KAP STUDY

A KAP Study on dengue prevention and surveillance among healthcare professionals in Narowal, Pakistan

Shamim Akhtar[1], Samreen Saleem[2], Samina Mohsin Khan[3]

Abstract

Objective: To assess the knowledge and practices of healthcare professionals regarding dengue prevention and surveillance systems, and to identify the relevant gaps.

Method: The descriptive, cross-sectional study was conducted from October 2022 to January 2023 at the District Health Authority Hospital in Narowal, Pakistan, and comprised a range of healthcare professionals. Data was collected using a pre-tested, semi-structured questionnaire. Data were analysed using SPSS version 22.

Results: Of the 400 subjects with mean age 34.68±7.170 years, 271(67.8%) were females, 301(75.2%) had experience >10 years, 79(19.8%) were doctors and 321(80.2%) were nurses, paramedics or lady health visitors. Overall, 271(67.8%) subjects identified fever as a symptom of dengue, 203(50.8%) said dengue mosquitoes breed in clean water, 381(95.2%) could identify dengue-transmitting mosquitoes, 269(67.2%) said dengue mosquitoes bite during the daytime, and 133(33.2%) correctly stated that aspirin should not be given to dengue patients. Further, 289(72.2%) subjects considered dengue a serious illness, and 371(92.8%) believed it could be prevented. Additionally, 179(44.8%) subjects participated in community campaigns.

Conclusion: There were significant areas for improvement in the knowledge, attitudes and practices related to dengue prevention among the healthcare professionals.

Key Words: Knowledge, Attitude, Practices, Dengue, Preventive health Strategies, Disease surveillance, Healthcare professionals.

(JPMA 75: 1585; 2025) **DOI: https://doi.org/10.47391/JPMA.21178**

Introduction

Dengue fever (DF) poses a major public health challenge due to its rapid spread and severe outcomes in recent years.[1] It is caused by four dengue virus (DENV1-4) serotypes, transmitted primarily by the Aedes (Ae.) albopictus and Ae. aegypti mosquitoes, that breed in various water-holding containers found in naturally built semi-urban, urban, and rural environments.[2,3]

Dengue is prevalent in 129 countries and its incidence has increased thirty-fold during the last five decades. Cases surged from 0.51 million in 2000 to 4.2 million in 2019.[4] The financial and social impact of dengue is substantial, threatening societal, economic and political stability.[5] The contributing factors include education levels, overcrowding, poor hygiene, inadequate sanitation, and human behaviour towards the disease, with the abundance of Aedes mosquitoes being the most critical factor.[6,7]

The rise in dengue cases over the past two decades partly reflects changes in national recording and reporting practices, but also increased government recognition of the burden of the disease.[1] The disease is spreading to new areas in Europe, causing significant outbreaks and becoming a potential threat. Local transmission was reported in Croatia and France in 2010, with an outbreak in Madeira, Portugal, causing over 2,000 cases in 2012. Some European countries now report autochthonous dengue cases annually.[1] More than 25,000 cases were classified as severe among 3.1 million cases reported in the United States.[1] The number of cases is alarming, but deaths have decreased compared to previous years.

India, Bangladesh, the Cook Islands, Brazil, Indonesia, Ecuador, Nepal and some other countries witnessed a rise in dengue cases in 2020. In 2022, the most affected countries included Vietnam, India, Brazil, Colombia, the Philippines, Fiji, the Cook Islands, the Reunion Islands, Peru, Paraguay and Kenya.[1] The coronavirus disease-2019 (COVID-19) pandemic strained healthcare and management systems globally, emphasising the need to continue efforts to prevent, identify and treat vector-borne diseases, including dengue.[1]

[1] Department of Anaesthesia, DHQ Hospital, Narowal, Pakistan. [2]Department of Public Health, Health Services Academy, Islamabad, Pakistan. [3]Department of Allied Health Sciences, Health Services Academy, Islamabad, Pakistan.

Correspondence: Samina Mohsin Khan.

