

# Disaster Management and General Dental Practitioners in India: An Overlooked Resource

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## Abbreviations:

BDS: Bachelor of Dental Surgery  
GDP: General Dental Practitioner  
MDS: Master of Dental Surgery

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## Abstract

**Objective:** To assess General Dental Practitioners' (GDPs) in India willingness to participate in disaster management and their previous training pertaining to disaster management, and to assess GDP objective knowledge, attitude, and behavior regarding disaster management.

**Materials and Methods:** This study was a cross-sectional survey conducted on all GDPs of Jodhpur, Rajasthan, India. Willingness to participate, perceived knowledge, perceived effectiveness, objective knowledge, attitude, and behavior regarding disaster management were assessed through questionnaire method. Information also was collected regarding age, gender, religion, and residence.

**Results:** A total of 142 out of 180 GDPs participated in the study, representing a response rate of 79%. A majority (85%) of respondents were willing to participate in disaster management. Mean score for knowledge was 12.21%, for attitude was 33.56%, for behavior was 14.50%, and for perceived effectiveness was 9.08%. Significant correlations were observed between qualification and perceived effectiveness ( $P = .003$ ), and between attitude and years of practice ( $P = .04$ ). Willingness to participate in disaster management and age showed significant association ( $P = .000$ ).

**Conclusions:** High willingness and attitude to participate in disaster management was observed among respondents. Low knowledge and behavior scores were observed among GDPs.

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## Introduction

Often, the number of casualties requiring prompt attention by health care professionals during disasters exceeds the capacity of the health care delivery system. Conventional medical teams trained in disaster response can fall short in the number of health care providers needed to respond to the situation in a coordinated and flawless manner.<sup>1-6</sup> An innovative way of dealing with a trained-manpower shortage is by involving health care professionals other than what most consider "conventional medical personnel." This includes health professionals such as dentists.<sup>2</sup>

India has experienced catastrophic events on numerous occasions. This has led to considerable loss of life and damage of property. Disasters can have an impact on the progress of a nation, especially developing nations. There is a need to reinforce disaster management resources in India, and dentists might represent one such opportunity.

The usefulness of forensic odontology<sup>7-9</sup> and Disaster Mortuary Operational Response Teams in disasters has been shown.<sup>9</sup> Dentists can be of help in obtaining medical history, in taking and interpreting radiographs, in recording maintenance and data management, with infection control procedures, with wound management and suturing, in managing infections and prescription of medications, with immunization procedures, in distributing medical supplies, in providing information to patients and the public, with victim triage, and with patient management.<sup>2,9-15</sup>

The profession of dentistry enjoys autonomy and trusted status of the public. General Dental Practitioners (GDPs) can work as first responders along with other medical professionals during the time of mass-casualty disasters. A study conducted on Indian

dental postgraduates by Rajesh et al<sup>16</sup> reported high attitude scores of respondents towards disaster management. In another study conducted on Indian dental undergraduates, Chhabra et al<sup>17</sup> reported similar findings.

To the best of the authors' knowledge, this is the first study that explores various aspects of disaster management and willingness to respond to catastrophic events among GDPs in India. The present study sought to provide baseline information for policy makers and administrators, and could pave the way for efficient disaster management in India. The objective of the present study was to explore the willingness of GDPs to participate in disaster management, their perceived effectiveness, prior training, and their knowledge, attitude, and behavior towards disaster management.

## Material and Methods

### Methods

The present study was conducted among GDPs of Jodhpur, Rajasthan, India. A list of GDPs of Jodhpur was obtained from the administrative office of the local branch (Jodhpur, Rajasthan, India) of the Indian Dental Association (IDA; Mumbai, Maharashtra, India). Permission to carry out the study was obtained from Jodhpur Dental College General Hospital (Jodhpur, Rajasthan, India), and ethical clearance was obtained from the Ethical Committee of Institutional Review Board of the institution.

A structured, pre-tested, closed-end, and self-administered questionnaire developed by the investigator was employed. The item generation for this instrument was from four sources: theory, research, observation, and expert opinion.<sup>16-18</sup> Study subjects' willingness to participate in disaster management, and their objective knowledge, attitude, and behavior towards disaster management, were assessed. Respondents' perceived effectiveness and their previous disaster management training were also assessed. The respondents were contacted through telephone, and the purpose of the study was explained to them. Survey questionnaires were handed over to GDPs during investigator visits to their dental clinics.

