit a high level of awareness regarding CHD, this awareness does not necessarily translate into caregiving competency. Instead, parental disposition—particularly acknowledgment of their role, and support and collaboration—plays a more significant role in predicting caregiving competency. This result aligns with previous literature, which highlights the importance of psychosocial factors in caregiving, especially in LMICs like Vietnam, where healthcare challenges and socioeconomic disparities further complicate caregiving (Burns et al., 2022).

Parents demonstrated strong awareness of CHD, especially in the area of prevention, suggesting they are well-informed about risk-reduction strategies. However, awareness of complications was relatively lower, indicating that while parents may understand how to prevent CHD, they are less familiar with the long-term risks and challenges associated with the condition. This gap in knowledge could impact long-term disease management and highlights the need for more targeted education on CHD complications (Gurvitz et al., 2013). This finding is consistent with research by Wu et al. (2020), which underscores the importance of enhancing disease-specific knowledge among caregivers to improve outcomes in CHD management.

Despite their strong awareness, no significant relationship was found between disease awareness and caregiving competency. This suggests that simply being informed about CHD does not necessarily equip parents with the practical skills needed for effective caregiving. This aligns with previous research, which indicates that practical caregiving skills often require hands-on experi-

Table 6. Regression Analysis of Disease Awareness, Disposition, and Care Competency in Parents of Children with CHD

Variables	Caregiving Competency		
	Coefficients	95% CI	p-value
Assessed disease awareness			
Intercept	4.1432		
A. Disease	-0.0534	-0.771 ; 0.665	0.884
B. Symptoms	-0.0632	-1.025 ; 0.898	0.897
C. Treatment	0.1661	-0.180 ; 0.512	0.346
D. Prevention	0.0290	-0.412 ; 0.470	0.897
E. Complications	-0.0238	-0.153 ; 0.105	0.717
	R²	0.00772	
Assessed disposition			
Intercept	0.2459		
A. Acceptance of the Condition	0.0696	-0.0336 ; 1.695	0.139
B. Acknowledgement of Role	0.0615	0.1413 ; 0.383	<.001
C. Support and Collaboration	0.310	0.1724 ; 0.447	<.001
	R²	0.386	

	Coefficients	95% CI	p-value
Assessed disease awareness			
Intercept	4.1432		
A. Disease	-0.0534	-0.771 ; 0.665	0.884
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E. Complications	-0.0238	-0.153 ; 0.105	0.717
	R²	0.00772	
Assessed disposition			
Intercept	0.2459		
A. Acceptance of the Condition	0.0696	-0.0336 ; 1.695	0.139
B. Acknowledgement of Role	0.0615	0.1413 ; 0.383	< .001
C. Support and Collaboration	0.310	0.1724 ; 0.447	< .001
	R²	0.386	

ence and continuous medical guidance, rather than theoretical knowledge alone (Burns et al., 2022). In Vietnam, where many parents face significant barriers to accessing specialized care (Le et al., 2025), future interventions should supplement disease education with training that focuses on caregiving skills and support.

Parental disposition emerged as a significant predictor of caregiving competency. Specifically, parents who displayed strong acknowledgment of their role and had high levels of support and collaboration demonstrated better caregiving skills. This finding aligns with the structure of caring framework proposed by Swanson (1991), which emphasizes the importance of maintaining belief and knowing, particularly in situations of chronic illness. The importance of external support in enhancing caregiving is especially relevant in Vietnam, where healthcare access is limited. Parents who feel a strong sense of responsibility and receive adequate external support are better equipped to manage their child's condition (Bruce et al., 2014; Jackson et al., 2018). Interestingly, while parents generally expressed a positive attitude toward CHD, their acceptance of the condition had the lowest score, indicating that some parents may still struggle with fully accepting their child's diagnosis. This could affect their emotional resilience and caregiving effectiveness, suggesting that psychological support interventions aimed at fostering greater acceptance could be beneficial (Yang et al., 2022).

In terms of specific caregiving competencies, parents excelled in medication compliance, indicating strong adherence to prescribed treatment regimens. However, challenges arose in managing their child's physical activity, particularly in avoiding competitive sports with heavy training. This underscores the need for clearer guidelines from healthcare providers regarding safe activity levels for children with CHD (Longmuir et al., 2013). Additionally, the lower adherence to regular dental checkups suggests that oral health may be an overlooked aspect of CHD care, which is supported in previous studies (Bsesa et al., 2023; Saraç et al., 2023). Such findings are critical in settings like Vietnam, where healthcare access may not provide adequate support for comprehensive disease management, including aspects like oral care.

