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Survival and mortality among patients admitted to intensive care unit of a tertiary level hospital of Bangladesh

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Abstract

Background: *Seriously ill patients are admitted to the Intensive Care Unit (ICU) for many reasons including respiratory failure, severe infectious diseases, multiple trauma and shock, myocardial infarction, heart failure, renal failure, poisoning, postoperative care and therapeutic interventions. The rate of ICU survival or mortality varies from country to country and even from region to region within a country.*

Objective: *This study was designed to estimate survival and mortality rates among patients admitted to an ICU of Bangladesh.*

Method: *This was a cross-sectional descriptive observational study conducted among 237 patients admitted to the ICU of a non-government tertiary hospital, namely President Abdul Hamid Medical College Hospital, Bangladesh. The study was carried out from March 2020 to December 2022. Data were recorded in a case record form and statistical analysis was performed using SPSS version 25.0.*

Result: *The majority of patients (88.2%, n=209) were in the age group of 21–80 years. The mean age (±SD) of the 237 respondents was 49.83±19.65 years. More than half (53.6%, n=127) of the patients were female, while males comprised 46.4% (n=110). The majority (94.5%, n=224) were from Kishoreganj district. The average duration of hospital stay was 2.52±4.50 days. Among 237 ICU patients, 97 (40.9%) were cured after treatment, 76 (32.1%) died in the ICU, 56 (23.6%) were discharged on request bond, and 8 (3.4%) were referred to the high dependency unit (HDU) of other hospitals. The overall survival rate (cured) was 40.9%, while patients discharged on request bond (23.6%) and those referred (3.4%) are not included in the survival count.*

Conclusion: *The overall mortality rate at the ICU of President Abdul Hamid Medical College Hospital was 32.1%, which was lower than several other studies conducted around the world.*

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Keywords: *Mortality, Intensive Care Unit, Tertiary Hospital, Postoperative Care, Survival Rate.*

Introduction

Intensive care unit (ICU) is a special treatment unit of a hospital, maintained by specially trained and equipped health personnel. It is designed for the monitoring and treatment of life-threatening conditions during the course of different acute and chronic diseases.[1] Modern intensive care medicine was introduced during the Polio epidemics in the 1950s, pioneered by the Danish anaesthetist Bjorn Ibsen in 1953 at the Kommune Hospital of Copenhagen.[2,3] Management in the intensive care unit has been increasingly demanded over the decades due to motorisation, urbanisation, hospital expansion and the emerging COVID-19 pandemic.[4,5,6] Seriously ill patients are admitted to the ICU for many

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reasons, including respiratory failure, severe infectious diseases, multiple trauma and shock, myocardial infarction, heart failure, renal failure, poisoning, postoperative care and therapeutic interventions.[5,7] Advancement of ICU care is very limited in low-income countries. This is due to the high cost of infrastructure, lack of trained medical staff and frequent failure to incorporate international guidelines for evidence-based care and difficulties in procuring medical supplies.[6,8] All-cause mortality rates are higher in intensive care units compared to other hospital services. Primary disease severity, age of the patients and complications are the main reasons for this.[9] The rate of ICU survival or mortality varies from country to country and even from region to region within a country. The prevalence of mortality in the ICU was found to range from 9 to 61% worldwide. An international study conducted among 13,796 patients from Africa, Asia, America, Europe and Oceania showed that the prevalence of mortality in ICU was 18.2%.[10] This study was designed to estimate survival and mortality rates among patients admitted to the ICU of President Abdul Hamid Medical College Hospital, a non-government tertiary level hospital of Bangladesh.

Methodology

This cross-sectional descriptive observational study was conducted in the ICU of President Abdul Hamid Medical College Hospital, Bangladesh, among 237 purposively selected admitted patients during the period from March 2020 to December 2022. Data on socio-demographic characteristics and in-hospital outcomes of the patients were recorded in a pretested, pre-designed semi-structured case record form. Collected data were entered into the Statistical Package for Social Sciences (SPSS) version 25.0 for analysis. Qualitative variables were summarized as percentages and quantitative variables as means with standard deviations. Data were presented using tables and graphs.

