

# Recasting Disaster Recovery Strategy at Dental Workplace in Combating Crisis – A Questionnaire Study

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## ABSTRACT

**Introduction:** The number of reported natural and human-made disasters continues to rise worldwide. Disasters occur every day somewhere in the world with dramatic impact on individuals, families and communities.

**Aim:** This study was designed to measure the knowledge, attitude and practices regarding disaster management among academicians and practitioners in Ghaziabad city.

**Materials and Methods:** A cross-sectional study was conducted among 487 dentists. A questionnaire (15 items) measuring

knowledge, attitude and practice was distributed manually to the participating dentists and data was analysed using SPSS software, version 19.0 and student t-test was performed to assess the differences.

**Results:** There was statistically significant relation between knowledge and attitude in relation to qualification degree, career prospective and years of experience ( $p < 0.05$ ).

**Conclusion:** Dentists form an important part of the health care community and thus there is a need to harvest the services of wide distribution of dentists practicing in our country.

**Keywords:** Dentists, Disaster management, Bioterrorism, Practice, Triage

## INTRODUCTION

According to International Emergency Disasters Data Base, disaster has been defined as an event that “overwhelms local capacity, necessitating a request to a national or international level for external assistance”. Events that can lead to disasters are classified as natural events (e.g., earthquakes, floods, tornadoes) and manmade events (e.g., military emergencies and terrorist attacks using chemical, biological, radiological, nuclear or explosive devices (CBRNE) [1]. Everyday disasters occur somewhere in the world with dramatic impact on individuals, families and communities [2]. According to World Disasters Report 2013, there were 529 disasters around the world (337 natural disasters and 192 technological disasters) affecting 100 million people in 2012 [3].

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions and ranks as the second country among disaster prone countries in terms of population affected. According to India’s Hazard profile, 60% of land mass is prone to earth quakes, 40 million hectares that is 8% of landmass prone to floods and 68% of the total area is vulnerable to drought [4].

Disasters are inevitable and it is almost impossible to fully recoup the damage caused by them. However, it is possible to minimize the potential risk by developing early disaster warning strategies, preparing and implementing developmental plans to provide resilience and to help in rehabilitation [5]. Over the past couple of years, the Government of India have brought about a paradigm shift in the approach to disaster management. The new approach proceeds from the conviction that development cannot be sustainable unless disaster mitigation is built into the development process. Another corner stone of the approach is that mitigation has to be multi-disciplinary spanning across all sectors of development [6].

According to Disaster Management Act 2003, disaster management has been defined as the “arrangement about managing the potential adverse effects of an event, including, for example arrangement for mitigating, preventing, preparing for responding to and recovering from a disaster” [7]. National Disaster Framework initiated the programme named National Disaster Management (NDM) which

covers the institutional mechanisms, disaster prevention strategy, early warning system, disaster mitigation, preparedness and response and human resource development [4].

During massive disaster events, the roles of traditional first responders shift due its magnitude as the hospitals and clinics become flooded with the victims and even emergency medical service personnel are compromised as the local infrastructure, clinics and hospitals are debilitated [8]. Thus for building needed partnerships, identifying and garnering resources, and facilitating training, policy development, surveillance, and evaluation, oral health care personnel can be successfully integrated into the emergency medical response system [9]. The dentists along with other health professionals can act as first responders and play a vital role in disaster response by wide range of skill sets based on personal experience, training and enthusiasm [10].

Dentists play an important role as they are well prepared at the time of catastrophic events and are experts in barrier techniques and infection control. They are trained and skilled in administering drugs by injection, can place sutures and control bleeding. Also, they are able to participate in interdisciplinary professional groups; and well adapted at managing uncomfortable patients. They can be employed in prescription of medications, immunization, and distribution of medical supplies as well as manages victim triage [11].

Dentists can contribute to bioterrorism surveillance (intentional release of biologic agents or toxins like Anthrax, Ebola virus, Ricin, etc.) by being alert to clues that might indicate a bioterrorist attack. Dental identifications using forensic odontology helps in victim identification during natural and manmade disaster situations and in particular mass casualties normally associated with aviation disasters [6].

Hurdles remain, because the majority of the disaster medicine and response community naturally does not perceive a contributing role by the dental profession. Therefore, it remains imperative for the oral health community as a whole to continue to participate actively in all aspects of preparedness involving disaster medicine and responses. There are no studies in the literature that explore the perceived knowledge regarding various aspects of disaster

management and preparedness as well as to assess the attitude towards participation in disaster management among registered dental practitioners in India.

