Original Article

Mortality Analysis during July & September 2022 at Benazir Bhutto Hospital Rawalpindi

Rizwana Shahid[1*], Sadia Khan[2], Rabbia Khalid[3], Muhammad Umar[4], Shaikh Abdul Rehman[1] and Nargis Zaidi[1]

[1]Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
[2]Department of Family Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
[3]Department of Pathology, Rawalpindi Medical University, Rawalpindi, Pakistan
[4]Department of Gastroenterology, Rawalpindi Medical University, Rawalpindi, Pakistan

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ABSTRACT

Hospital mortality reflects the quality of healthcare and is a tool to perceive department-wise variations in health care services. **Objectives:** To determine age, gender and department-wise mortality reported during July and September 2022 at Benazir Bhutto Hospital Rawalpindi. **Methods:** A cross-sectional descriptive study was done to analyse the variations in age, sex and department-wise in-hospital mortality among reported deaths at Benazir Bhutto Hospital (BBH) Rawalpindi during July and September 2022. The data were gathered from Hospital administration through informed consent. The demographics and primary cause of mortality were scrutinized. Data were analysed by using SPSS version 25.0 and Microsoft Excel 2010. Hospital death rate during July and September 2022 were computed. Difference in mean age of the expired cases other than those of infant and neonates was statistically determined by independent sample t-test. P < 0.05 was considered significant. **Results:** Of the total 5338 and 4514 patients admitted at BBH during July and September 2022, about 8.2% and 7.1% deaths were reported respectively. On an average 53.2% males and 46.8% females succumbed to various diseases. About 58.5% and 64.2% deaths were reported from Paediatrics department during July and September 2022 respectively. Around 45.6% neonatal deaths were reported during two months period. Difference in mean age of expired cases excluding infants and neonates was statistically insignificant (P=0.09). Infants and neonates frequently succumbed to sepsis, low birth weight, birth asphyxia and pneumonia. **Conclusion:** Infants and neonates are more susceptible to in-hospital mortality predominantly due to sepsis and low birth weight.

INTRODUCTION

Mortality indicators of a region are of paramount significance in identifying the age and sex-related fatalities apart from scrutinizing the cause of death. Statistics pertinent to mortality of a nation enable our policy makers to deliberate on this issue for its mitigation [1]. The role of effectively implemented Hospital Management Information System (HMIS) in provision of updated healthcare related data can never be overlooked [2]. Mortality data of a country reflects the quality of its healthcare services. Composite mortality data of any hospital illustrates the operationality of health system in addition to depicting the accountability of healthcare

workforce [3]. Sustainable Development Goal (SDG) No. 3 is intended to ensure health and well-being among people of all age groups and one of its 9 targets to be achieved by 2030 is to reduce neonatal and under 5 mortalities to as low as 12 and 25 per 1000 live births respectively [4]. Current neonatal and child death rate of Pakistan is illustrative of almost failure of our healthcare system towards achievement of SDG 3 within specified timeline [5]. Mortality is perceived as an essential tool in assessing the quality of healthcare system [6]. The validity of statistics related to deaths and associated causes cannot be neglected [7]. As deaths during infancy and neonatal

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period are attributed to pregnancy related disorders or genetic diseases, so such deaths are considered inescapable [8]. Although mortality review at departmental level in healthcare facilities provide useful information pertinent to a specific speciality; however, institutional mortality analysis provides a holistic picture of the scenario that can best be brought to the attention of strategic planners for curtailment [9]. The present study was therefore intended to determine the mortality reported during 2 months period i.e; July and September 2022 from all departments of Benazir Bhutto Hospital Rawalpindi. This would enable the stakeholders to pinpoint the commonest causes of deaths among our population in order to chalk out suitable measures for their reduction.

