

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_914_22

# Preparedness toward participation in disaster management: An online survey among dental practitioners in a disaster-prone region of Eastern India

Sri Priya Narayanan, Hemamalini Rath, Shilpa Mahapatra, Manoranjan Mahakur<sup>1</sup>

## Abstract:

**BACKGROUND:** Dentists are often overlooked resources in the workforce for disaster management (DM). To determine the knowledge, attitudes, willingness, and self-perceived effectiveness to participate in DM among general dental practitioners (GDPs) of Eastern India.

**MATERIALS AND METHODS:** A web-based online survey was conducted among 256 Dental Council of India registered GDPs of Cuttack district, Odisha. The 45-item survey comprised closed-ended questions on the demographic data of the participants, years of practice, previous experience in DM, and willingness to participate. Other domains assessed were the participants' objective knowledge of DM, attitude, and self-perceived effectiveness toward participation during disasters. Data were analyzed descriptively, and the Chi-square and Mann-Whitney U tests were used for statistical analysis, with a significance threshold of  $P < 0.05$ .

**RESULT:** A total of 154 responses were analyzed, giving a response rate of 60.16%. The average age was  $\leq 35$  years, 59.1% were BDS dentists and 78.6% had less than 10 years of practice. Only 18% of them had previous experience with DM, and merely 3.2% were formerly trained; however, 95.5% of the dentists were willing to participate in DM. The mean DM knowledge and attitude scores were 16.12 (CI = 15.4–16.8) and 5.79 (5.45–6.13), respectively. Knowledge and attitude showed a significant correlation. About 56% indicated that they would be able to respond effectively to a disastrous event. Significant associations were observed between age group ( $P = 0.008$ ), years of clinical practice ( $P = 0.001$ ), qualification ( $P = 0.012$ ), previous participation ( $P = 0.029$ ), and self-perceived effectiveness.

**CONCLUSION:** The knowledge regarding DM among respondents was at an average level. However, the majority of them were found to have a positive attitude toward participation in DM. Thus, including DM in dental curricula and drills for dental professionals might prove beneficial as almost all GDPs were showing greater self-perceived effectiveness and willingness to participate in disasters.

## Keywords:

Bioterrorism, capacity building, dentists, disasters, web-based survey, workforce development

## Introduction

Disaster is a significant public health concern as it influences the socio-economic, political, and cultural state of the affected area. Moreover, the emergency systems as well as the essential needs and processes such as food, education,

shelter, and health status are also affected depending on the intensity and severity of the calamity.<sup>[1]</sup> India has also been the focal point for various manmade and natural disasters with a total of 80% of the area being prone to disasters.<sup>[2,3]</sup> When it comes to climate-induced natural disasters, the Eastern state of Odisha is witness to frequent

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Narayanan SP, Rath H, Mahapatra S, Mahakur M. Preparedness toward participation in disaster management: An online survey among dental practitioners in a disaster-prone region of Eastern India. *J Edu Health Promot* 2023;12:68.

Department of Public Health Dentistry, S.C.B Dental College and Hospital, Cuttack, Odisha, India, <sup>1</sup>Department of Pedodontics and Preventive Dentistry, S.C.B Dental College and Hospital, Cuttack, Odisha, India

## Address for correspondence:

Dr. Sri Priya Narayanan, Department of Public Health Dentistry, S.C.B Dental College and Hospital, Cuttack – 753 007, Odisha, India.  
E-mail: dr.nsrpriya@gmail.com

Received: 28-06-2022  
Accepted: 27-09-2022  
Published: 28-02-2023

floods and cyclones because of its geographic location and climatic conditions. There have been 146 calamities in the past 112 years with 2–3 cyclones a year since the beginning of the 19<sup>th</sup> century.<sup>[4]</sup>

Conventionally, medical professionals have always been involved as the first responders in DM. Shortage of personnel is a major stumbling block during disasters, and hence, there is a need for potential sources other than conventional medical personnel who can contribute effectively to DM.<sup>[5-7]</sup> The impact of these disasters can be managed effectively by promoting capacity-building measures and involving dentists as well.<sup>[8-11]</sup> Dental professionals possess various skills that can contribute to efficient DM such as infection control, taking and using information from medical histories for the treatment plan, patient education, taking and interpreting radiographs, administering injections, suturing wounds, managing infections, prescribing medications, and making a diagnosis based on clinical signs and symptoms and in forensic odontology.<sup>[12-17]</sup> In addition, a general dentist is trained for basic life support (BLS), which can be helpful in the time of disaster in-patient management and victim triage.<sup>[18,19]</sup>

In India, there are currently 291,467 registered dentists. Furthermore, a total of 26,949 Bachelor of Dental Surgery (BDS) graduates and 6696 Master of Dental Surgery (MDS) post-graduates are added every year.<sup>[20]</sup> This represents a large standby of a valuable workforce who can be part of the DM manpower. Few surveys conducted among Indian general dental practitioners (GDPs) belonging to the states Rajasthan,<sup>[21]</sup> Uttar Pradesh,<sup>[22]</sup> and Karnataka<sup>[23]</sup> have reported that; although the participants revealed high willingness and attitude to participate in DM, the knowledge scores were low. However, to the best of our knowledge, no such studies in the literature have explored various aspects of DM among the GDPs of Odisha. Therefore, the present survey aimed to determine the knowledge, attitudes, self-perceived effectiveness, and willingness to participate in DM among GDPs of Cuttack district, Odisha, India.

