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Comorbidities among dengue patients reported during Dengue Epidemic 2019 in Tertiary care hospitals of Rawalpindi

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Abstract

Objectives: To determine the comorbidities among the dengue patients admitted to tertiary care hospitals of Rawalpindi during the dengue epidemic of 2019.

Subjects & Methods: A cross-sectional descriptive study was done among 12,192 dengue cases who got admitted to three tertiary care hospitals (Holy Family Hospital, Benazir Bhutto Hospital, and DHQ Hospital) during the dengue epidemic 2019. The data was collected from administrators of the hospitals through informed consent. Apart from ascertaining the comorbidities among admitted patients, their gender-based differences and distribution in the hospitals were also deliberated. The data were analyzed by means of SPSS version 25.0.

Results: Of the total 9976 dengue patients with diverse comorbidities, 70.5 % (7031) were males and 29.5 % (2945) were females. The mean age of the dengue patients was 37.8 ± 12.4 years. Around 42.1 %, 38.7 % and 19.2 % of dengue patients were admitted to HFH, BBH, and DHQ hospital Rawalpindi amidst the dengue epidemic of 2019. Most (54 %) of our patients were cases of dengue fever while 42.9 % and 3.1 % of our study subjects were verified as cases of dengue hemorrhagic fever and dengue shock syndrome respectively. About 3.61 % of dengue patients were constituted by pregnant women. The majority (92.5%) of our dengue cases were edematous while approximately 2.3 % were diabetic. However, patients with hypertension, hepatic disease, and peptic ulcer constituted individually 0.3% of the comorbidities among our cases.

Conclusion: Comorbidity among dengue patients is a hallmark of the disease severity that demands rigorous care from healthcare providers.

Keywords: Comorbidities, warning signs, dengue epidemic, dengue fever, dengue hemorrhagic fever, dengue shock syndrome.

Introduction

Dengue infection is associated with mortality and grave health consequences in Asian and American regions of the world. Around half of the global population are now at risk of suffering from this menace **[1]**. About 70 % of this disease burden has been recounted in our Asian countries **[2]**. Dengue epidemic 2019 in Pakistan was determined to be the woeful outbreak in the country's archive **[3]**. Of the total 54,386 dengue cases reported across the country, around 95 patients succumbed to dengue **[4]**.

Although dengue is endemic in Pakistan outburst of this infectious disease during 2019 stormily shook all concerned health authorities **[5]**. Testing the positive samples at the National Institute of Health (NIH) laboratory from Rawalpindi and Islamabad amidst the dengue epidemic in 2019 verified the circulation of dengue virus serotype 1 and 2. However, World Health Organization (WHO) has assessed the risk of DENV-3 circulation also among dengue afflicted patients in the region **[6]**.

The severity of the dengue virus infection particularly among children **[7]** has provoked the consideration of this arthropod-borne viral disease as a Public Health Emergency of International Concern (PHEIC) under International Health Regulations (IHR) **[8]**.

In addition to the uncontrolled propagation of mosquitoes; the escalating trend of this life-threatening viral infection in endemic regions is also attributed to climate change, unplanned human mobility, and population explosion **[9]**. A meta-analysis carried out by Tsheten T et al revealed the seriousness of dengue infection among patients combating diabetes and renal diseases as comorbid states **[10]**. Moreover, According to WHO categorization of dengue guidelines 2009, Dengue with warning signs is also one of the entities that necessities due consideration of the care providers **[8]**.

The current study is therefore strategized to study the frequency of comorbidities among dengue patients who were admitted to tertiary care hospitals of Rawalpindi during the dengue epidemic of 2019.

This research would facilitate our policymakers in comprehensive situational analysis for effective and efficient management of dengue cases with comorbidities for their better prognosis.

Subjects & Methods

A cross-sectional descriptive study was carried out among 12,192 dengue cases who were admitted to three tertiary care hospitals (Holy Family Hospital, Benazir Bhutto Hospital, and DHQ Hospital) affiliated with Rawalpindi Medical University, Pakistan. The data was gathered from administrators of the hospitals through informed consent. In addition to identifying the comorbidities among admitted patients, their gender and distribution in the hospitals were also studied. The data analysis was done by using SPSS version 25.0.

Results

Of the 12,196 dengue patients admitted in three tertiary care hospitals of Rawalpindi amidst the dengue epidemic in 2019, around 9976 patients were determined with known comorbid states as depicted below in Table 1.

Table 1: Proportion of comorbidities among dengue patients during dengue outbreak 2019

Co-morbidity among dengue patients – Hospital wise (n = 9,976)										
Hosp.	**Edema**	**Postural Hypotension**	**Profuse perspiration**	**Diabetes Mellitus**	**Pregnancy**	**Peptic ulcer**	**Liver disease**	**Hypertension**	**Renal disease**	**Altered mental state**
HFH	3889 (42.1 %)	10 (66.7 %)	09 (47.4 %)	125 (54.6 %)	232 (64.4 %)	20 (74.1 %)	17 (60.7 %)	12 (41.4 %)	14 (73.7 %)	13 (56.5 %)
BBH	3566 (38.7 %)	02 (13.3 %)	07 (36.8 %)	72 (31.4 %)	78 (21.7 %)	03 (11.1 %)	03 (10.7 %)	12 (41.4 %)	02 (10.5 %)	02 (8.7 %)
DHQ	1772 (19.2 %)	03 (20 %)	03 (15.8 %)	32 (14 %)	50 (13.9 %)	04 (14.8 %)	08 (28.6 %)	05 (17.2 %)	03 (15.8 %)	08 (34.8 %)
Total	**9227**	**15**	**19**	**229**	**360**	**27**	**28**	**29**	**19**	**23**

