FAMILY CAREGIVER'S EDUCATION AND TRAINING PROGRAM: CAREGIVER'S COMPETENCY IN TRACHEOSTOMY CARE AND BASIC MECHANICAL VENTILATION MANAGEMENT

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ABSTRACT

This study investigates the competency of family caregivers in caring for tracheostomized and mechanically ventilated children. Using a pre-/post-training test design, data was collected from 32 family caregivers who participated in a comprehensive education and training program. Results indicate a significant improvement in caregiver competency, with a statistically significant difference in pre- and post-training competency scores ($t = 51.71$, $p = 0.000$). However, challenges such as physical exhaustion, emotional stress, financial strain and difficulty managing caregiver responsibilities also emerged, highlighting the need for comprehensive support systems and ongoing education to address caregiver challenges.

Keywords: Caregiver competency, education and training, tracheostomized and mechanically ventilated children, family caregivers, complex medical needs.

INTRODUCTION

The care of tracheostomized and mechanically ventilated children is a complex and challenging task that requires specialized knowledge, skills and support (Kun et al., 2020). Home caregivers play a vital role in maintaining the child's health, safety and well-being, but often face significant challenges and barriers in providing optimal care (Neunhoeffer et al., 2022). Research has consistently shown that family caregivers are essential in ensuring the health and well-being of children with complex medical needs (High et al., 2022). However, there is a growing recognition that caregivers require comprehensive education, training and support to provide high-quality care. The increasing prevalence of children requiring long-term mechanical ventilation has led to a growing need for family caregivers to provide complex care in the home setting (Carlsen & Gerritsen, 2019). Pediatric home mechanical ventilation is a life-sustaining treatment that enables children with respiratory failure to receive mechanical ventilation in the comfort of their own homes. Studies have highlighted the importance of family caregiver education and training in enhancing caregiver competency and confidence in providing complex care (Kun et al., 2020; Neunhoeffer et al., 2022). However, there is a lack of standardized programs and competency assessments tailored to the unique needs of caregivers providing tracheostomy care and basic mechanical ventilation management (High et al., 2020).

Despite the importance of caregiver education and training, there is a significant gap in the literature regarding the effectiveness of comprehensive education and training programs in enhancing caregiver competency and confidence. Previous studies have highlighted the challenges faced by caregivers in providing tracheostomy care and basic mechanical ventilation management, including physical exhaustion, emotional stress, financial strain and difficulty managing caregiver responsibilities (Lemos et al., 2019; Sotoudeh et al., 2019). However, there is a lack of research exploring the effectiveness of comprehensive education

and training programs in addressing these challenges and enhancing caregiver competency and confidence in the Philippine context. This study seeks to address the knowledge gap by exploring the effectiveness of the Family Caregiver's Education and Training Program in enhancing caregiver competency and confidence in tracheostomy care and basic mechanical ventilation management. Moreover, the study seeks to identify the challenges and barriers faced by family caregivers, enhance the standardized comprehensive education and training program, and evaluate the program's effectiveness in enhancing caregiver competency and confidence. On the other hand, the study's findings provide insights into the effectiveness of comprehensive education and training programs in enhancing caregiver competency and confidence and highlight the importance of ongoing support and resources in addressing caregiver challenges. The study employed a pre-/post-training test design, with a convenience sample of 32 family caregivers participating in the Family Caregiver's Education and Training Program. The study findings contribute to the growing body of research highlighting the importance of comprehensive education and training programs in enhancing caregiver competency and confidence.

This article begins with an introduction to the importance of caregiver education and training. It then reviews the current literature on caregiver education and training, highlighting gaps and weaknesses. The article proceeds to outline the study's methodology, followed by a presentation of the results, which demonstrates a significant improvement in caregiver competency and confidence. Finally, the discussion interprets the findings, highlighting the implications for practice, education and research.

LITERATURE REVIEW

This study integrates three theoretical frameworks to understand caregiver competency in caring for children with tracheostomy and long-term ventilation needs. The Caregiver-Centered Care Competency Framework (Toles et al., 2019) emphasizes family-centered care and caregiver empowerment, highlighting the need for caregivers to possess specific competencies. The Tracheostomy Competency Framework (Royal College of Speech and Language Therapists, 2019) outlines competencies for tracheostomy care, emphasizing assessment, planning, implementation and evaluation. The Long-Term Ventilation in Children and Young People Clinical Model (Pan Thames, 2020) provides a comprehensive outline of clinical care requirements, emphasizing multidisciplinary care, family-centered care and caregiver empowerment. By integrating these frameworks, this study aims to identify key competencies, clinical care requirements and caregiver empowerment strategies to promote optimal care outcomes.