## Materials and Methods

### Study design and setting

The present online cross-sectional survey was conducted among the GDPs of Cuttack district, Odisha, India, between February and March 2022.

### Study participants and sampling

Sample size calculation was carried out based on the proportion of GDPs willing to participate in DM. According to the previous literature, an estimated 96% of dentists were willing to assist in the case of a disaster in

Karnataka, India.<sup>[23]</sup> Assuming a 95% confidence interval, 5% level of significance, and 5% margin of error, the sample size was calculated as 72. A list of email ids of the 256 licensed GDPs of Cuttack, Odisha, was obtained from the registrar at the Dental Council of India, Odisha branch. Universal sampling was adopted, and all the DCI registered dentists were included in the study, who were primarily practicing in the city of Cuttack.

### Data collection tool and technique

A 45-item closed-ended questionnaire was designed by three investigators and was discussed for two rounds among the primary investigators and three rounds of review by external experts. The final questionnaire was developed to assess six categories regarding participants' socio-demographic characteristics, previous training and participation in DM, objective knowledge of disasters and DM, attitude, self-perceived effectiveness, and willingness to assist in an event of a disaster. The questionnaire was pre-tested and subjected to cross-cultural validation in a pilot study conducted among 24 dentists affiliated with a dental institute at Cuttack, Odisha. An acceptable internal consistency (Cronbach's alpha of 0.79 and 0.96 for knowledge and attitude, respectively) was attained. The data from the pilot study were not included in the final analysis.

The demographic details included four items: age ( $\leq 35$  years old/ $\geq 36$  years), gender (male/female), qualification (BDS/MDS), and years of clinical practice ( $\leq 10$  year,  $\geq 11$  years). For the questions on the previous training and participation in DM, familiarity with the standard operating procedures (SOPs),<sup>[24]</sup> the self-perceived effectiveness ("Do you think you can respond effectively to a disastrous event?"), and the willingness to participate in DM, responses recorded were either "yes" or "no".

Knowledge construct constituted 29 items, comprising questions on disasters in the local region, bio-terrorism and toxins, DM authorities at the state and national levels, triaging, tagging, and post-disaster problems encountered. A total of 26 questions were acquired from the Rajasthan study questionnaire,<sup>[21]</sup> and three questions were adopted from the Government of Odisha website for the state DM portal.<sup>[25]</sup> Questions were selected to represent basic knowledge of disasters, clinical manifestations of bio-terrorism-related agents, and management and control measures for post-disaster implications. Each correct answer was scored as 1, and the incorrect answer was scored as 0. The higher the knowledge score, the better the DM knowledge.

The attitude construct pertained to seven items constituting questions on whether dentists should

update their knowledge, involvement of GDPs in DM activities, coordination with other professionals, assistance in victim identification, the inclusion of DM in the curriculum of under-graduates, and conducting dental education programs for dentists. Questions were scored on a five-point Likert scale as “Strongly agree” (5), “Agree” (4), “Neutral” (3), “Disagree” (2), and “Strongly disagree” (1). The higher the score, the better the DM attitude.

The questionnaire was administered through Google Forms, a web-based survey company. An approach that followed Dillman’s tailored design method was employed.<sup>[26]</sup> Before the commencement date, participants received an emailed pre-letter informing them about an upcoming questionnaire in 3 days. The questionnaire link was included as plain text in the body of the second e-mail with a unique and personalized ID. Responders answered the questionnaire through internet surroundings. Four reminders have been recommended as an appropriate number for improving the response rate in any kind of survey.<sup>[26]</sup> Thus, non-respondents were sent reminders to complete the questionnaire once every 3 days four times. Owing to the very low response rate initially in the first 2 days, this duration for sending the reminders was chosen. Subsequently, the remaining non-respondents who could be personally contacted by telephone mentioned e-mail ids and spam e-mails incorrectly used or not used. Two final reminders were sent at 1-week intervals to their functional e-mail ids.

### Ethical consideration

Permission to carry out the study was obtained from Srirama Chandra Bhanja Dental College and Hospital (Cuttack, Odisha, India). Ethical clearance was obtained from the Institutional review board (IEC/SCBDCH/126/2021). The voluntary nature of participation, the participant’s anonymity declaration, and details of informed consent were presented at the beginning of the survey.

### Statistical analysis

The responses were entered in MS Excel Spreadsheet Version 12.0 (Microsoft Corporation; Redmond, Washington USA), and SPSS version 25.0 (IBM Corporation; Armonk, USA) was used for statistical analysis. Descriptive statistics for the demographic variables, Mann–Whitney U test for the differences between study variables, and Chi-square tests to find the associations between the variables were applied.  $P < 0.05$  was considered significant for all statistical inferences.

## Results

The present cross-sectional survey was conducted to assess the knowledge, attitude, self-perceived

effectiveness, and willingness to participate in DM among general dental practitioners of Cuttack district, Odisha. A total of 154 out of 256 registered GDPs participated in the survey, representing a response rate of 60.16%.