Ethical Considerations: Ethical approval for this study was obtained from the Institutional Ethics Review Board (IERB) of President Abdul Hamid Medical College, Kishoreganj, Bangladesh Approval No. : **PAHMC/ERB/2023/09**. Written informed consent was obtained from all participants or their legally authorized representatives before enrollment. Confidentiality and anonymity of the participants were strictly maintained throughout the study.

Results

Socio-demographic Characteristics

This study was carried out among 237 respondents with ages ranging from 2 to 100 years. Among them, 22 (9.3%) were in the age group of 2–20 years; 60 (25.3%) in 21–40 years; 72 (30.4%) in 41–60 years; 77 (32.5%) in 61–80 years; and 6 (2.5%) in the age group of 81–100 years. The majority of them, 209 (88.2%), were in the age group of 21–80 years. The mean age (±SD) of the 237 respondents was 49.83±19.65 years (Table I). More than half, 127 (53.6%), of the patients were female, while males comprised 110 (46.4%) (Figure 1). The majority of patients, 224 (94.5%), were from Kishoreganj district; 7 (3.0%) were from Netrokona; 5 (2.1%) from Mymensingh; and 1 (0.4%) patient was from Brahmanbaria (Table II).

Table I: Age distribution of the respondents (n=237)

Age in years	Frequency (n)	Percentage (%)
2–20	22	9.3
21–40	60	25.3
41–60	72	30.4
61–80	77	32.5
81–100	6	2.5

Total	237	100.0

*Mean±SD = 49.83±19.65 years

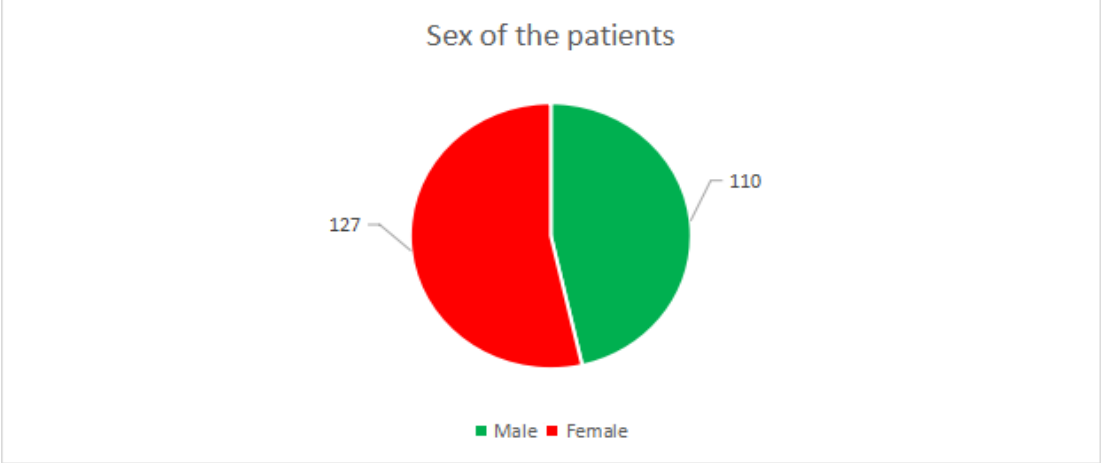

Figure 1: Sex distribution of the respondents (n=237)

Table II: Home district of the respondents (n=237)

Name of the district	Frequency (n)	Percentage (%)
Kishoreganj	224	94.5
Netrokona	7	3.0
Mymensingh	5	2.1
Brahmanbaria	1	0.4
Total	237	100.0

Duration of Hospital Stay

The majority of patients, 221 (93.2%), stayed in the hospital for 1 week, followed by 11 (4.6%) for 2 weeks, 4 (1.7%) for 3 weeks, and 1 (0.4%) for 7 weeks. The average duration of hospital stay was 2.52±4.50 days (Table III).