METHODS

A cross-sectional descriptive study was carried out to review the mortality of the patients admitted in Benazir Bhutto Hospital Rawalpindi during July 2022 and September 2022. The data were gathered from the Hospital administration after getting informed consent. The data were collected pertinent to age, gender and primary cause of mortality. Hospital death rate was calculated by putting value in the following formula [10]:

$$\text{Hospital death rate} = \frac{\text{No. of deaths of in patients in a period}}{\text{No. of discharges (including deaths)}} \times 100$$

The data were entered and analysed by using SPSS version 25.0 and Microsoft Excel 2010. Difference in mean age of the expired cases excluding infant and neonates was statistically determined by independent sample t-test. P-value < 0.05 was considered significant.

RESULTS

Of the total 5338 patients admitted at Benazir Bhutto Hospital Rawalpindi during September 2022, about 377 expired while 369 patients died out of 4514 admitted patients during July 2022. Around 58.5% and 64.2% deaths were reported among the patients admitted in Paediatrics department of BBH during July and September 2022 respectively. Trend of mortality during 2 months is depicted below in Figure 1.
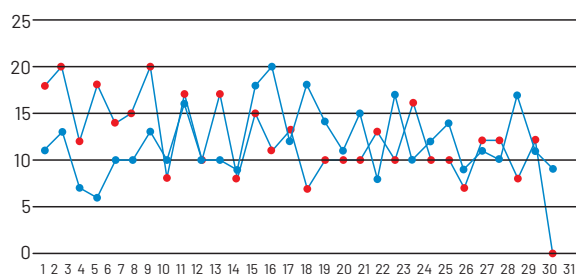

Figure 1: Mortality Trend during July & September 2022 at BBH

Of the 369 expiring patients during July, about 198 (53.6%)

and 171 (46.4%) were males and females respectively. Approximately 199 (52.8%) males and 178 (47.2%) females succumbed to various diseases during September 2022. Hospital mortality rate during July and September 2022 were 8.2% and 7.1% respectively. the greatest number of deaths were reported from paediatrics department of BBH as reflected below in Figure 2.
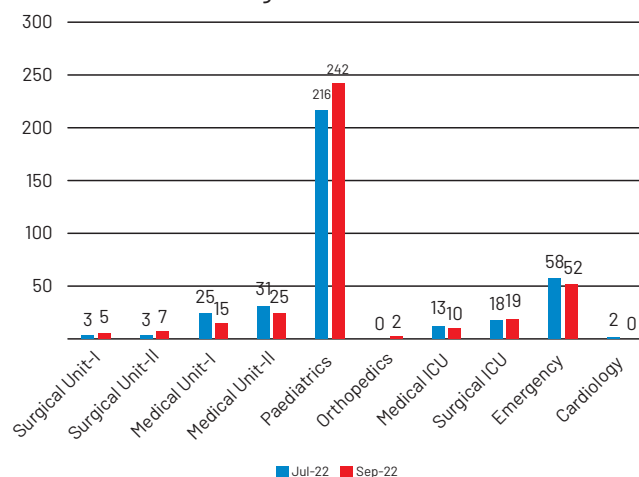
Figure 2: Department-wise mortality at BBH during July & September 2022

Neonatal deaths constituted about 45.6% of the total mortalities registered at BBH during two months period as shown below in Figure 3.
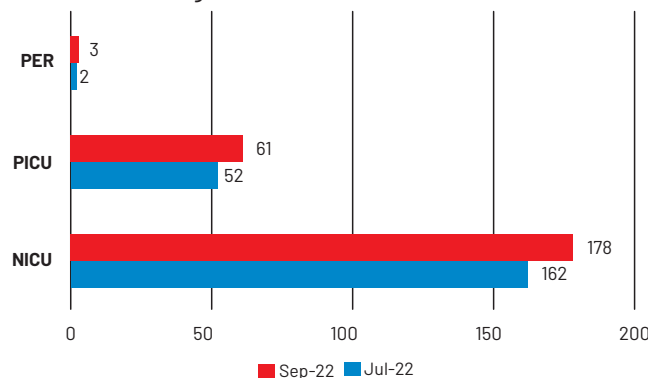
Figure 3: Frequency of deaths from different sections of Paediatric department at BBH

Difference in mean age of the dying people other than those of neonatal and infant deaths had statistically insignificant difference (p= 0.09) as revealed below in Table 1.

