



An Assessment of Knowledge and Attitude of Iranian Nurses Towards Bioterrorism

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Abstract

Background: An increase in disasters around the world like bioterrorism attacks emphasizes the need to assess healthcare workers' preparedness to respond to bioterrorism. Nurses form the majority of first responders in disasters and emergencies, thus it is important to guarantee that their knowledge and skills are adequate to respond to such events.

Objectives: This study aimed at assessing the level of nurse's knowledge and attitude of Sari city of Mazandaran province about bioterrorism, in 2015.

Methods: Overall, 240 nurses participated in this cross-sectional study that was conducted at the University of Mazandaran Medical Sciences. The units were selected through the accessible sampling method. Data were collected by a questionnaire in 3 sections, demographic data, knowledge, and attitude, respectively.

Results and Conclusions: The results showed that 91.7% of samples had low knowledge about bioterrorism and 93.3% had no opinion in regarding attitude of bioterrorism. Little knowledge of nurses regarding bioterrorism attacks indicates inefficiencies in hospitals units. Therefore, bioterrorism preparedness should be proposed through continuing education for under graduate and post-graduate nursing curriculum.

Keywords: Bioterrorism, Knowledge, Attitude, Nurses

1. Background

Occurrence of bioterrorism is a significant challenge for public health personnel. Nurses play an important role in this regard. Therefore, they should have the necessary skills to prepare and protect themselves, their patients, and families from becoming infected (1-3). In the recent century, bioterrorist attacks increased around the world (4). Bioterrorism is a potential hazard to the health of people around the world (4, 5). The goal of bioterrorism is to create death, disease, and fear by using organisms or their products, such as toxins (6). The use of biological agents as weapons started as early as 600 BC when the cadavers and animal carcasses were used to cause disease in the enemy. Different studies showed that infectious agents and toxins, such as anthrax and smallpox, are mostly used as biological weapons (7, 8). Anthrax and smallpox are serious diseases because anthrax is easily aerosolized and smallpox has easily spread from person to person and both are cheap

to develop, have a long shelf life, and are also a threat to national security (9, 10). The objectives of disaster preparedness are to ensure that appropriate systems, procedures, and resources are in place to provide prompt effective assistance to victims, thus facilitating relief measures and rehabilitation of services is needed. Thus disaster preparedness is a program of long-term progressive activities with the goal of reinforcing the overall capacity of a community to manage all types of emergency (11). A bioterrorism event requires specific preparedness beyond usual medical disaster planning (12). To minimize death and casualties of disasters and emergencies, such as bioterrorism, the Asia-Pacific emergency disaster nursing network (APEDNN) was formed in order to better prepare nurses to respond effectively to disasters (13) and to increase the knowledge of nurses about the bioterrorism's symptom recognition, early diagnosis, and treatment (14, 15). Nurses work in all kinds of medical care units so they should be trained to be prepared about bioterrorism (1). Considering that

in biological terrorism, hospitals, emergency departments and health practitioners, including physicians and nurses, are the first responders dealing with patients, they are more responsible, and having bioterrorism preparedness training program will be necessary (15, 16). Recent studies have shown that nurses have poor knowledge in dealing with biological agents (17-20). Another study from America was carried out to assess the nurses' preparedness against bioterrorism and determined that most participants did not have enough knowledge to respond in these situations. Two others studies confirmed that nurses as the first responders did not have enough knowledge and preparedness to deal with bioterrorism attacks even in developed countries (19, 20). Similarly, the research of aghaei and bagheri-nesami (2013) showed that the majority of Iranian nurses (96.9%) had low knowledge about bioterrorism (4). Some other studies defined that Health care personnel, including trained nurses and physicians, had greater willingness to treat bioterrorism patients and injuries (4, 21, 22). Nurses will be the first responders in bioterrorism events (5, 20, 23). However, their attitudes to treat patients, awareness about the dangers of bioterrorism and participation in bioterrorism preparedness have not been well evaluated (19, 20, 24). The biological terrorism has been signed by a large number of countries (24). Therefore, it is an important challenge in a majority of countries as well as Iran. Thus, preparedness for a biological attack of emergency services and health care workers is necessary and needs further attention and researches. Limited knowledge and poor readiness of health care providers, such as nurses about bioterrorism, and considering lack of enough knowledge of Iranian nurses, especially the nurses of the north of Iran (Mazandaran Province) (4), this study was conducted to assess the knowledge and attitudes of nurses toward bioterrorism in this area of Iran. The results of this study could be used as a guideline for the Ministry of Health and decision makers for planning programs to increase knowledge and develop the attitude of nurses through bioterrorism and biological events. Also the subject of "bioterrorism" is somewhat a new topic in Iran and has not received enough attention, particularly in the north of Iran

2. Objectives

The aim of this study was to assess nurse's knowledge and attitude of bioterrorism in Sari city of Mazandaran Medical University, during year 2015.

