

Knowledge, Attitudes, and Practices of Caregivers Toward Spacer Device Use in Pediatric Asthma Management in San Fernando City, La Union

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ABSTRACT

This study examined the knowledge, attitudes, and practices (KAP) of caregivers toward spacer device use in pediatric asthma management in San Fernando City, La Union. The research targeted caregivers of children aged 1 to 12 years who had been prescribed metered-dose inhalers (MDIs), using total enumeration across all public primary schools in the city. A total of 125 caregivers of the 254 identified pediatric MDI users were reported to be spacer users and were included as respondents. Data were collected through a structured, close-ended questionnaire administered in schools and through home visits when caregivers were not present. The study employed a descriptive-correlational quantitative design to assess caregivers' KAP levels and determine differences and relationships concerning their demographic characteristics. Findings revealed that most caregivers were female, middle-aged, and belonged to the low income but not poor group. Overall, the caregivers demonstrated adequate knowledge, positive attitudes, and good practices regarding spacer use. Significant differences in KAP were observed according to educational attainment ($p < .001$) and monthly income ($p < .05$), indicating that higher education and better financial capacity enhanced proper spacer use. Strong positive correlations were also found between knowledge and attitude ($r = 0.885$, $p < .001$) and between knowledge and practice ($r = 0.878$, $p < .001$), demonstrating the interconnected nature of these domains. These results underscore the need for continuous caregiver education and support. Based on the findings, strategies such as infomercial dissemination, educational seminars, and brochure distribution were proposed to improve caregiver understanding and consistent use of spacers in pediatric asthma management.

Keywords: Spacer Device, Pediatric Asthma, Caregiver Knowledge, Attitudes, Practices, Metered Dose Inhaler, San Fernando City

1. Introduction

Asthma is a chronic inflammatory disease of the airways that affects individuals of all ages, marked by symptoms of wheezing, coughing, shortness of breath, and tightness of the chest (World Health Organization, 2021). Worldwide, asthma is one of the most prevalent chronic diseases in children. In 2020, the World Health Organization (WHO) estimated that asthma affected 262 million people and caused 455,000 deaths. Among children under the age of eighteen, the Centers

for Disease Control and Prevention's (CDC) 2021 National Health Interview Survey indicates that males (7.3%) have a higher prevalence of asthma than females (5.6%). However, in adults, females (9.7%) have a higher prevalence than males (6.2%). Asthma development can be caused by a mix of genetic factors, environmental exposures, and lifestyle choices, such as being around allergens or pollution. Managing asthma effectively is important to reduce health-related complications and enhance the quality of life for those who have it (Global Initiative for Asthma, 2024).

Given the great prevalence of asthma, especially in children, immediate and effective treatment plans are needed. As a major health concern, asthma disproportionately affects children, making it one of the leading causes of morbidity worldwide. According to the Centers for Disease Control and Prevention (CDC, 2021), about 4.7 million children under the age of 18 in the United States suffer from asthma, making up 6.5% of the pediatric population. The frequency varies by age, affecting 1.9% of children aged 0 to 4 years, 7.5% of those aged 5 to 11 years, and 8.7% of those aged 12 to 17 years (Centers for Disease Control and Prevention [CDC], 2021). Associated with frequent hospitalizations, visits to emergency rooms, and long-term use of medication, this chronic condition highlights the challenges that asthma places on both patients and healthcare systems. Because of its high frequency and potential complications, asthma remains a priority for public health interventions worldwide (Centers for Disease Control and Prevention, 2021).

As the disease affects a child's physical, emotional, and psychological health, it can lead to severe impacts on their overall quality of life. Research indicates that children with asthma often engage in less physical activity compared to their healthy peers, which can adversely affect their emotional stability and academic performance. For instance, a study by Reznik et al. (2020) found that children with moderate to severe persistent asthma symptoms were less likely to participate in interactive physical play at school, and this reduced participation was associated with poorer socio-emotional and academic outcomes. Additionally, the psychological and social impact of asthma extends beyond the child, affecting family dynamics as caregivers, defined as individuals who provide direct care and support to another person, especially a child, elderly, or someone with health needs, such as parents, grandparents, or other family members (Oxford University Press, 2024), must manage frequent doctor visits and medication schedules.

These findings demonstrate the extensive impact of asthma on various aspects of a child's daily life. To effectively manage asthma, the use of medication delivery devices, such as metered-dose inhalers, plays a crucial role. Metered-dose inhalers are handheld devices designed to deliver specific amounts of medication directly to the lungs in the form of aerosolized particles. The device consists of a pressurized canister containing medication, which, when activated, releases a measured dose of the drug. Metered-dose inhalers are commonly used to administer bronchodilators, which relax airway muscles, and corticosteroids, which reduce airway inflammation.

