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First aid knowledge among caregivers of children receiving home health care

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ABSTRACT

Objective: Parents of children receiving home health care must possess adequate first aid knowledge to manage emergencies effectively. This study aimed to assess the level of first aid knowledge among caregivers of pediatric patients receiving home health care and to identify factors associated with knowledge gaps.

Materials and Methods: This cross-sectional study was conducted with 66 caregivers of children aged 1 month-18 years registered at the Home Health Services Unit of Prof. Dr. Cemil Tascioglu City Hospital between November 2024 and February 2025. Data were collected through face-to-face interviews using a 20-item first aid knowledge questionnaire developed from a literature review. Demographic and clinical characteristics were recorded.

Results: The average first aid knowledge score was 8.18±4.88 (range: -4 to 18), indicating a 39.0% success rate. Most participants were mothers (86.4%) with elementary or middle school education (65.2%). Significant positive correlations existed between first aid knowledge and both education level (rho=0.290, p=0.019) and age group (p=0.030), with caregivers aged 35-45 showing higher knowledge scores than those aged 18-25 (p=0.015). Critical gaps in knowledge were seen in poison control hotline awareness (4.5%), fall-from-height intervention (16.7%), and unconscious child assessment (27.3%). Despite low knowledge levels, 87.9% of participants were willing to receive first aid training.

Conclusion: Caregivers of children receiving home health care show inadequate first aid knowledge, especially in critical emergencies. Lower education levels and younger age are linked to reduced knowledge. The strong motivation for training among caregivers offers a chance for targeted educational efforts. Urgent, comprehensive, and customized first aid training programs are necessary, particularly for caregivers of medically complex children using specialized medical devices.

Keywords: Caregivers, child,first aid, home health care, pediatrics

Introduction

Home Health Services (HHS) is a community-based care model that provides medical and supportive services to home-bound individuals in order to ensure continuity of care and improve quality of life (1). In our country, legislation related to HHS was first defined on March 10, 2005 (2). In recent years, advances in medicine have reduced mortality rates, increasing the number of children with life-limiting illnesses (3). Pediatric palliative care (PPC) takes a multidisciplinary approach, integrating medical, psychological, and rehabilitative support for children with complex healthcare needs and their families, both in hospital and home settings. HHS follows many PPC patients with complex requirements in concordance with hospital-based care teams. The use of HHS by these children with chronic illnesses requiring care improves the quality of life for both the child and the caregiver, and also contributes to reducing healthcare costs by decreasing the use of intensive care beds, the risk of infection, and complication rates (4,5). In Türkiye, pediatric HHS predominantly serve children with chronic neurological conditions and complex care needs, many of whom are dependent on medical devices such as tracheostomy, mechanical ventilation, or gastrostomy, with mothers being the primary caregivers in the vast majority of

cases, as previously reported (6). In children receiving HHS, it is important for caregivers to know how to approach the patient and manage emergencies that may occur outside the hospital in order to reduce mortality in such situations.

Despite the essential importance of emergency awareness in home care contexts, there is a lack of evidence about the first aid knowledge and capability of caregivers who overlook medically demanding children outside hospital settings. This disparity is especially worrying given that these youngsters frequently utilize specialized medical devices (tracheostomies, mechanical ventilators, gastrostomy tubes) and encounter elevated rates of emergencies necessitating prompt attention. This study aimed to evaluate the first aid knowledge of caregivers of children receiving HHS and to identify demographic and clinical characteristics linked to knowledge gaps, to inform targeted educational interventions.

Materials and Methods

This study was designed as a cross-sectional research study. The study was conducted to assess the first aid knowledge level of parents of children aged 0-18 receiving HHS. Caregivers of neonates <1 month and incomplete medical records, temporary caregivers, and individuals who declined participation were excluded. Written informed consent was obtained from all participants.