## AIM

Thus, the objective of the present study was to assess the knowledge, attitude, and practices regarding disaster management among academicians and practitioners in Ghaziabad city and also to find out the association between knowledge and selected demographic variables.

## MATERIALS AND METHODS

### Study setting and design

A cross-sectional descriptive study was conducted among 487 dentists in the city of Ghaziabad, India.

### Ethical clearance

Ethical approval was received from the institutional review board. The informed consent was obtained from all the dentists participating in the survey.

### Tools of Data Collection

It consists of two tools that were self administered to collect data about:

1. Demographics information as- name, age, qualification, years of experience and career prospective.
2. Self administered questionnaire to collect the data related to knowledge, attitude and practices regarding disaster management.

### Questionnaire

A structured, pretested, self-administered questionnaire was employed to assess the study subject' knowledge, attitude, and practices towards disaster management. The questionnaire consisted of 15 items, 7 for assessing knowledge, 5 attitude and 3 for practices and were assessed on a two -point Likert scale: yes and no.

### Reliability and Validity of Questionnaire

The questionnaire was pretested by conducting a pilot study on 22 of the study participants. Reliability of the questionnaire was assessed by using Test-Retest and the values of measured Kappa (k) were 0.86 and Weighted Kappa (k) was 0.9. Internal consistency of questionnaires was assessed by applying Chronbach's-Alpha ( $\alpha$ ) and the value of  $\alpha = 0.78$  were measured.

### Data collection

The details of 120 dentists practicing were obtained from register of Indian Dental Association of Ghaziabad Branch. All the three Dental Colleges of Ghaziabad city were selected and 367 dentists working as academicians were taken as the sample for the study. Each practicing dentist personally was approached by Principal Investigator at their clinic requesting for participation in survey where as those working in colleges were approached in their respective colleges only. Dentist who consented were given questionnaire to respond within two weeks. The questionnaire was given in person to the participating dentists after explaining the study design with two rounds of follow-up sent to non-responders. Selected dentists were reminded once before the deadline. The reminder was given through phone calls to return the questionnaire.

## STATISTICAL ANALYSIS

The data were entered into a Microsoft Excel spreadsheet 2007 Version (Microsoft Office, New Mexico, US) and SPSS Version 19 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis for

frequencies and descriptive. An independent t-test was employed to assess the differences in knowledge, attitude and practices by age, gender and qualification among study subjects. The confidence interval was fixed at 95% for the present study.

## RESULTS

Out of 487, 434 completed the questionnaire, 29 (7%) subjects who were non-contactable and 24 (6%) filled incomplete questionnaire were excluded from the study thus giving the response rate of 89%. A total of 278 (64.1%) of respondents were male; 156 (35.9%) were female. The majority had completed their post graduation (76.7%).

Characteristics	Total no (%age)
<b>Gender</b>	
Male	278 (64.1)
Female	156(35.9)
<b>Qualification</b>	
BDS	101 (23.3)
MDS	333 (76.7)
<b>Years of experience</b>	
Less than 1 year	18(4.1)
1-5 years	111(25.6)
5-10 years	226(52.1)
More than 10 years	79(18.2)
<b>Career prospective</b>	
Academician	314 (72.4)
Clinician	120 (27.6)

[Table/Fig-1]: Demographic characteristics of study participants.

	Knowledge		
	Respondent's comments		Mean±SD
	Yes N (%)	No / don't know N (%)	
Disaster plan	300(69.1)	134 (30.9)	0.69±0.46
Various forms of disaster and their management	340 (78.3)	94(21.7)	0.78±0.41
Triage	182(41.9)	252(58.1)	0.42±0.49
Role of dentist in bioterrorism disaster management	254(58.5)	180(41.5)	0.59±0.49
Awareness of government agencies dealing with disaster management in our country	307(70.7)	127(29.3)	0.71±0.45
Disaster management policy	265(61.1)	169(38.9)	0.61±0.48
Public information projects undertaken in our country	246(56.7)	188(43.3)	0.57±0.49
<b>Attitude</b>			
Need of any separate preparedness and management plans for different disasters	184(42.4)	250(57.6)	0.42±0.49
Necessity to conduct disaster drill	229(52.8)	205(47.2)	0.53±0.5
Essentiality to identify potential hazards causing disasters	340(78.3)	94(21.7)	0.78±0.41
Importance of disaster management in dentistry	301(69.4)	133(30.6)	0.69±0.46
Requirement for enhanced public awareness of risks of disaster	308(71.0)	126(29)	0.71±0.45
<b>Practice</b>			
Volunteered for first aid /disaster management programme	164 (37.8)	270(62.2)	0.38±0.48
Undergone any formal training in disaster management	134(30.9)	300(69.1)	0.31±0.46
Undergone training in BDLS/CDLS/CPR	163(37.6)	271(62.4)	0.38±0.48

[Table/Fig-2]: Knowledge, attitude and practice level regarding disaster among study participants.