These devices are integral to asthma management, providing quick relief during acute exacerbations and helping maintain long-term control. Proper technique is crucial to ensure that the medication effectively reaches the lungs, a challenge especially evident among pediatric

patients. Studies have consistently shown that inhaler technique remains suboptimal among pediatric patients, often compromising asthma control. However, technique significantly improves when using metered -dose inhalers (MDIs) with spacers or VHC (VHCs). Duncan (2024) emphasized that routine instruction and demonstrations by healthcare providers greatly enhance both caregiver and child competence in spacer use. Thus, regular education on proper inhalation techniques is essential to ensure effective and consistent medication delivery in children with asthma.

One of the prevalent challenges in pediatric asthma management is the difficulty children face in achieving proper hand – breath coordination when using pressurized metered -dose inhalers (pMDIs). This coordination is crucial for effective medication delivery , yet many children, especially those aged 1 to 12, struggle with synchronizing inhaler actuation with inhalation. A study by Almomani et al. (2021) found that only 13.4% of pediatric patients using MDIs demonstrated correct technique, highlighting the widespread issue of improper inhaler use among children. To mitigate this problem, the use of spacers, particularly VHC , is recommended. These devices act as reservoir chambers, allowing for a two -step medication delivery process , first activating the inhaler, then inhaling the medication , thus helping patients overcome coordination difficulties and improving overall treatment efficacy.

Spacers such as VHC are especially beneficial as they enhance the deposition of fine particles in the lungs, reduce drug accumulation in the mouth and throat, and lower the risk of side effects such as hoarseness, throat discomfort, and oral candidiasis (Lavorini et al., 2020). It also features a one -way inspiratory valve that prevents exhalation into the chamber, further improving delivery efficiency (Zar & Jeena, 2020). These devices significantly minimize the need for precise timing, making them especially useful for younger children. Additionally, breath-actuated inhalers (BAIs) offer an alternative by automatically releasing medication upon inhalation, further assisting children who have difficulty coordinating their breathing with pMDI use. This is especially advantageous for young children, who often have difficulty performing the correct inhalation technique. The Global Initiative for Asthma (GINA, 2024) also recommends spacers in pediatric asthma management to improve drug efficacy and minimize corticosteroid-related complications. Given these benefits, VHCs are widely endorsed in clinical guidelines for children using pMDIs.

Recent studies have reinforced the importance of spacers and VHC in enhancing the efficacy of inhaler therapy, particularly for pediatric patients who often struggle with the coordination required for proper inhaler use. A 2022 randomized crossover study by Alcoforado et al. demonstrated that using a VHC with a jet nebulizer significantly improved pulmonary deposition of aerosolized medication compared to using the nebulizer alone, indicating enhanced drug delivery efficiency. Similarly, a 2023 study by Lu et al. compared nebulization and MDI with spacer in bronchodilator responsiveness testing, finding that the MDI with spacer provided comparable efficacy to nebulization, suggesting that spacers can effectively enhance drug delivery in clinical settings. Furthermore, a 2022 study by Schreiber et al. highlighted that improper inhaler technique remains a significant issue, with many patients making critical errors that can be

mitigated by using spacers, which simplify the inhalation process and improve medication deposition in the lungs.

2. Objectives

This study aims to assess the knowledge, attitudes, and practices of caregivers of pediatric asthma patients regarding spacer use.

Specifically, it sought to answer the following questions:

1. What is the demographic profile of caregivers in terms of:
 - a. sex;
 - b. age;
 - c. educational attainment; and
 - d. monthly household income?
2. What is the level of knowledge of caregivers regarding the use of spacers in pediatric asthma management?
3. What is the level of attitude of caregivers toward the use of spacers in pediatric asthma management?
4. What is the level of caregivers' practices in using, cleaning, and maintaining spacers in pediatric asthma management?
5. Is there a significant difference in the knowledge, attitudes, and practices of caregivers regarding spacer use when grouped according to their demographic profile?
6. What strategies can be proposed to improve the knowledge, attitudes, and practices of caregivers on spacer use in pediatric asthma management in San Fernando City, La Union?