Mean age of the expired patients		p-value
July 2022	September 2022	0.09
48.02 ± 23.20	45.31 ± 20.17	

Table 1: Statistical difference in mean age of expired cases at BBH

Infants and neonates constituted about 46.4% of all reported mortalities at BBH as illustrated below in Table 2.

Age groups	No. of expired patients	
	July 2022	**September 2022**
Infants & Neonates	169	178
1–10 years	49	49
11–20 years	11	11
21–30 years	17	15
31–40 years	20	20
41–50 years	22	26
51–60 years	33	26
61–70 years	21	24
71–80 years	17	22
81–90 years	08	04
> 90 years	02	02
Total	369	377

Table 2: Frequency of expired patients in different age groups

Primary causes of mortality among reported deaths in our study are illustrated below in Table 3.

Sr. No.	Primary cause of mortality	Frequency	
		July 2022	**September 2022**
1.	Sepsis / septicemia	116	135
2.	Low Birth Weight (LBW)	35	48
3.	Birth asphyxia	18	13
4.	Pneumonia	18	25
5.	Prematurity	15	13
6.	Hypoxic Ischemia Encephalopathy (HIE-III)	12	07
7.	IUGR	0	02
8.	Carcinoma (Thyroid, pancreas, stomach, rectum)	05	09
9.	Breast carcinoma	0	02
10.	Chronic Kidney Disease (CKD)	12	07
11.	Coronary Heart Disease (CHD)	05	09
12.	CLD / DCLD	13	11
13.	COPD	09	04
14.	DIC	11	15
15.	Nephropathy / uropathy	10	07
16.	Diabetes Mellitus /Diabetic Ketoacidosis	04	07
17.	Respiratory Distress Syndrome (RDS)	12	05
18.	Stroke /cerebral palsy	09	06
19.	Alcoholism	01	02
20.	Road Traffic Accident (RTA) / Trauma	07	06
21.	Upper Gastrointestinal Bleed	14	9
22.	Snake bite	02	0
23.	Leiomyosarcoma	01	0
24.	Anaemia (aplastic / microcytic)	07	04
25.	Rheumatic Heart Disease (RHD)	01	02
26.	Down syndrome	01	0
27.	End Stage Renal Disease (ESRD)	06	0
28.	Acute pulmonary edema / embolism	06	02
29.	Eclampsia / Epileptic fits	04	03
30.	Gangrene (foot / gut)	02	01
31.	Viral Hepatitis (A / C)	01	01
32.	Hypertension	06	10
33.	Pulmonary tuberculosis	03	05
34.	Intracranial bleed	02	04
35.	Tetanus	0	03
36.	Erb's paralysis	01	0