The majority of respondents were working experience between 5-10 years (52.1%), followed by 1-5 years (25.6%) [Table/Fig-1].

The mean knowledge, attitude and practice scores of the respondents were 4.36±1.378, 3.14±1.017 and 1.06±.908

respectively. [Table/Fig-2] shows that the knowledge level regarding disaster preparedness among the study sample which implied that majority of dentists (69.1%) were aware of disaster plan and disaster management (78.3%). However, comparatively 41.9% dentists had no knowledge regarding the term "triage". It also illustrates the percentages of agreement regarding disaster preparedness attitudes of the study participants which were as following; 57.6% agreed to the need of any separate preparedness and management plans for different disasters, 52.8% to the necessity of conducting disaster drill, 69.4% realized the importance of disaster management in dentistry and 78.3% agreed that it is essential to identify potential hazards causing disasters. A 62.2% of the study participants' said that they have never volunteered for first aid / disaster management programme where as 30.9% and 37.6% said they had undergone formal training in disaster management and Basic Disaster Life Support (BDLS)/ Core Disaster Life Support (CDLS)/ Cardiopulmonary Resuscitation (CPR) respectively.

Gender		Mean±SD	Std. Error Mean	p-value
Knowledge	Male	4.38 ±1.39	0.083	0.675
	Female	4.33±1.39	0.110	
Attitude	Male	3.17±1.01	0.061	0.347
	Female	3.08±1.03	0.082	
Practice	Male	1.01±0.88	0.053	0.143
	Female	1.15±0.95	0.076	

[Table/Fig-3]: Mean score of knowledge, attitude and practice on the basis of gender. \*p< .05-statistically significant.

Qualification		Mean±SD	Std. Error Mean	p-value
Knowledge	BDS	3.95±1.41	0.140	0.0001*
	MDS	4.86±1.36	0.07	
Attitude	BDS	3.3±0.9	0.099	0.0006*
	MDS	3.7±1.02	0.056	
Practice	BDS	1.1±0.90	0.090	0.056
	MDS	2.01±0.91	0.050	

[Table/Fig-4]: Mean score of knowledge, attitude and practice on the basis of qualification. \*p< .05- statistically significant.

Career prospective		Mean±SD	Std. Error Mean	p-value
Knowledge	Academician	4.39±1.41	0.080	0.0001*
	Clinician	3.1±1.28	0.117	
Attitude	Academician	4.19±1.02	0.058	0.0002*
	Clinician	3.04±.099	0.091	
Practice	Academician	1.47±0.91	0.051	0.039
	Clinician	1.03±0.91	0.083	

[Table/Fig-5]: Mean score of knowledge, attitude and practice on the basis of career prospective. \*p< .05- statistically significant.

Results of independent t-test indicated the relation of demographic variables and knowledge, attitude and practice regarding disaster management. It showed no significant difference in relation to gender [Table/Fig-3].

There was statistically significant relation between knowledge and attitude in relation to qualification with p-value of 0.0001 and 0.0006 respectively that implied postgraduates had greater perceived knowledge compared to those of the graduates [Table/Fig-4].

Also, the results indicated that there were statistically significant values among the dentists who worked in clinics and as academician in institutions (p=0.0001). The mean scores were higher for academicians thus implying that they had greater knowledge and better attitude towards disaster management [Table/Fig-5].

[Table/Fig-6] also showed that there were statistically significant results among dentists on the basis of years of experience which indicated that dentists with 1-5 years of experience had more

Years of Experience		Mean±SD	Std. Error	p-Value
Knowledge	Less than 1 year	4.39±1.037	0.244	0.0005*
	1-5 years	4.89±1.405	0.133	
	5-10 years	4.33±1.346	0.090	
	More than 10 years	4.18±1.483	0.167	
Attitude	Less than 1 year	3.11±.963	0.227	0.0069*
	1-5 years	3.58±1.059	0.101	
	5-10 years	3.16±1.007	0.067	
	More than 10 years	3.15±1.014	0.114	
Practice	Less than 1 year	.94±.873	0.206	0.0372
	1-5 years	1.29±.900	0.085	
	5-10 years	1.07±.911	0.061	
	More than 10 years	1.03±.933	0.105	

[Table/Fig-6]: Mean score of knowledge, attitude and practice on the basis of years of experience. \*p< .05- statistically significant

perceived knowledge, attitude and practice as compared to others (p=0.0005).