3. Methods

This cross-sectional study examined the knowledge and attitudes of nurses, who were working in one of the governmental hospitals of Sari city of Mazandaran province, about bioterrorism, during year 2015. There were 4 governmental hospitals under the supervision of Mazandaran Medical University of Sari city of Mazandaran province. Two of the hospitals were general and referral hospitals and had the desired sections of the researcher, such as the infectious disease and internal wards, and emergency rooms. The total number of beds of selected hospitals was 593 and the number of hospital sections was 39. The inclusion criteria for this study was as follows, volunteers as participant, having bachelor of nursing or higher degree, working in one of the infectious disease and internal wards as well as the emergency rooms of governmental hospitals of Sari city, under supervision of Mazandaran Medical University, having at least one year experience in a setting of the study and having no type of formal training regarding bioterrorism before or simultaneously with the present study. Amongst the research population (675 nurses), 655 nurses were matched with the inclusion criteria and 20 nurses were excluded. The sample size was calculated as 280 nurses, based on the sample size formula of $(n = z^2 p(1-p)/d^2)$ and with regards to Aghaei and Bagheri-Nesami's (4) study, which reported that the majority of nurses (96.9%) had low knowledge about bioterrorism, ($P = 0.97$, $d = 0.02$ and $\alpha = 0.05$; 280 samples were computed). Finally, 240 nurses, who were in access and had all the inclusion criteria, were selected as participants. The data collection tool was a questionnaire. To define the validity of the questionnaire, content quality assessment with the help of eight experts was used to determine reliability, and the Split-half method of Cronbach's coefficient alpha was also employed. In the present study, Cronbach's coefficient alpha was 0.78 and was found to be suitable. After acquisition of ethical approval (on the 17th of April, 2013; approval NO.26) and other required ethical permissions, the researcher introduced herself to the nursing offices of the related hospitals and visited the nursing staffs, who were working in the hospital wards. The research was then explained for the participants and questionnaires were distributed among the nurses, who had all the inclusion criteria, and they were asked to return the filled questionnaires. The questionnaire had 3 sections. The first section contained questions about the demographic profile of the participants. The second part included 26 questions to assess knowledge of the bioterrorism that itself included 5 parts (6 questions about the concept and nature of bioterrorism, 3 questions about the agents of bioterrorism, 4 questions about the release of

bioterrorism factors, 5 questions about the detection of bioterrorism and 8 questions about the decontamination and care of bioterrorism victims). Answering each question was planned to select the correct, incorrect, and don't know options and each correct answer was given a score of 1 and each incorrect and don't know answer obtained a score of 0. The researchers categorized the dependent variables after transforming the sum of scores between 0 and 100 and determined absolute and relative frequency of participants' knowledge and attitude towards bioterrorism (Tables 1 and 2). Lastly, knowledge of the participants was categorized as low knowledge (0 to 33.3), moderate (33.4 to 66.6), and well done (66.7 to 100).

The third section of the questionnaire included 10 press statements in regards to the attitude evaluation. For scoring each statement a 4-point Likert scale was used. The range of degrees was displayed as totally agree, agree, no opinion, disagree, and quite the opposite. For attitude measurement of the statements that were indicative of a positive attitude, 4 points for totally agree option, 3 points for agree option, 2 points for no opinion option, 1 point for disagree option, and 0 point for quite the opposite option were considered. On the other hand, for attitude calculation of the statements that were indicative of a negative attitude, 0 point for totally agree option, 1 point for agree option, 2 points for no opinion option, 3 points for disagree option, and 4 points for quite the opposite option were considered and scores in three rows, negative attitude (0 to 33.3), no opinion or indifferent (33.4 to 66.6), and positive attitude (66.7 to 100) were included in this study. Data were analyzed using the SPSS statistical software and descriptive statistics.

4. Results

Collecting and assessing demographic data showed that most of the participants (66.7%) were aged 31 to 40, and 70.8% of them were female. The educational level of 95.8% of samples was Bachelor of Science (BS) and the rest had master of science (MSc) in nursing. Overall, 41.7% had work experience in a field hospital for 8 to 14 years. This study was based on two important research questions. The first question was "How sufficient is the knowledge of nurses about bioterrorism?" The result of this question showed that the level of bioterrorism knowledge was very low in all domains. Research domains included concept and nature of bioterrorism, causal factors, emission, detection and decontamination and care of victims. The level of knowledge in aforementioned domains of the first question was estimated as 9.3%, 0%, 12.5%, 4.1%, and 15%, respectively (Table 1).

The second question was "What is the attitude of nurses towards bioterrorism?" Unfortunately, the results

showed that the majority of the sample had no opinion about bioterrorism and this population was estimated as 93.3% (Table 2).

According to the achieved results in this study, in order to promote and improve the level of knowledge and preparedness against bioterrorism attacks in nurses, designing comprehensive educational programs is unavoidable. It is recommended for educational programs to be organized in the format of holding off workshops, student seminars, and several conferences at the national and international level and even include educational curriculum and lesson plans for medical and paramedical students in all medical universities of science in Iran. This education would be effective in providing a suitable attitude toward bioterrorism yet it isn't sufficient and other processes should be contemplated in the long time. Nevertheless, the existing nurses and other health staff in health care facilities should not be ignored. Continuous education courses are vital for increasing the level of preparedness, awareness, and practice of this target group (4, 14, 17, 18, 20, 25-27).