A total of 48.05% of respondents were male. More than two-thirds of the participants were  $\leq 35$  years (70.8%). Overall, participants who completed their graduation made up 59.1% of the total. A common fraction of the dental practitioners (78.6%) had established their private practice  $\leq 10$  years ago. Almost all of the participants (95.45%) were willing to participate in the management of disasters. Only 3.2% of respondents reported having received earlier training on managing disasters. Merely 21.43% were familiar with the Government of India’s SOP for responding to natural disasters, 2010. Participants who had previously assisted in disasters were 18.2% [Table 1].

Dentists had a mean knowledge score of 16.12 (CI = 15.4–16.8) and a median score of 17 (IQR = 13–19) out of a total score of 29 [Figure 1a].

**Table 1: Respondents’ demographic characteristics and responses to disaster management preparedness**

Variable	n (%)
Gender	
Male	74 (48.1)
Female	80 (51.9)
Age group (in years)	
$\leq 35$	109 (70.8)
$\geq 36$	55 (29.2)
Qualification	
BDS	91 (59.1)
MDS	63 (40.9)
Years of clinical practice	
$\leq 10$ years	121 (78.6)
$\geq 11$ years	33 (21.4)
Previous participation in disaster management?	
Yes	28 (18.2)
No	126 (81.8)
Previous training in disaster management?	
Yes	5 (3.2)
No	149 (96.8)
Familiarity with SOP for responding to natural disasters, 2010?	
Yes	33 (21.4)
No	121 (78.6)
Willingness to participate in disaster management?	
Yes	147 (95.5)
No	7 (4.5)
Do you think you can respond effectively to a disastrous event?	
Yes	87 (56.5)
No	67 (43.5)

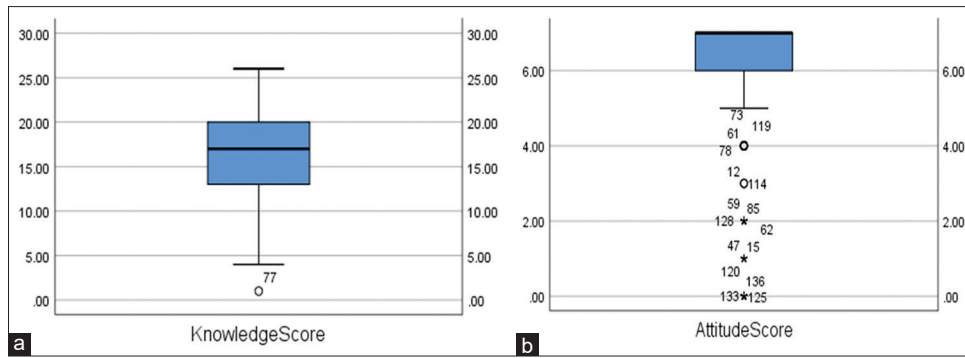


Figure 1: (a) Box plot for the knowledge scores of respondents; (b) box plot for the attitude scores of respondents with the outliers

More than 90% of respondents correctly answered questions about disasters in general such as definitions, types, and scales for measuring disasters and regional disasters. About 70% correctly answered questions on bioterrorism, such as the pathogens and the deadliest forms involved, whereas only about half of them responded appropriately to vehicles carrying toxins. Only around 20–30% answered correctly for DM authority-related questions such as state and national authorities, investigators in DM, religious and cultural considerations, finances for the calamity relief fund, community volunteers in Odisha, and Odisha Disaster Rapid Action Force. Approximately about 50% correctly answered questions on response, preparedness, and mitigation, such as triage, tagging, and also post-disaster problems among the health staff involved, disinfection procedures, and so on. [Supplementary File 1]. However, no significant association could be detected between various participant characteristics and total knowledge scores [Table 2].

In general, the participants had a positive attitude toward DM. The mean attitude score of the study participants was 5.79 (5.45–6.13) and the median was 7.0 (IQR = 6–7) out of a total attitude score of 7 [Figure 1b]. It was also observed that an average of 83% of the participants strongly agreed upon improving the core competencies of dentists, collaboration with other healthcare professionals, and provision of standard training at dental institutions for DM in the country [Supplementary File 1]. There were no significant associations between the reported attitude score and other independent variables similar to the knowledge score [Table 2].

A total of 56.49% indicated that they would be able to respond effectively to a disastrous event. A statistically significant association was observed between self-perceived effectiveness and study participants of the younger age group ( $\chi^2 = 7.04$ ;  $P = 0.008$ ), respondents with more than 10 years of clinical experience ( $\chi^2 = 11.72$ ;  $P = 0.001$ ), MDS participants ( $\chi^2 = 6.30$ ;  $P = 0.012$ ), and those without previous participation in DM ( $\chi^2 = 4.77$ ;  $P = 0.029$ ) [Table 3].

Table 2: Association of respondents’ test score for knowledge and attitude with other independent variables

Factors	Knowledge P	Attitude P
Gender		
Male	0.78	0.28
Female		
Age group		
≤35	0.06	0.58
≥36		
Years of Clinical practice		
≤10 years	0.31	0.57
≥11 years		
Qualification		
BDS	0.34	0.46
MDS		
Previous participation?		
Yes	0.81	0.74
No		
Previous training?		
Yes	0.36	0.47
No		
Familiarity with SOP?		
Yes	0.60	0.08
No		

Mann-Whitney  $P < 0.05$ , Statistically significant

A statistically significant correlation ( $r = 0.36$ ;  $P < 0.01$ ) was observed between knowledge and attitude toward DM among the study subjects.

