Letter to the Editor

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The Quality Changes in Intensive Care Units in South Korea since the Initiation of Intensive Care Unit Quality Assessments

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Factors that affect mortality in the intensive care unit (ICU) include clinical condition and characteristics of patients, and treatment-related factors and medical resources such as facilities and medical staff[1,2]. To ensure appropriate treatment and medical resource environment in ICUs, excluding patient factors, a quality assessment program was conducted by the Health Insurance Review and Assessment Service (HIRA) in South Korea[3]. This quality assessment of ICU was conducted over a three-month period in 2014, 2017, 2019, and 2023, following Donabedian's healthcare quality evaluation model. The evaluation results were published on the HIRA website, and we aim to describe the changes in the ICU quality in Korea based on these findings[4]. Since the assessment criteria in 2023 differ slightly from those used in previous years, only the identical items were compared.

Table 1 shows several analysis results and trends from 2014 to 2023. The total number of hospitals increased from 266 in 2014 to 303 in 2023. Among them, the number of tertiary hospitals remained stable, ranging between 42 and 45. During the investigation period, most hospitals (63.5% to 67.0%) had only one ICU unit, but more than 90% of tertiary hospitals had two or more ICU units; in particular, the proportion of tertiary hospitals with three or more ICU units increased from 67.4% in 2014 to 80% in 2023. The proportion of intensivists also increased significantly, from 32.8% in 2014 to 46.9% in 2023. General hospitals have shown a significant increase in intensivist staffing, rising from 19.8% to 37.6%, while tertiary hospitals have consistently maintained a 100% rate since the first assessment. The number of ICU beds per intensivist decreased from 44.7±37.7 in 2014 to 22±11.6 in 2023 for all hospitals (Figure 1). In tertiary hospitals, it decreased from 40.4±35.1 in 2014 to 20.3±8 in 2023, while it in general hospitals decreased from 48.9±34.3 to 22.7±12.9. Although the proportion of intensivists was still lower in general hospital ICUs compared to that in tertiary hospitals (37.6% vs. 100%, respectively, in 2023), the number of ICU beds per intensivist in general hospitals was close to that in tertiary hospitals (22.7±12.9 vs. 20.3±8). The number of beds per nursing staff has also gradually decreased from 1.1±0.68 in 2014 to 0.92±0.72 in 2023, indicating an increase in nursing staff; in particular, for tertiary hospitals, the ratio decreased from 0.61±0.12 in 2014 to 0.43±0.05 in 2023.

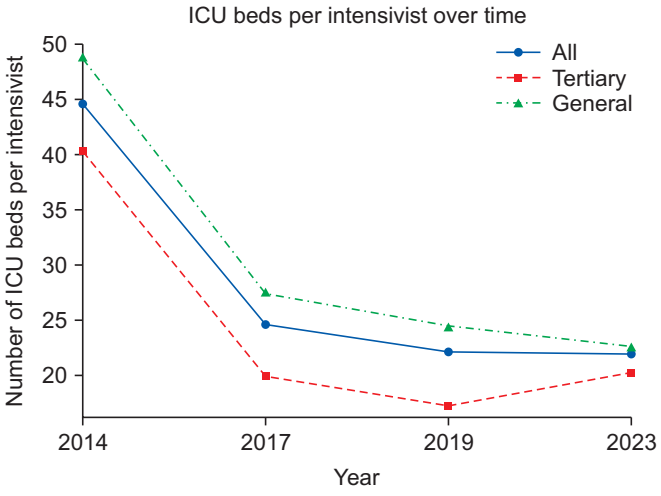
Meanwhile, an investigation was conducted to evaluate the quality of equipment in the ICU by assessing how many of the following items were available in ICU: arterial blood gas analyzer, transport ventilator, continuous renal replacement therapy machine, bronchoscopy, isolation room, and independent intensivist workspace. All tertiary hospitals possessed all six mentioned equipment and facilities throughout

Table 1. Results of the quality assessment of intensive care unit from 2014 to 2023