3. Materials and methods

This study employed a descriptive–correlational quantitative research design to determine the demographic profile of caregivers and to assess the level of knowledge, attitudes, and practices (KAP) regarding spacer use in pediatric asthma management in San Fernando City, La Union. The descriptive component of the design was used to describe the caregivers' socio - demographic characteristics (such as age, sex, educational attainment, and monthly income) as well as to determine the level of caregivers' knowledge, attitudes, and practices toward spacer use.

The correlational component of the design was utilized to examine the relationships between caregivers' knowledge, attitudes, and practices, as well as to determine whether

significant differences in KAP levels exist when caregivers are grouped according to their socio-demographic characteristics. This quantitative approach was deemed appropriate as it allows for the measurement of variables, identification of patterns, and testing of relationships using appropriate statistical methods (Creswell & Creswell, 2022; Apuke, 2020).

Furthermore, the use of a quantitative design enables objective measurement of variables and facilitates statistical analysis to support evidence-based conclusions. This research design is suitable for achieving the study's objectives, as it provides a comprehensive understanding of caregivers' KAP levels and the factors associated with spacer use in pediatric asthma management (Creswell & Creswell, 2022; Apuke, 2020). Population and Locale of the Study This study was conducted in San Fernando City, La Union, and targeted caregivers of pediatric asthma patients aged 1 to 12 years who had been prescribed metered-dose inhalers (MDIs). The locale was chosen as it provided access to enough eligible caregivers within the city's barangays and public primary schools.

Table 1. *Distribution of Respondents Using MDIs and Spacers Across All Primary Schools in San Fernando City, La Union*

| School | No. of Spacer Users |
|--|----------------------------|
| Bangbangolan Elementary School | 8 |
| Baraoas Elementary School | 6 |
| Bungro Elementary School | 7 |
| Cadaclan Elementary School | 3 |
| Canaoay Elementary School | 4 |
| Catbangan Elementary School | 9 |
| Dallangayan Elementary School | 4 |
| Dalumpinas Elementary School | 8 |
| Ilocanos Elementary School | 9 |
| Lingsat Integrated School | 6 |
| Mameltac Elementary School | 2 |
| Masicong Elementary School | 5 |
| Nagyubuyuban Elementary School | 4 |
| Pagudpud Elementary School | 3 |
| Pao Elementary School | 6 |
| Parparya Elementary School | 3 |
| Puspus Elementary School | 1 |
| Sacyud Elementary School | 8 |
| Sagayad Elementary School | 7 |
| San Agustin (Poro) Elementary School | 3 |
| San Fernando North Central School | 4 |
| San Fernando South Central Integrated School | 3 |
| Santiago Elementary School | 5 |
| Sevilla Elementary School | 4 |
| Sibuan-Otong Elementary School | 1 |
| Tanquigan Elementary School | 2 |
| Total | 125 |

A total enumeration sampling method was employed, wherein all identified caregivers of pediatric asthma patients who met the inclusion criteria were included as respondents. Data were gathered from all public primary schools in San Fernando City, La Union, considering accessibility and logistical feasibility. These schools included Canaoay Elementary School, Catbangan Central School, Dallangayan Elementary School, Dalumpinas Integrated School, Ilocanos Elementary School, Lingsat Integrated School, Mameltac Elementary School, Pagudpud Elementary School, Sagayad Elementary School, San Agustin (Poro) Elementary School, Santiago Elementary School, Sevilla Elementary School, San Fernando North Central School, San Fernando South Integrated School, Sibuan -Otong Integrated School, and Tanquigan Elementary School . As presented in

Table 1, a total of 125 users were identified across the 26 elementary schools to be using spacers. This distribution highlights varying levels of spacer utilization among pediatric asthma patients, indicating that while metered -dose inhaler use is widespread, the adoption of spacers remains moderate across schools in San Fernando City, La Union. Within these schools, the researchers identified caregivers of pediatric asthma patients either by approaching parents who accompanied their children or by obtaining information on students with asthma diagnoses. For cases where the caregiver was not present in school, home visits were conducted to reach the identified respondents. This procedure ensured comprehensive inclusion of the target population and facilitated accurate data collection on caregivers' knowledge, attitudes, and practices regarding spacer use in pediatric asthma management.

The inclusion criteria for this study were as follows: (1) caregivers of pediatric patients aged 1 to 12 years diagnosed with asthma, (2) caregivers whose children had been prescribed MDIs with spacers, (3) caregivers who were residents of San Fernando City, La Union, and (4) caregivers who were willing to participate in the survey. These criteria ensured that the study focused on individuals directly involved in administering MDIs with spacers to pediatric asthma patients. The exclusion criteria included: (1) caregivers of pediatric patients who were not diagnosed with asthma, (2) caregivers of children who did not use MDIs, (3) individuals who were not the primary caregivers responsible for medication administration, and (4) those who declined to participate in the study. These criteria were established to maintain the relevance and reliability of the collected data by ensuring that all participants had firsthand experience with spacer use in asthma management.

