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DENTAL PROFESSIONALS' ATTITUDE AND WILLINGNESS TO RESPOND DURING DISASTER EVENTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

INTRODUCTION. In the present times, natural and man-made threats have questioned our existence on this planet. Health care professionals need to be aware of all the procedures to follow during such an event that threatens to paralyze the entire community and should be able to respond effectively.

OBJECTIVE. The present study was conducted to assess the willingness and attitude of dental professionals to render help during any disaster or catastrophic event.

MATERIAL AND METHODS. The present cross-sectional study among 480 subjects who were residing in Tricity (Chandigarh, Mohali and Panchkula). Informed consent was taken from all the subjects. Systematic random sampling methodology was employed for selection for study sample. The study utilized a self-designed close-ended questionnaire written in English and verified by experts. The questionnaire was divided into two parts to collect the required information. The data was analyzed using SPSS software version 21; chi-square test and multiple regression analysis were used to arrive at the results.

RESULTS. More than 85% of subjects had awareness regarding natural and manmade disasters. A positive response was given by 79.2% of subjects regarding willingness to help during disaster. Educational qualification of subjects was significantly associated with attitude towards some aspects of disaster response ($p < 0.05$). Postgraduate subjects and subjects who were academicians were more willing to render help (OR: 2.18 & 3.65 respectively).

CONCLUSIONS. The study emphasizes the need for educational and training programs for dentists' regarding disaster management. A short course on emergency and disaster management can be included in undergraduate and postgraduate dental curriculum.

Keywords: *emergencies, attitude, dentists, bioterrorism, residence characteristics*

INTRODUCTION

Natural (earthquakes, floods etc.) or man-made catastrophic events (bio-terrorism) sometimes create demands that far exceed the capacity of the medical and public health systems to respond. Emergencies, mass casualty situations, catastrophes or disasters are those situations that cannot be managed by normal procedures and workforce. Under such circumstances, casualties are likely to be high and fear among the

people and the urgent need for information will complicate the ability to react (1). There is also significant loss of lives and property depending upon the impact of the catastrophic event. Regardless of origin, all disasters reflect unique environments, needs and risks within a given community, jurisdiction and state. The recent occurrence of COVID-19 pandemic is a perfect example of one such disaster event which has claimed millions of lives all over the globe (2).

On account of its unique geo-climatic conditions, India has been traditionally vulnerable to natural disasters. Millions of hectares of lands mass of this country is prone to earthquakes, floods and vulnerable to drought and therefore is ranked second among disaster prone countries in terms of population affected (3, 4). In the recent past, the Govt. of India has brought a paradigm shift in approach to disaster management. An apex body called 'National Disaster Framework Authority' (NDMA) has been set up to mitigate the damage and destruction caused by natural and man-made disasters, through sustained and collective efforts of all Government agencies, Non-Governmental Organizations and People's participation (5).

Owing to the magnitude of any disaster event, the roles of traditional first responders shift. The hospitals and clinics become overwhelmed with the victims. Even emergency medical services can be rendered compromised due to the damage to the infrastructure, clinics and hospitals (6). Here dental professionals can play a vital role in disaster response as they have been well trained in barrier techniques, control of bleeding and infection control (7). Although dentists comprise an important aspect of health team, their role or utility remains under-utilized. Oral health care personnel can be successfully integrated into the emergency medical response system and victim identification during natural and manmade disasters by using forensic odontology (8). There is dearth of research exploring dental professionals' role in disaster management and majority of published literature are reviews on the current topic. Therefore, the present cross-sectional study was conducted to assess the willingness and attitude of dental professionals to render help during any disaster or catastrophic event.

MATERIAL AND METHODS

Ethical clearance and study design. The present study (cross-sectional descriptive study) was conducted after obtaining permission and ethical clearance from concerned health authorities. Written informed consent was signed by all the subjects. In addition, the purpose and the methodology of the study was thoroughly explained to each subject, they were assured of data confidentiality/anonymity, and informed that participation was voluntary. The study was conducted in the month of January 2022.

Study population and study sample. The study population consisted of dental health professionals (private practitioners and academicians) residing in Tricity (Chandigarh, Mohali & Panchkula). List of all private dental practitioners was obtained from Local Indian Dental Association (IDA) bodies through

email. The following formula was used to calculate the required sample size:

$$n = \frac{Z^2 1-(\alpha / 2) \times S^2}{d^2}$$

Where Z is the standard normal score with 95% confidence interval (CI) ($\alpha=0.05$), S is the standard deviation of the variable, and d is maximum acceptable error. After applying the formula, 480 subjects constituted the final sample size (excluding the non-responders). Subjects from were enrolled in the study using systematic random sampling methodology.