Investigation period	Oct–Dec 2014	May–Jul 2017	May–Jul 2019	Jan–Mar 2023
No. of hospitals	266	282	287	303
Tertiary	43 (16.2)	43 (15.2)	42 (14.6)	45 (14.9)
General	233 (83.8)	239 (84.8)	245 (85.4)	258 (85.1)
No. of enrolled patients	37,577	39,576	42,637	43,483
Male	24,755 (65.9)	22,513 (56.9)	24,398 (57.2)	24,593 (56.6)
Female	12,822 (34.1)	17,063 (43.1)	18,239 (42.8)	18,890 (43.4)
Age, yr	67.6±15.3	68.6±15.3	69.4±15.3	71±15
18–30	671 (1.8)	647 (1.6)	710 (1.7)	640 (1.5)
30–40	1,196 (3.2)	1,183 (3)	1,172 (2.7)	999 (2.3)
40–50	3,174 (8.5)	3,005 (7.6)	2,772 (6.5)	2,259 (5.2)
50–60	5,905 (15.7)	5,875 (14.8)	6,095 (14.3)	5,108 (11.7)
60–70	6,660 (17.7)	7,198 (18.2)	7,956 (18.7)	8,551 (19.7)
70–80	10,986 (29.2)	10,868 (27.5)	11,129 (26.1)	10,591 (24.4)
80–90	7,738 (20.6)	9,199 (23.2)	10,679 (25)	12,652 (29.1)
≥90	1,247 (3.3)	1,601 (4.1)	2,124 (5)	2,683 (6.2)
No. of ICU units in all hospitals, unit				
1	169 (63.5)	189 (67)	191 (66.6)	199 (65.7)
2	49 (18.4)	39 (13.8)	37 (12.9)	42 (13.9)
≥3	54 (20.3)	54(19.1)	59 (20.6)	62 (20.5)
No. of ICU units in tertiary hospitals, unit				
1	3 (7)	2 (4.6)	2 (4.8)	1 (2.2)
2	11 (25.6)	7 (16.3)	7 (16.7)	8 (17.8)
3	8 (18.6)	11 (25.6)	8 (19)	9 (20)
4	5 (11.6)	5 (11.6)	8 (19)	8 (17.8)
5–6	10 (23.3)	12 (27.9)	11 (26.2)	11 (24.4)
7–10	6 (14)	6 (14)	6 (14.3)	8 (17.8)
Intensivist				
All	87 (32.8)	113 (40.1)	134 (46.7)	142 (46.9)
Tertiary	43 (100)	43 (100)	42 (100)	45 (100)
General	44 (19.8)	70 (29.3)	92 (37.6)	97 (37.6)
No. of beds per nurse				
All	1.1±0.68	1.01±0.69	1.03±1.28	0.92 ±0.72
Tertiary	0.61±0.12	0.55±0.07	0.5±0.07	0.43±0.05
General	1.19±0.7	1.1±0.72	1.12±1.37	1±0.75
No. of available equipment*				
All	3.6±2	4±1.9	4.2±1.8	4.3±1.8
Tertiary	6±0	6±0	6±0	6±0
General	3.2±1.9	3.7±1.8	3.9±1.7	4.1±1.8

Values are presented as number (%) or the mean±standard deviation unless otherwise indicated.
*Arterial blood gas analyzer, transport ventilator, continuous renal replacement therapy machine, bronchoscopy, isolation room, independent intensivist workspace.
ICU: intensive care unit.

Figure 1. Intensive care unit (ICU) beds per intensivist over time.



the evaluation period. General hospitals gradually increased the possession of these equipment from 3.2±1.9 in 2014, 3.7±1.8 in 2017, 3.9±1.7 in 2019, and 4.1±1.8 in 2023, but some general hospitals did not have any.

Despite some differences between general and tertiary hospitals, the quality assessments brought about an improvement in overall quality of ICUs in South Korea. Continuous evaluation of ICU quality may help to optimize ICU resource allocation and patient treatment outcomes, and the next evaluation is expected to be conducted in 2025.

In February 2024, the South Korean government suddenly announced plans to increase the number of physicians by 2,000 annually starting in 2025, a 67% increase from the current 3,058 medical graduates. This decision was met with widespread protests by the mass resignation of trainee residents and fellows. Approximately 9,000 (71%) resigned shortly after the announcement, with 92% remaining resigned as of May 30, 2024[5]. The protests continue to this day, leading to a decrease in the number of doctors in tertiary hospitals and a growing reluctance among doctors to pursue critical care specialties. Unfortunately, intensivists and critical care physicians in South Korea were already facing burnout due to excessive workload and suffering abnormally high rates of medical error reporting compared to other countries[6]. Recently, a system was established to compensate for the financial losses of hospitals due to the resignations, but the current workforce is still leaving and the supply and demand for new specialists remain uncertain. Notably, there is a vague trend among physicians towards avoiding the ICU area. As seen in previous quality assessments of ICUs, improvements in the quality of intensive care have been achieved. However, there are concerns that, due to the recent medical crisis, quality indicators related to staffing may regress to previous levels.

Authors' Contributions

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Conflicts of Interest

No potential conflict of interest

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