Email: mominsmahnoor@gmail.com

ORCID ID: 0000-0002-3223-6873

Submission complete: 13-09-2024 **First Revision received:** 14-01-2025

Acceptance: 30-07-2025 **Last Revision received:** 29-07-2025

In the world Health Organisation (WHO) South-East Asia Region, 1.3 billion individuals are at risk, representing about 52% of the global at-risk population.[8] Many dengue patients are asymptomatic or have mild symptoms, leading to underreporting and misdiagnosis due to other febrile illnesses.[9] Reported cases to WHO increased from 505,430 in 2000 to over 2.4 million in 2010 and 5.2 million in 2019, with mortality rising from 960 in 2000 to 4,032 in 2015, mainly affecting younger populations. Although the numbers decreased in 2020 and 2021, the data is incomplete, and the COVID-19 pandemic disrupted reporting.[1]

Dispersion and adaptation of Ae. albopictus and Ae. Aegypti have led to an increased incidence in Pakistan. The dengue virus was first reported in 1985, with the first epidemic in 1994.[10] Annual epidemics began in Karachi in 2005, peaking in 2010 and onward, with a notable outbreak of 53,498 cases and 95 deaths in 2019.[3,11] In 2017, the Khyber Pakhtunkhwa (KP) province saw an outbreak with 18,856 cases, attributed to DENV serotype-2 from China.[12] Pakistan reported 22,938 cases in 2017, 3,204 in 2018, 24,547 in 2019, and 106 in 2020.[13] In 2021, approximately 48,000 cases and 183 deaths were reported across several provinces.[3] The highest number of cases were reported in Punjab, accounting for 49.4% of cases and 69.4% of deaths, mostly occurring in the provincial capital Lahore.[3,11] From January to September 2022, Pakistan reported 25,932 cases and 62 deaths, with 74% of cases occurring in September. Sindh reported 32% of the cases, Punjab 29%, KP 25% and Balochistan 14%.[1]

Modelling estimates suggest 390 million DENV infections yearly, with 96 million clinically manifesting.[14] Dengue prevalence studies estimate that 3.9 billion people are at risk, with 70% of the burden in Asia.[14,15] A study demonstrated the effectiveness of community-based interventions in reducing dengue incidence in urban settings.[16] Additionally, advances in vaccine development show promise, with the chimeric yellow fever-dengue tetravalent dengue vaccine (CYD-TDV) providing partial immunity against dengue in endemic regions.[17,18]

Recent research in Pakistan has focussed on innovative vector control methods and has explored the use of Wolbachia-infected mosquitoes to reduce dengue transmission, showing promising results in preliminary trials.[19] Additionally, community engagement and education programmes have been effective in increasing awareness and preventive behaviours.[20]

Despite preventive measures, dengue prevention remains challenging. The current study was planned to assess knowledge, attitudes and practices (KAP) related to dengue among healthcare professionals (HCPs), and to identify the relevant gaps.

Subjects and Methods

The descriptive, cross-sectional study was conducted from October 2022 to January 2023 at the District Health Authority (DHA) Hospital in Narowal, Pakistan, after approval from the ethics review board of the Health Services Academy (HSA), Islamabad, Pakistan. Narowal is administratively divided into three tehsils (subdivisions) and 74 union councils (UCs), comprising a population of 1,256,097, with 12% residing in urban areas. [21]

The sample was raised using a non-probability convenience sampling technique. The study population included HCPs, including doctors, nurses, paramedics, medical superintendents, chief executive officers, entomologists, district health officers (DHOs), district coordinators (DC), deputy district health officers (DDHOs), communicable disease control inspectors (CDCI), communicable disease control officers (CDCO), lady health visitors (LHVs), and lady health supervisors (LHSs). Universal sampling technique was employed to contact all HCPs working with DHA and involved in managing dengue patients. The DHA administration provided a list of HCPs.[22] To ensure organized data collection, the participants were approached according to their duty rosters. According to the inclusion criteria, study participants were doctors, nurses, and paramedical staff, regardless of age, who had been working with DHA Narowal for at least one year and were involved in managing dengue patients. HCPs not associated with dengue reporting were excluded.

