Suez Canal University Medical Journal Vol. 21 (1), 2018
Pages 31-39

Evaluation of the National Influenza Epidemic Preparedness Plan in Ismailia City Hospitals and Primary Health Care Centers

Zeinab F. Abdel-Fatah*, Sobhy A. Sobhy, Lamiaa E. Fiala, Rasha F. Abdellah, Ashraf M. El-Shatawy

Department of Public Health, Faculty of Medicine, Suez Canal University, Egypt

Abstract

***Background*: There are many bioterrorism threats clinical cases used biological agent such as virus and bacteria. Viruses that are potentially used in bioterrorism act are influenza viruses. The emergence of a new influenza A subtype among humans can cause a worldwide outbreak, known as a pandemic, leading to larger than usual numbers of deaths as well as societal disruption Influenza can be epidemics and causes mass casualty. For this reason, health care settings must have a good preparedness plan for influenza epidemics. *Aim:* To estimate the current state of influenza preparedness level in hospitals and primary health care centers. *Subjects and Methods:* A cross sectional study design was conducted at three hospitals and four primary health care centers in Ismailia city. Data collection tools included a questionnaire for assessment of preparedness level in hospitals and a checklist for assessment of primary health care centers preparedness level. *Results:* The results of this study showed that the overall preparedness level in the studied hospitals was moderate (67%). The weakest domain in hospital preparedness was health personnel and supplies (56%) while the weakest area of preparedness among primary health centers was infection control (41%). The overall preparedness level in primary health care centers was poor (52%). *Conclusions:* From our result we concluded that the weakest domains of preparedness in hospitals were health personnel and supplies while the weakest domain of preparedness in primary centers was infection control measures.**

Keywords: Influenza, preparedness, evaluation, epidemic, hospitals, primary health care centers

Introduction

Preparedness can be defined as the ability to reduce morbidity and mortality that results from large-scale transmission of infectious diseases such as pandemic influenza, or from other natural or man-made disasters[1]. Preparedness plans consist of public health capacity building and include activities relevant for individual healthcare facilities. These activities include surveillance, communication, vaccination services, and maintenance of an inventory of antiviral drugs. All WHO member states were advised to develop an individualized pandemic plan, because the contents and structure of healthcare partnerships depend on country-specific regulatory, finance, and administration systems[2]. *World Health Organization,*

**Corresponding Author: zeinab.farahat@yahoo.com*

Regional Office for the Eastern Mediterranean: The WHO provided advice on pandemic preparedness to all countries in the Eastern Mediterranean Region including Egypt. Their support focused on: 1) preparation for an emergency, 2) surveillance, 3) containment strategies, 4) continuity of essential services in a crisis and 5) research and evaluation. In addition, they provided advice on implementation, testing and revision of national plans. The WHO stated that influenza pandemic planning requires specific planning to address actions that should be taken by countries as well as by WHO and other partners according to the Pandemic Phases[3]. The aim of preparing the healthcare services for a pandemic/ an epidemic is to ensure the continuation of regular and emergency services while providing appropriate clinical care for cases of pandemic influenza, whether these present to primary healthcare, are hospitalized or admitted to critical or intensive care units (ICUs). Appropriate clinical treatment will reduce morbidity and mortality and thus mitigate the effects of the pandemic[4]. In any healthcare system, primary care is at the forefront of the response to any emerging epidemic. Since the outbreak of SARS, there has been a growing recognition of the need for an integrated preparedness approach to deal with public health threats, to include acute clinical care, public health, and emergency management systems. However, few studies have been conducted using a previously developed framework to evaluate the response of primary care to influenza A pandemic[5]. An evaluation of local preparedness in Taiwan used evaluation methods via checking the completeness of their preparedness and response plans with the indicators and observation via an exercise. The major gap was found in medical resource mobilization. None of these reports provide rigorous information related to grassroots health level, the major front line in developing countries[4]. Due to endemicity of avian influenza in Egypt and occurrence of the next influenza epidemic is unpredictable and due to lack studies on assessment of preparedness plan on health care level so we conduct this cross-sectional observational study.

Subjects and Methods

Design: Cross sectional design was used to assess the influenza preparedness plan in health care facilities (hospitals and primary health centers) in Ismailia city.

Subjects: Directors of health facilities or those responsible for the influenza epidemic plan in the facility (hospitals and primary health care centers).

Setting: This study was conducted at three hospitals and four primary care centers in Ismailia city. One primary care center refused to participate in the study. For the confidentiality of results, the included hospitals were coded into hospital A, B, C and centers were coded into center A, B, C and D.

Data collection tools: Data collection tool included questionnaire for assessment of preparedness level in hospitals and checklist for assessment of primary health care centers preparedness level. Hospitals survey questions were based on WHO checklists[6] and Egypt's influenza epidemic preparedness plans (2014-2016)[7]. The checklist for the survey of primary health centers preparedness plan were adapted from WHO checklists (WHO, 2007)[8], Egypt's influenza epidemic preparedness plans (2014-2016)[6] and Prateepko and Chongsuvivatwong, 2012[4].

Statistical analysis

Statistical analyzes were performed using IBM SPSS Statistics software Version 22.0. Descriptive statistics of the data were presented. Quantitative data were expressed as a mean and standard deviation while categorical data were expressed as frequency and percentage.