The study was conducted at Prof. Dr. Cemil Tascioglu City Hospital Hospital, a tertiary care center. The HHS Unit provides comprehensive medical support, including medication administration, wound care, nasogastric tube replacement, blood sampling, physical therapy, respiratory support management (tracheostomy care, mechanical ventilation), and nutritional support (gastrostomy tube management).

Data collection took place between November 1, 2024, and February 1, 2025. Researchers collected data via face-to-face interviews during house visits. The researchers completed the questionnaires during the interviews, which averaged 10 to 15 minutes in duration.

The study population consisted of parents of 92 children aged 0-18 years who were registered in the HHS unit. The sample size was calculated using the Cochran formula with a 95% confidence interval and a 5% margin of error. When the finite population correction was applied, the minimum required sample size was determined to be 75. The study was conducted with 66 parents, representing 71.7% of the population. Post-hoc power analysis revealed that the current sample size had 62.4% statistical power, which is acceptable for descriptive and correlational analyses.

The functional dependency status of children was classified based on functional mobility and caregiving needs, independent of medical diagnosis, using a functional care-based approach. Children who were bedbound, had no independent mobility, and required complete assistance for all activities of daily living, including those dependent on medical devices such as tracheostomy or mechanical ventilation, were classified as fully dependent. Children who were able to get out of bed and had limited or assisted mobility within the home environment but required caregiver support for certain daily activities or outdoor mobility were classified as partially dependent. Children who were not bedbound and had functional mobility within the home but whose participation outside the home was restricted due to conditions such as autism spectrum disorder, psychiatric disorders, or epidermolysis bullosa were classified as independent. Although these children were not physically dependent on caregivers for daily activities, they were considered home-bound because of clinical or safety-related limitations. This classification was intended to reflect functional caregiving burden rather than disease-specific severity.

Caregivers' first aid knowledge was assessed using a 20-item multiple-choice questionnaire developed based on the literature (7,8). The questionnaire addressed common pediatric emergency situations, including trauma and falls, bleeding control, loss of consciousness, poisoning, electrical injuries, and basic emergency response principles. The content and clinical relevance of the questionnaire were reviewed by two pediatric emergency medicine specialists. Correct answers were scored as +1, "I do not know" responses as 0, and incorrect answers as –1, resulting in a total score ranging from –20 to +20, with higher scores indicating better first aid knowledge.

Statistical analysis

Data analysis was performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics are presented as mean and standart deviation, median (minimum and maximum), and number (percentage). The distribution of continuous variables was assessed using the Shapiro–Wilk normality test. Multivariate linear regression analysis was performed to jointly evaluate the demographic and clinical variables that could affect caregivers' first aid knowledge scores. Categorical variables were compared using the chi-square test. Differences in continuous variables between groups were evaluated using the Mann–Whitney U test or the Kruskal–Wallis test, as appropriate. The relationship between education level and first aid knowledge score was assessed using Spearman's correlation analysis. Multivariate linear regression analysis was performed to evaluate the independent effects of demographic and clinical variables on caregivers' first aid knowledge scores. A p value <0.050 was considered statistically significant.

Results

A total of 66 caregivers participated in the study, with women constituting the vast majority of participants (93.9%). The educational level of participants was predominantly elementary school (27.3%) and middle school (25.8%).

When examining the age distribution of the 66 caregivers who participated in the study, it was found that more than half of the participants were in the 35–45 age range (57.6%), followed by the 26–35 (18.2%) and 45–55 age groups (18.2%), the least represented group was individuals aged 55 and over (1.5%). The socio-demographic characteristics of participants are shown in Table I.

