



단일 응급실에서 전문의 3명 및 소아청소년과 전공의 1명이 야간진료한 환자의 체류시간 예비 비교

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Preliminary comparison of length of stay of patients treated by 3 board-certified physicians and 1 pediatric resident in the emergency department during night shifts

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Shortage of doctors in emergency departments (EDs) is a root issue in maintaining ED-based residency programs. This study describes the efficiency of emergency practice according to board certification; 3 board-certified physicians versus a pediatric resident. Of 342 children, we found no differences as per the board certification in the ED length of stay, acuity, and return visits with more frequent hospitalization by the board-certified physicians. This result suggests that with a proper residency program, both board-certified physicians and residents can make a decision on hospitalization.

Key words: Efficiency; Emergency Service, Hospital; Internship and Residency; Medical Staff; Shift Work Schedule

Despite improvements in the number of personnel and facilities in emergency departments (EDs), the shortage of doctors in EDs remains a challenge^{1,2)}. To solve this issue, several hospitals have increased the number of substitute workers, such as residents and trained nurse practitioners, rather than board-

certified physicians (henceforth specialists unless otherwise specified)^{3,4)}.

Residents under the supervision of specialists are important economically because of their low salary, a reason for maintaining the training system in EDs⁴⁾. Many studies have been conducted to assess the residents' role in EDs with a focus on the effectiveness of the training system based on cooperation of specialists and residents⁵⁻⁸⁾. Some studies have focused on the comparison according to board certification (e.g., specialists alone vs. with residents)^{4,9-11)}. To the authors' knowledge, there is a lack of study directly comparing the practicing efficiency between specialists and residents as major pediatric emergency medicine (EM) providers in EDs. To address

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this topic, the authors compared ED length of stay (EDLOS) according to board certification during night shifts.

This single ED-based, retrospective study using medical records was approved by the institutional review board of Severance Children’s Hospital, Seoul, Korea (IRB no. 4–2021–0930). We included children aged 18 years or younger who visited the ED during night shifts (19:00–07:00 on the following day) on weekdays from April 2 through June 19, 2021. Only night shifts were chosen to standardize the individual providers’ conditions of practice. Children with trauma as a chief complaint were excluded.

In the study period, emergency practice was carried out by 3 specialists (2 pediatricians and 1 EM physician) and a third-year pediatric resident. The 2 board-certified pediatricians and the EM physician had worked in the ED for 2 years, 6 months, and 2 months, respectively, since the board certification. Both pediatricians had completed their residency in the hospital, and subsequently had done practice during the night shift in the ED before the study. The EM physician had done pediatric practice for 1 month in the ED during her residency, and after the board certification, had obtained additional training for pediatric practice under a pediatrician’s supervision for 1 month before the study. The resident had practiced during the night shift for 1 month before the study.

We measured EDLOS, defined as the time interval from ED arrival to the point of decision on hospitalization, as a surrogate marker for the effectiveness of emergency practice^{4–11}. Children were hospitalized based on the institutional guidelines using the Korean Triage and Acuity Scale (KTAS) and each clinical condition. Children presumed to have coronavirus disease 2019 were directly assigned to an isolation area. In cases of discharge, we noted return visits to the ED within 24 hours. Since the KTAS is a valid triage tool^{12,13}, we compared the discharged children’s KTAS levels during their initial and return visits. We compared the numbers of hospitalization, discharge, and return visits per the board certifi-

cation. For the analyses, we used the IBM SPSS ver. 26.0 for Windows (IBM Corp., Armonk, NY). The chi-square tests or Fisher exact tests and Mann–Whitney–U tests were used respectively for categorical and continuous variables. Significance was set at $P < 0.05$.

Of 1,047 eligible children, 342 were selected as the study population (Fig. 1). Of the population, 251 (73.4%) and 91 (26.6%) were examined by the specialists and the resident, respectively. The clinical features are summarized in Table 1. The children treated by the specialists had a higher proportion of hospitalization ($P = 0.024$) without a difference in the return visit. No differences per the board certification were found in the other variables.