The study was conducted within a specified timeframe, during which data collection focused on administering structured survey questionnaires composed of close-ended questions to eligible caregivers of pediatric asthma patients. The collected data were analyzed to assess caregivers' knowledge, attitudes, and practices regarding spacer use, as well as to determine the relationships between these factors and their demographic characteristics. The results provided valuable information to guide targeted interventions aimed at improving caregivers' knowledge, attitudes, and practices regarding spacer use. Ultimately, the study sought to support better asthma management and help reduce the burden of uncontrolled asthma among young pediatric patients in the local community.

4. Results and Discussion

The results present the findings on the knowledge, attitudes, and practices of caregivers toward the use of spacer devices in pediatric asthma management in San Fernando City. The data gathered from the respondents were analyzed to determine their level of knowledge, attitudes, and practices regarding the use of spacer devices in managing pediatric asthma.

Demographic questions are used in research to gather profiling information and categorize respondents based on their characteristics. This segmentation allows researchers to analyze data and identify patterns or relationships among different groups of respondents (Taylor, 2024). In this study, the demographic profile of the caregivers of pediatric asthma patients in San Fernando City,

La Union provides an overview of their characteristics such as age, sex, educational attainment, and other relevant information. A total of 125 caregivers participated in the study. Since the total population of caregivers who met the inclusion criteria was manageable, the researchers employed total enumeration sampling, meaning all qualified respondents were included in the study.

Sex is a biological classification distinguishing individuals as male or female, based on reproductive anatomy and physiological characteristics (World Health Organization [WHO], 2022). It serves as an essential demographic variable in health research, as biological and sociocultural differences between males and females often influence health behaviors, decision-making, and caregiving roles (Kautzky-Willer et al., 2020).

Table 2 shows that most caregivers were female (64.8%), while males accounted for 35.2%. The majority were middle-aged adults (36–55 years old) at 50.4%, followed by young adults (18–35 years old) at 36%. In terms of educational attainment, most respondents were high school graduates (26.4%) and college graduates (21.6%). Regarding monthly income, the largest proportion belonged to the low-income group (40%), followed by the lower middle-class group (35.2%). The table also indicates that caregiving responsibilities were more commonly assumed by females. In studies on pediatric care, sex is particularly relevant since caregiving responsibilities are often shaped by traditional gender norms, with females more frequently assuming the primary role in child health management (Philippine Statistics Authority [PSA], 2022).

Table 2. Demographic Profile of the Caregivers

| Socio-demographic Variables | | Frequency (<i>f</i>) | Percentage (%) |
|-----------------------------|---|---------------------------|-------------------|
| Sex | Female | 81 | 64.8 |
| | Male | 44 | 35.2 |
| Age | Young Adults (18–35 years old) | 45 | 36 |
| | Middle-Aged Adults (36–55 years old) | 63 | 50.4 |
| | Older Adults (56–64 years old) | 14 | 11.2 |
| | Old-Old Adults (65 years old and above) | 3 | 2.4 |
| Educational Attainment | No formal education | 8 | 6.4 |
| | Elementary level (incomplete) | 5 | 4 |
| | Elementary graduate | 12 | 9.6 |
| | High school level (incomplete) | 9 | 7.2 |
| | High school graduate | 33 | 26.4 |
| | Vocational/Technical course | 12 | 9.6 |
| | ALS (Alternative Learning System) graduate | 1 | 0.8 |
| | College level (incomplete) | 17 | 13.6 |
| | College graduate | 27 | 21.6 |
| Monthly Income | Postgraduate | 1 | 0.8 |
| | Poor: Less than ₱10,957 | 17 | 13.6 |
| | Low income (but not poor): ₱9,520–₱21,194 | 50 | 40 |
| | Lower middle class: ₱21,194–₱43,828 | 44 | 35.2 |
| | Middle class: ₱43,828–₱76,669 | 10 | 8 |
| | Upper middle income: ₱76,669–₱131,484 | 4 | 3.2 |
| | High income (but not rich): ₱131,484–₱219,140 | 0 | 0 |
| Rich: ₱219,140 and up | 0 | 0 | |

As shown in the table, most of the respondents were female (64.8%), while males comprised 34.4% of the total valid responses. This suggests that caregiving responsibilities for pediatric asthma patients in San Fernando City, La Union, are largely undertaken by women. This finding reflects traditional caregiving roles within Filipino households, where mothers or female guardians are typically the primary caregivers of children with chronic illnesses (Philippine Statistics Authority [PSA], 2022). The predominance of female caregivers may have a meaningful impact on the study's findings regarding knowledge, attitudes, and practices toward spacer device use. Research indicates that women often demonstrate higher health-seeking behaviors and stronger adherence to pediatric asthma management plans than male caregivers (Orlando et al., 2020).

