

Abu Dhabi's CBRN

The impacts and costs of hazards on people, properties and the environment are often severe when they occur, especially when there's no warning system in place. The lack of an early warning system (EWS), and limited knowledge of the potential impact of hazard in some communities in the UAE have emphasised the need for more effective early warning systems. This paper examines the use of an innovation lab to improve understanding of the potential impacts of hazards, and as an EWS tool in the UAE.

Identifying elements of EWS from literature helped in developing the framework for structuring and implementing activities in the innovation lab, using a comprehensive hazard approach that focuses on CBRN risks, knowledge of which is minimal in the UAE. The population of Abu Dhabi was surveyed to determine how much people know about CBRN hazards, while eight managers in the Abu Dhabi Police (ADP) were interviewed to further understand the role of the innovation lab in improving the current level of knowledge. The research revealed that knowledge and warning of CBRN hazards in the UAE is low, and may be improved through the use of an innovation lab.

Introduction

As an essential part of the preparedness phase for any disruptive event, EWS are very important, though underemphasised^{1,2}. Among all the other preparedness activities such as training programmes, mutual aid agreements, exercises, resource inventories and management^{3,1} EWS often tend to be overlooked or inadequately conducted at this stage⁴.

The limited attention paid to EWS often impacts on response arrangements, and the effect of this further impacts communities that are prone to such hazards⁵. Past hazards and the resultant impacts have shown just

how susceptible communities are when faced with hazards while lacking adequate EWS⁴. A 2010 paper on disaster management with regard to rapid onset natural disasters⁵ states that concerns about hazards and safety can preoccupy people to the extent that fear overwhelms them to the point of inaction. Such inaction has been linked³ to lack of public education, awareness and information.

It can be argued¹, however, that the negative impacts of hazards should be strong grounds for investing in effective EWS. Further, the role of emergency officers/agencies and the community in planning for response, and the indicators for EWS for hazards are confusing, and even in best case scenarios they are vague in many countries, the UAE included^{4,6}. Thus, this paper draws upon EWS literature, and identifies the key elements of effective EWS, which are used to evaluate hazard knowledge in Abu Dhabi. These elements also inform police use of the innovation lab for the purpose of improving knowledge levels and educating both emergency organisations and communities on the impacts of hazards, and clarifying their roles in response to CBRN hazards.

Innovation Lab: Concepts and application

The UAE faces various socio-technical challenges one of which is the vagueness surrounding EWS for communities, and the roles of communities and emergency organisations in implementing EWS. Abu Dhabi residents, for example are unaware of national or emergency plans that define their role and the procedures for EWS⁵. What's more, there is little knowledge, as well as a lack of education regarding EWS signals and confirmation of receipt of EWS in the event of hazards. The consequences of this lack of an end-to-end approach to preparedness have been identified⁵. But other papers⁷ have emphasised how the lack of a people-

focused approach to preparedness, and especially EWS, could be devastating immediately and in the long term in Abu Dhabi. Undeniably, the presence of many non Arabic-speaking expatriates creates further communication challenges, so careful consideration needs to be given to EWS tools and public education in multiple languages.

The weaknesses in the transfer of comprehensible warning messages and preparedness information to those at risk are acknowledged⁸. Thus, the past lack of networking and communication among all stakeholders⁸ has reinforced the relevance of using the innovation lab to generate ideas for brainstorming models that may be used to communicate on CBRN risks. Brainstorming sessions in the innovation lab, have created solutions for CBRN response and EWS that may lead to more effective integration of technologies for EWS and response processes for CBRN hazards in Abu Dhabi⁹.

The model created integrates monitoring and control measures for hazards, and the means of raising community awareness around potential risks of CBRN. Use of technology in this space has further enabled the use of modern detectors at hazard sites and control. This comprehensive mode incorporates the elements of effective EWS identified in UN recommendations¹⁰ in 2006. The four elements of effective EWS being; risk knowledge which includes data collection and risk assessment, monitoring and warning, warning dissemination and communication, and response capability. Taking a lead from these elements, more comprehensive ideas were created in the innovation lab, and then tested through semi-structured interviews and questionnaires.

Methods

Primary qualitative and quantitative

Innovation Lab



data were collected in the UAE. The qualitative element, which focused on investigating the existing deployment of EWS and the role of the innovation lab in improving knowledge of CBRN, involved a series of semi-structured interviews with emergency organisations in Abu Dhabi. A total of eleven questions were put to eight interviewees, with sessions lasting between 45 and 90 minutes depending on the level of engagement.

The questionnaire set out to determine the risk knowledge level and perceptions of CBRN among people in Abu Dhabi. A random sampling technique¹¹ was used to determine the required number of participants, and a paper questionnaire was used to encourage wide participation by people living, working and conducting business with close proximity to a potential CBRN hazard. Using this method, a total of 845

respondents was achieved, which is a sample size calculated to provide a confidence level similar to that of Gautam and Shivakoti¹² in 2001.

The questionnaire included 25 questions grouped into four main sections based on four interrelated elements or themes for effective EWS. Due to the vast number of foreigners in Abu Dhabi, it was produced in both English and Arabic and was collected five days after being dropped off at homes, offices, commercial centres like malls, stations and community centres, and schools. Copies were also delivered to and collected from staff in hotels, public ministries and other organisations.