Tools of data collection / Research instrument. A self-designed, close-ended questionnaire written in English was employed specifically for the study. The content of the questionnaire was verified by an expert in disaster management and a specialist in forensic odontology. The questionnaire was pre-tested on 25 participants by conducting a pilot study. Reliability of the questionnaire was assessed using Test-Retest and the values of measured Kappa (k) were 0.83 and Weighted Kappa (k) was 0.8. The questionnaire was divided into two parts: 'General Section' (Section A) which was made to collect socio-demographic details of the subjects (gender, occupation, experience, working profile etc.). Section B comprised of 12 questions on knowledge, willingness and attitude to respond during any disaster or catastrophic event. The questionnaire was delivered personally to the subjects (residence or place of practice) and one week time was given to the subjects to fill the questionnaire and return it. A reminder was given through phone calls as some of the subjects may be having a busy schedule. Some of the subjects were unresponsive even after giving the reminder; those were excluded from the study. The principal investigator made sure that the subjects answered all the questions and none of the questionnaires were incomplete. The response of subjects' (positive or negative) towards the questionnaire was assessed on a two-point Likert scale (positive or negative).

Statistical analysis. Data were entered into Microsoft Excel Spreadsheet version 2010 and was assessed using SPSS statistical package (SPSS, version 21.0, Chicago, IL, USA). Categorical measurements were calculated using number and percentages. Chi-square test was used to evaluate the relationship between some demographic factors on the attitude towards disaster response. The significance level was set at <0.05 . Multivariate logistic regression analysis was also performed to assess the effect of various independent variables on willingness to help during disaster events. Odds ratio with 95% CI were also generated.

RESULTS

Socio-demographic profile of study population.

The analysis of the socio-demographic data (Table 1) revealed that the majority of the subjects were males (63.5%) and 45.5% had a postgraduate qualification. Subjects having experience of more than 10 years were comparatively less (24.1%) as compared to subjects having 5-10 years of experience (44.7%). More than half of the subjects (53%) were involved in academics and private practice.

Response to the questionnaire on disaster management. The responses of the subjects on various questions on disaster management are summarized in Figure 1. More than 85% of subjects

had awareness regarding natural and manmade disasters. A 72.5% of study subjects seemed to be aware of disaster management programs started by Govt. of India. When asked about their willingness to render help during any disaster or catastrophic event, 79.2% of subjects gave a positive response. Only 12.6% of subjects had witnessed some disaster event at their workplace and 18.8% of subjects were of the opinion that they were trained to deal with any kind of disaster. A vast majority of the subjects (88.2%) agreed on including disaster management program in the Bachelors in Dental Surgery (BDS) curriculum. Nearly 70% of the subjects were willing to make their place of work disaster resilient. Results of chi-square test revealed that educational qualification of subjects

Table 1. Socio-demographic characteristics of the study population

| Socio-demographic characteristic | | Number | Percentage (%) |
|----------------------------------|----------------------|--------|----------------|
| Gender | Male | 305 | 63.5 |
| | Female | 175 | 36.6 |
| Educational status | Graduate (BDS) | 262 | 54.5 |
| | Postgraduate (MDS) | 218 | 45.5 |
| Years of experience | Up to 5 | 149 | 31.0 |
| | 5-10 | 215 | 44.7 |
| | More than 10 | 116 | 24.1 |
| Working profile | Private practitioner | 120 | 25.0 |
| | Academics | 106 | 22.0 |
| | Both | 254 | 53.0 |