Nevertheless, the participation of male caregivers, though smaller in proportion, reflects a growing shift toward shared caregiving roles in the Philippines. This changing dynamic may be attributed to evolving gender norms and the increasing involvement of fathers in child health management (Özel, Yilmaz, & Dogan, 2020). Overall, the sex distribution of respondents underscores the significance of maternal involvement in asthma management while recognizing the emerging role of male caregivers in pediatric care.

Age is a fundamental demographic variable that represents the length of time an individual has lived, typically measured in years from birth (World Health Organization [WHO], 2020). In research, age is a crucial factor influencing knowledge, attitudes, and practices, as it often correlates with life experience, cognitive maturity, and health-related decision-making behaviors (Liu et al., 2022). In health studies, the age of caregivers may affect their understanding of medical instructions, their level of responsibility, and their adaptability to using medical devices such as spacers in asthma management (Akinbami et al., 2021).

Table 2 presents the frequency and percentage distribution of respondents according to age. The largest proportion of respondents were middle-aged adults (36–55 years old), comprising 50.4% of the valid responses. This indicates that most caregivers of pediatric asthma patients are in their middle adulthood, a stage typically characterized by stable employment and active parental responsibilities. This finding is consistent with studies showing that middle-aged individuals are most often responsible for managing chronic illnesses in children due to their caregiving and financial capacity (Reznik, Johnson Silver, & Cao, 2020 ; McQuaid et al., 2022).

Meanwhile, young adults (18–35 years old) accounted for 36.0% of the respondents, suggesting that a significant number of younger caregivers are also involved in pediatric asthma management. Younger caregivers may possess more recent exposure to health information through digital media, which could positively influence their knowledge and attitudes toward using spacer devices. However, older adults (56–64 years old) represented 11.2%, and old-adults (65 years and above) accounted for only 2.4%, indicating fewer older caregivers. The lower participation of older adults could be attributed to the fact that primary caregiving for pediatric patients often falls on parents rather than grandparents (Guerra & Vásquez, 2020). Overall, the results reveal that caregiving responsibilities for asthmatic children are primarily managed by middle-aged adults, who may balance both the experience of caregiving and the capability to provide financially for medical needs. This demographic trend is important to consider when analyzing caregivers' knowledge, attitudes, and practices regarding spacer device use, as age can influence both health literacy and caregiving effectiveness (Özel, Yilmaz, & Dogan, 2020).

Overall, the results reveal that caregiving responsibilities for asthmatic children are primarily managed by middle-aged adults, who may balance both the experience of caregiving and the capability to provide financially for medical needs. This demographic trend is important to consider when analyzing caregivers' knowledge, attitudes, and practices regarding spacer device use, as age can influence both health literacy and caregiving effectiveness (Özel, Yilmaz, & Dogan, 2020).

Educational attainment shows that the highest proportion of respondents were high school graduates (26.4%), followed by college graduates (21.6%). Some caregivers had incomplete college education (13.6%), while only a few reached postgraduate level (0.8%). Other respondents had lower educational attainment, including elementary, vocational, and ALS education. The findings indicate that most caregivers attained at least secondary education, which may positively influence their health literacy and understanding of spacer device use in pediatric asthma management. However, differences in educational background suggest that some caregivers may

require additional education and support to ensure proper asthma care and effective use of spacer devices.

Monthly income shows that most respondents belonged to the low-income but not poor category (₱9,520–₱21,194), comprising 40.0% of the caregivers, followed by the lower middle-class group (₱21,194–₱43,828) at 35.2%. Meanwhile, 13.6% were classified as poor, while only a small proportion belonged to the middle-class and upper middle-income groups. The findings indicate that most caregivers have moderate but limited financial capacity, which may influence their access to healthcare services, asthma management resources, and acquisition of spacer devices for pediatric asthma care.