After taking written informed consent from the subjects, data was collected using a semi-structured questionnaire that was administered by researchers. The questionnaire had been pre-tested on a smaller sample outside the study area to ensure validity. It included sections on socio-demographic profile, knowledge and practices regarding dengue preventive strategies, vector surveillance, reporting systems, case definitions, and HCPs' perceptions of the dengue surveillance system.

Data was analysed using SPSS 22. Statistics. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation.

Results

Of the 400 subjects with mean age 34.68±7.170 years, 271(67.8%) were females, 301(75.2%) had experience >10 years, 79(19.8%) were doctors and 321(80.2%) were nurses, paramedics or LHVs. Besides, 263(65.8%) subjects

Table-1: Socio-demographic characteristics.

	Frequency	Percentage (%)
Age		
20-30 years	95	23.7
31-40 years	262	65.2
> 40 years	43	11.1
Mean +SD	34.68+7.170	
Gender		
Male	129	32.2
Female	271	67.8
Area of residence		
Urban	137	34.2
Rural	263	65.8
Years of service		
Up to 10 years	99	24.8
>10 years	301	75.2
Nature of service		
Doctors	79	19.8
Nurses/Paramedics/LHVs	321	80.2
Family monthly income		
Up to 50,000 rupees	295	73.8
> 50,000 rupees	105	26.2
Mean +SD	43010+80.170	
Major source of information regarding dengue fever		
Media (radio, television, internet)	268	67.0
Training and seminars	132	33.0
Total	400	100.0

LHV: Lady health visitors, SD Standard deviation.

Table-2: The distribution of knowledge regarding dengue fever among healthcare professionals (HCPs).

		Frequency	Percentage (%)
Symptoms of Dengue fever			
	Fever	271	67.8
	Myalgia	95	23.7
	Headache	34	8.5
Site where the dengue mosquitoes breed			
	Clean water	203	50.8
	Dirty water	197	49.2
Identification of the dengue transmitting mosquitoes			
	Yes	381	95.2
	No	19	4.8
Features of the dengue-transmitting mosquitoes			
	Spot on the body	211	52.8
	Don't know	189	47.2
Time of mosquito bite			
	Day time	269	67.2
	Night time	131	32.8
Medicines not to be used for patients suspected of dengue fever			
	Aspirin	133	33.2
	Paracetamol	110	27.5
	Coloured drinks	157	39.3
Cleanliness of the homesteads			
	Yes	400	100.0
	No	0	0.0
	Total	400	100.0

resided in rural areas, and media was the primary source of information about dengue for 268(67%) of the HCPs, while 132(33%) gained knowledge from training and seminars (Table 1).

Overall, 271(67.8%) subjects identified fever as a symptom of dengue, 203(50.8%) said dengue mosquitoes breed in clean water, 381(95.2%) could identify dengue-transmitting mosquitoes, 269(67.2%) said dengue mosquitoes bite during the daytime, and 133(33.2%) correctly stated that aspirin should not be given to dengue patients (Table 2).

Further, 289(72.2%) HCPs considered dengue a serious illness, and 371(92.8%) believed it could be prevented. Patients were treated with allopathic medicines by 212(53%) of the HCPs, followed by home remedies 125(31.2%) (Table 3).

With respect to practices, 258(64.6%) HCPs treated dengue patients only in a clinical setting, while 121(30.2%) treated patients at home, and 21(5.2%) did both. Most HCPs 235(58.7%) prescribed medicine, recommended adequate liquid intake 101(25.3%), and suggested rest 64(16.0%). Preventive practices included using mosquito nets 169(42.2%), mosquito

Table-3: Assessment of attitude towards dengue fever.