A total of 26 questions on disaster management focused on: common disasters in the local geographic region, reliable methods of identifying victims, various vehicles for carrying toxins, common micro-organisms used for bioterrorism and their identification, post-disaster problems, color coding in triaging, and tagging. Questions related to attitude included: whether dentists should update their knowledge about disaster management and get involved in disaster management activities, if they should act in coordination with other professionals toward disaster management, if Dental Council of India (DCI; New Delhi, India) should include disaster management in the curriculum of undergraduates and post graduates, if dentists should assist in victim identification of people killed in disasters, and if there should be continuing dental education programs on disaster management for dentists. Questions pertinent to behavior assessed how frequently the respondents read scientific journals and referred to the Internet regarding disaster management, maintained accurate patient records, attended training programs regarding disaster management, collected information regarding vulnerability of their local area for certain disasters, and how often they obtained information related to prevention of disasters.

### Statistical Analysis

The data were entered into a Microsoft Excel spreadsheet Version 12.0 (Microsoft Corporation; Redmond, Washington USA); SPSS Version 16.0 (IBM Corporation; Armonk, New York USA)

was used for statistical analysis. Pearson's correlation analysis was used to assess associations between knowledge, attitude, behavior, and perceived effectiveness of study subjects. Associations of demographic variables with knowledge, attitude, behavior, and perceived effectiveness of study subjects were also assessed using Pearson's correlation analysis.

## Results

A total of 142 out of 180 available GDPs participated in the present study, representing a response rate of 79% and resulting in a crude margin of error of +/- 21% for quantitative results. A total of 63% (n = 89) of respondents were male; 37% (n = 53) were female. The majority of respondents were Hindu (n = 124; 87%), and 18 (13%) of them specified other religious affiliations. The mean knowledge, attitude, behavior, and perceived effectiveness scores of the respondents were 12.21 (SD = 3.91), 33.56 (SD = 4.36), 14.50 (SD = 6.14), and 9.08 (SD = 22.64), respectively (Table 1).

Results indicated that respondents holding a Master of Dental Surgery (MDS) qualification had greater perceived effectiveness ( $P = .003$ ) than the dentists holding a Bachelor of Dental Surgery (BDS) degree. Dentists with working experience of less than 10 years had favorable attitudes towards disaster management ( $P = .04$ ; Table 1).

Overall, 123 participants (83%) reported that they had not participated in a disaster management activity. Most of respondents (n = 120; 84%) were willing to participate in disaster management. A total of 117 (82%) of the participants had not attended a training program on disaster management. Overall, 117 (83%) of the participants were not familiar with "Standard Operating Procedure for responding to natural disasters, 2010" (Table 2).

A statistically significant correlation ( $P \leq .005$ ) was observed between knowledge and attitude towards disaster management among the study subjects. Highly significant correlation ( $P \leq .000$ ) was observed between perceived effectiveness and behavior towards disaster management among the participating dentists (Table 3).

Correlation analysis revealed a significant association between age of study participants with willingness to participate in disaster management activities ( $P \leq .000$ ). Educational qualification was correlated significantly with perceived effectiveness ( $P \leq .000$ ) and previous training on disaster management ( $P \leq .05$ ) among the study participants. Years of practice in dentistry were correlated significantly ( $P \leq .05$ ) with attitude towards disaster management (Table 4). A total of 39 respondents (27.46%) agreed that they could respond effectively to disasters. Overall, 61 respondents (42.95%) replied that they could identify and recognize an event of bioterrorism and 56 respondents (39.43%) replied that they could identify and recognize dental-related manifestations of bioterrorism.

## Discussion

The frequent incident of disasters, both natural and manmade, has brought to light the inadequacies of the India health care system. A shortage of trained-manpower resources and scarce medical resources of regional and local health departments have been highlighted. There are few studies that have investigated these issues, and there are no studies that reported on issues related to disaster management among Indian dental practitioners. Attitude has been defined as "a relatively enduring organization of beliefs around an object, subject, or concept which pre-disposes one to respond in some preferential manner."<sup>19</sup> The investigators in the