1. Level of Knowledge of Caregivers on Spacer Device Use

The second problem of this study is to determine the level of knowledge of caregivers of pediatric asthma patients regarding the use of spacers with metered-dose inhalers (MDIs). Table 3 presents the compiled and tabulated results from the respondents on each indicator under this component, which consists of eleven (11) items designed to assess their understanding of the purpose, benefits, proper usage, and maintenance of spacers.

Table 3. *Level of Knowledge of Caregivers on Spacer Device Use*

| Statement | Mean Score | Descriptive Equivalent |
|--|-------------------|------------------------------------|
| I know what a spacer is and how it works in Asthma Management. | 2.78 | Moderate Level of Knowledge |
| I am aware that spacers help deliver more medicine into a child's lungs. | 2.82 | Moderate Level of Knowledge |
| I understand that using a spacer reduces side effects from inhaled medications. | 2.80 | Moderate Level of Knowledge |
| I know that spacers are recommended for children who use metered-dose inhalers (MDIs). | 2.83 | Moderate Level of Knowledge |
| I know how to properly attach a spacer to an MDI. | 2.85 | Moderate Level of Knowledge |
| I am familiar with how often a spacer should be cleaned. | 2.87 | Moderate Level of Knowledge |
| I know what materials or solutions are safe to use when cleaning a spacer. | 2.82 | Moderate Level of Knowledge |
| I am aware that improper cleaning of spacers can affect medication delivery. | 2.81 | Moderate Level of Knowledge |
| I understand that spacers can be reused but should be replaced when damaged. | 2.78 | Moderate Level of Knowledge |
| I am aware that spacers help reduce coordination problems when using MDIs. | 2.85 | Moderate Level of Knowledge |
| I know that a child should breathe in slowly and deeply after using the spacer. | 2.79 | Moderate Level of Knowledge |
| Grand Mean | 2.82 | Moderate Level of Knowledge |

Mean scores ranging from 3.28–4.00 indicate a high level of knowledge, 2.52–3.27 indicate a moderate level of knowledge, 1.76–2.51 indicate a low level of knowledge, and 1.00–1.75 indicate a very low level of knowledge.

The overall grand mean of 2.82 reflects a "Moderate Level of Knowledge" among caregivers regarding spacer use in pediatric asthma management. Caregivers generally understand basic concepts such as proper MDI attachment, medication delivery, minimizing side effects, and spacer cleaning and replacement. However, the moderate rating suggests gaps still exist in deeper understanding and consistent practical application. Studies by Alismail et al. (2020) and Ramirez et al. (2021) support these findings, showing that while caregivers may report awareness, improper technique is common and that ongoing education and demonstration by healthcare providers significantly improve competency. Overall, caregiver knowledge is adequate but requires reinforcement for optimal asthma control.

2. Level of Attitude of Caregivers on Spacer Device Use

The third problem of this study is to determine the level of attitude of caregivers of pediatric asthma patients toward the use of spacer devices with metered-dose inhalers (MDIs).

Table 4 presents the compiled and tabulated results from the respondents on each indicator, which consists of nine (9) statements designed to measure their perceptions, beliefs, and feelings about the usefulness, convenience, and importance of spacers in asthma management. These indicators aim to assess how positively or negatively caregivers view the use of spacers in improving medication delivery and treatment adherence among children with asthma.

Table 4. *Level of Attitude of Caregivers on Spacer Devices*

| Statement | Mean Score | Descriptive Equivalent |
|---|-------------------|---------------------------------|
| I believe that using a spacer is important for effectively managing my child's asthma. | 2.85 | Mildly Positive Attitude |
| I feel confident in my ability to use a spacer correctly when giving my child asthma medication. | 2.94 | Mildly Positive Attitude |
| Using a spacer makes administering asthma medication easier for me and my child. | 2.91 | Mildly Positive Attitude |
| I think using a spacer helps reduce side effects like throat irritation from asthma medication. | 2.90 | Mildly Positive Attitude |
| I feel that spacers are convenient and worth the effort to use regularly. | 2.86 | Mildly Positive Attitude |
| I am concerned that using a spacer might be complicated or confusing. | 2.90 | Mildly Positive Attitude |
| I believe that my child will be more likely to take asthma medication properly if a spacer is used. | 2.87 | Mildly Positive Attitude |
| I believe that using a spacer is important for effective asthma management. | 2.94 | Mildly Positive Attitude |
| I feel confident in my ability to use a spacer for my child. | 2.90 | Mildly Positive Attitude |
| I believe using a spacer makes it easier to give asthma medication correctly. | 2.94 | Mildly Positive Attitude |
| Grand Mean | 2.90 | Mildly Positive Attitude |

Mean scores ranging from 3.28–4.00 indicate a high level of knowledge, 2.52–3.27 indicate a moderate level of knowledge, 1.76–2.51 indicate a low level of knowledge, and 1.00–1.75 indicate a very low level of knowledge.