Table 3: Primary causes of Mortality

DISCUSSION

Performance of any healthcare facility is markedly linked to its mortality rate. Competent authorities across the globe use this rate substantially to measure the hospital's performance [11]. Age and gender are substantially important while reviewing in-hospital mortality [12]. Neonatal and infant deaths constituted about 46.4% of in-hospital mortality that has consistently been reported from a public sector tertiary healthcare facility of Rawalpindi. Similarly, a mortality review carried out at BBH during March–April 2022 revealed about 50% of the fatalities among up to 5 years old population [13]. According to UNICEF, approximately 2.4 million neonates died in 2020 with reporting of about one third of such mortalities on first day of their lives and around three fourth of such expiries during first week of life [14]. The incongruity in neonatal deaths have also been determined between developing and developed regions of the globe that needs attention of the policy makers for apt and robust interventions for attainment of Universal Health Coverage (UHC) till 2030 [15, 16]. There has also been a prediction about confrontation with rising neonatal morality in coming days while infant mortality was perceived to have decline due to implementation of adequate relevant measures [17]. A similar study by Dawood Z et al in Pakistani scenario divulged somewhat indifference in trend of interprovincial neonatal mortality that necessitates further studies to dig out the underlying reasons [18]. As children expiring in 1st 28 days of life succumb to various diseases or infections acquired either during intra-natal or postnatal period; this attributes to poor healthcare quality [19]. In short neonatal care should be given due consideration by MNCH care providers for its betterment in our set up. The leading causes of neonatal and infant mortality in our study are sepsis, low birth weight, birth asphyxia, pneumonia and prematurity. Likewise, the key reason for neonatal admission to hospital was sepsis (35.5%) and their expiry was significantly ascribed to respiratory distress syndrome and low birth weight [20]. Likewise, World Health Organization highlighted preterm birth, neonatal infections and birth asphyxia as the prime reasons for neonatal death. In the context of birth defects, that have also been mentioned by WHO as the prime cause for neonatal expiry, it is notable to mention that Hypoxic Ischemic Encephalopathy (HIE) and Intra Uterine Growth

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Restriction (IUGR) have also been detected among our expiring infants and neonates [19]. These details should also be deliberated for lessening the mortality rate. A similar study by Chowdhury et al to determine the causes of neonatal mortality among population of rural Bangladesh disclosed birth asphyxia, prematurity, sepsis, respiratory distress and pneumonia as the frequently reported causes of death. As those deaths were identified among those delivering babies at home, this reflected the dire need of skilled birth attendants in rural areas for maternal and neonatal health and well-being [21]. About 44 deaths in our study have been reported among under 5 years old children primarily due to sepsis and pneumonia. A similar study done by Perin et al on broad based data (2000-2019) revealed approximately 5.3 million deaths among under 5 years old children that were predominantly attributed to prematurity and infections. However, under-5 deaths predominantly due to lower respiratory infections, diarrhea, malaria and measles across the globe have declining trend since 2000 due to vaccination against these ailments [22]. Around 5 million under 5 mortalities have been determined worldwide that reveals the death among about 13,800 less than 5 years old children daily [23]. Likewise, a study based on 9 years data by Gutema et al revealed high under -5 mortality of 85 deaths / 1000 live despite the gradual decline of mortality trend during study [24]. This study also necessitates the implementation of appropriate measures for mitigating this age-specific fatality. Males in current study succumbed to various diseases comparatively more than those of females. About 53.6% and 52.8% of the male patients in present study expired during July and September 2022 respectively. Although unadjusted in-hospital deaths in a study by Fabijanic et al were greater among female patients, the relative risk among women in consideration with different diseases was determined to be relatively less [25]. Contrary to our results, a cohort study revealed statistically insignificant difference in gender-based hospital mortality [26]. In-hospital mortality can sufficiently be lessened by good leadership, operative Health Management Information System (HMIS), community participation and quality assurance [27]. Apart from cultural and ethnic variants of the patients, care provided in hospitals might be associated with mortality that should methodically be studied for identification of the accompanying aspects for their rectification by the concerned authorities.

CONCLUSIONS

Although mortality during September were somewhat less than those reported during July 2022, mounting neonatal and infant mortality is an enigma that seems to be foremost obstacle in attainment of health-related sustainable development goals by 2030. Healthcare indicators of Pakistan can substantially be improved by enhancing the health of under-5 population. However, this alone cannot be achieved without giving due consideration to maternal health. In short, there is dire need to emphasize Maternal & Neonatal Child Health (MNCH) primarily in public sector healthcare facilities for their augmented survival and refraining from their grave health consequences.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

REFERENCES

[1]   Phillips DE, Lozano R, Naghavi M, Atkinson C, Gonzalez-Medina D, Mikkelsen I, et al. A composite metric for assessing data on mortality and causes of death: the vital statistics performance index. Population health metrics. 2014 Dec; 12(14): 1-16. doi: 10.1186/1478-7954-12-14.