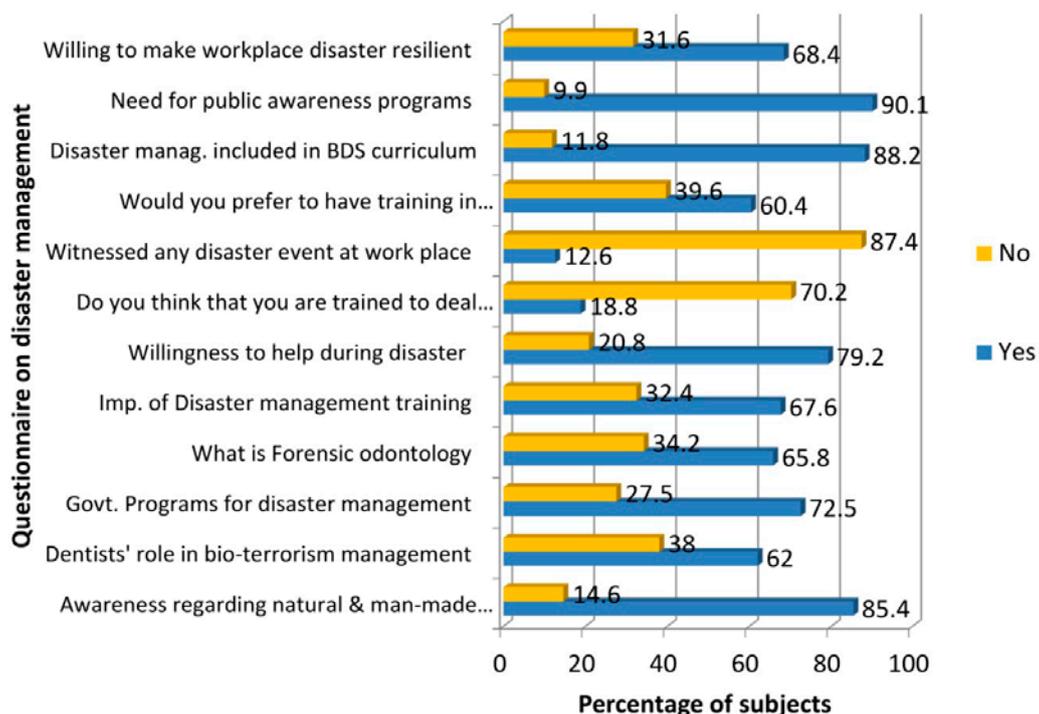


Figure 1. Bar Graph showing response of the subjects towards the questionnaire

was significantly associated with attitude towards disaster response with regard to dentists' role in bio-terrorism management ($p=0.016$) and training aspects. ($p=0.15$, $p=0.25$) (Table 2).

Multivariate logistic regression analysis.

Multivariate logistic regression analysis was also performed to assess the effect of various independent variables on the willingness to render help during any disaster event (Table 3). Postgraduates were 2.18 times

more willing to render help during disaster as compared to graduates. The odds of willingness to help were 3.65 times greater in academicians as compared to subjects who were engaged in private practice. Subjects who preferred to have training in disaster management and who were interested in making the workplace disaster resilient were more willing to render help during any disaster or catastrophe as compared to other subjects (OR: 3.26 & OR: 3.15 respectively).

Table 2. Relationship of educational qualification of subjects with attitude regarding disaster management

| S. No. | Attitude | Response | Graduate (BDS) | Postgraduate (MDS) | Total | p-value |
|--------|---|----------|----------------|--------------------|-------------|---------|
| 1. | Dentists' role in bio-terrorism management | Yes | 142 (54.1%) | 156 (71.5%) | 298 (62%) | 0.016* |
| 2. | Heard about forensic odontology | Yes | 155(39.7%) | 185 (60.3%) | 340 (71.3%) | 0.067 |
| 3. | Importance of disaster management training | Yes | 152 (59%) | 169 (77.5%) | 321 (67.6%) | 0.015* |
| 4. | Prefer to have training in disaster management | Yes | 148 (56.4%) | 140 (64.2%) | 288 (60.4%) | 0.025* |
| 5. | Disaster management to be included in BDS Curriculum | Yes | 224 (85.4%) | 198 (90.8%) | 422 (88.2%) | 0.087 |
| 6. | Need for public awareness programs on disaster management | Yes | 240 (91.6%) | 192 (88%) | 432 (90.1%) | 0.079 |

*Chi-square test, $p \leq 0.05$ Statistically significant

Table 3. Multivariate logistic regression analysis on willingness to render help during any disaster event

| Variable | OR (Odds Ratio) | 95% CI | p-value |
|--|-----------------|-------------|---------|
| Gender | | | |
| Male | 2.54 | 0.54 - 3.12 | 0.018* |
| Female | 1.00 | Ref | |
| Educational Status | | | |
| Graduate (BDS) | 1.00 | Ref | 0.034* |
| Postgraduate (MDS) | 2.18 | 0.76 - 3.22 | |
| Years of Experience | | | |
| Up to 5 | 1.00 | Ref | 0.063 |
| 5-10 | 2.78 | 1.79 - 3.56 | |
| More than 10 | 1.67 | 0.23 - 3.67 | |
| Working Profile | | | |
| Private practitioner | 1.00 | Ref | 0.027* |
| Academics | 3.65 | 2.44 - 4.88 | |
| Both | 2.86 | 1.98 - 3.85 | |
| Prefer to have training in disaster management | | | |
| Yes | 3.26 | 1.66 - 3.59 | 0.007* |
| No | 1.00 | Ref | |
| Witnessed any disaster event at the workplace | | | |
| Yes | 2.65 | 0.72 - 3.77 | 0.085 |
| No | 1.00 | Ref | |
| Making the workplace disaster resilient | | | |
| Yes | 3.15 | 1.45 - 3.48 | 0.015* |
| No | 1.00 | Ref | |

* $p \leq 0.05$, Statistically significant

DISCUSSION

In the present times, the challenges which humankind is facing are unprecedented like the recent occurrence of COVID-19 pandemic. Whether it is a natural disaster or a bioterrorism attack, the response of the community to overcome a disaster should be collective using the talents of all the health care workers to the limits. Most of the injuries are sustained during the impact, and thus the greatest need for emergency care is required in the first few hours after disaster (9). Dentists, forming an important part of the health care community will be looked upon to perform potential service to the society in event of any mishap or disaster. Therefore the present study was conducted to assess the attitude and willingness of dental professionals to render help during any disaster or catastrophic event.