## DISCUSSION

Increasingly frequent global disasters are posing threats to human health and life. The World Health Organization has called for countries to have detailed plans at all levels in order to be prepared for disasters that may arise. Dentists are looked upon as respected members of the community and thus have a responsibility to protect the public [12]. Dentists are not perceived as much of help in case of any disaster event. Although the first responders are primarily looked upon for in case of any disaster response; if called upon dentists can be a source of vital support in medical surge events. In order to contribute to saving lives and promoting health under such difficult conditions, they need to have the right competencies and knowledge [2].

Various researchers have explored knowledge, attitude and behaviour/practices (KAB/KAP) of study subjects in other areas. 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" [13].

The present study was conducted to explore various issues related to disaster management among dentists in Ghaziabad city. The investigators in the present study had explored knowledge, attitude and willingness to participate in disaster management and previous training regarding disaster management.

Dentists in the armed forces also have been trained in handling various emergency situations. Galligan has reported that dentists were a part of Disaster Mortuary Operational Response Teams and contributed to disaster management [14]. Dental professionals' involvement in identifying victims and human remains, and in dealing with mass suicides, mass graves, homicides, and terrorist attacks also have been reported [15]. Frykberg has indicated that dental professionals should read the growing scientific literature on disaster management, and should be involved in disaster planning at the level of local communities [16]. Singh G et al., reviewed the role dentists can play in disaster response. He studied that the dentists have the clinical skills and medical knowledge that are invaluable assets in a mass casualty event; dentists can be given the opportunity with additional targeted training to become more effective responders to natural disasters and other catastrophic events. Inculcating disaster training in the undergraduate course will better prepare the dentist for any surge event [17].

In the present study, it was found that majority of dentists were aware of disaster plan and disaster management but very few had an idea about the term "triage". Majority of dentists realised the importance of disaster management in dentistry and also identified

the essentiality of potential hazards causing disasters. Similar findings were reported by Colvard et al., in which it was seen that oral health care professionals believed that the Core Disaster Life Support (CDLS) and Basic Disaster Life Support (BDLS) courses were of great educational value [18]. But contrasting findings were reported by Katz et al., and Rajesh et al., in which low objective knowledge scores of the respondents representing the lack of any definitive steps for involving dental professionals in disaster management was observed [19,20].

Galligan JM observed that dentists must be educated, at minimum to recognize the symptoms of exposure to biological agents or naturally diseases, such as avian flu and SARs, in their patients [21]. Pretty IA et al., stated that mock disaster exercises should replicate features of aircraft crashes as closely as possible by using commingled, fragmented and burned remains. In addition, mock disasters should require the identification of realistic number of individuals to ensure authenticity and the maximum logistical preparedness of participants [22]. Bhoopathi V et al., observed that more than 90% of the dental professionals were willing to provide care during bioterrorist events and their perceived knowledge was high but actual knowledge was low [23].

However, there was no statistically significant correlation between gender and attitude, knowledge and practices among dental professionals. This was seen in contrast with the study done by Rajesh G et al., in which gender showed a statistically significant correlation with attitude and behaviour as males tend to have a more proactive role in Indian families [1].

There were statistically significant results ( $p < 0.0001$ ) reported in knowledge and attitude in relation with educational qualification among the dentists. Thus, was found that the post graduates had more perceived knowledge and attitude towards disaster management and more willingness to participate in disaster drill as they are more comprehensive in their particular specialty.

Also, the present study implied that there were statistically significant values between clinicians and academicians in perceiving knowledge regarding disaster management ( $p < 0.0001$ ). The dentists working in institutions are more exposed and enlightened towards disaster planning and have more awareness about the latest policies and plans undergoing in our country and worldwide. There were statistically significant results found among dentists on the basis of years of experience which indicated that dentists with more years of experience had more perceived knowledge, attitude and ( $p$ -value  $< 0.001$ ). Thus, it was found in the present study that the knowledge, attitude and practice were effectively seen towards disaster management among the dentists. However, one also has to consider the pitfalls of such an exercise. Developing uniform training on disaster management might be difficult due to regional variations in the occurrence of disasters. There might also be legal implications in permitting dental professionals to carry out certain procedures during disaster management [1]. These issues should be considered by the policymakers and decision makers in rendering disaster management more effective in India. However, very few dentists have undergone practices in disaster planning conditions. So, conducting training programs on disaster management is another area of consideration. Training programs should be developed along the lines of the training programs for basic and advanced life support courses.