[2]   Arora L and Ikbal F. Experiences of implementing Hospital Management Information System (HMIS) in at a tertiary care hospital, India. Vilakshan - XIMB Journal of Management 2021 Nov; 1-23. doi: 10.1108/XJM-09-2020-0111.

[3]   English M, Mwaniki P, Julius T, Chepkirui M, Gathara D, Ouma PO, et al. Hospital mortality: A neglected but rich source of information supporting the transition to higher quality health systems in low and middle-income countries. BMC Medicine 2018 Dec; 16(1): 1-9. doi: 10.1186%2Fs12916-018-1024-8.

[4]   World Health Organization. Targets of Sustainable Development Goal 3. [Last cited on: 28th January 2022]. Available at: https: //www.who.int/europe/about-us/our-work/ sustainable-development-goals/targets-of-sustainable-development-goal-3.

[5]   World Health Organization. The Global Health Observatory. [Last cited on: 28th January 2022]. Available at: https: //www.who.int/data/gho/data/countries/country details/GHO/pakistan?countryProfileId=314d19a1-bfdc-4611-a586-54cd8aec3531.

[6]   Barber RM, Fullman N, Sorensen RJ, Bollyky T, McKee M, Nolte E, et al. Healthcare Access and Quality Index based on mortality from causes amenable to personal health care in 195 countries and territories, 1990–2015: a novel analysis from the Global Burden of Disease Study 2015. The lancet. 2017 Jul; 390(10091): 231-66. doi: 10.1016/s0140-6736(17)30818-8.

[7]   Setel PW, Macfarlane SB, Szreter S, Mikkelsen L, Jha P, Stout S, et al. A scandal of invisibility: making

everyone count by counting everyone. The Lancet. 2007 Nov; 370(9598): 1569–77. doi: 10.1016/s0140-6736(07)61307-5.

[8] Choi J, Ki M, Kwon HJ, Park B, Bae S, Oh CM, Chun BC, Oh GJ, Lee YH, Lee TY, Cheong HK. Health indicators related to disease, death, and reproduction. Journal of Preventive Medicine and Public Health. 2019 Jan; 52(1): 14-20. doi: 10.3961/jpmph.18.250.

[9] Kobewka DM, van Walraven C, Turnbull J, Worthington J, Calder L, Forster A. Quality gaps identified through mortality review. BMJ quality & safety. 2017 Feb; 26(2): 141-9. doi: 10.1136/bmjqs-2015-004735.

[10] Zakaria A, Piper M, Douda L, Jackson NM, Flynn JC, Misra DP, et al. Determinants of all-cause in-hospital mortality among patients who presented with COVID-19 to a community teaching hospital in Michigan. Heliyon 2021 Dec; 7(12): e08566. doi: 10.1016%2Fj.heliyon.2021.e08566.

[11] Pitocco C, Sexton TR. Measuring hospital performance using mortality rates: an alternative to the RAMR. International Journal of Health Policy and Management. 2018 Apr; 7(4): 308-16. doi: 10.15171%2Fijhpm.2017.94.

[12] Schwartz N, Sakhnini A, Bisharat N. Predictive modeling of inpatient mortality in departments of internal medicine. Internal and Emergency Medicine. 2018 Mar; 13(2): 205-11. doi: 10.1007/s11739-017-1784-8.

[13] Shahid R, Umar M, Zeb S, Khokhar MN, Zafar F, Fatima F. Mortality review in tertiary healthcare facilities of Rawalpindi from 1st March-10th April 2022. Journal of Community Medicine and Public Health Reports 2022. Jun; 3(07): 1–5. doi: 10.38207/JCMPHR/2022/JUL03070453.

[14] UNICEF. Neonatal mortality. Last Update December 2021. Available at: https: //data.unicef.org/topic/child-survival/neonatal-mortality/.