Table I: Socio-demographic characteristics of the participants

Category	n (%)
Age group	
18–25	3 (4.5)
26–35	12 (18.2)
35–45	38 (57.6)
45–55	12 (18.2)
55 and above	1 (1.5)
Gender	
Female	62 (93.9)
Male	4 (6.1)
Relationship to the child	
Mother	57 (86.4)
Father	4 (6.1)
Other	5 (7.6)
Education level	
Not completed primary school	8 (12.1)
Primary school	18 (27.3)
Secondary school	17 (25.8)
High school	10 (13.6)
Associate degree	1 (1.5)
University	11 (16.7)
Postgraduate	1 (1.5)
Occupation	
Housewife	56 (81.8)
Other	12 (18.2)

The mean age of the children was 9.33±5.10 years, with a median age of 8 years (min–max; 1–17). Regarding clinical diagnoses, the most common conditions were cerebral palsy (30.3%), epidermolysis bullosa (16.7%), and spinal muscular atrophy type 2 (4.5%). Among the children, 56.1% were classified as fully dependent, 30.3% as independent, and 13.6% as partially dependent. In terms of medical device usage, 62.1% of children used at least one specialized medical device: 10.6% required mechanical ventilation with tracheostomy and gastrostomy tube, while 37.9% had no device-related special health conditions. The average first aid knowledge score of caregivers was 8.18±4.88, with scores ranging from –4 to 18. The percentage of correct answers to knowledge questions ranged from 28.2% to 92.4%. When examining the distribution of first aid knowledge scores according to age, gender, and occupational groups, no statistically significant difference was found between the groups (p>0.712).

When examining the relationship between the child's bedridden status and caregivers' first aid knowledge levels, no statistically significant difference was found between the groups (p = 0.740). When evaluating the average knowledge scores, it was observed that the scores of caregivers of partially dependent children were slightly higher than those of caregivers of fully dependent and independent children (9.11±4.97 vs. 8.32±4.83 vs. 7.50±4.88, p=0.740). However, this difference did not reach a statistically significant level. When examining the relationship between the child's specific health condition (tracheostomy, PEG tube, etc.) and caregivers' first aid knowledge levels, no statistically significant difference was found between the groups (p = 0.500). Among the least correctly known topics were the National Poison Control Center number to call in case of poisoning (28.2%), the information that the head should not be tilted back in case of a nosebleed (33.3%), and the information that direct contact should not be made with a child who has been electrocuted (36.4%).

In contrast, the statement that participants knew most correctly was "A child who has suffered a head injury should be kept awake," with a correct answer rate of 92.4%. This result indicates that caregivers have relatively higher awareness of trauma and basic first aid topics, but not poisoning and electric shock.

Multivariate linear regression analysis was performed to jointly evaluate the demographic and clinical variables that could affect caregivers' first aid knowledge scores. The variables included in the model were age, gender, education level, occupation, the child's dependency status, and the child's specific health condition. The analysis found that the age variable was a significant predictor (Table II). Specifically, caregivers aged 35–45 had significantly higher knowledge scores than those aged 18–25 (B=6.05; β=0.62; 95% CI: 0.49–11.60; p=0.048). Specifically, caregivers aged 35–45 had significantly higher knowledge scores than those aged 18–25 (p=0.048). Although there was a trend toward higher scores in other age groups, these differences did not reach statistical significance. The relationship between participants' demographic and clinical characteristics and their first aid knowledge score was evaluated using univariate analyses, and the results are presented in Table III. The study revealed a statistically significant relationship between age group (p = 0.030) and education level (p = 0.023) and first aid knowledge score.

The post-hoc analysis revealed that participants aged 35-45 exhibited significantly higher first aid knowledge ratings compared to those aged 18-25 (p=0.015) (Table III). Participants in the 35-45 age group had the highest mean knowledge score (9.42±4.02), followed by the 45-55 age group (8.17±4.00).

A positive and significant correlation was found between education level and first aid knowledge score (rho=0.290, p=0.019). A noticeable correlation was discovered between an elevated level of education and an increase in first aid knowledge scores. The score of participants with postgraduate education was 12.00, the average score of high school graduates was 8.78±2.54, that of primary school graduates was 7.72±4.85, and that of individuals who did not complete primary school was 5.25±4.37.