## Discussion

The state of Odisha has been described as the disaster capital of India because of frequent witness to natural disasters, primarily climate-induced natural disasters (CINDs). A dearth of trained manpower resources and medical resources has been highlighted in the case of any surge event. Hence, the need for potential resources, other than “conventional medical personnel,” such as GDPs, is to be explored.<sup>[27-29]</sup> The American Dental Association has suggested that utilizing dental professionals with their strong scientific and technical skills should assist in DM. The dentists after

**Table 3: Association of respondents' perceived effectiveness scores by selected variables using Chi-square test**

Factors	Self-perceived effectiveness		Chi-square	P
	Yes n (%)	No n (%)		
Gender				
Male	44 (59.5)	30 (40.5)	0.51	0.48
Female	43 (53.8)	37 (46.3)		
Age group				
≤35	69 (63.3)	40 (36.7)	7.04	0.008*
≥36	18 (40)	27 (60)		
Years of Practice				
≤ 10 years	77 (63.6)	44 (36.4)	11.72	0.001*
≥ 11 years	10 (30.3)	23 (69.7)		
Qualification				
BDS	59 (64.8)	32 (3.2)	6.30	0.012*
MDS	28 (44.4)	35 (55.6)		
Previous participation?				
Yes	21 (75)	7 (25)	4.77	0.029*
No	66 (52.4)	60 (47.6)		
Previous training?				
Yes	4 (80)	1 (20)	1.16	0.28
No	83 (55.7)	66 (44.3)		
Familiarity with SOP?				
Yes	21 (63.6)	12 (36.4)	0.87	0.35
No	66 (54.5)	55 (45.5)		

*P*<0.05, Statistically significant

undergoing training under the National Disaster Life Support curriculum need minimal additional training.<sup>[5]</sup>

The average objective knowledge score of the participants was around 55% of the total score, which was consistent with the finding of a few Indian studies<sup>[21-23]</sup> and one Nigerian study.<sup>[30]</sup> This might be attributed to the fact that hardly any dentists (only about 3%) had undergone proper training regarding DM. Therefore, also, the role of GDPs in DM is not well defined unlike in developed countries such as the USA, where dentists undergo regular training.<sup>[5]</sup> The consequence of a lack of formal training is well reflected in the study, resulting in only 21% of GDPs being aware of SOPs in tandem with findings of other Indian studies.<sup>[21,23]</sup> Previous participation in DM, which could have enhanced the familiarity among the respondents even in the absence of formal training, was also found to be less (18%) in the present study, similar to the findings among GDPs of Rajasthan.<sup>[21]</sup> No independent variable was predictive of the total knowledge score, similar to the finding of the Rajasthan study.<sup>[21]</sup> Nevertheless, this was contrary to the findings of Uttar Pradesh<sup>[22]</sup> and Nigerian<sup>[30]</sup> studies wherein post-graduates, dentists with more years of clinical experience, and males had significantly greater knowledge scores, respectively. This could be attributed to the sampling variation of the respondents' socio-demographic characteristics among the studies.

A high attitude score was reported among the participants in the present study, which was similar to all other studies among dentists in India and Nigeria.<sup>[21,22,23,30]</sup> This positive attitude can be attributed to the recognition of social responsibilities among the GDPs which can be utilized for capacity building by increasing the number of trained manpower available at the time of emergency. In corroboration of this outcome, the majority of the participants (95.5%) were willing to participate during the testing times of disasters. This was comparable to the results reported among the GDPs of Karnataka,<sup>[23]</sup> Nigeria,<sup>[30]</sup> and Rajasthan.<sup>[21]</sup> There was no significant association in attitude scores between groups based on the independent variables. In contrast, a significant correlation was observed between religion and attitude among Karnataka<sup>[23]</sup> GDPs. Further, in the Nigerian study,<sup>[30]</sup> participants older than 35 years and males had significantly better attitudes than their counterparts. The GDPs of Rajasthan study<sup>[21]</sup> reported higher attitude scores among dental practitioners having less than 10 years of experience had higher attitude scores toward DM. The Uttar Pradesh study<sup>[22]</sup> reported higher attitude scores among GDPs with MDS qualifications and greater years of practice. This difference reported in the studies was probably because of sampling variation.

High self-perceived effectiveness among the participants was in discordance with the results of Rajasthan<sup>[21]</sup> and Karnataka.<sup>[23]</sup> Respondents without previous participation, those among the younger age group, MDS-qualified respondents, and those with greater than 10 years of experience showed greater self-perceived effectiveness. This was mostly in concurrence with the Rajasthan study,<sup>[21]</sup> except for dentists with previous training who reported greater perceived effectiveness. However, in the Karnataka study,<sup>[23]</sup> years of experience and familiarity with SOP were significant predictors of perceived effectiveness. This varying result in the current study despite average knowledge score, lack of previous training, or previous participation could be attributed to the fact that the GDPs of Odisha, having witnessed several disasters, have greater self-confidence, positive attitude, and high willingness in managing disasters. However, it could also be because of social desirability bias. Post-graduate training might have reinforced various aspects of DM among the respondents. In addition to this, the impact of exposure to greater learning resources, in terms of libraries, conferences, seminars, and other CDE programs, might also have contributed to the significant results among MDS-qualified and young dentists. Moreover, exposure to varied clinical scenarios among respondents with greater years of experience might have been conducive to higher perceived effectiveness and self-confidence in the present study.

