

## Hemorrhagic Manifestations among Dengue Patients in Tertiary care Hospitals of Rawalpindi Medical University Pakistan

Rizwana Shahid\*, Shazia Zeb\*\*, Sadia Khan\*, Muhammad Umar\*, Sumaira Yasmeen\*,  
Muhammad Mujeeb Khan \*\*, Muhammad Khurram \*\*

\* Rawalpindi Medical University, Rawalpindi

\*\*Holy Family Hospital, Rawalpindi

### Abstract

#### Objective

To determine the frequency of various hemorrhagic manifestations among patients presenting with different dengue clinical syndrome in tertiary care hospitals affiliated with Rawalpindi Medical University.

#### Methods

A cross-sectional descriptive hospital record-based research was carried out in three tertiary care hospitals (Holy Family Hospital (HFH), Benazir Bhutto Hospital (BBH) and District Head Quarters (DHQ) Hospital) affiliated with Rawalpindi Medical University. The data was collected during dengue epidemic from September-November 2019 pertinent to demographics, various bleeding manifestations, dengue clinical syndrome and hospital stay through consecutive sampling. The data was analyzed by means of SPSS version 25.0 and Microsoft Excel 2010. Gender based differences in various haemorrhagic manifestations was statistically verified by application of chi square test.  $P < 0.05$  was taken as significant.

#### Results

Of the total 1928 dengue cases with bleeding manifestations, 73.4% were males. About 1248(64.7%), 466(24.2%) and 214(11.1%) were admitted in HFH, BBH and DHQ Hospital Rawalpindi respectively. Amongst diverse haemorrhagic manifestations 33.8% had hematuria while 34.1% and 25.6% had gum bleeding and maculopapular rash respectively. Males presented with hematuria ( $P < 0.001$ ), gum bleeding ( $P < 0.001$ ) and rash ( $P < 0.005$ ) comparatively more than those of females.

#### Conclusion

Dengue virus infections are more prevalent among males residing in Rawalpindi and Islamabad. It is deadly but curable. Timely and appropriate management of cases can result in significant reduction of death toll.

#### Keywords

dengue epidemic, dengue fever, dengue hemorrhagic fever,

*Corresponding Author: Rizwana Shahid,  
Assistant Professor, Community Medicine  
Rawalpindi Medical University, Rawalpindi  
Email: drriz\_shahid@yahoo.com*

dengue shock syndrome, tertiary care hospitals.

#### Introduction

Substantial infectious disease burden among children and adults residing in tropical and sub-tropical countries is attributed to dengue virus infection.<sup>1</sup> Individuals are reported to be at high risk for dengue hemorrhagic fever and dengue shock syndrome in Pakistan.<sup>2</sup> In addition to dengue epidemic 2019, about 106 dengue cases were also reported by National Institute of Health in Pakistan in 2020.<sup>3</sup> Despite of similar geographic distribution to that of malaria, dengue is more widespread in urban and residential regions globally.<sup>4</sup>

Discernible variation in dengue virus infections has been noticed from asymptomatic sickness to dengue fever, dengue hemorrhagic fever (DHF) and dengue shock syndrome.<sup>5</sup> Raised hematocrit level ( $\geq 20\%$ ) pinpointing plasma leakage and low platelet count ( $\leq 20,000/\mu\text{L}$ ) are more prevalent among cases of dengue hemorrhagic fever.<sup>6,7</sup> DHF is a fatal disease illustrated by pyrexia, hemorrhagic manifestations and circulatory failure.<sup>8</sup> Bleeding manifestations in DHF are linked with dynamic pathologies. Vasculopathy, thrombocytopenia and blood coagulation defects are contributory harms in this regard.<sup>9</sup> Profuse plasma leakage is characterized by shock, cyanosis, ecchymosis, petechia, purpura, ascites, pleural and pericardia effusions.<sup>10</sup>

The shocking ascend in dengue virus infections has encompassed approximately 40% global inhabitants.<sup>11</sup> In addition to escalated healthcare cost, this dreadful ailment has drastically raised Disability-Adjusted-Life-Years (DALY) to 8324.<sup>12</sup> Even the patients confirmed to had DHF were reported with twice higher odds of prolonged hospital stay than those without DHF.<sup>13,14</sup>