METHODOLOGY

Respondents of the Study

The study was conducted at the Philippine Children's Medical Center (PCMC), Quezon City, Metro Manila. This made use of descriptive-developmental design and employed purposive random sampling in selecting samples from the population. The sample size consisted of 32 family caregivers of tracheostomized and mechanically ventilated pediatric children. Qualified respondents were family caregivers who were at least 18 years old, able to read, write and communicate in the language of the study, and had no cognitive impairment, who were enrolled in the PCMC's Home Ventilation Management Program and Pulmonary Rehabilitation Program. The minimum recommended sample size was 30 respondents, and

since the study exceeded this requirement with 32 participants, the evaluation results are reliable and generalizable, assuming a high response rate from the selected sample.

Instrumentation

This study utilized a systematic and standardized Family Caregiver's Competency Manual, which was self-constructed and validated through a multidisciplinary team review. The manual comprised various modules, including respiratory anatomy and physiology, infection control, stoma care and basic ventilator management, among others. The manual was developed based on the key findings of a multidisciplinary group discussion and was benchmarked against established guideline from reputable international pediatric institutions.

To ensure validity and reliability, the comprehensive competency manual was assessed and reviewed by a multidisciplinary team, incorporating their comments and suggestions for improvement. Following modifications, the manual was presented to the adviser for final approval. Additionally, a Caregiver Competency training Evaluation Checklist was created to assess and evaluate family caregiver competency in caring for tracheostomized and mechanically ventilated children for home care.

Data Collection Procedure

The data collection procedure involved implementing the comprehensive caregiver's competency manual to the 32 family caregivers of tracheostomized and mechanically ventilated pediatric children. Prior to this, permission was sought from the head consultants of the Home Ventilator Management Program (HVMP) and Pulmonary Rehabilitation Program (PRP), obtaining informed consent for the enrolled family caregivers. The respondents were informed of the purpose of the family caregiver's education and training program and the assessment process through the caregiving orientation (multidisciplinary conference). Upon completion of the Family Caregiver's Education and Training Program, the respondents underwent a comprehensive assessment and evaluation using the caregiver's competency evaluation checklist. The completed checklists were then collected, tallied and analyzed for statistical interpretation.

Data Analysis

The data collected from the respondents were encoded, organized and classified. The data were then treated using statistical tools to gain numerical results. The weighted mean was used to evaluate the competency of family caregivers on both pre-training and post-training, frequency and percentage distribution were used to identify the challenges and barriers faced by the caregivers. Additionally, a paired t-test was employed to identify significant difference in the family caregiver's competency before and after participating in the education and training program.

The results were interpreted using a 5-point Likert scale, with assigned points and numerical ranges corresponding to performance levels, including excellent (4.5-5.0), very good (3.5-4.4), good (2.5-3.4), needs improvement (1.5-2.4) and unsatisfactory (1.0-1.4). Moreover, the p-level of significance was set at 5%, considering $p < 0.05$ as statistically significant.

RESULTS

Table 1. Competency of Family Caregivers in Caring for Tracheostomized and Mechanically Ventilated Children Before (Pre-Training) Participating in the Education and Training Program

Competency Indicators	Average Weighted Mean	Interpretation	Rank
Knowledge and Understanding	1.40	Unsatisfactory	2
Tracheostomy Care Skills	1.36	Unsatisfactory	3
Basic Mechanical Ventilator Skills	1.19	Unsatisfactory	6
Emergency Response Skills	1.33	Unsatisfactory	5
Pulmonary Rehabilitation Support	1.34	Unsatisfactory	4
Communication and Documentation	1.49	Unsatisfactory	1
Overall Weighted Mean	1.35	Unsatisfactory	

Table 1 summarizes the competency of family caregivers in caring for tracheostomized and mechanically ventilated children before participating in the education and training program. Remarkably, the overall weighted mean of 1.35 indicates that family caregivers demonstrated unsatisfactory levels of competency across all indicators at a pre-training level.

The competency indicator with the highest weighted mean is Communication and Documentation, with a weighted mean of 1.49, although it still falls within the unsatisfactory range. Knowledge and Understanding ranked second, with a weighted mean of 1.40. Tracheostomy Care Skills, Pulmonary Rehabilitation Support, and Emergency Response Skills had weighted means ranging 1.33 to 1.36, indicating unsatisfactory levels of competency. On the other hand, Basic Mechanical Ventilator Management Skills has the lowest weighted mean of 1.19, suggesting that family caregivers lacked the necessary skills to operate mechanical ventilators effectively.