Demographic Variable		N	%	Knowledge	Attitude	Behavior	Perceived Effectiveness
Age (years)	≤30	78	55	12.46	33.74	14.17	9.00
	≥31	64	45	11.91	33.34	14.91	9.17
Gender	Male	89	63	12.70	33.72	15.06	9.11
	Female	53	37	11.92	33.47	14.17	9.05
Religion	Hindu	124	87	12.24	33.70	14.52	9.21
	Others	18	13	12.00	32.61	14.39	8.17
Marital Status	Married	117	82	12.16	33.50	14.48	8.98
	Single	25	18	12.44	33.84	14.60	9.52
Qualification	MDS	71	50	12.52	32.90	15.20	<b>9.73<sup>a</sup></b>
	BDS	71	50	11.90	34.23	13.80	<b>8.42<sup>a</sup></b>
Years of Practice	≤10 yrs	110	77	12.52	<b>33.97<sup>b</sup></b>	14.59	9.15
	≥11 yrs	32	23	11.16	<b>32.16<sup>b</sup></b>	14.19	8.84
Attached to College	Yes	100	70	12.41	33.99	14.84	9.03
	No	42	30	11.74	32.55	13.71	9.19
	<b>Total</b>	<b>142</b>	<b>100</b>	<b>12.21</b>	<b>33.56</b>	<b>14.50</b>	<b>9.08</b>

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**Table 1.** Demographic Variables and Knowledge, Attitude, and Behavior about Disaster Management among Study Subjects  
Abbreviations: BDS, Bachelor of Dental Surgery; MDS, Master of Dental Surgery.

<sup>a</sup>Significant at 1% level of significance (P = .003; CI, 0.46-2.16).

<sup>b</sup>Significant at 5% level of significance (P = .04; CI, 0.10-3.53).

Question	Yes		No	
	n	%	n	%
Previous participation in disaster management?	19	13	123	87
Willingness to participate in disaster management?	120	85	22	15
Previous training on disaster management?	25	17	117	83
Familiarity with "Standard Operating Procedure for responding to natural disasters, 2010?"	25	17	117	83

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**Table 2.** Distribution of Study Subjects Regarding Willingness to Participate, Previous Training, and Familiarity with National Documents Regarding Disaster Management

present study explored perceived effectiveness, willingness to participate in disaster management, and previous training regarding disaster management among GDPs.

Investigators have observed that disasters are dealt with at the local level within a given region.<sup>20-24</sup> A deficiency of trained personnel can be a major hurdle during emergencies. Hence, the need for potential sources from other than "conventional medical personnel," such as GDPs, should be explored. The present study highlights policy implications towards necessary expansion and inclusion of GDPs to maximize the disaster management capabilities.

The low objective knowledge scores of the respondents in the present study are in agreement with the findings reported by Katz et al,<sup>14</sup> Rajesh et al,<sup>25</sup> and Chhabra et al,<sup>17</sup> but they are

contrasted with results reported by Colvard et al.<sup>20</sup> Low perceived effectiveness scores among the respondents are in concurrence with the findings of Katz et al<sup>14</sup> and Rajesh et al.<sup>25</sup> Lack of clear directives in dental curriculum might have contributed to low objective and perceived effectiveness scores among the study subjects in the present study. The contrasting results reported by Colvard et al<sup>20</sup> could be attributed to the fact that the role of dental professionals in disaster management in developed nations, such as the US, is defined more clearly. High attitude scores among the participants in the present study are suggestive of willingness of GDPs to make contributions towards disaster management.

Dental practitioners who have completed higher education reported higher perceived effectiveness scores than undergraduate

	Knowledge		Attitude		Behavior		Perceived Effectiveness	
	R	P Value	R	P Value	R	P Value	R	P Value
Knowledge	-	-						
Attitude	0.19	.03 <sup>a</sup>	-	-				
Behavior	0.11	.18	0.01	.94	-	-		
Perceived Effectiveness	0.06	.50	-0.00	.96	0.40	.000 <sup>b</sup>	-	-

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**Table 3.** Correlation Analysis of Knowledge, Attitude, and Behavior among Study Subjects by Using Pearson Correlation<sup>a</sup>Significant at 5% level of significance.<sup>b</sup>Significant at 1% level of significance.