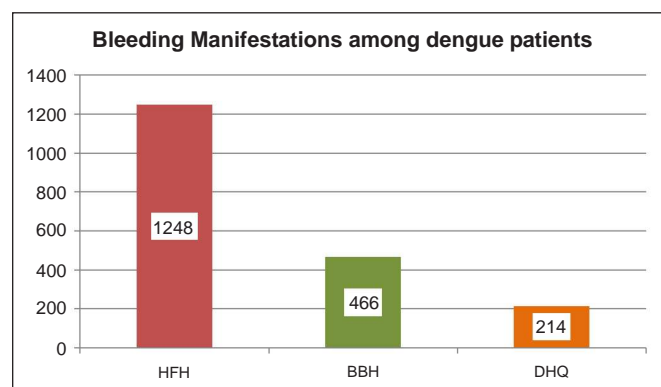
The present study is therefore aimed to determine the hemorrhagic manifestations among DHF and DSS patients presenting in all three tertiary care hospitals (Holy Family Hospital, Benazir Bhutto Hospital and District Head Quarters Hospital) affiliated with Rawalpindi Medical University. The propensity of bleeding manifestation will guide our stakeholders for amendment of management guidelines to timely arrest the drastic escalation of cases and hence improvement in current state of affairs.

## Materials & Methods

A cross-sectional descriptive hospital data-based research was carried out in three tertiary care hospitals affiliated with Rawalpindi Medical University (RMU) through consecutive sampling. These hospitals were Holy Family Hospital, Benazir Bhutto Hospital and DHQ Hospital. The study was conducted among 1928 dengue patients who were admitted and managed in tertiary healthcare settings during 3 months from September – November 2019 for various bleeding manifestations in response to dengue virus infections. Data was collected and scrutinized pertinent to demographics, dengue clinical syndrome, various bleeding manifestation (rash, gum bleeding, petechia, hematemesis, malena, purpura, hematuria) duration of hospital stay among dengue patients who visited each of the 3 tertiary hospitals of RMU during dengue epidemic 2019. Data was entered and analyzed by using SPSS version 25.0 and Microsoft Excel 2010. Gender based discrepancies in bleeding manifestations was statistically confirmed by chi square test.  $P < 0.05$  was considered significant.

## Results

Of the total 1928 dengue patients presenting with bleeding in tertiary care hospitals, 1415 (73.4%) were males and 513 (26.6%) were females. Median age of our study participants was found to be  $38 \pm 14.6$  years. Majority of these patients got admitted at Holy Family Hospital as depicted in Figure 1. On reviewing the varied types of hemorrhagic demonstrations, highest propensity of dengue patients with bleeding manifestations was determined to be at Holy Family Hospital

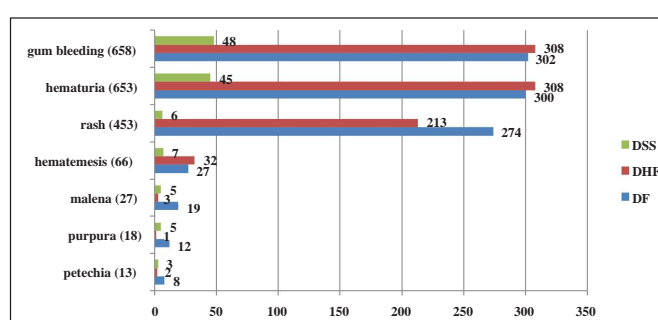


**Fig 1. Bleeding manifestations reported among dengue patients at tertiary care hospitals of RMU**

as evident from Table 1.

Of the total 1928 dengue patients presenting with bleeding manifestations, about 46%, 47.2% and 6.8% were verified as cases of dengue fever, dengue haemorrhagic fever and dengue shock syndrome respectively. Gum bleeding constituted the most frequently occurring hemorrhagic presentation among our study subjects as depicted below in Figure 2.

About 63.8% dengue patients admitted in tertiary care hospitals of RMU belonged to Rawalpindi city and 36.2% from Islamabad. Maximum number of our male and female dengue patients presented with hematuria as shown below in Table 2.



**Fig 2. Hemorrhagic illustrations associated with varied dengue clinical syndrome**

**Table 2: Gender based differences in dengue related bleeding manifestations (n = 1928)**

Bleeding manifestations	Males (n = 1415)	Females (n = 503)	P-value
Maculopapular Rash	336	157	* < 0.005
Gum bleeding	450	208	* < 0.001
Petechiae	10	3	> 0.2
Hematemesis	43	23	> 0.1
Malena	21	6	> 0.2
Purpura	14	4	> 0.2
Hematuria	447	206	* < 0.001

\*Statistically significant difference on application of chi-square test

**Table 1. Diverse hemorrhagic manifestations among dengue patients in tertiary care hospitals of RMU**

Hospitals	Maculopapular Rash	Gum bleeding	Petechia	Hematemesis	Malena	Purpura	Hematuria
HFH	321 (65.1%)	425 (64.6%)	08 (61.5%)	42 (63.6%)	19 (70.4%)	12 (66.7%)	421 (64.5%)
BBH	131 (26.6%)	160 (24.3%)	02 (15.4%)	09 (13.7%)	03 (11.1%)	01 (5.5%)	160 (24.5%)
DHQ	41 (8.3%)	73 (11.1%)	03 (23.1%)	15 (22.7%)	05 (18.5%)	05 (27.8%)	72 (11%)
<b>Total</b>	<b>493 (25.6%)</b>	<b>658 (34.1%)</b>	<b>13 (0.7%)</b>	<b>66 (3.4%)</b>	<b>27 (1.4%)</b>	<b>18 (0.9%)</b>	<b>653 (33.8%)</b>

Mean length of hospital stay among our patients was  $2.9 \pm 0.8$  days. Of the total 1928 study participants, 10 succumbed to dengue and among them 2, 6 and 2 expired subjects were verified as cases of DF, DHF and DSS respectively. Among them 7 were males while 3 were females.

