Health Emergency Mass Notification: Lessons Learnt from the H1N1 Pandemic in Tehran

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ABSTRACT

Background: Timely notification is of great importance in health emergencies. So identifying the most important sources of information used by people in emergencies seems necessary. The objective of this study was to assess peoples' level of awareness concerning the symptoms, routes of transmission, prevention, and treatment of H1N1 at the time of the pandemic and also to identify their most important source of information.

Methods: Two telephone surveys were performed at the beginning of levels five and six of the pandemic at a four-month interval on two populations. Using a questionnaire, random phone numbers were called and 662 and 701 individuals from Tehran were surveyed at the two phases.

Results: Peoples' level of awareness concerning the disease, symptoms, its routes of transmission, prevention, and treatment of H1N1 had increased in the second phase of the study. At the same time, people were less afraid of the disease in the second phase. The most important sources of information used were TV, newspapers, and radio, respectively.

Conclusions: Mass media including TV and newspapers were recognized as the most important sources of information used by the people in emergencies. It seems that designing educational programs and synchronizing the media's policies with health authorities can help fight future health emergencies and prevent delays in notifying people.

Keywords: Epidemics, emergency, health promotion, mass media, swine flu

INTRODUCTION

Notification strategies are essential components of epidemic management. Precise and timely notification is vital in reducing the unwanted social, economic, and unforeseen consequences of an epidemic. And it should be done according to the community's and different groups' needs with respect to the pandemic phase the country is experiencing.[1] This matter is more important when pandemics are concerned, the example of which was seen in the recent swine flu pandemic.

The H1N1 influenza of swine origin emerged for the first time with acute respiratory symptoms in March 2009 in Mexico.[2] This virus was the result of a mutation of three types of swine, avian, and human viruses, and most humans were not immune to it. Like other seasonal influenza, this disease spreads through coughing and sneezing of infected individuals and its symptoms are non-specific and include fever, cough, sore throat, headache, malaise and fatigue, and in some instances diarrhea and vomiting.[3]

The US CDC (Centers for Disease Control and Prevention) believed that H1N1 vaccination was the first and foremost step in H1N1 influenza prevention. According to the Advisory Committee on Immunization Practices (ACIP), vulnerable individuals should receive the vaccine as soon as it is made available.[4] Other preventive measures advised were: repeated hand washing with soap and water, avoiding contact with eyes and nose, avoiding close physical contact with infected individuals, avoiding crowded places, delaying unnecessary trips, and if infected, staying at home and resting.[5-7]

The World Health Organization (WHO) defined the necessary measures needed to fight the influenza pandemic at individual, familial, and community level. In this guide, observing personal hygiene and safety, caring for patients at home and isolating them have been considered as personal level measures. Measures at community level, however, require a change in community behavior. At this level, other organizations such as the media need to cooperate as well.[7,8]

Most countries affected took up the non-pharmaceutical interventions (NPI) advised by WHO in the first phase including: mass education for keeping a safe distance in gatherings, house isolation/quarantine, limiting travels, and presenting useful information to health service providers, public health authorities and the community.[8,9] These measures were taken through notification and dissemination of educational material to all target audiences including service providers and people via the internet and at times even delivery of educational pamphlets to household doorsteps.[10]

Developing countries face more difficulties in pandemics because they have fewer resources. Difficulties in adequate and timely provision of antiviral drugs and/or vaccines are why proper education and notification can play more decisive roles in these communities.[7]

In Iran too, authorities tried to control the disease by taking up the most appropriate strategy in light of the available resources. Measures such as mass notification via mass media, creating a specific homepage dedicated to H1N1 influenza on the Health Ministry's and medical universities' websites, distribution of educational CDs and pamphlets, putting up posters in public places, and offering 24 hour hotlines were among those taken up in the country. These measures reached their peak in the gap between the two phases of the study.

The survey was performed simultaneously on physicians and people to assess the educational requirements at the time of the epidemic. The results of this study were promptly presented to decision makers at the disease management center. Part of the study that was concerned with physicians' level of awareness has been published elsewhere.[11] This part was concerned with peoples' level of awareness, to assess their educational needs and identify their sources of information.

METHODS

A cross-sectional study was conducted in two phases at a four-month interval. The first phase of the study was conducted after the WHO announced phase five[1] of the epidemic, i.e. international spread of the disease and the second phase was conducted after the first incidence of death resulting from swine influenza in Iran [Figure 1]. The populations studied were the people of Tehran. Data were gathered through phone survey. Each phase of the study was performed in eight consecutive days (phase 1: 30th April -7th May, phase 2: 2nd -9th September) [Figure 1].