Gender (p=0.549), occupation (p=0.712), and the child's dependency status (p=0.740) were found to have no significant effect on the level of first aid knowledge.

When participants' desire to receive first aid training was evaluated, it was determined that the vast majority (87.9%) wanted to receive training. Only 12.1% stated that they did not want to receive first aid training.

When comparing participants' desire to receive first aid training with their current knowledge levels, the average knowledge score for those who wanted to receive training was 7.95±5.01, while for those not wishing to receive

Table II: Univariate and multivariate linear regression analysis of factors associated with first aid knowledge scores

Predictor	Univariate				Multivariate				
	B	SE	95% CI	p	B	SE	β	95% CI	p
Age group (ref: 18–25)				0.030*					
26–35 years	2.83	2.98	-3.13–8.79	0.346	2.32	2.97	0.18	-3.63–8.27	0.439
35–45 years	6.09	2.77	0.55–11.63	0.032*	6.05	2.77	0.62	0.49–11.60	0.048*
45–55 years	4.83	2.98	-1.13–10.79	0.110	4.99	3.05	0.40	-1.13–11.10	0.108
≥55 years	-3.33	5.33	-14.00–7.33	0.534	-3.27	5.54	-0.08	-14.37–7.84	0.558
Gender (male)	-1.52	2.53	-6.57–3.53	0.549	-1.34	2.74	-0.07	-6.83–4.14	0.625
Education level	0.74	0.36	0.02–1.46	0.023*	0.73	0.44	0.25	-0.14–1.61	0.100
Occupation	0.73	1.68	-2.64–4.09	0.712	-1.19	2.11	-0.09	-5.41–3.04	0.576
Child dependency status	0.36	0.68	-0.99–1.71	0.740	0.47	0.68	0.09	-0.91–1.84	0.500
Child specific health condition	-0.61	1.24	-3.10–1.88	0.500	-1.39	1.36	-0.14	-4.12–1.33	0.310

***B:** Unstandardized regression coefficient, **SE:** Standard error, **β:** Standardized regression coefficient, **CI:** Confidence interval. (Multivariate model summary: $R^2 = 0.241$, Adjusted $R^2 = 0.119$, $F(9, 56) = 1.97$, $p = 0.060$, $N = 66$.)*

Table III: Comparison of mean first aid knowledge scores by sociodemographic characteristics

Variables	n	Values*	p
Age group			
18–25 years	3	4.0 (0–6)	0.030†
26–35 years	12	6.0 (–4–15)	
35–45 years	38	9.0 (0–18)	
45–55 years	12	8.5 (0–15)	
55 years and above	1	0.0 (0–0)	
Gender			
Female	62	8.0 (–4–18)	0.549‡
Male	4	7.5 (0–12)	
Education level			
Not completed primary school	8	6.0 (–1–12)	0.023†
Primary school	18	8.0 (–4–14)	
Secondary school	17	7.0 (0–17)	
High school	10	8.5 (6–15)	
Associate degree	1	11.0 (11–11)	
University	11	10.0 (–3–18)	
Postgraduate	1	12.0 (12–12)	
Occupation			
Housewife	56	8.0 (–4–17)	0.712†
Officer	2	11.0 (10–12)	
Other	8	9.5 (–3–18)	
Child's dependency status			
Fully dependent	37	8.0 (–3–17)	0.740†
Partially dependent	9	10.0 (0–16)	
Independent	20	7.5 (–4–18)	
Willingness to receive first aid training			
Yes	58	8.0 (–4–18)	0.324‡
No	8	10.0 (5–14)	

: median (min-max), †: Kruskal–Wallis test, ‡: Mann–Whitney U test

training, it was 9.88±3.56. The variation between the groups was not found to be statistically significant (p=0.324).

Notably, a small group of participants who did not wish to receive training (n = 8) had a higher average knowledge level. The knowledge levels of this group were above the overall average (8.18±4.88), while a few participants (12–14 points) exhibited significantly high knowledge levels.