Forensic odontology plays a crucial role in victim identification during any mass disaster event through assessment of bite marks and patterned skin injuries along with the use of dental materials in the examination of evidence (10). Well maintained dental records also find their use in forensic cases apart from teaching and research purposes. However, more than one-third of subjects in the study were not familiar with the term 'forensic odontology' which is an area of concern. These findings of the present study differ from another study conducted recently on Croatian dentists (11).

Knowledge and training in emergency and disaster preparedness are important in responding effectively towards any natural or manmade disaster. Only 62.4% of subjects in the present study felt the importance of training in disaster management. This is in congruence to the results of another study conducted elsewhere among a group of health professionals (12). Long-term training programs with comprehensive curriculum should be included in undergraduate dental courses to strengthen dental professionals' ability while combating any disaster (13). Almost 90% of subjects in the present study agreed in this regard. Some authors have also proposed educational activities for hospital-based dentists to prepare them to contribute to a hospital disaster response (14).

In the present study, only 12.6% of subjects had witnessed a disaster event at work place and less than 20% of subjects believed that they are trained enough to deal with any kind of disaster if it happens at their work place. It is imperative to be aware of work place evacuation plans in case of any emergency as it can save many lives. Reports of another study conducted among hospital staff reveal that 18% of subjects were not aware of hospital evacuation plans (15). Approximately 70% of subjects of subjects in our

study were willing to make their work place disaster resilient which is a positive finding.

Widespread public awareness and education is vital to prevent loss of life, personal injuries, and damage from natural disasters. People must be made aware of what natural hazards they are likely to face in their own communities. More than 90% of subjects felt the need for public awareness programs regarding disaster management in the current study.

There was a statistically significant association of educational qualification of subjects with dental professionals' attitude towards bio-terrorism management and training ($p < 0.05$) in the study. Similar findings were observed in another study conducted among Nigerian dentists (16). Result of multiple regression analysis showed that postgraduate subjects were 2.18 times more willing to render help as compared to graduates and the results were statistically significant. Contrasting findings were reported in some other study conducted in some other part of India among General Dental Practitioners (17). Moreover, subjects who were postgraduates were more willing to render help during any disaster as compared to graduates in our study. Willingness to take part in disaster management was also found among academicians (OR: 3.65) as compared to subjects who were private practitioners. Study conducted by Pandita et al., revealed similar findings (4). Dental professionals who are academicians are usually attached with a dental institution which gives them more exposure and are more enlightened towards disaster management and planning.

The present study had some limitations. Firstly, because of limited time and resources, the study focussed on some of the aspects on disaster management. Secondly, this was a questionnaire based study so there can be possibility of social-desirability bias. Moreover, as it could have taken lot of time to take permission from government health authorities, the study population didn't include subjects working in government set up or institutions. Therefore the results of the study should be interpreted with caution. Further studies employing a larger sample and focusing on other aspects of disaster management should be conducted in future.

CONCLUSIONS

Dental professionals are trained enough in the daily practice of infection control, taking and using information from medical histories, administering injections, suturing wounds, managing infections and prescribing medications. All these skills can be utilized effectively in response to any disaster or catastrophe. The results of the study indicate that

majority of the subjects had positive attitude towards disaster management though there were insufficiencies in some of the aspects. More than two-thirds of subjects showed enhanced willingness to partake in disaster management. Results of multiple regression analysis showed that gender, educational status, working profile, training in disaster management emerged as significant predictors of willingness among the study subjects.

Key recommendations. The study emphasizes the need of periodic training in disaster management among dental health care professionals especially in developing nations like India. Courses on disaster management can be included in the undergraduate dental curriculum and a short post graduate course can also be started. All dental clinics should have a safe evacuation plan and unobstructed exits in case there is any emergency or disaster. There should also be provision to deliver emergency dental services to vulnerable people in case the need arises. Public officials and the media such as television, radio, and newspapers are equally important and must be fully prepared to respond effectively, responsibly, and speedily to large-scale natural emergencies.

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Received: 24.02.2022

Accepted for publication: 30.09.2022

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