A positive significant correlation was observed between knowledge and attitude among dentists. Similar findings were stated among dentists of Karnataka,<sup>[23]</sup> Rajasthan,<sup>[21]</sup> and Nigeria.<sup>[30]</sup> This indicates that increasing exposure and training will offer immense benefits and prompt the GDPs into support in disasters because of their improved understanding of DM.

Capacity building is a pressing priority, especially in developing countries such as India, where frequent disasters are a major public health concern. An initiative was put forward in this direction, and a “New Delhi Declaration-Call for Commitment” Joint Statement by the Indian Association of Public Health Dentistry and the National Institute of DM was released on December 3, 2020, and subsequently published to facilitate the effective integration of dental professionals in DM.<sup>[31]</sup> To contribute, dentists need to have the right competencies and knowledge of the SOP. A pilot study conducted among Indian dental graduates<sup>[32,33]</sup> and post-graduates<sup>[34]</sup> indicated that these students might be receptive to undergoing training programs on DM and stressed the need for change in the courses. Further integrating training and education into the under-graduate and post-graduate curriculum would improve the knowledge and better prepare dental professionals for disaster mitigation and response.

In a Chinese descriptive study to assess dentistry’s role in treating earthquake-related facial injuries, it was found that dentists were a reliable force in the medical response to earthquakes and other disasters. The authors concluded that establishing oral and maxillofacial surgeon (OMS)/dentist reserves using OMSs and general dentists’ offices as bases can help improve disaster response in both developing and developed countries.<sup>[35]</sup> This finding further substantiates the benefits of integrating dentists in DM.

A key strength of this study was the use of objective knowledge-based questions to assess knowledge, as opposed to sole dependence on self-assessment items.

### Limitations and recommendation

The cross-sectional study design of the present survey has its limitations. Findings from a limited sample carried out with convenience sampling might not be representative of all dental professionals, restraining the generalizability to other regions. From an ethical perspective, sending multiple reminders in a short time could be viewed as coercion. However, the participants could withdraw from the survey voluntarily at any time. Telephonic follow-up of the non-respondents after the initial four reminders helped to identify functional e-mail ids of a few dentists (n = 9), and all of them responded

with the final two reminders. Therefore, multiple reminders may be avoided if researchers consider a mixed-mode survey for data collection. The moderate response rate in the present study could have affected the overall quality of the data. However, the respondents and non-respondents were similar in gender and area of residence. Further, including the Likert scale may involve the possibility of social desirability or positive bias and/or deviation or negative bias.

At the outset, emphasis is needed on developing practical skills to help dentists become more effective responders to disasters. This can include hands-on training sessions along with basic and life support courses, practical demonstrations, and mock disaster drills.

Second, the SOPs for involving dental health professionals in disaster response have to be acknowledged.

Furthermore, curriculum changes at the under-graduate level and periodic up-gradation of post-graduates and GDPs about DM should be considered.

Developing uniform training on DM might be difficult because of regional and cultural variations in the different regions of disaster occurrence countrywide. There might also be legal implications in permitting dental professionals to carry out certain procedures during DM. Hence, the credentialing systems and licensure for dentists interested in supporting the DM task force must be improvised.

Last, the institutional preparedness of the dental institutions in the country should be technically strengthened, such as improved core competencies of the students, faculty, and well-equipped mobile dental care units, to aid and respond effectively to disasters.

Therefore, the present study highlights the need for similar implications for the necessary development and amalgamation of GDPs to maximize the DM workforce which should be considered by the apex bodies and decision-makers in rendering DM more effective at international, national, state, and regional levels.

### Conclusion

The current study revealed a high level of willingness to render assistance in a disaster and a high DM attitude but average DM knowledge. Post-graduate dental practitioners (MDS), subjects having clinical experience greater than 10 years, and those without previous participation in DM had greater perceived effectiveness. The objective knowledge and attitude of the respondents revealed a statistically significant correlation. Further studies with a larger sample size covering wider

geographic regions are necessary to shed more light on DM among dental practitioners.

### Acknowledgements

We thank Dr. Denzy Lawrence (Assistant Professor, Department of Public Health Dentistry, Bapuji Dental College & Hospital) for providing the questionnaire materials.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### References