The ranking of the competency indicators from highest to lowest weighted mean is as follows: Communication and Documentation (1.49), Knowledge and Understanding (1.40), Tracheostomy Care Skills (1.36), Pulmonary Rehabilitation Support (1.34), Emergency response Skills (1.33), and Basic Mechanical Ventilator Management Skills (1.19). The results highlighted the need for targeted education and training programs to enhance the competency of family caregivers in caring for tracheostomized and mechanically ventilated children.

Table 2. Competency of Family Caregivers in Caring for Tracheostomized and Mechanically Ventilated Children After (Post-Training) Participating in the Education and Training Program

Competency Indicators	Average Weighted Mean	Interpretation	Rank
Knowledge and Understanding	4.30	Very Good	5
Tracheostomy Care Skills	4.44	Very Good	3
Basic Mechanical Ventilator Skills	4.27	Very Good	6
Emergency Response Skills	4.42	Very Good	4
Pulmonary Rehabilitation Support	4.47	Very Good	2
Communication and Documentation	4.61	Excellent	1
Overall Weighted Mean	4.42	Very Good	

Table 2 presents the competency levels of family caregivers in caring for tracheostomized and mechanically ventilated children after participating in the education and training program. The results show that family caregivers demonstrated significant improvements in their competency levels across all competency indicators, with an overall weighted mean of 4.42, indicating a "Very Good" level of competency.

The competency indicator with the highest weighted mean is Communication and Documentation, with a weighted mean of 4.61, which falls within the "Excellent" range. Pulmonary Rehabilitation Support ranked second, with a weighted mean of 4.47, followed by Tracheostomy Care Skills, Emergency Response Skills, and Knowledge and Understanding, all of which had weighted means ranging from 4.30 to 4.44, indicating "Very Good" levels of competency. Moreover, the Basic Mechanical Ventilator Management Skills had a weighted mean of 4.27, also indicating a "Very Good" level of competency. The significant improvements in competency levels across all competency indicators suggest that the education and training program was effective in enhancing the skills and knowledge of family caregivers in caring for tracheostomized and mechanically ventilated children.

Table 3. Difference in the Family caregivers' Competency in Caring for Tracheostomized and Mechanically Ventilated Children Before (Pre) and After (Post-Training) Participating in the Education and Training Program

Competency Indicators	PRE-Mean Competency	POST Mean Competency	t-Test	p-value	Interpretation
1. Knowledge and Understanding	1.40	4.30	51.71	0.000	Significant
2. Tracheostomy Care Skills	1.36	4.44	42.28	0.000	Significant
3. Basic Mechanical Ventilator Management Skills	1.19	4.27	44.23	0.000	Significant
4. Emergency Response Plan	1.33	4.42	50.26	0.000	Significant
5. Pulmonary Rehabilitation Support	1.34	4.47	43.48	0.000	Significant
6. Communication and Documentation	1.49	4.61	59.23	0.000	Significant

0.05 level of significant

Table 3 presents the difference in family caregivers' competency in caring for tracheostomized and mechanically ventilated children before and after participating in the education and training program. The results show that there were significant improvements in competency levels across all indicators.

The t-test results indicate that the difference between pre- and post-training competency levels were statistically significant at the 0.05 level, with p-values ranging from 0.000 for all indicators, this suggests that the education and training program had a significant impact on enhancing the competency of family caregivers. The largest improvements was observed in Communication and Documentation, with a pre- and post-training mean of 1.49 and 4.61, respectively. Similarly, significant improvements were observed in Knowledge and Understanding (pre- and post-training mean of 1.40 and 4.30), Tracheostomy Care Skills

(1.36 and 4.44), Basic Mechanical Ventilator Management Skills (1.19 and 4.37), Emergency Response Plan (1.33 and 4.42), Pulmonary Rehabilitation Support (1.34 and 4.47).

The significant improvements in competency levels across all competency indicators suggest that the education and training programs was effective in enhancing the skills and knowledge of family caregivers in caring for tracheostomized and mechanically ventilated children.

Table 4. Challenges and Barriers Face by the Caregivers

Challenges and Barriers	Frequency	Percentage	Rank
Physical Exhaustion (fatigue, sleep disturbances)	29	90.63%	1
Emotional stress (anxiety, worry, overwhelm)	25	78.13%	2
Lack of time for self-care	22	68.75%	4
Uncertainty about the future (care needs, own ability)	22	68.75%	4
Financial strain (financial burden, reduced income)	23	71.8%	3
Difficulty managing caregiver responsibilities (daily tasks)	20	62.5%	5
Emotional stress (sadness, depression)	15	46.8%	7
Physical exhaustion (physical strain)	18	56.25%	6

Table 4 presents the challenges and barriers faced by caregivers of tracheostomized and mechanically ventilated children. The results show that caregivers experienced a range of physical, emotional and practical challenges.