Among the sufferers, about 7031 and 2945 were males and females respectively. Their mean age was determined to be 37.8±12.4 years. About 5392 (54 %), 4276 (42.9 %), and 308 (3.1 %) of our patients were diagnosed as cases of dengue fever, dengue hemorrhagic fever, and dengue shock syndrome respectively. Of the varied comorbid states; profuse perspiration, diabetes mellitus, hypertension, hepatic impairment, renal disease, and mental deterioration were comparatively more among patients diagnosed with dengue hemorrhagic fever as reflected below in **Table 2.**

Table 2: comorbidities among dengue patients with diverse clinical syndromes (n = 9976)

Co-morbidity among dengue patients – dengue clinical syndrome wise										
	Edema	**Postural Hypotension**	**Profuse perspiration**	**Diabetes Mellitus**	**Pregnancy**	**Peptic ulcer**	**Liver disease**	**Hypertension**	**Renal disease**	**Altered mental state**
DF	5096	06	07	87	149	13	13	10	05	06
DHF	3879	09	12	124	185	14	14	17	10	12
DSS	252	0	0	18	26	0	01	02	04	05
Total	**9227**	**15**	**19**	**229**	**360**	**27**	**28**	**29**	**19**	**23**

Males in our study were determined to have known comorbidities relatively more as revealed below in **Table 3.**

Table 3: Gender-wise comorbidities among our dengue patients (n = 9976)

Co-morbidity among dengue patients – Gender wise										
	Edema	**Postural Hypotension**	**Profuse perspiration**	**Diabetes Mellitus**	**Pregnancy**	**Peptic ulcer**	**Liver disease**	**Hypertension**	**Renal disease**	**Altered mental state**
Males	6788	12	14	140	0	11	18	20	12	16
Females	2439	03	05	89	360	16	10	09	07	07
Total	**9227**	**15**	**19**	**229**	**360**	**27**	**28**	**29**	**19**	**23**

Discussion

About eight-fold escalation in dengue cases has been reported across the globe during the last 20 years **[10]**. Concerned health officials worked really hard during the dengue epidemic in 2019 in the provision of technical support and guidance to arrest the spread of this menace **[11]**. Drawing a dengue predictive model 2020 by scrutinizing the dengue data from the public sector tertiary care facilities of Rawalpindi city was one of the initiatives to mitigate the massive dissemination of dengue virus serotypes and hence terminate this rampant outrbreak **[12]**.

Out of 9976 dengue cases reported in public sector tertiary care hospitals during the dengue epidemic of 2019, around 3.61 % were pregnant women. The reason for the inclusion of pregnancy as a comorbid state among dengue patients is the risk of vertical transmission of dengue virus **[13,14]** that may induce preterm deliveries, low birth weight, and grave fetal well-being. Special consideration of the pregnancy during dengue virus infection is associated with serious complications and poor feto-maternal healthcare outcome **[15]**. Pregnancy-associated physiological changes can conceal the dengue attributed hematological indices; this factor may lead to misdiagnosis among dengue afflicted pregnant women **[16]**. The guidelines for clinical management of pregnant dengue cases have recently been devised for getting rid of repercussions **[17]**. Integrated vector control measures can help pregnant women a great deal in the protection against dengue virus infections.

Of the varied comorbidities, edema was revealed among the majority (92.5 %) of our dengue patients. This was followed by 2.3 % of the dengue patients suffering from diabetes mellitus; however, hypertension, hepatic involvement, and peptic ulcer were determined to be in the same proportion (0.3 %) among our study participants. A similar study by Badawi A et al revealed the substantial prevalence of obesity, hypertension, and diabetes mellitus among dengue patients and henceforth illuminated the complexity of flavivirus infection in association with chronic diseases **[18]**. Likewise, a cross-sectional study to scrutinize healthcare records of dengue cases from multiple countries unveiled the relationship of comorbidities among dengue patients with the severity of viral infection in addition to an increased likelihood of fatality **[19]**. Special care for dengue cases with comorbid states should be emphasized by the healthcare professionals in order to avoid the critical scenario.

In the current study, most (70.5 %) of the dengue patients were males. The mean age of our patients was 37.8 ± 12.4 years. A similar national study carried out among dengue patients admitted in public sector tertiary care hospitals of Faisalabad during 2011-12 also revealed that the majority (72.9 %) of the dengue patients were males with a median age of around 30 years **[20]**. Likewise reviewing the gender-based variations in reporting of dengue fever cases from six Asian countries over a span of 10 years by Anker M et al revealed that males in comparison with females were more prone to dengue fever and hence the resultant agony; however, this similarity in results was professed despite the inter-country cultural and economic discrepancies **[21]**. In addition to comparatively more engagement of males in outdoor activities, other contributing factors need in-depth analysis so that efforts could appropriately be rationalized to mitigate the proportion of males falling victim to this adversity.

Conclusion & Recommendations

Dengue patients with comorbidities are more prone to progress towards complexity; hence the intensive care of such cases should be prioritized in order to avoid adverse healthcare aftermaths.

Conflict of Interest: None

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