- Randolph R, Chacko S, Morsch G. Disaster medicine: Public health threats associated with disasters. *FP Essent* 2019;487:11-6.
- Government of India. Disaster management in India-A status report. Ministry of Home Affairs, National Disaster Management Division, New Delhi, 2004.
- Rajesh G, Binnal A, Pai MBH, Vijayendranath Nayak S, Shenoy R, Rao A. Insights into disaster management scenario among various health-care students in India: A multi-institutional, multi-professional study. *Indian J Community Med* 2020;45:220-4.
- Marrone P, Chambers, RT. Economics of natural disasters in Odisha. *Etica e Polit* 2013;15:583-605.
- Colvard MD, Lampiris LM, Cordell GA, James J, Guay A, Lee M, *et al.* The dental emergency responder: Expanding the scope of dental practice. *J Am Dent Assoc* 2006;137:468-73.
- Rekow ED. The dental team: A ready reserve or an overlooked resource? *J Am Dent Assoc* 2006;137:432-4.
- Katz AR, Nekorchuk DM, Holck PS, Hendrickson LA, Imrie AA, Effler PV. Dentists' preparedness for responding to bioterrorism: A survey of Hawaii dentists. *J Am Dent Assoc* 2006;137:461-7.
- Psoter WJ, Park PJ, Boylan RJ, Morse DE, Glotzer DL. National emergency response programs for dental health care professionals. *J Am Dent Assoc* 2008;139:1067-73.
- Naiman M, Karl Larsen A, Valentin PR. The role of the dentist at crime scenes. *Dent Clin North Am* 2007;51:837-56.
- Hagen JC, Parota B, Tsagalis M. TOPOFF 2 and the inclusion of dental professionals into federal exercise design and execution. *Dent Clin North Am* 2007;51:827-35.
- Mosca NG. Engaging the dental workforce in disaster mitigation to improve recovery and response. *Dent Clin North Am* 2007;51:871-8.
- Pittayapat P, Jacobs R, De Valck E, Vandermeulen D, Willems G. Forensic odontology in the disaster victim identification process. *J Forensic Odontostomatol* 2012;30:1-12.
- Guay AH. Dentistry's response to bioterrorism: A report of a consensus workshop. *J Am Dent Assoc* 2002;133:1181-7.
- Dutta SR, Singh P, Passi D, Varghese D, Sharma S. The role of dentistry in disaster management and victim identification: An overview of challenges in Indo-Nepal Scenario. *J Maxillofac Oral Surg* 2016;15:442-8.
- Almutairi AF, Alkhaltheri BA, Aleidan HN, Alhabib AA, Alotaibi EA, Salam M. Examining the perceived versus the actual knowledge about forensic odontology: A cross-sectional survey among dentists. *Clin Exp Dent Res* 2018;4:297-304.
- Forrest A. Forensic odontology in DVI: Current practice and recent advances. *Forensic Sci Res* 2019;4:316-30.
- Hinchliffe J. Forensic odontology, part 2. Major disasters. *Br Dent J* 2011;210:269-74.
- Gambhir R, Kapoor D, Singh G, Singh G, Setia S. Disaster management: Role of dental professionals. *Int J Med Sci Public Heal* 2013;2:424.
- Guay AH. The role dentists can play in mass casualty and disaster events. *Dent Clin North Am* 2007;51:767-78.
- Dental Council of India, Government of India. New Delhi: Dental Council of India; 2021. Available from: <http://www.dciindia.org>. [Last accessed on 2021 Dec 12].
- Chhabra KG, Rajesh G, Chhabra C, Binnal A, Sharma A, Pachori Y. Disaster management and general dental practitioners in India: An overlooked resource. *Prehosp Disaster Med* 2015;30:569-73.
- Pandita V, Basavaraj P, Singla A, Gupta R, Kaur R, Vashishtha V, *et al.* Recasting disaster recovery strategy at dental workplace in combating crisis-A questionnaire study. *J Clin Diagn Res* 2016;10:zc39-zv44.
- Rajesh G, Binnal A, Pai MBH, Nayak V, Shenoy R, Rao A. General dental practitioners as potential responders to disaster scenario in a highly disaster-prone area: An explorative study. *J Contemp Dent Pract* 2017;18:1144-52.
- Government of India. Standard Operating Procedure For Responding To Natural Disasters. Ministry Of Home Affairs Disaster Management Division, New Delhi, 2010.
- Odisha. Odisha State Disaster Management Authority. OSDMA; 2021. Available from: [https://www.osdma.org/about-us/osdma\\_overview/#gsc.tab=0](https://www.osdma.org/about-us/osdma_overview/#gsc.tab=0). [Last accessed on 2021 May 06].
- Dillman DA, Smyth JD, Christian LM. Internet, Mail, and Mixed-Mode Surveys. The Tailored Design Method. 3<sup>rd</sup> ed. Hoboken, New Jersey: Wiley; 2009.
- Rico A, Sanders CA, Broughton AS, Andrews M, Bader FA, Maples DL. CDC's Emergency management program activities — Worldwide, 2013-2018. *MMWR Morb Mortal Wkly Rep* 2021;70:36-9.
- O'Neill PA. The ABC's of disaster response. *Scand J Surg* 2005;94:259-66.
- Glotzer DL, Rinchiuso A, Rewok ED, Triola MM, Psoter WJ. The medical reserve corps. An opportunity for dentists to serve. *NY State Dent J* 2006;72:60-1.
- Odai ED, Azodo CC, Chhabra KG. Disaster management: Knowledge, attitude, behavior, willingness, and preparedness among Nigerian dentists. *Prehosp Disaster Med* 2019;34:132-6.
- Mohanty VR, Rao RG, Gupta AK, Reddy VK, Rijhwani K, Amin F. Integration of dental health professionals in disaster management-commitment to action-New Delhi declaration-2020. *Prehosp Disaster Med* 2022;37:290-1.
- Chhabra KG, Rajesh GR, Shetty PJ, Prasad KVV, Chhabra C, Muddapur M. Disaster management among dental graduates in a private dental institution in India: A pilot study. *Disaster Med Public Health Prep* 2014;8:37-43.
- Rajesh G, Pai MBH, Shenoy R, Priya H. Willingness to participate in disaster management among Indian dental graduates. *Prehosp Disaster Med* 2012;27:439-44.
- Rajesh G, Chhabra KG, Shetty PJ, Prasad K V., Javali SB. A survey on disaster management among postgraduate students in a private dental institution in India. *Am J Disaster Med* 2011;6:309-18.
- Wang L, Wei JH, He LS, Cao M, Cao J, Liu YP, *et al.* Dentists' role in treating facial injuries sustained in the 2008 earthquake in China how dental professionals can contribute to emergency response. *J Am Dent Assoc* 2009;140:543-9.