The results of this study show the absence of significant difference in the efficiency by means of the EDLOS and KTAS as per the board certification and more frequent hospitalization by the specialists. Unlike our results, a study mentioned that proper residency program may reduce unnecessary hospitalization, eventually increasing efficiency¹⁴. However, it needs to be considered that in this study, the specialists tended to care for children with higher acuity as shown by the non-significantly higher proportion of KTAS 1–2 (Table 1). In addition, children who are exceptional to the institutional guidelines for hospitalization may need specialists’ decisions. This consideration partially explains the more frequent hospitalization in children treated by the specialists. EDLOS may not be affected by the presence or total number of different groups of trainees¹⁵ but by the proper residency program⁵. Thus, to analyze

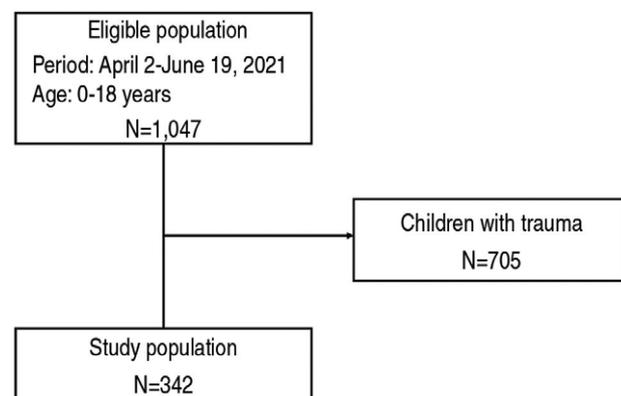


Fig. 1. Flowchart for the selection of children.

Table 1. Characteristics of the patients

Variable	Total (N = 342)	Specialists (N = 251)	Pediatric resident (N = 91)	P value
KTAS, overall	4 (3-4)	4 (3-4)	4 (3-4)	0.964
EDLOS, overall, min	117 (55-194)	119 (59-191)	107 (53-197)	0.612
Hospitalization	77 (22.5)	64 (25.5)	13 (14.3)	0.024
KTAS				0.949
1	1 (0.3)	1 (0.4)	0 (0)	
2	16 (4.7)	14 (5.6)	2 (2.2)	
3	45 (13.2)	36 (14.3)	9 (9.9)	
4	13 (3.8)	11 (4.4)	2 (2.2)	
5	2 (0.6)	2 (0.8)	0 (0)	
Absolute value	3.0 (3.0-3.0)	3.0 (3.0-3.0)	3.0 (3.0-3.0)	
EDLOS, min	170 (130-273)	168 (130-288)	170 (123-244)	0.878
Discharge	265 (77.5)	187 (70.57)	78 (85.7)	0.024
KTAS				0.838
1	1 (0.3)	1 (0.4)	0 (0)	
2	15 (4.4)	10 (4.0)	5 (5.5)	
3	85 (24.9)	57 (22.7)	28 (30.8)	
4	151 (44.2)	110 (43.8)	41 (45.1)	
5	13 (3.8)	9 (3.6)	4 (4.4)	
Absolute value	4.0 (3.0-4.0)	4.0 (3.0-4.0)	4.0 (3.0-4.0)	
EDLOS, min	99 (45-170)	99 (45-164)	99(48-183)	0.685
Return visit < 24 h*	14 (4.1)	12 (4.8)	2 (2.2)	0.425
KTAS, first visit	3.5 (3.0-4.0)	3.5 (3.0-4.0)	3.5 (3.6-3.8)	0.645
KTAS, return visit	3.0 (2.3-3.8)	3.0 (2.0-3.3)	3.5 (3.3-3.8)	0.424

Values are expressed as medians (interquartile ranges) or numbers (%).

* Calculated in the children undergoing return visits.

KTAS: Korean Triage and Acuity Scale, EDLOS: emergency department length of stay.

the efficiency of emergency practice, other variables need to be used in addition to EDLOS, hospitalization, and the KTAS. As for a limitation, the single-center setting and small number of the doctors suggest a selection bias. The findings were probably affected by individual variations in practice pattern.

Our study suggests that well-trained residents might make a decision on hospitalization as efficiently as specialists. Given the flaws of this study, additional variables should be used to analyze the efficiency of emergency practice according to board certification.

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