Data analysis

The interview data was analysed using Nvivo 10 software and categorised according to the elements of effective EWS. The questionnaire data analysis

was carried out using SPSS software to produce descriptive and inferential statistics¹³. By using SPSS version 16, important data from the community at risk were generated to determine the level of risk knowledge, and the potential impacts of EWS ideas developed in the innovation lab. This process generated data which contributed to developing the framework for effective EWS for mitigating the impacts of CBRN hazards in the UAE.

Results and Discussion

The result revealed that risk knowledge of CBRN hazards is low among the community, while community members believed that hazard monitoring and warning ought to be conducted by the police and disseminated via the media or mobile SMS. It also revealed that the community are unaware that the police run exercises and are trained to respond

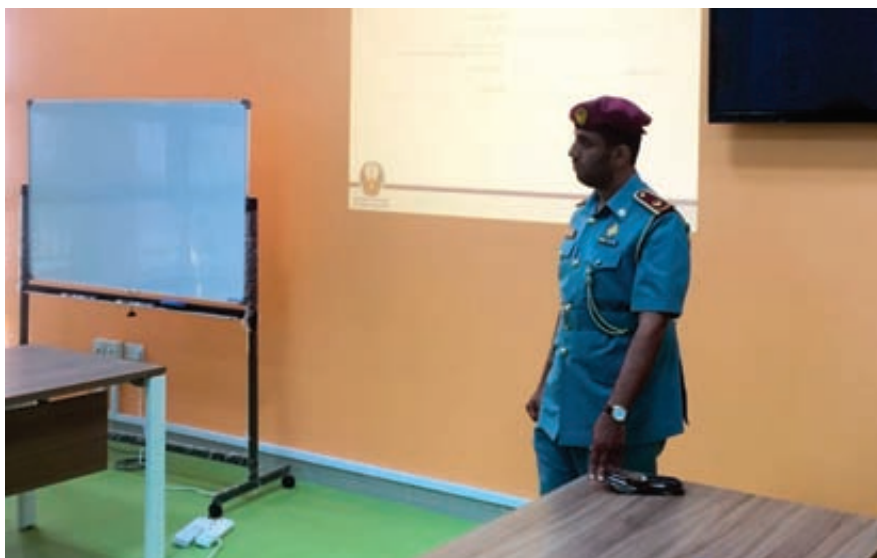


A lack of a people focused approach to preparedness could be devastating ©Al Hmoudi

Abu Dhabi's CBRN Innovation Lab

to CBRN hazards. They believe that the community should participate in exercises to test evacuation processes. For instance, 48% of the respondents replied that participating in exercises of this nature will help to improve awareness and knowledge of CBRN risks.

The semi-structured interviews with managers in emergency organisations revealed a low level of knowledge of the use of the innovation lab to increase risk knowledge. However, ADP managers were aware of the potential and importance of the innovation lab in developing new ideas that can improve community awareness and knowledge of CBRN hazards. Though views vary on which organisation should lead the EWS for CBRN hazards, all the managers interviewed emphasised that several multi-cultural mediums should be used to disseminate warnings of CBRN hazards to the community. The interview results indicate that the response capabilities of emergency organisations vary with only civil defence confirming its capability to respond to CBRN hazards. ADP confirmed its ability to use the innovation lab to create an effective



Multicultural public education has been identified as an important component of Abu Dhabi EWS. © Al Hmoudi

EWS model that may be used to improve knowledge of CBRN risks and give warnings that may help to preserve the lives of residents.

Discussion

The pattern of results generated by this research show that improvement is needed in the areas of risk knowledge,

and the monitoring and dissemination of warnings concerning CBRN hazards. While the interview results on risk knowledge reveal the lack of expertise and understanding of EWS in Abu Dhabi, the full results also reveal that any preparedness activities fail to involve the community at risk. The practice of EWS in the UAE and response lacks the

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four interrelated elements of EWS identified in the literature. A structured process exists for communicating warnings between organisations, but it lacks community involvement. This suggests that communication only takes place along horizontal lines, which is too limited a process for disseminating hazard warning messages¹⁴. The results



Fig. 1. EWS model generated from UAE innovation lab

show that there is no effective EWS in Abu Dhabi since the four elements are not sufficiently identified through the survey nor explained by the managers. Consequently, the results were subjected to further brainstorming sessions in the innovation lab, from which the EWS model in Figure 1 was generated.

The model shows that multicultural public education has been identified as an important component of any EWS in Abu Dhabi due to its large number of expatriates. Community awareness has been added to the model, and encompasses community participation, media engagement and CBRN training and communication. It was decided in the innovation lab that these elements will enhance response capabilities and the overall early warning systems for CBRN hazards in Abu Dhabi.

Conclusions

The elements of effective EWS derived from the 2006 UN global survey of early

warning systems¹⁰ were instrumental in determining what was important for EWS in Abu Dhabi. The research results, however, revealed that improvement is required in Abu Dhabi, and the innovation lab provided the platform from which ADP officers could embark on brainstorming and investigation that involved the communities at risk. While this combined method of inquiry is unprecedented in Abu Dhabi and by ADP, it has emphasised the importance of the innovation lab and its role in enhancing knowledge and creating ideas that can lead to improved systems, procedures and preparedness for CBRN hazards in Abu Dhabi and the UAE as a whole. While the lab was not popular prior to this investigation, its role in helping officers to brainstorm and create ideas has pushed it to the fore within ADP as a means of improving preparedness and capabilities for responding to CBRN hazards.



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