	Knowledge	Attitude	Behavior	Perceived Effectiveness	Previous Participation	Willingness to Participate	Previous Training	Familiarity with SOP
Age	0.40	0.59	0.48	0.70	0.80	0.00 <sup>a</sup>	0.10	0.45
Gender	0.25	0.75	0.41	0.90	0.31	0.71	0.88	0.45
Religion	0.80	0.33	0.94	0.12	0.67	0.13	0.59	0.59
Marital Status	0.75	0.73	0.93	0.36	0.38	0.60	0.73	0.17
Qualification	0.35	0.07	0.18	0.003 <sup>a</sup>	0.48	10.0	0.02	0.51
Years of Practice	0.08	0.04 <sup>b</sup>	0.75	0.57	0.12	0.03	0.08	0.85
Attached to College	0.35	0.07	0.32	0.74	0.72	0.80	0.44	0.78

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**Table 4.** Correlation Analysis of Demographic Variables with Perceived Effectiveness, Knowledge, Attitude, and Behavior about Disaster Management among Study Subjects

Abbreviation: SOP, standard operating procedure.

<sup>a</sup>Significant at 1% level of significance.<sup>b</sup>Significant at 5% level of significance.

(BDS) dental practitioners. Postgraduate (MDS) training might have reinforced various aspects of disaster management among the respondents. The impact of exposure to greater learning resources, in terms of libraries, conferences, seminars, and others, might also have had an impact on the respondents. The results of various studies, like Wang et al,<sup>26</sup> highlighted the important role played by oral and maxillofacial surgeons in treating oral-facial injuries sustained by victims of the 2008 earthquake in China. A new computerized method for age estimation using dental tissues for child victims has been reported by Keiser et al.<sup>27</sup>

Dental professionals' role as oral pathologists and forensic odontologists to identify victims and human remains during mass suicides, mass graves, homicides, and terrorist attacks have been reported.<sup>28-34</sup> General Dental Practitioners can be resourceful in distributing medical supplies, in providing information to patients and the public, in managing victim triage and patient management, and in educating people about identification of signs of bioterrorism and educating people about the "do's" and "don'ts" at the time of disasters of multifaceted origin.

Dental practitioners having less than 10 years of experience had higher attitude scores towards disaster management than

practitioners having experience more than 10 years. Younger participants could be more inclined and receptive towards additional roles for GDPs than the older counterparts. The same has been reported by Rajesh et al<sup>16,25</sup> and Chhabra et al.<sup>17</sup>

The respondents reported high willingness towards disaster management; this could be utilized for capacity building in terms of trained-manpower availability at the time of emergencies. Objective knowledge and attitude, perceived effectiveness, and behavior of study subjects showed a statistically significant correlation.

Age showed a statistically significant correlation with willingness to participate in disaster management. Years of practice showed a statistically significant correlation with attitude of study subjects regarding disaster management. These might be due to increasing recognition of societal responsibilities with increasing age among the respondents. Qualification showed statistically significant correlation with perceived effectiveness and previous training. Exposure to avenues for continuing professional education among respondents with higher qualification might lead to higher perceived effectiveness in the present study.

As vulnerability to manmade and natural disasters increases in India, training programs should be developed along the lines for

Basic and Advanced Life Support courses for the GDPs. Practical skills regarding disaster management can include hands-on training sessions, practical demonstrations, and simulation drills. Colvard et al<sup>20</sup> have reported that dentists undergoing training in disaster management programs under the American Medical Association's (AMA's; Chicago, Illinois USA) National Disaster Life Support (NDLS) curriculum need minimal further additional training.

### Limitations

The results of the present study should be viewed in light of its limitations. Findings from one city may not entirely be generalizable to other areas. Questionnaire-based studies may involve possibility of social desirability or positive bias, and/or deviation or negative bias. Instruments employing Likert scales are prone to biases such as end-aversion bias, positive skew, and the halo effect.<sup>18</sup> Further studies are warranted to heave more light on the issue of disaster management among dental practitioners in India.

### Conclusions

High willingness to participate in disaster management was observed among dental practitioners. Low knowledge and behavior scores were observed among the respondents, but attitude scores were high. Postgraduate dental practitioners (MDS) had greater perceived effectiveness than undergraduates (BDS). Subjects having experience of less than 10 years had better attitudes towards disaster management. Objective knowledge and attitude, perceived effectiveness, and behavior of study subjects showed a statistically significant correlation. Age showed a statistically significant correlation with willingness to participate in disaster management. Qualification showed statistically significant correlation with perceived effectiveness and previous training. Years of practice showed a statistically significant correlation with attitude of study subjects regarding disaster management. General Dental Practitioners might prove to be critical resources for effective response to disasters in India.

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