## Discussion

Dengue virus infections are one of the mosquito-borne diseases that are escalating worldwide. Dengue haemorrhagic fever and dengue shock syndrome are primarily associated with grave health scenario and considerable burden on healthcare resources.<sup>10</sup> Being epidemic in Pakistan, dengue disease entails great attention of policy makers to control the resulting mortality and morbidity.<sup>11</sup>

Median age of the dengue patients in current study was  $36 \pm 14.6$  years. In accordance with WHO criteria, dengue fever was confirmed among 1056 patients (54.8%) while DHF was diagnosed among 830 patients (43%). There were only 42 (2.2%) confirmed cases of DSS in tertiary care hospitals of RMU. Mean length of hospital stay was reported to be  $1.28 \pm 0.67$  days. Contrary to the results of our study, majority of the dengue cases (88.1%) examined in tertiary care hospital of Malaysia were diagnosed as DF while only 11.1% and 0.8% cases were confirmed as DHF and DSS respectively. Mean hospital stay among dengue patients seeking health care services in Malaysian hospital was  $4.88 \pm 2.74$  days.<sup>12</sup> The increased frequency of DHF and DSS in our tertiary care hospitals in comparison with those of Malaysia might be due to poor observance of hygienic practices in our country, lack of awareness and delay in seeking health care services for unusual symptoms. Short duration of hospital stays among our dengue patients as compared to those of Malaysian patients should also be given due consideration as this factor may result in non-compliance and transmission of infection to healthy population.

Majority (73.4%) of dengue patients enrolled in our study was males and 46% suffered from dengue fever while 47.2% were diagnosed as cases of DHF. Contrary to my results, a research carried out in 2017 among Indian patients revealed that people primarily suffer from dengue fever while dengue haemorrhagic fever is detected as secondary infection; hence small fraction of dengue patients usually present with dengue hemorrhagic fever.<sup>15</sup> Another similar study by Bashir AB et al among dengue patients of Sudan showed majority (86.5%) of dengue fever patients with only 13.5% patients with bleeding manifestations.<sup>16</sup> This regional diversity in forms of dengue clinical syndrome should rationally be studied to explore it.

In current study about 447 (%) of dengue patients had hematuria. This was followed by gum bleeding and body rash among 450 (%) and 336 (%) patients respectively. However, petechia was evident only among 10 dengue cases. On the other hand, a research by Sam SS *et al* revealed petechiae as predominant bleeding manifestation followed by gingival bleeding, vaginal

bleeding and epistaxis.<sup>17</sup> Another research done in Sudan during 2013-14 illustrated highest frequency of hematuria (5.7%) followed by gum bleeding (2.7%) and epistaxis (1.5%).<sup>16</sup> In a similar study among children diagnosed as dengue cases; 26% had malena, 20% developed petechiae. About 8%, 4% and 2% of these children presented with hematemesis, epistaxis and gum bleeding respectively.<sup>18</sup> The variations in the dengue related haemorrhagic manifestations in association with cultural and ethnic diversities should thoroughly be studied to bring some evidence to the attention of our strategic planners.

In our study, majority 60% of the deaths were reported among DHF cases. Males constituted the maximum proportion of mortalities. Similarly gender based variations in dengue fever cases reported in six Asian countries disclosed that majority of them was comprised of males who were more than or equal to 15 years of age.<sup>19</sup> A similar research conducted among dengue patients of Malaysia during dengue epidemic 2006-2007 reflected that majority of adult females with dengue clinical syndrome succumbed to death with secondary infection.<sup>17</sup> Likewise, scenario pertinent to dengue fever in South American states depicted either equal gender association or higher proportion of females diagnosed with dengue fever.<sup>20</sup> These regional differences might be due to certain climatic or environmental attributes that should intensely be researched for verification.

## Conclusion & Recommendations

Gum bleeding was determined to be the highly prevalent haemorrhagic manifestation among dengue patients followed by hematuria, rash and hematemesis. Early diagnosis and prompt symptomatic treatment of dengue cases at primary health care facilities can drastically reduce the likelihood of bleeding manifestations and other complications.

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