The most common challenge faced by caregivers was physical exhaustion, with 90.63% of respondents reporting fatigue, sleep disturbances or physical strain. This was closely followed by emotional stress, with 78.13% of respondents reporting anxiety, worry, or feeling overwhelmed. Moreover, financial strain was also a significant challenge, with 71.8% of respondents reporting a financial burden or reduced income. Lack of time for self-care and uncertainty about the future were also common challenges, with 68.75% of respondents reporting these concerns. Additionally, difficulty managing caregiver responsibilities and physical exhaustion due to physical strain were also reported by 62.5% and 56.25% of respondents, respectively. Emotional stress in the form of sadness or depression was reported by 46.8%of respondents.

The findings suggest that caregivers of tracheostomized and mechanically ventilated children face a complex array of challenges that impact their physical, emotional and practical well-being. Addressing these challenges through targeted support and resources is essential to ensuring the well-being of both caregivers and children.

DISCUSSION

The findings of this study highlight several key issues related to the competency of family caregivers in caring for tracheostomized and mechanically ventilated children. Firstly, the results indicate that family caregivers have inadequate competency levels before participating in an education and training program (Table 1). The overall weighted mean of 1.35 suggests a significant need for improvement in caregiver competency, which is consistent with previous research (Kun et al., 2020; Neunhoeffer et al., 2022). This emphasizes the importance of targeted education and training programs to enhance the competency of family caregivers. This study demonstrates the effectiveness of an education and training program in improving caregiver competency (Table 2). The overall weighted mean of 4.42 after participating in the

program indicates a significant improvement in caregiver competency, which is consistent with previous studies (High et al., 2022; Woodridge & Carter, 2021). This highlights the need for healthcare providers to prioritize the development and implementation of education and training programs for family caregivers of children with complex medical needs.

Furthermore, the study reveals significant improvements in competency levels of family caregivers after participating in the education and training program (Table 3). The t-test results indicate that the differences between pre- and post-training competency levels were statistically significant, which is consistent with previous studies (Yilmaz Yegit et al., 2021; Stanley et al., 2019). This underscores the importance of providing ongoing support and resources to family caregivers to maintain and improve their competency levels.

Lastly, the study highlights the significant challenges and barriers faced by caregivers of these children (Table 4). The findings indicate that physical exhaustion, emotional stress and financial strain are among the most common challenges faced by caregivers, which is consistent with previous research (Sherman et al., 2024; Amar-Dolan et al., 2020). This emphasizes the need for healthcare providers to recognize the importance of providing comprehensive support and resources to caregivers to manage these challenges.

CONCLUSIONS

This study aimed to investigate the baseline competency of family caregivers in caring for tracheostomized and mechanically ventilated children, the changes in caregiver competency after participating in an education and training program, and the challenges and barriers faced by caregivers. The results show that family caregivers have inadequate competency levels before participating in the education and training program but demonstrate significant improvements in competency levels after participating in the program. The study also highlights the significant challenges and barriers faced by caregivers, including physical exhaustion, emotional stress and financial strain.

The findings of the study answer the research questions and objectives, providing a comprehensive picture of the competency levels of family caregivers and the challenges they face. The study's results have important implications for practice, emphasizing the need for targeted education and training programs to enhance caregiver competency and provide comprehensive support and resources to manage the challenges faced by caregivers.

Furthermore, the results of the study have significant implications for healthcare providers, policymakers and researchers. Future studies can build on the findings of this study by exploring the long-term effects of education and training programs on caregiver competency and the development of strategies to address the challenges and barriers faced by caregivers.

Specifically, future research can focus on:

1. Developing and evaluating the effectiveness of education and training programs for family caregivers of tracheostomized and mechanically ventilated children.
2. Investigating the impact of caregiver competency on child health outcomes and quality of life.
3. Exploring the experiences and challenges faced by caregivers from diverse cultural and socioeconomic backgrounds.

4. Developing and evaluating the effectiveness of interventions aimed at addressing the physical, emotional and financial challenges faced by caregivers.

By addressing these areas, future research can contribute to the development of evidence-based strategies to support family caregivers and improve the health outcomes and quality of life of tracheostomized and mechanically ventilated children.

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