5. Implication and limitations

5.1. Implications and Future Directions

These findings have several important implications for CHD management programs. Interventions should focus not only on increasing parental awareness but also on fostering a sense of responsibility, enhancing social support, and improving practical caregiving skills. Additionally, more emphasis should be placed on educating parents about CHD complications, ensuring they are better prepared for long-term disease management. Healthcare providers should

also provide clearer guidance on physical activity and oral care to address competency gaps in these areas. In this context, psychological support and information from healthcare professionals can be very helpful in helping parents overcome the acceptance phase and positively cope with their child's health condition (Duru et al., 2021; Rajan & Klein, 2020; Tomasoni et al., 2019).

5.2 Strengths of the Study

This study possesses several notable strengths that enhance the validity, reliability, and applicability of its findings. Primarily, the utilization of a multi-phase research design, encompassing both descriptive and correlational methodologies, allows for a comprehensive analysis of the complex dynamics between disease awareness, disposition, and caregiving practices. Furthermore, the inclusion of a geographically diverse sample of 275 parents, selected via simple random sampling across three distinct regions in Vietnam (the Mekong Delta, Central Highlands, and Central Coast), significantly strengthens the generalizability of the results. This multi-regional approach addresses the ongoing need for granular data in lower-middle-income countries, where parental health literacy and socioeconomic disparities continue to be critical determinants of pediatric cardiac outcomes (Burns et al., 2022).

The research is also robustly underpinned by Swanson's theory of the structure of caring (Swanson, 1991), providing a validated conceptual framework that remains highly relevant in recent studies for evaluating the quality of life and psychosocial support systems for caregivers of children with chronic conditions (Yang et al., 2022). Finally, the rigorous cross-cultural translation, back-translation, and expert validation of the self-administered questionnaire, conducted in accordance with established methodological guidelines (Sousa & Rojjanasrirat, 2011), ensured that the data collection instruments were both culturally appropriate and highly reliable for the target Vietnamese population. This methodological rigor is essential, as contemporary literature emphasizes that culturally adapted tools are vital for accurately assessing caregiving competency and identifying specific educational gaps in diverse healthcare settings (Maneekunwong et al., 2022).

5.3. Limitations and Constraints

Despite the meaningful insights gained from this study, several limitations must be acknowledged. First, the reliance on self-reported measures for evaluating disease awareness and caregiving competency may introduce social desirability bias, as participants might overestimate their practices to meet perceived clinical expectations (Burns et al., 2022). This bias is particularly prevalent in caregiving studies where subjective reports may not fully align with objective clinical performance (Maneekunwong et al., 2022). Future research should

consider incorporating direct observation or objective skill assessments to triangulate these findings (Yang et al., 2022).

Second, the study utilized a cross-sectional design, which captures parental disposition and competency at a single point in time, thereby preventing the establishment of causal relationships or the observation of how caregiving abilities evolve across different stages of a child's development (Lopez et al., 2022). Third, while the sample was geographically diverse across Vietnam, the exclusion of children with significant comorbidities limits the generalizability of the results to more complex clinical cases where multifaceted health needs often increase parental uncertainty and caregiving burden (Bsesa et al., 2023).

Finally, although parental disposition emerged as a significant predictor, this study did not extensively explore external systemic factors such as the specific quality of healthcare access, financial toxicity, or environmental barriers (Saraç et al., 2023). Contemporary literature suggests that these social determinants of health are pivotal in the long-term management of congenital heart disease and should be a primary focus for future longitudinal investigations in resource-limited settings (Lopez et al., 2022).

6. Conclusion

While parents of children with CHD exhibit strong awareness and caregiving competency, awareness alone does not predict caregiving effectiveness. Instead, parental disposition, particularly acknowledgment of role and external support, plays a crucial role. These findings highlight the need for holistic interventions that not only educate parents but also provide psychological and social support to enhance caregiving competency.

Author Contributions Dang Van Sang was responsible for data analysis, conceptualization, data acquisition, and manuscript writing. Nguyen Thi Phuong Uyen contributed to writing and editing the manuscript.

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