Considering the above Table 1, most participants (91.7%) had low knowledge about bioterrorism.

Considering the above Table 2, most participants (93.3%) had no opinion towards bioterrorism.

5. Discussion

This study determined that 91.7% of nurses had poor knowledge about bioterrorism. Another study that assessed nurse's knowledge in the nature of bioterrorism, etiologic agents of bioterrorism, clinical manifestations, and treatment of botulism in northwest Ohio showed the same results. For instance, they found that only 25.95% of the participants answered to the questions about the knowledge of botulism. Furthermore, 72.9% of participants announced their level of awareness of bioterrorism as "Not Much" or "Too Little" (not too much = 46.3%, too low = 26.6%) (18). Also, in another descriptive study based on the web, the assessment results about the level of preparedness and willingness to response to a bioterrorism attack, among Florida community health care providers (physicians, nurses, and pharmacists) demonstrated that only 1/3 of the Florida Medical Society had enough preparedness to deal with bioterrorism attacks. The rest of the 240 participants did not have enough preparedness about bioterrorism. The respondents were more competent in administrative skills than clinical knowledge (62.8% versus 45%) and this was reversed in comparison to the current study. In addition, in the present research, the least level of knowledge in nurses was allocated to diagnosis domain of bioterrorism victims whereas in Florida

Table 1. Distribution of Absolute and Relative Frequency of Participants Regarding Knowledge of Bioterrorism in Different Areas and in Total

Rate of Knowledge About Bioterrorism Frequency	(0 - 33.3) Low		(33.4 - 66.6) Medium		(66.7 - 100) Well Done	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
The concept and nature of bioterrorism (6 questions)	220	91.7	20	8.3	0.00	0.00
The agents of bioterrorism (3 questions)	240	100	0.00	0.00	0.00	0.00
The release of bioterrorism factors (4 questions)	210	87.5	24	10	6	2.5
The detection of bioterrorism (5 questions)	230	95.9	10	4.1	0.00	0.00
The decontamination and care of bioterrorism victims (8 questions)	204	85	26	10.9	10	4.1
Total knowledge of bioterrorism	220	91.7	20	8.3	0.00	0.00

Table 2. Distribution of Absolute and Relative Frequency of Participant's Attitude Toward Bioterrorism

Attitude Toward Bioterrorism	Frequency	Percentage
(0 - 33.3) negative attitude	0.00	0.00
(33.4 - 66.6) no opinion	224	93.3
(66.7 - 100) positive attitude	16	6.7
Total	240	100

community health care providers, the least level of knowledge was about the agents of bioterrorism. The other considerable point of Florida research was physicians' knowledge about bioterrorism, the results of which indicated that 74.2% of physicians had not received any education on this aspect and they had little awareness (25). Based on Kshirsagar et al.'s study (2017), less than 60% of the dentists were unaware of commonly-used biologic agents, such as plague, small pox, anthrax, and botulism, employed in an attack (28). Another study on 291 samples, including nurses, physicians, and medical students showed the low knowledge of health service providers about bioterrorism. The knowledge score of all participants was very low and the rate of correct answers to the knowledge questions was only 25%. Less than 23% of respondents expressed that they could provide health services in emergencies and disasters (15).

A similar study in America was carried out to assess the nurses' preparedness to respond to bioterrorism attacks; only 15 individuals of 1528 participants had enough knowledge on how to respond in these situations. Two other studies confirmed that nurses, as the first responders did not have enough knowledge and preparedness to deal with bioterrorism attacks, even in developed countries (19, 20).

On the other hand, many studies showed that if the knowledge and preparedness of the health care team is promoted, their willingness to respond to biological accidents and treatment of injuries will be promoted as well,

and could mitigate harmful consequences. For instance, the result of Thomas' study indicated that from 76 nurses and physicians working at emergency departments, from those, who had the highest awareness in the field of anthrax, 50% more than others tended to give services in case of biological attacks at work. Furthermore, 37% were more likely to be prepared to treat patients with suspected anthrax and also 28% more than those who were not trained, were willing to treat patients who had definitely suffered from anthrax (29). These results emphasize the above mentioned subjects.

5.1. Ethical Considerations

This study was approved by the human research and ethics committee of Nasibeh nursing and midwifery school of Mazandaran University of Medical Sciences, during April 17, 2013 (approved NO.26) and the permission to enter the research fields were obtained from the related authorities. The purpose of the study was explained to all participants prior the beginning of the research and their informed consent was obtained verbally. Also, one of the study inclusion criteria for nurses was "to be volunteer as a participant". They were also assured of the data confidentiality and all the questionnaires were kept anonymously.

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Footnotes

Authors' Contribution: Study concept and design, acquisition of data, analysis and interpretation of data, and drafting of the manuscript: Nahid Aghaei; study concept and design: Hasan Abolghasem Gorji; critical revision of the manuscript and statistical analysis: Nouredin Niknam and Tahereh Yaghoubi.

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