[15] Houweling TA, Kunst AE, Borsboom G, Mackenbach JP. Mortality inequalities in times of economic growth: time trends in socioeconomic and regional inequalities in under 5 mortality in Indonesia, 1982–97. Journal of Epidemiology & Community Health. 2006 Jan; 60(1): 62-8. doi: 10.1136/jech.2005.036079.

[16] Amouzou A, Jiwani SS, da Silva ICM, Carvajal-Aguirre L, Maiga A, Vaz LME, et al. Closing the inequality gaps in reproductive, maternal, newborn and child health coverage: slow and fast progressors. BMJ Global Health 2020 Jan; 5: e002230. doi: 10.1136/bmjgh-2019-002230.

[17] Moss W, Darmstadt GL, Marsh DR, Black RE, Santosham M. Research priorities for the reduction of perinatal and neonatal morbidity and mortality in developing country communities. Journal of perinatology. 2002 Sep; 22(6): 484-95. doi: 10.1038/sj.jp.7210743.

[18] Dawood Z, Majeed N. Assessing neo-natal mortality trends in Pakistan: an insight using equity lens. Archives of Public Health. 2022 Dec; 80(1): 1-10. doi: 10.1186/s13690-021-00767-1.

[19] World Health Organization. New born mortality. [Last cited on: 28th January 2022]. Available at: https://www.who.int/news-room/fact-sheets/detail/levels-and-trends-in-child-mortality-report-2021

[20] Andegiorgish AK, Andemariam M, Temesghen S, Ogbai L, Ogbe Z, Zeng L. Neonatal mortality and associated factors in the specialized neonatal care unit Asmara, Eritrea. BMC Public Health 2020 Dec; 20(10): 1–9. doi: 10.1186/s12889-019-8118-x.

[21] Chowdhury HR, Thompson S, Ali M, Alam N, Yunus M, Streatfield PK. Causes of neonatal deaths in a rural subdistrict of Bangladesh: implications for intervention. Journal of health, population, and nutrition. 2010 Aug; 28(4): 375. doi: 10.3329%2Fjhpn.v28i4.6044.

[22] Perin J, Mulick A, Yeung D, Villavicencio F, Lopez G, Strong KL, et al. Global, regional and national causes of under-5 mortality in 2000-19: An updated systematic analysis with implications for the Sustainable Development Goals. The Lancet Child & Adolescent Health 2022 Feb; 6(2): 106-15. doi: 10.1016/S2352-4642(21)00311-4.

[23] UNICEF. Under-Five mortality. [Last cited on: December 2021]. Available at: https: //data.unicef.org/topic/child-survival/under-five-mortality/.

[24] Gutema GD, Geremew A, Mengistu DA, Dammu YM, Bayu K. Trends and Associated Factors of Under-five Mortality Based on 2008–2016 Data in Kersa Health and Demographic Surveillance Site, Eastern Ethiopia. INQUIRY: The Journal of Health Care Organization, Provision, and Financing. 2022 Mar; 59: 1-12. doi: 10.1177%2F00469580221090394.

[25] Fabijanic D, Culic V, Bozic I, Miric D, Stipic SS, Radic M, et al. Gender differences in in-hospital mortality and mechanisms of death after the first acute myocardial infarction. Annals of Saudi medicine. 2006 Nov; 26(6): 455-60. doi: 10.5144%2F0256-4947.2006.455.

[26] Chen FT, Chou AH, Chan Y, Wu VCC, Lin CP, Hung KC, et al. Sex-related differences on the risks of in-hospital and late outcomes after acute aortic dissection: A nationwide population-based cohort study. PLoS ONE 2022 Feb; 17(2): 1-13. doi: 10.1371/journal.pone.0263717.

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[27] Wright J, Dugdale B, Hammond I, Jarman B, Neary M, Newton D, et al. Learning from death: a hospital mortality reduction programme. Journal of the Royal Society of Medicine. 2006 Jun; 99(6): 303-8. doi: 10.1258%2Fjrsm.99.6.303.