Discussion

Our findings show that caregivers of children receiving HHS have poor first aid knowledge, which aligns with previous Turkish studies that report low training rates and widespread knowledge gaps among parents (9,10). The children in our study are at higher medical risk and have complex care needs. Therefore, the consequences of lacking first aid knowledge may be more serious for this group.

This study identified a link between education level and first aid knowledge, aligning with previous research that connects health literacy to emergency preparedness (11). Likewise, Dinçer et al. (9) found that parents with university education were more likely to have received first aid training, which helped them feel more confident during emergencies. Notably, 65.2% of our participants had education levels of middle school or lower. It is well established that lower educational attainment negatively impacts both health literacy and first aid knowledge (11). This underscores the importance of carefully designing educational programs for this group. Educational materials should be visually engaging, written in simple language, and include practical demonstrations.

Caregivers aged 35-45 years showed significantly higher knowledge scores than those aged 18-25 years. Similar age-related trends have been documented in a previous study (12). The greater knowledge level among middle-aged parents can be attributed to their additional life experience and exposure to various health issues during child-rearing. However, the notably lower knowledge level among the younger group is concerning. This underscores the importance of creating targeted first aid training programs for young parents.

Research in the literature explores the relationship between caregiving burden and knowledge level. Studies on caregivers of patients receiving HHS have shown that increasing caregivers' knowledge can reduce their burden and improve patient care quality (13). In this context, providing thorough first aid training to parents of children with all levels of dependency could both enhance the quality of care and boost parents' self-confidence and psychological well-being.

Our study found that the questions with the highest success rates were "Children who have suffered head trauma should be kept awake" (92.4%), "The emergency number in Türkiye is 112" (90.9%), and "Apply direct pressure to the wound site in case of bleeding" (89.4%). The high success rate on these topics can be explained by the fact that this information is generally widespread in society and frequently emphasized through the media.

The fact that 90.9% of respondents correctly knew the emergency number (112) demonstrates the success of awareness campaigns in Türkiye. However, the 9.1% of the group who did not know this vital information remains concerning. The high rate of correct knowledge about bleeding injury intervention (89.4%) is encouraging, as bleeding control is a critical first aid skill of vital importance.

It is very concerning that the questions with the lowest success rates were the poison control hotline number (4.5%), intervention for falls from heights (16.7%), assessment sequence for an unconscious child (27.3%), and intervention for animal bites/insect stings (30.3%).

Only 4.5% of participants knew the correct number for the poison control hotline (114), while 63.6% responded "I don't know," indicating a severe lack of awareness on this issue. Childhood poisonings represent a significant portion of emergency department visits (14). Knowing the poison control hotline number can be life-saving, especially for children who are at high risk of coming into contact with medications, cleaning products, and other chemicals at home. This finding underscores the urgent need for comprehensive awareness campaigns promoting the poison control hotline.

Only 27.3% correctly answered the question about the order of assessment in an unconscious child, highlighting a significant knowledge gap. While first aid education is important for the general population, the importance of proper ABC (airway, breathing, circulation) assessment and management is particularly evident in the patient profile followed in home healthcare. Changes in consciousness are especially common in children with epilepsy, cerebral palsy, or metabolic disorders, making accurate ABC assessment crucial (15). A lack of knowledge in this area may lead to incorrect or delayed emergency interventions.

Only 16.7% of respondents answered the question about intervention in falls from height correctly, which is a serious concern. InHHS patients, first aid knowledge is particularly important given the risk of falls and related complications associated with inadequate or insufficient use of protective bed or edge barriers. In cases of falls from height, due to the risk of cervical spine injury, it is crucial not to move the child and to stabilize the head and neck while waiting for professional help (16). Lack of knowledge in this area may result in permanent neurological damage due to inappropriate interventions.