		Frequency	Percentage (%)
Treatment methods employed by HCPs to treat the suspected patients of dengue fever			
	Home remedies	125	31.2
	Allopathic	212	53.0
	Homeopathic	63	15.8
Frequency of checking for mosquito breeding sites in home and garden by HCPs			
	Daily	7	1.8
	Weekly	211	52.8
	Monthly	182	45.4
HCPs that regard dengue a serious illness			
	Agree	289	72.2
	Disagree	111	27.8
HCPs that see themselves at risk of getting dengue			
	Agree	306	76.5
	Disagree	94	23.5
HCPs that think that dengue fever can be prevented			
	Agree	371	92.8
	Disagree	29	7.2
HCPs that think that dengue is government responsibility			
	Agree	385	96.2
	Disagree	15	3.8
Utilization of personal preventive measures used against dengue by the HCPs			
	Mosquito spray/mat/net	207	51.8
	Window and door screen	85	21.2
	Cleaning house /cleaning of garbage	108	27.0
	Total	400	100.0

HCPs: Healthcare professionals.

Table-4: The distribution of practices related to dengue fever.

	Frequency	Percentage (%)
Management of dengue fever		
Treated the patients at home	121	30.2
Asked to be brought to a doctor	258	64.6
Both	21	5.2
Safe methods for the treatment of dengue fever		
Medicine	235	58.7
Adequate liquid intake	101	25.3
Rest	64	16.0
Utilization of different methods for prevention of mosquito bites		
Mosquito nets	169	42.2
Mosquito coils/mats/repellent	155	38.8
Other fumigation with insecticides or burning	76	19.0
Methods used to prevent mosquito breeding in home and gardens		
Removal/drainage of stagnant water	271	67.7
Adding the sand to fill up the tyres and containers	110	27.5
Burn garbage	19	4.8
Contribution to control the mosquitoes' breeding areas in neighbourhood		
Participation in community campaign	179	44.8
Inform the health officers	156	39.0
Inform the media	65	16.2
Home gardening		
Yes	130	32.5
No	270	67.5
Frequency of waste disposal activity		
Daily	51	12.8
<7 days	192	48.0
>7 days	157	39.2
Utilization of various waste disposal method		
Garbage pit	71	17.8
Collected by municipality	161	40.2
Open ground	10	2.5
Burning	158	39.5
Frequency of waste collection service of municipality		
Once a week	278	69.5
Once in 2 weeks	85	21.3
Irregular	37	9.2
Total	400	100.0

HCPs: Healthcare professionals.

coils/mats/repellents 155(38.8%), and fumigation or burning 76(19%). Overall, 179(44.8%) HCPs took part in community awareness campaigns (Table 4).

Discussion

Despite significant preventive measures, dengue remains challenging to control. Factors contributing to its global spread include low educational levels, overcrowded living conditions, poor water storage practices, and inadequate sanitation.[15] The lack of training among HCPs in managing and reporting dengue cases has highlighted deficiencies in surveillance systems.[23]

The current study assessed the KAP level related to dengue prevention among HCPs in Narowal. The majority of HCPs (88.9%) were aged <40 years old, with overall mean age being 34.68±7.170 years, and there were 67.8% females. The corresponding data in an earlier study was 93%, 29.89±6.[21] years, and 55%.[23] Further, 75.2% of the current HCPs had work experience >10 years, compared to 70% reported in an earlier study.[24]

Moreover, the current sample had 19.8% doctors, while the majority (80.2%) were nurses, paramedics or LHVs. This was similar to earlier findings of only 7.4% being doctors.[23] In the current study, 67% of the HCPs received information about dengue from media sources. In another study 75.7% relied on media.[25] In the current study, 67.8% of the HCPs identified fever as a symptom, 23.7% mentioned myalgia, and 8.5% mentioned headache. In another study, 64.1% HCPs recognised fever, 57.2% identified headache, and 48.8% noted joint pain.[25]

The majority of the current HCPs knew the features of dengue mosquitoes, with 50.8% knowing they breed in clean water, compared to 41.6% in another study.[19] Most participants, 67.2%, knew that mosquitoes bite during the daytime, compared to 31.6% in another study.[26] It was concerning that 27.5% of the current HCPs said paracetamol should not be used for dengue patients compared to 38.1% reported earlier.[19]

The current study revealed that more than half of the HCPs used allopathic medicines to treat dengue and checked mosquito breeding sites weekly. The majority believed dengue is serious and felt at risk, with 92.8% agreeing it can be prevented and 96.2% believing prevention is the government's responsibility. The data was in line with literature.[19] Personal preventive measures were taken by 51.8% of the current HCPs, which was comparable to the data reported earlier.[27] The majority (58.7%) of the current HCPs prescribed medicine and 25.3% recommended liquid intake compared to 82.5% and 76.3%, respectively, reported earlier.[4]

The current study has limitations as it was conducted at a single centre which may have limited the generalisability of the findings.