## LIMITATION

The limitation of the present study was that the respondents at the dental institution at which the study was conducted might not be representative of all dental professionals. As with any questionnaire-based study, there is the possibility of social desirability or faking good bias, deviation or faking bad bias and yea-saying or acquiescence bias. Further studies are required to shed more light into various issues related to disaster management in India.

## RECOMMENDATIONS

1. It is recommended that state oral health programs have an emergency preparedness plan that ensures the appropriate planning for the delivery of emergent dental services to disaster victims. Having a plan allows the state oral health program to develop written mutual aid agreements with other state programs and with non-government entities so that critical resources, such as mobile dental facilities, supplies, and properly trained personnel will be available during the initial response to a disaster.
2. Dental clinics should have unobstructed exits. Alarm system should be installed that is audible within the work environment.
3. Mock disaster exercises should replicate features of aircraft crashes as closely as possible using by using commingled, fragmented and burned remains. Drills and interactive training using questions about the plan are ways of teaching employees about their responsibilities and what to do in actual emergencies. After initial training, you should conduct periodic retraining. In addition, mock disasters should require the identification of realistic number of individuals to ensure authenticity and the maximum logistical preparedness of participants.
4. In a disaster, a practice may have fiduciary responsibilities with respect to reasonably protecting the patient treatment information (dental health records) in its possession irrespective of whether the information is held in an electronic or a paper format.
5. Integrating training and education into the pre-doctoral dental and dental hygiene curriculum and developing continuing education courses would improve knowledge and better prepare dental professionals to effectively perform their roles in any future bioterrorism events. All dental students should be trained in a core set of competencies enabling them to respond to a significant bioterrorism attack, help contain the spread of the attack, and participate in surveillance activities as appropriate upon direction of proper authorities.
6. Also, dentists and dental societies should make local emergency response planners aware of the services the dental profession can provide in wake of any unforeseen events.

## CONCLUSION

In the future years, mankind may face many challenges that can be unparalleled whether it is a natural calamity or a bioterrorism attack, the response of the community to overcome that will be collective. Dental professionals that form an integral part of the health care community will be looked upon to perform potential service to the society in event of any mishap. At the time of their under graduation dentists are exposed to information in various general medical areas that can be useful in disaster response situations. Additional targeted training can be given to the dentists to become more effective responders to natural disasters and other catastrophic events. Introduction of disaster training in the undergraduate and post graduate curriculum will better prepare the dentist for any torrent event. Thus the present study investigates the various duties which dental professionals can play during major public health catastrophe.

## SUPPLEMENTRY MATERIALS

### Recasting disaster recovery strategy at dental workplace in combating crisis – A questionnaire study DEMOGRAPHIC DETAILS

Name : \_\_\_\_\_ Age : \_\_\_\_\_ Sex: M/F \_\_\_\_\_  
 Years of experience : \_\_\_\_\_ Place of residence : urban /rural \_\_\_\_\_  
 Qualification : BDS/MDS \_\_\_\_\_ Career prospective : Academician/ Clinician \_\_\_\_\_

### QUESTIONNAIRE

Note: Kindly tick [  ] the appropriate option

#### Knowledge:

1. Are you aware of the term "disaster plan"?  
 Yes  No  Don't know
2. Do you know about the various forms of disaster and their management preparedness?  
 Yes  No  Don't know
3. Are you familiar with the term " triage" ?  
 Yes  No  Don't know
4. Do you think dentist has a role in bioterrorism disaster management ?  
 Yes  No  Don't know
5. Are you aware of the government and other agencies that deal with disaster management in our country ?  
 Yes  No  Don't know
6. Is there any national disaster management policy ?  
 Yes  No  Don't know
7. Is there any awareness towards disaster and public information projects being undertaken in our country ?  
 Yes  No  Don't know

#### Attitude :

8. Do you think that there are separate preparedness and management plans for different disasters?  
 Yes  No  Don't know
9. Is it necessary to conduct a disaster drill for the preparedness of disaster events?  
 Yes  No  Don't know
10. Is it essential to identify potential hazards causing disasters ?  
 Yes  No  Don't know
11. Is disaster management important to your dental practice ?  
 Yes  No  Don't know
12. Do you think there is a requirement for enhanced public awareness of risks of disaster?  
 Yes  No  Don't know

#### Practice :

13. Have you ever volunteered for first aid/ disaster management programme ?  
 Yes  No  Don't know
14. Have you ever received any formal training in disaster management ?  
 Yes  No  Don't know
15. Have you ever undergone training in BDLS/CDLS/CPR ?  
 Yes  No  Don't know

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