In our study, 62.1% of participants' children used at least one medical device, such as a tracheostomy, mechanical ventilator, or gastrostomy tube. Our findings highlight insufficient basic first-aid knowledge among caregivers managing these devices, underscoring an urgent need for training. Although discharge education on device use is routinely provided in many centers, the need for repetition, reinforcement, and hands-on practice remains evident. Moreover, this training is generally limited to device-specific management and does not include first aid education. Life-threatening complications such as tracheostomy tube obstruction or decannulation, gastrostomy tube dislodgement or blockage, and ventilator failure require rapid and appropriate intervention (17). Therefore, caregivers of children using medical devices should be trained not only in device-related care but also in basic first aid and emergency response.

The literature highlights that proper caregiver training is essential for ensuring patient safety and quality of care in the home care of children with complex medical needs (18). However, our findings indicate that caregivers of children who use medical devices still have insufficient first-aid knowledge. Training provided to families generally focuses on device management and does not include first-aid education; therefore, incorporating structured first-aid training into existing caregiver education programs would provide meaningful additional benefit.

Our study found that the most common diagnoses were cerebral palsy. These conditions present distinct emergency risks, seizures and aspiration in cerebral palsy, skin breakdown and infection in epidermolysis bullosa, and respiratory failure in SMA (19-21). Similar to our findings, a recent Turkish study on pediatric palliative care patients reported that neurological disorders, particularly cerebral palsy, constitute the majority of children requiring home-based complex care, emphasizing the need for comprehensive caregiver education in managing disease-specific emergencies (22). Each of these disorders needs specific first aid knowledge. These different situations suggest that first aid training needs to include both basic first aid and diagnosis-specific emergency protocols.

One of the most positive findings of our study is that the vast majority of participants (87.9%) expressed a desire to receive first aid training. This increased determination is an important factor that increases the chance of success in training programs.

The literature shows that first aid training programs provided to families of children with special needs increase parents' knowledge levels, strengthen their self-confidence, and reduce their anxiety levels (23).

In a study, though primarily focused on adult patients, evaluating the effectiveness of basic life support training provided to home caregivers, a significant increase in knowledge levels was found after training, and it was determined that organizing these trainings in a practical, hands-on manner increased their effectiveness (2). These findings indicate that parents' high motivation should be assessed through well-planned training programs.

Limitations

The relatively small sample size limited the statistical power for subgroup analyses. In addition, as the study was conducted in a single HHS unit, the findings may not be generalizable

to all regions of Türkiye. This study assessed only caregivers' theoretical first-aid knowledge; practical application skills were not evaluated, and a discrepancy between knowledge and practice may exist. Furthermore, emergency management skills specific to medical devices such as tracheostomy, mechanical ventilation, and gastrostomy tube were not assessed. Finally, the predominance of female participants limited the evaluation of fathers as caregivers.

Conclusion

This study revealed that the first aid knowledge level of parents of pediatric patients receiving HHS is inadequate. There are serious knowledge gaps, particularly in critical areas such as the poison control hotline, assessment of unconscious patients, and intervention for falls from heights. There is a positive correlation between educational level and first aid knowledge, with parents with low educational levels constituting a particularly at-risk group.

Our study aims to emphasize the importance of comprehensive emergency training programs for patients monitored by HHS, the desire of the vast majority of participants (87.9%) to receive training, and the provision of first aid training to these patients, anticipating the potential success of interventions in this area. Additionally, studies on home care populations, though primarily focused on adult patients, highlight an urgent need for pediatric-specific research on the effectiveness of first-aid training programs for caregivers of children with complex healthcare needs.

Ethics committee approval

This study was conducted in accordance with the Helsinki Declaration Principles. The study was approved by Prof. Dr. Cemil Taşcıoğlu City Hospital (21.10.2024 reference number: 242).

Contribution of the authors

Study conception and design: AB, BA; data collection: AB; analysis and interpretation of results: AB, BA, SA; draft manuscript preparation: AB, BA. All authors reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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