Stratified random sampling was done from Tehran's phone numbers. With the help of the telecommunications' office, random numbers were selected with equal proportions from the northern, southern, western, and eastern areas of the city.

The questionnaire on peoples' awareness included 4 questions on demographic information and 13 questions on the methods of transmission, symptoms, preventive measures, treatment,

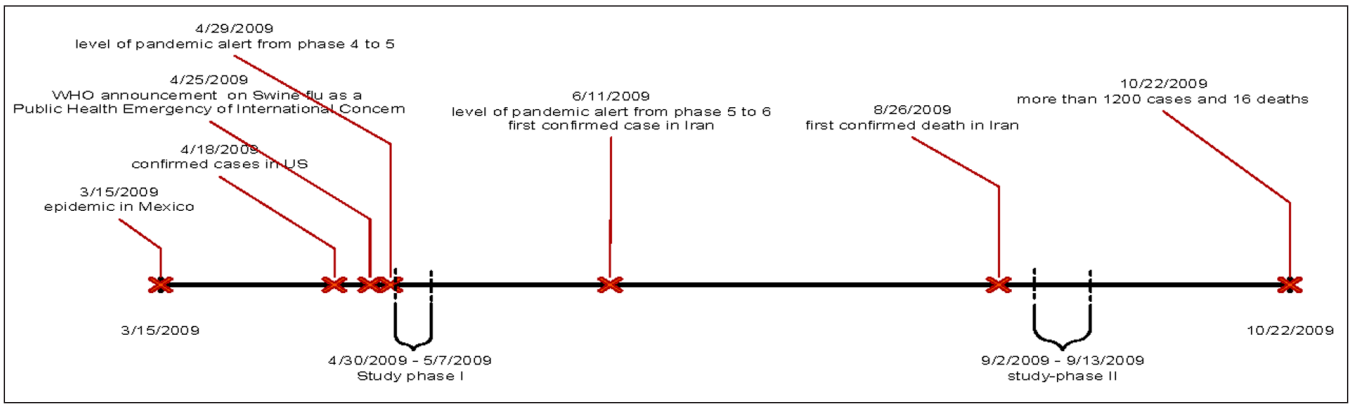

Figure 1: Study's timing with respect to the state of the epidemic

and severity of the disease. The questions on transmission, preventive and curative measures of disease were arranged on the basis of relevant organizations' recommendations. In the end, the source of information was asked in an open-ended question. For ethical reasons, participants' verbal consent was obtained after explaining the project's objectives. In case the participant had inadequate or incorrect information on the disease, correct and up-to-date information would be given to him/her by the interviewer at the end of the interview and their questions would be answered. The first phase began upon receiving the approval of the Vice Chancellor of Research of Tehran University of Medical Sciences (TUMS). The second phase, however, began after the protocol of the study was approved by the Ethical Board Committee.

Data analysis

The data gathered were analyzed with Statistical Package for the Social Sciences (SPSS) software. Chi^2 was used to compare the frequencies and *t*-test was used to calculate the means.

RESULTS

During the two phases of the study, 712 and 759 calls were made, respectively, and 662 and 701 questionnaires were filled. The response rate was 92.9% and 92.3% in the first and second phases, respectively.

A total of 69.5% and 67.1% of the respondents in the first and second phase, respectively, were women. The participants mean age was 39.62 ± 14.8 and 38.41 ± 14.17 (P<0.151) in the two phases, respectively. The youngest respondents were 13 and 11 years old, respectively. The oldest respondent was 85 in both phases.

The participants' educational status has been demonstrated in Figure 2.

Level of awareness

In the first phase, 19.5% of people (129 individuals), and in the second phase, 20.8% (146 individuals) had heard nothing about swine influenza (P=0.538). The rest of the questions were asked from the people who had some information about it. In the second phase, 68.6% (481 individuals) were aware that the disease had reached Iran. The rest were unaware.

Table 1 shows the participants' opinions on the routes of disease transmission. In the first phase, 29.8%, and in the second phase, 67.3% were aware of the possibility of person-person transmission.

Peoples' awareness on preventive measures had significantly increased in the second phase as compared to the first phase. The most frequent items reported by people in the first and second phase respectively were 'avoiding close contact with patients' (39%) and 'hand washing' (47.3%) [Table 2].

Peoples' level of awareness in the field of diagnosis and treatment of disease had also increased in the second phase [Table 1].

Severity of threat

As illustrated in Table 3, people thought the severity of disease was higher in the first phase, rather than that in the second phase. Apparently, their fear of the disease had lessened due to their increased awareness of the disease. Sixty percent believed that death was a complication of disease, but this number had changed in the second phase, and less than a third thought so.