Table 4 shows caregivers had a "Mildly Positive Attitude" toward spacer use, with an overall grand mean of 2.90. The highest scores (2.94) reflected caregiver confidence in using spacers correctly, belief in their importance, and ease of administration. Moderately high scores were seen for reducing side effects and simplifying medication delivery. The lowest score (2.85), though still mildly positive, was on linking spacer use to long-term asthma control, suggesting a gap in understanding its role in symptom prevention and treatment adherence. Overall, caregivers view spacers positively as tools that improve medication delivery and ease of use, but continued education and technique reinforcement are needed to ensure positive attitudes translate into consistent, proper practice.

3. Level of Practice of Caregivers Towards Spacer Device Use

The fourth problem of this study sought to determine the level of practice of caregivers towards spacer device use among pediatric asthma patients.

Table 5 presents the compiled and tabulated responses of the caregivers based on their reported frequency of performing recommended spacer-related practices. such as using the spacer during inhaler administration.

Table 5. *Level of Practice of Caregivers Towards Spacer Device Use*

| Statement | Mean Score | Descriptive Equivalent |
|---|-------------|-----------------------------|
| I use a spacer every time my child needs their inhaler. | 2.88 | Moderately Practiced |
| I clean the spacer regularly according to instructions. | 2.88 | Moderately Practiced |
| I check the spacer for cracks or damage. | 2.90 | Moderately Practiced |
| I replace the spacer when it becomes worn out or damaged. | 2.82 | Moderately Practiced |
| I ask healthcare providers for guidance about spacer use. | 2.78 | Moderately Practiced |
| I demonstrate or explain spacer use to other caregivers or family members. | 2.82 | Moderately Practiced |
| I ensure that my child uses the spacer correctly (e.g., slow breathing, proper timing). | 2.79 | Moderately Practiced |
| Grand Mean | 2.84 | Moderately Practiced |

Mean scores ranging from 3.28–4.00 indicate practices that are highly practiced, 2.52–3.27 indicate moderately practiced, 1.76–2.51 indicate rarely practiced, and 1.00–1.75 indicate never practiced.

Table 5 shows caregivers demonstrated "Moderately Practiced" behaviors regarding spacer use, with an overall grand mean of 2.84. The highest score (2.90) was for checking spacers for cracks or damage, showing good attention to device integrity. Consistently using spacers and cleaning

them regularly both scored 2.88, reflecting adherence to clinical recommendations. The lowest score (2.78) was for seeking guidance from healthcare providers, suggesting caregivers may rely on prior instructions rather than seeking ongoing professional reinforcement. Other practices like timely replacement (2.82), sharing knowledge with other caregivers (2.82), and ensuring correct child technique (2.79) were moderately practiced but indicate occasional lapses. Supported by Abrams (2020), the findings emphasize that sustained caregiver education and consistent practice of proper techniques are essential for effective pediatric asthma management.

4. Significant difference in the knowledge, attitudes, and practices of caregivers regarding spacer use when grouped according to their demographic profile

The fifth problem sought to determine whether there was a significant difference in the knowledge, attitudes, and practices (KAP) of caregivers regarding spacer use when grouped according to their demographic profile. The results of the Two-Way ANOVA revealed that educational attainment was the only demographic variable that exhibited a statistically significant difference across all KAP domains, knowledge, attitude, and practice ($p < .001$). This indicates that caregivers with higher levels of education demonstrated greater understanding, more positive attitudes, and better practices related to spacer use in pediatric asthma management.

Table 6. Significant difference in the knowledge, attitudes, and practices of caregivers regarding spacer use when grouped according to their demographic profile.

| | Knowledge | | Attitude | | Practices | | Interpretation |
|-------------------------------|-----------|---------|----------|---------|-----------|---------|-----------------|
| | F value | P value | F value | P Value | F value | P value | |
| Age | 0.251 | 0.860 | 0.327 | 0.806 | 0.182 | 0.909 | Not Significant |
| Sex | 0.389 | 0.535 | 0.844 | 0.361 | 0.097 | 0.757 | Not Significant |
| Educational Attainment | 7.369 | < 0.001 | 8.194 | < 0.001 | 8.399 | < 0.001 | Significant |
| Monthly Income | 2.843 | < 0.001 | 2.101 | 0.089 | 1.126 | 0.351 | Not Significant |
| Overall Interpretation | | | | | | | Not Significant |

The findings indicate that caregivers' educational attainment is a key factor influencing their health literacy and ability to understand and apply asthma management instructions. Those with higher education levels tend to have better comprehension and adherence to treatment, including proper inhaler and spacer use, leading to improved disease control.