## Supplementary File 1: Responses to questions on disaster management preparedness survey

Question*	Percentage of correct answers†
<b>Section A - Objective knowledge-based questions</b>	
Events with a low frequency of occurrence and high impact are known as?	
<u>Disasters</u>	144 (93.5)
Routine events	3 (1.9)
Essential events	1 (0.6)
Sustained development	1 (0.6)
I do not know	5 (3.2)
Which of the following is a natural disaster?	
Bombing	2 (1.3)
Bio-terrorism	0
Aircraft hijacking	0
<u>Earthquakes and floods</u>	149 (96.8)
I do not know	3 (1.9)
Which of the following is a man-made disaster?	
Earthquakes	4 (2.6)
<u>Bombing</u>	145 (94.2)
Drought	1 (0.6)
Cyclones	2 (1.3)
I do not know	2 (1.3)
Which of the following is a technological disaster?	
Earthquakes	2 (1.3)
<u>Chemical release into the environment</u>	147 (95.5)
Drought	1 (0.6)
Cyclones	0
I do not know	4 (2.6)
Disasters caused by social, economic, and political problems involving armed confrontation are known as?	
Natural disasters	3 (1.9)
Technological disasters	19 (12.3)
Avoidable disasters	0
<u>Conflict-related disasters</u>	111 (72.1)
I do not know	14 (9.1)
Richter scale is used to quantify	
<u>Earthquakes</u>	139 (90.3)
Chemical release into the environment	1 (0.7)
Drought	2 (1.3)
Cyclones	1 (0.7)
I do not know	10 (6.5)
Dangerous goods classes are used to quantify	
Earthquakes	0
Chemical release into the environment	27 (17.5)
<u>Explosives</u>	100 (65)
Cyclones	1 (0.6)
I do not know	26 (16.9)
Coastal areas are more prone to?	
Volcanos	7 (4.5)
Landslides	57 (37)
Drought	22 (14.3)
<u>Cyclones</u>	42 (27.3)
I do not know	26 (16.9)
Which of the following pathogens can be used in bioterrorism?	
Scabies	2 (1.3)
Measles	10 (6.5)
<u>Anthrax</u>	122 (79.2)
Malaria	5 (3.2)
I do not know	15 (9.7)

Contd...



## Supplementary File 1: Contd...

Question*	Percentage of correct answers <sup>†</sup>
<b>Section A - Objective knowledge-based questions</b>	
The first police personnel to arrive at a disaster scene must be involved in	
Search operation for survivors	20 (13)
Rescue operations of victims	41 (26.6)
<u>Communication of accurate information to facilitate proper response measures</u>	77 (50)
Ensuring maintenance of law and order	5 (3.2)
I do not know	11 (7.1)
Which of the following methods of identifying victims of disaster is considered unreliable and unscientific?	
<u>Visual recognition</u>	106 (68.8)
Fingerprints	5 (3.2)
Dental evidence	14 (9.1)
DNA analysis	9 (5.8)
I do not know	20 (13)
Which of the following is NOT a reason to ensure total site security in a disaster zone?	
Allow the rescue operations to proceed without interruption	15 (9.7)
Protect evidence	8 (5.2)
Protect the public from danger	13 (8.4)
<u>Protection of high-level government officials visiting the site</u>	80 (51.9)
I do not know	38 (24.7)
Which districts of Odisha are involved in the training of community-level volunteers in disaster response - Aapada Mitra?	
<u>Puri and Jagatsinghpur</u>	42 (27.3)
Bhadrak and Jajpur	5 (3.2)
Baleswar and Kendrapara	16 (10.4)
Cuttack and Khurda	23 (14.9)
I do not know	68
Triage	
Yellow indicates ambulatory patients.	6 (3.9)
Green is for dead or moribund patients.	1 (0.6)
Red indicates medium-priority treatment.	56 (36.4)
<u>Black is for dead or moribund patients</u>	55 (35.7)
I do not know	36 (23.4)
Identifying individuals with tags stating their names, ages, place of origin, diagnosis, and initial treatment is known as	95 (61.7)
Triage	19 (12.4)
<u>Tagging</u>	6 (3.8)
Cataloging	6 (3.9)
Nomenclature	28 (18.2)
I do not know	
The heroism phase of disasters includes	
Fear among victims	2 (1.3)
<u>Rescuing victims</u>	111 (72.1)
Shared good outcome	9 (5.8)
Death of victims	3 (1.9)
I do not know	29 (18.8)
The honeymoon phase of disasters includes	
Fear among victims	3 (1.9)
Rescuing victims	12 (7.8)
<u>Shared good outcome</u>	99 (64.3)
Death of victims	4 (2.6)
I do not know	36 (23.4)

Contd...