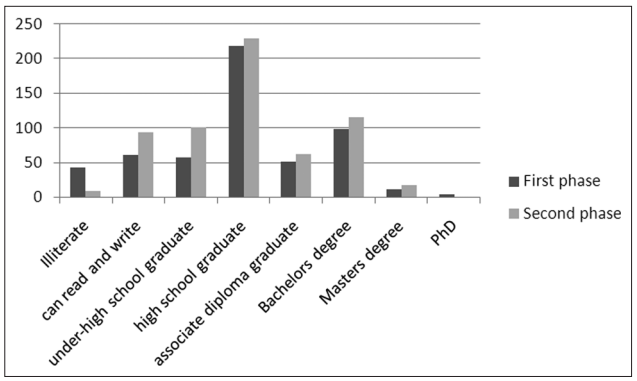

Figure 2: Distribution of educational status among respondents in the first and second phases of the study

Table 1: Level of awareness on swine influenza

Fields for assessment of awareness	First phase number (percent)	Second phase number (percent)	*P* value
Person to person transmission	196 (29.8)	446 (67.3)	<0.001
Symptoms of disease*	256 (38.7)	389 (55.5)	<0.001
Vaccine unavailability	179 (27.8)	249 (38.5)	<0.001
Possibility of death resulting from disease	335 (60.3)	191 (29.4)	<0.001
Existence of antiviral medication for the disease	133 (20.7)	173 (26.8)	<0.001

*At least two symptoms of the disease have been reported

Sources of mass notification

TV, newspapers, and radio were the most important sources of information. More than 90% of people had gained some information on swine influenza via television in both the phases [Table 4].

DISCUSSION

This study was performed with the objective of identifying Tehranians' sources of information and level of awareness on swine influenza as a health emergency. These data can prove very useful to health policy makers and authorities and help them in designing appropriate mass notification means for future health emergencies.

With the passage of time and the measures taken by authorities during the epidemic, peoples' level of awareness has significantly increased on the disease, its routes of transmission, prevention, and treatment. In the first phase of the study, people were very scared of the disease, such that 60% believed it resulted in death. Mass media including television and newspapers were peoples' most important sources of information in both the phases. Television was the source of information in more than 90% of cases.

We used random sampling from the people

Table 2: Level of awareness on preventive measures

Preventive measures	First phase number (percent*)	Second phase number (percent*)	*P* value
Repeated hand washing with soap and water	45 (6.8)	278 (47.3)	<0.001
Covering the nose and mouth with a piece of cloth while sneezing and coughing	105 (15.9)	135 (23.0)	<0.001
Using a mask	12 (1.8)	22 (3.7)	<0.036
Avoiding close contact with patients, those with symptoms and/or travelers coming from affected countries, and crowded places	258 (39)	152 (25.9)	<0.001
Avoiding contact with eyes, nose and mouth with dirty hands	14 (2.1)	53 (9.0)	<0.001
If affected by the disease, staying at home and avoiding contact with others	40 (6.0)	29 (4.9)	<0.391
Sleep and adequate rest	2 (0.3)	17 (2.9)	<0.001
Proper nutrition and exercise	21 (3.2)	11 (1.9)	<0.146
Avoiding unnecessary travel to infected areas	0 (0)	13 (2.2)	<0.001

*Since different items have been combined the total might exceed 100

Table 3: People's opinions on the severity of disease

Disease threat	First phase number (percent)	Second phase number (percent)
Mild	22 (4.0)	100 (15.4)
Severe	97 (17.3)	108 (16.6)
Death	335 (60.3)	191 (29.4)
Uncertainty toward the severity of disease	103 (18.5)	251 (38.6)

$X^2 = 145.43$, *P* value=0.0001

Table 4: People's sources of information on swine influenza

Sources of information	First phase Number (percent)	Second phase Number (percent)	*P* value
Television	481 (94.3)	465 (92.3)	<0.192
Public newspapers and magazines	55 (10.8)	51 (10.1)	<0.729
Radio	39 (7.6)	34 (4.9)	<0.579
Satellite TV	17 (3.3)	6 (1.2)	<0.022
Health service providers	3 (0.6)	10 (2.0)	<0.048
Friends and acquaintances	0 (0.0)	9 (1.8)	<0.002
Internet	11 (2.2)	7 (1.4)	<0.354
Educational brochures, pamphlets and notes	0 (0)	4 (0.8)	<0.044
Book	3 (0.6)	2 (0.4)	<0.664