Monthly household income was significantly associated only with knowledge, suggesting that higher-income caregivers may have better access to healthcare resources and information. In contrast, age and sex showed no significant relationship with knowledge, attitudes, or practices, indicating that these factors do not strongly affect caregivers' understanding or management of asthma care.

Overall, the results emphasize the need for targeted asthma education programs that address gaps related to education and income to ensure all caregivers can effectively manage pediatric asthma.

5. Conclusions

Based on the indicated findings, the following conclusions were drawn:

1. Caregiving for pediatric asthma patients in San Fernando City, La Union, was predominantly undertaken by females in their middle adulthood, many of whom were high school graduates and belonged to the low -income but not poor group. This pattern reflects the traditional caregiving structure in Filipino households, where women, particularly mothers, are the primary providers of care for children with chronic conditions.
2. Caregivers demonstrated a moderate level of knowledge regarding spacer use in asthma management, showing that they understood its purpose, benefits, and correct handling. This indicates that most caregivers are informed about how spacers improve medication delivery and contribute to better asthma control among children.
3. The caregivers showed a generally mildly positive attitude toward spacer use, recognizing its importance in asthma management. This favorable outlook suggests their openness to using spacers as recommended by healthcare professionals and their belief in its effectiveness in improving pediatric respiratory health.
4. The findings also revealed that caregivers moderately practiced proper spacer use, including correct attachment, cleaning, and maintenance. Their reported frequency of use indicates a commendable level of compliance with asthma management guidelines that emphasize the regular use of spacers.
5. Significant differences were found in the caregivers' knowledge, attitudes, and practices when grouped according to educational attainment and monthly income. This implies that higher educational levels and better financial capacity contribute to greater awareness, more positive attitudes, and improved adherence to proper spacer use.
6. Based on the findings, several strategies were developed to promote proper spacer use among caregivers. These included an infomercial video to be posted on the official social media page of San Fernando City, La Union, an educational seminar to enhance caregiver understanding, and the distribution of informative brochures to reinforce key messages about spacer use and maintenance.

6. Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed to enhance caregiver knowledge, attitudes, and practices toward spacer use in pediatric asthma management:

1. It is recommended that local health authorities and pediatric clinics in San Fernando City, La Union, continue to strengthen caregiver engagement programs, particularly targeting mothers and female guardians, as they are the primary caregivers of pediatric asthma patients. Initiatives may include community -based education and regular health forums focused on asthma management and spacer use.

2. Since most caregivers already possess adequate knowledge but may still benefit from reinforcement, it is suggested that healthcare professionals provide continuous health education through home visits, clinic orientations, or short instructional sessions during consultations to sustain and enhance caregiver understanding of spacer use.
3. To maintain and further improve caregivers' positive attitudes toward spacer use, healthcare providers may integrate motivational discussions and testimonies from successful asthma management cases during health education programs to encourage sustained adherence.
4. It is recommended that caregivers be given more practical demonstrations and visual guides on proper spacer handling, cleaning, and maintenance to ensure consistent and correct practice. Regular follow -ups by barangay health workers may help in monitoring and supporting these practices.
5. As educational attainment and income were found to influence caregivers' KAP toward spacer use, the City Health Office and local government units are encouraged to design inclusive educational materials that are easily understandable and accessible to all literacy levels and socioeconomic backgrounds.
6. The proposed strategies, such as producing and posting an infomercial video, conducting seminars, and distributing brochures, are recommended for implementation in collaboration with the San Fernando City Health Office. These tools can effectively disseminate essential information and promote proper spacer use across the community.
7. It is strongly recommended that the City Health Office of San Fernando, La Union, formally adopt and utilize the findings of this research as part of their local asthma education and management initiatives. Integrating the study's evidence -based strategies , such as infomercial dissemination, caregiver -focused seminars, and brochure distribution , into existing citywide health programs may significantly enhance caregiver competency in using spacers. Adoption of this research may also guide policy development, strengthen community health interventions, and support sustained improvements in pediatric asthma outcomes across the city.
8. Lastly, future researchers are encouraged to explore other potential factors influencing spacer use, such as caregiver access to healthcare services, physician communication, or child health outcomes, to provide a more comprehensive understanding of pediatric asthma management

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