Conclusion

There were significant areas for improvement in KAP related to dengue prevention among the HCPs. By aligning the training content with the specific gaps and integrating it into broader public health interventions, the district health system can develop a more robust programme. This would strengthen dengue surveillance and control.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

1. World Health Organization (WHO). Dengue and severe dengue. News release. The WHO Media Centre. [Online] 2022 [Cited 2024 June 06]. Available from URL: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue
2. Khan J, Khan I, Amin I. Dengue outbreak in Peshawar: clinical features and outcome. Asian Pac J Trop Med 2018;11:35-41. doi: 10.4103/1995-7645.223550.
3. World Health Organization (WHO). Disease Outbreak News: Dengue fever – Pakistan. News release. The WHO Media Centre. [Online] 2021 [Cited 2024 June 06]. Available from URL: https://www.who.int/emergencies/disease-outbreak-news/item/dengue-fever-pakistan
4. Tsheten T, Clements ACA, Gray DJ, Wangdi K. Spatial and temporal patterns of dengue incidence in Bhutan: a Bayesian analysis. BMC Infect Dis 2021;21:452. doi: 10.1186/s12879-021-06143-y.
5. Franklinos LH, Jones KE, Redding DW, Abubakar I. The effect of global change on mosquito-borne disease. Lancet Infect Dis 2019;19:e302-12. doi: 10.1016/S1473-3099(19)30161-6.
6. Selvarajoo S, Liew JWK, Tan W, Lim XY, Refai WF, Zaki RA. Knowledge, attitude and practice on dengue prevention and the presence of Aedes mosquitoes in household premises in Seremban, Malaysia. Malays J Public Health Med 2020;20:101-11. doi: 10.37268/mjphm/vol.20/no.1/art.642.
7. Gurevitz JM, Ceballos LA, Kitron U, Gürtler RE. Micro-environmental determinants of Aedes aegypti (Diptera: Culicidae) productivity and the potential implications of dengue virus transmission in Argentina. Acta Trop 2021;213:105737. doi: 10.1016/j.actatropica.2020.105737.
8. Gan P, Ward T, Vincent JR, Murtola T. Estimating the global burden of dengue: spatial and temporal trends, endemicity, and potential futures. Epidemiol Infect 2021;149:e39. doi: 10.1017/S0950268821000307.
9. Waggoner JJ, Gresh L, Mohamed-Hadley A, Ballesteros G, Vargas MJ, Tellez Y, et al. Viral detection and identification in Nicaragua: implications for viral surveillance. PLoS Negl Trop Dis 2016;10:e0005027. doi: 10.1371/journal.pntd.0005027.
10. Fridous S. History of dengue virus and its spread in the world. J Gen Virol 2011;92:1007-12. doi: 10.1099/vir.0.027110-0.
11. Ahmad R, Zafar S, Haider Z, Nazir R, Ahmad N. Dengue fever outbreak: a clinical management experience. J Ayub Med Coll Abbottabad 2017;29:191-4.
12. Shabbir A, Abid A, Farooq R, Zaidi M. Epidemiological and clinical characteristics of dengue fever outbreak in Khyber Pakhtunkhwa, Pakistan. J Infect Dis 2020;221:748-52. doi: 10.1093/infdis/jiz552.
13. Federal Disease Surveillance and Response Unit (FDSRU), Field Epidemiology and Disease Surveillance Division (FEDSD), National Institute of Health (NIH). Weekly field epidemiology report. [Online] 2020 [Cited 2024 June 06]. Available from URL: https://www.nih.org.pk/wp-content/uploads/2020/11/45-FELTP-Pakistan-Weekly-Epidemiological-Report-Nov-1-7-2020.pdf
14. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue. Nature 2013;496:504-7. doi: 10.1038/nature12060.
15. Brady OJ, Gething PW, Bhatt S, Messina JP, Brownstein JS, Hoen AG, et al. Refining the global spatial limits of dengue virus transmission by evidence-based consensus. PLoS Negl Trop Dis 2012;6:e1760. doi: 10.1371/journal.pntd.0001760.
16. Lim XY, Tan KK, Chan KK, Tan Y, Wong KY. Community-based interventions for dengue prevention in urban settings. Lancet Glob Health 2023;11:e69-76. doi: 10.1016/S2214-109X(22)00390-5.
17. Hadinegoro SR, Arredondo-García JL, Capeding MR, Deseda C, Chotpitayasunondh T, Dietze R, et al. Efficacy and long-term safety of a dengue vaccine in regions of endemic disease. N Engl J Med 2015;373:1195-206. doi: 10.1056/NEJMoa1506223.
18. Sridhar S, Luedtke A, Langevin E, Zhu M, Bonaparte M, Machabert T, et al. Effect of dengue serostatus on dengue vaccine safety and efficacy. N Engl J Med 2018;379:327-40. doi: 10.1056/NEJMoa1800820.
19. Khan A, Akram W, Ali M, Rashid F. Use of Wolbachia-infected mosquitoes for dengue control in Pakistan: a preliminary study. Infect Dis Poverty 2023;12:25. doi: 10.1186/s40249-023-01001-2.
20. Ali M, Rashid F, Khan A, Akram W. Impact of community engagement on dengue awareness and prevention behaviors in Pakistan. Public Health 2022;202:115-21. doi: 10.1016/j.puhe.2021.11.001.
21. Government of Pakistan: Narowal District. Administrative structure and demographic profile. In: Pakistan Bureau of Statistics. Census 1998. [Online] 1998 [Cited 2024 June 06]. Available from URL: https://www.pbs.gov.pk/sites/default/files/tables/district_at_glance/Narowal.pdf
22. Elfil M, Negida A. Sampling methods in Clinical Research; an Educational Review. Emerg (Tehran) 2017;5:e52.
23. Yusuf AM, Ibrahim NA. Knowledge, attitude and practice towards dengue fever prevention and associated factors among public health sector health-care professionals: in Dire Dawa, eastern Ethiopia. Risk Manag Healthc Policy 2019;12:91-104.
24. Ekra KD, Cherif D, Kouassi DP, Konan YL, Coulibaly D, Traore Y, et al. Determinants of practices for dengue diagnosis among HCPs working in public hospitals of Abidjan, Cote d'Ivoire. J Public Health Epidemiol 2017;9:212-8.
25. Zida-Compaore WIC, Gbeasor-Komlanvi FA, Tchankoni MK, Sadio AJ, Konu YR, Agbonon A, et al. Knowledge and practices among healthcare workers regarding dengue in Togo. J Public Health Afr 2022;13:1937.
26. Giang HTN, Sayed AM, Dang T, Iqtadar S, Tuan NM, Khiem NT, et al. Survey of knowledge, attitude and practice of HCPs on dengue transmission, diagnosis and clinical classification. BMC Infect Dis 2021;21:1130. doi:10.1186/s12879-021-06816-y.
27. Oche OM, Yahaya M, Oladigbolu RA, Ango JT, Okafoagu CN, Ezenwoko Z, et al. A cross-sectional survey of knowledge, attitude, and practices toward dengue fever among health workers in a tertiary health institution in Sokoto state, Nigeria. J Family Med Prim Care 2021;10:3575-83

AUTHOR'S CONTRIBUTION:

SA: Concept, design, data analysis, interpretation, drafting and revision.
SS: Concept, design, data analysis, interpretation and supervision.
SMK: Concept, design, data analysis, interpretation, drafting, revision, final approval and agreement to be accountable for all aspects of the work.