*Since different items have been combined the total might exceed 100

of Tehran in this study, so limitations that exist in telephone surveys may apply to our study too. Phenomena such as absence of a phone in a household (which is albeit very rare nowadays), presence of cellphones instead of landlines, non-response because of being unfamiliar with the calling number, having more than one phone line in the house, absence of employed individuals at the time of the call, and their exclusion from the study are limitations of sampling. The absentees' level of awareness and sources of information may be different from those participating in the study as well. However, the aim of the study group was to present executive bodies with data in a short period of time. Considering the importance of the topic at the time, the sampling bias may be overlooked; a phenomenon that is present in studies conducted elsewhere too and ignored because of its ease and reduction in costs.[12,13] Concerning sampling bias in a cross-sectional study, a fixed method of sampling was undertaken in two consecutive phases (four months apart) on two different populations, so the possibility of sampling bias is reduced. Therefore, practically speaking, since the populations under study were different in the two phases, they can be considered free of sampling bias.

When facing a health emergency, having an appropriate definition of a problem or disease, creating sensitivity and correct awareness in the health system, and mass notification are the most important items that health policy makers should have access to.[14-16] According to WHO's recommendations, countries should get ready to face pandemics by planning and coordination, monitoring and evaluation of the status quo, creating communications, reducing the spread of the disease, and maintaining health care services. The role of the health system is crucial in organizing and leading organizations in such measures. Planning for and taking primary preventive measures seem more valuable in developing countries, because they have fewer resources and therapeutic measures and pharmacologic prevention is costlier. Unfortunately, in the recent swine flu epidemic, many countries lacked this particular coherence in the initial phases of the disease.[17] International organizations have recommended correct and timely notification at various levels and NPIs in the initial phases of an epidemic.[8] In Iran too, health authorities have taken many measures on notification to raise peoples' awareness and knowledge on the nature of disease, its transmission, and effective methods of prevention.

According to our results, person-to-person transmission which is the most important mode of transmission of disease was stated by 29.8% and 67.3% of participants in the first and second phases of the study, respectively. The most important method of prevention i.e. hand washing with soap and water was stated by 6.8% and 47.3% of participants in the first and second phases of the study, respectively. People's level of awareness had increased in the field of treatment too. All these evidences bear witness to the appropriateness of the teachings. Whether this awareness has been good enough requires another study on the effectiveness of this awareness in behavior change or disease reduction which were not the objectives of the current study. A study conducted on people aged above 18 reported their low awareness on influenza.[18] It appears that better education and notification are required to raise people's awareness in order to better control epidemics.

The danger felt by people in the first phase was greater compared with the second phase. Past experiences affect the way we confront matters. In infectious epidemics peoples' fears are exaggerated. A study conducted on SARS in 2005 in five European and three Asian countries

on 18-75 year olds showed that when people are more afraid they are more eager towards adopting preventive measures, correct behavior, and acquiring awareness.[19] No doubt peoples' psychological reactions such as anxiety and behaviors upon facing a fearful situation is different based on individuals' circumstances and knowledge.[20] Therefore, informing people on the severity of threat in emergencies is effective in encouraging them to gain information and avoid unnecessary anxiety and stress. The interesting point here is that, in the study's second phase, be it exaggerated; the danger felt by ordinary people may have contributed to the increase in their thirst to acquire awareness. Although another study performed in Saudi Arabia showed that a mere increase in public qualms will not guarantee people's correct behavior.[2] This issue, however, can be separately studied. Moreover, in the second phase of the study, the uncertainty toward severity of disease had increased. Our interpretation is that people's awareness and their impression of its lethality had decreased and people were uncertain of the severity of disease or had reported it as mild.

People use different sources of information corresponding to their personal and social factors and facilities available. In spite of public notifications made via separate internet links in various sites in the country such as universities and Ministry of Health, and distribution of posters, pamphlets, CDs and various other items, mass media was recognized as a more important source of information in this study. Television, magazines, and public newspapers were identified as the most important sources of information. An American study conducted on people inside hospitals and their health knowledge showed that most of them had acquired their information from TV and newspapers.[18] Perhaps, since the majority of ordinary people did not have access to the internet, in spite of the time and money spent, specialized sites could not play a significant role in notifying them. On the other hand, being accessible and cheap, mass media has been able to reach out to people and become their most important source of information. In more developed countries like Australia, however, the internet too has been recognized as a main source of information.[8] Therefore, by improving peoples' access to the internet, this media too can become a valuable source of information. Also, contextualizing through these very means, other sources can be introduced, such as telephone, email, SMS etc.

CONCLUSION

This study shows the positive impact of mass education on raising peoples' awareness and level of knowledge, and the appropriateness of such executive measures. Also, at the time being and under the current circumstances, the most important sources in the country are mass media like TV and newspapers. Therefore, having a single notification policy and interacting with these media to present timely and quality content can prove helpful in cases of emergencies and prevent social and economic harm.

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