Table III: Duration of hospital stay of the respondents (n=237)

Duration in days	Frequency (n)	Percentage (%)
0–7	221	93.2
8–14	11	4.6
15–21	4	1.7
42–49†	1	0.4
Total	237	100.0

*Mean±SD = 2.52±4.50 days

†No patients were admitted for 22–41 days.

Outcomes of ICU Patients

Among 237 ICU patients, 97 (40.9%) were cured after treatment and 76 (32.1%) died in the ICU. Fifty-six (23.6%) patients were discharged on request bond (DORB) and 8 (3.4%) were referred to the HDU of other hospitals. The survival rate (cured pa-

tients only) was 40.9% and the mortality rate was 32.1% (Table IV).

Table IV: Survival and mortality of ICU patients (n=237)

Outcomes	Frequency (n)	Percentage (%)
Cure	97	40.9
Death	76	32.1
Discharged on Request Bond (DORB)	56	23.6
Referred	8	3.4
Total	237	100.0

Discussion

This cross-sectional descriptive observational study was carried out among 237 ICU-admitted patients with ages ranging from 2 to 100 years. In an Ethiopian study, the majority of patients were in the age range of 19–39 years.[11] In the present study, 22 (9.3%) patients were in the age group of 2–20 years; 60 (25.3%) in 21–40 years; 72 (30.4%) in 41–60 years; 77 (32.5%) in 61–80 years; and 6 (2.5%) in the age group of 81–100 years. The majority, 209 (88.2%), were in the age group of 21–80 years. The mean age (±SD) was 49.83±19.65 years. In a study from Turkey, the mean age of participants was 73.79±14.73 years (min-max: 21–93).[12]

In the present study, more than half, 127 (53.6%), of the patients were female, while males comprised 110 (46.4%). In the Turkish study, females comprised 47.7% and males 52.3%.[12] The majority of patients, 224 (94.5%), were from Kishoreganj district, which is expected given the hospital's location.

In the Turkish study, the median duration of hospitalisation was 9.1 days (min-max: 1–49 days).[12] In this study, the majority of patients, 221 (93.2%), stayed for 1 week, followed by 11 (4.6%) for 2 weeks, 4 (1.7%) for 3 weeks and 1 (0.4%) for 7 weeks. The average duration of hospital stay was 2.52±4.50 days. Among 237 ICU patients, 97 (40.9%) were cured, 76 (32.1%) died, 56 (23.6%) were discharged on request bond, and 8 (3.4%) were referred. All-cause mortality among ICU-admitted patients was 47.7% in the Turkish study,[12] markedly higher than this study (32.1%). Uysal et al. reported an ICU mortality rate higher than that observed in the present study.[9] In an Ethiopian study, the overall ICU mortality rate was 46.8%,[11] also higher than the present study. ICU mortality in low-income countries can be as high as 61%, compared to 9–18% in developed countries.[11] The mortality rate in this study (32.1%) was higher than that of developed countries but lower than several other low- and middle-income country studies. The study was limited to a single hospital with a relatively small sample size. Further studies across multiple hospitals with larger sample sizes would provide a more representative picture of Bangladesh.

Conclusion

Mortality of patients in ICU varies from country to country and even from region to region within a country. The overall mortality rate at the ICU of President Abdul Hamid Medical College Hospital was 32.1%, which was lower than several other studies conducted around the world.

Acknowledgement

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

Author Contribution

Author Contribution: Khan ANMN-study design, supervision; Begum T-data collection, manuscript writing; Hallaz M-data collection, analysis; Tripura KK-literature review, manuscript revision; Akter

MR- statistical analysis, manuscript revision. All authors read and approved the final manuscript.

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Data Availability
The data that support the findings of this study are available from the corresponding author upon reasonable request.

AI Disclosure
No artificial intelligence (AI) tools were used in the preparation of this manuscript.

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