## Supplementary File 1: Contd...

Question*	Percentage of correct answers*
<b>Section A - Objective knowledge-based questions</b>	
Under the Indian Federal System, disaster management is the responsibility of	
Municipal corporation	9 (5.8)
Panchayati Raj	6 (3.9)
District Headquarters	18 (11.7)
<u>State government</u>	97 (63)
I do not know	24 (15.6)
Health staff involved in disaster management are at risk for	
Poliomyelitis	1 (0.6)
Arteriosclerosis	9 (5.8)
Scabies	28 (18.2)
<u>Asphyxiation by smoke</u>	83 (84.8)
I do not know	33 (21.4)
Finances for calamity relief in India are provided chiefly by	
<u>Calamity relief fund</u>	34 (22.1)
Public welfare fund	8 (5.2)
Disaster mitigation fund	72 (46.8)
State contingency fund	13 (18.4)
I do not know	27 (17.5)
Religious and cultural considerations should not compromise which one of the following in disaster management?	
<u>Due legal processes</u>	29 (18.8)
Providing shelter	24 (15.6)
Food distribution	43 (27.9)
Stress and welfare of the personnel	21 (13.6)
I do not know	37 (24)
Who among the following is NOT an assistant of investigator-in-charge during disaster management?	
Director of Communications	25 (16.2)
Director of Rescue Operations	6 (3.9)
Director of Victim Identification	15 (9.7)
<u>Director of Future Disaster Prevention</u>	28 (18.2)
I do not know	80 (51.9)
Who are the special victims of drought?	
Adults	2 (1.3)
<u>Children &lt;5 yrs, pregnant and nursing mothers</u>	90 (58.4)
All individuals	43 (27.9)
Relief workers	7 (4.5)
I do not know	12 (7.8)
Which of the following vehicles can carry toxins?	
<u>Food and water</u>	24 (61.0)
Air	28 (18.2)
Fire	8 (5.2)
Dust	9 (5.8)
I do not know	15 (9.7)
Which is the deadliest form of anthrax?	
Cutaneous	7 (4.5)
<u>Inhalational</u>	79 (51.3)
Gastro-intestinal	30 (19.5)
Bubonic	13 (8.4)
I do not know	25 (16.2)
Which is the most common form of chlorine used for the disinfection of water during disaster management?	
<u>Bleaching powder</u>	115 (74.7)
Alum	19 (12.3)
Table salt	7 (4.5)
Coarse salt	1 (0.6)
I do not know	12 (7.8)

Contd...

## Supplementary File 1: Contd...

Question*	Percentage of correct answers <sup>†</sup>
<b>Section A - Objective knowledge-based questions</b>	
Number of units of Odisha Disaster Rapid Action Force that have been set up	
4	4 (2.6)
5	6 (3.9)
10	33 (21.4)
<u>20</u>	9 (5.8)
I do not know	102 (66.2)
The most commonly reported disease in the post-disaster period following a disaster is	
Vector-borne diseases	64 (41.6)
<u>Gastroenteritis</u>	32 (20.8)
Plague	10 (6.5)
Acute respiratory infections	27 (17.5)
I do not know	21 (13.6)
The capacity of a community to cope with hazards is known as?	
<u>Resilience</u>	80 (51.9)
Susceptibility	19 (12.3)
Vulnerability	21 (13.6)
Liability	14 (9.1)
I do not know	20 (13)
<b>Section B - Attitude-related questions</b>	
Dentists should update their knowledge about disaster management?	
Strongly Agree/Agree	133 (86.4)
Strongly Disagree/Disagree/Neutral	21 (13.5)
Dentists should coordinate with other health professionals in disaster response?	
Strongly Agree/Agree	124 (80.6)
Strongly Disagree/Disagree/Neutral	30 (19.4)
Disaster management should be included in under-graduate BDS syllabus?	
Strongly Agree/Agree	130 (84.5)
Strongly Disagree/Disagree/Neutral	24 (15.5)
Dental institutions should conduct continuing dental education programs related to disaster management?	
Strongly Agree/Agree	130 (84.5)
Strongly Disagree/Disagree/Neutral	24 (15.5)
Dentists should assist in the identification of people killed in disaster?	
Strongly Agree/Agree	131 (85.1)
Strongly Disagree/Disagree/Neutral	23 (14.9)
Dental practitioners should maintain accurate and complete dental records to assist in the identification of disaster victims?	
Strongly Agree/Agree	128 (83.1)
Strongly Disagree/Disagree/Neutral	26 (16.9)
DCI should include education in bio-terrorism and mass casualty in the dental curriculum as "Mandatory"?	
Strongly Agree/Agree	113 (75.3)
Strongly Disagree/Disagree/Neutral	38 (24.7)

\*Correct answers are underlined. <sup>†</sup>Percentages do not always add up to 100% owing to improper responses (no answer)