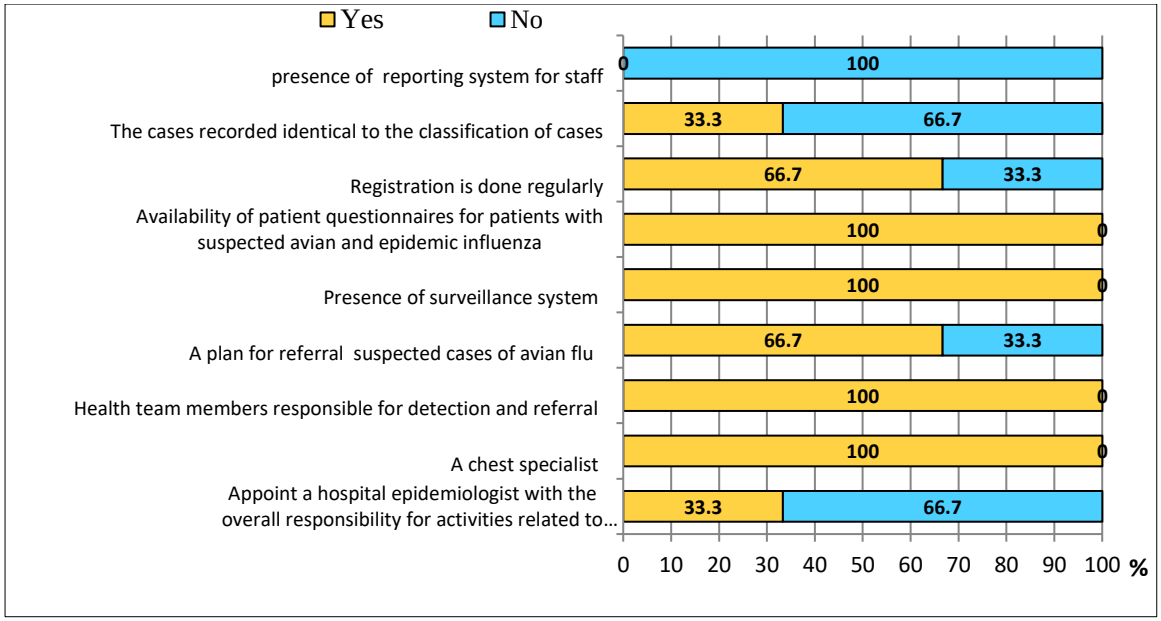

Figure 1: Distribution of plan and surveillance items of preparedness plan in hospitals

Results

This study was conducted at three hospitals and four primary health care centers in Ismailia city. For the confidentiality of results, the included hospitals were coded into hospital A, B, C and centers were coded into center A, B, C and D. Figure (1) represents 66.7% of hospitals did not have Appoint a hospital epidemiologist with the overall responsibility for activities related to early warning and monitoring in the hospitals but all hospitals had a chest specialist, health team member responsible for dealing with influenza cases, surveillance system and case report. Reporting system for staff member did not available in all hospitals and 66.7% of hospital did the registration regularly. Regarding the infection control measures all hospitals had an infection control policy but only 33.3% of hospital gave information on influenza transmission and hand hygiene, presence protocol of infection control for influenza epidemic and triage of influenza cases in emergency department. About two third (66.7%) of hospitals had the designed area for influenza inpatient, isolated and ventilated patients and a plan to prioritize hospital workers to receive vaccines figure (2). Regarding the clinical management items in hospitals figure (3) shows that all hospitals had fulfilled implemented 5 items of management and two third of hospital fulfilled the criteria for screening new patient for febrile respiratory illness, questioned the suspected cases with specific questionnaire and knowing referral sites while one third of them knowing criteria for admission and starting patients on ventilators. Figure (4) shows that all hospitals trained their employees on the guide of dealing with influenza cases and had a guide for sample transfer and which central lab to transfer their sample while the supplies two third of hospitals had stockpile for gloves, hand hygiene products, tamiflu, disinfectant and throat swap and cultures but all hospitals had not stockpile of face shield and eye protection.

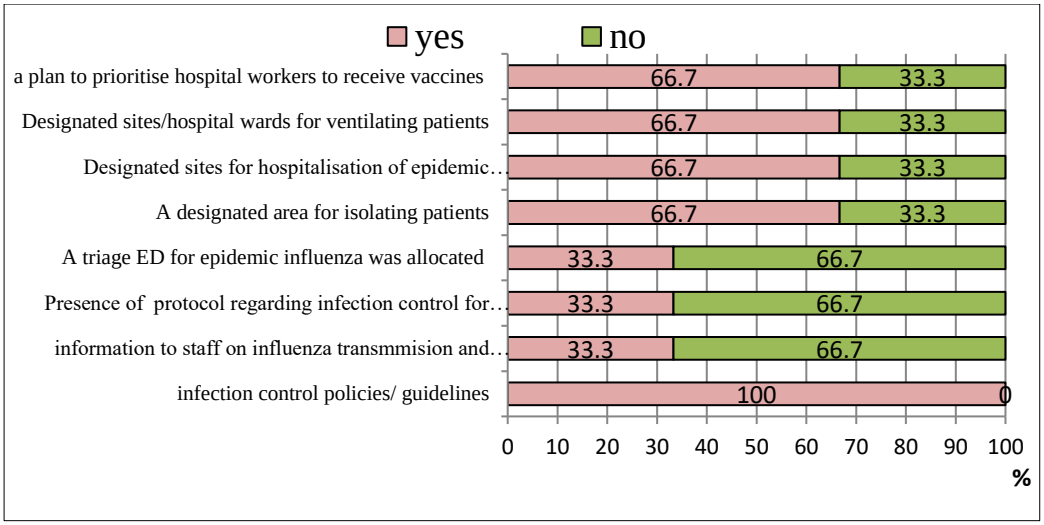

Figure 2: Distribution of Infection control measures items of preparedness plan in hospitals

In figure 5, overall, the highest mean score for clinical management measures was 7.6 of 31 total score concerning preparedness plan, while the least mean score for health personnel was 1.6 of 31 total preparedness score. Table 1 shows the distribution of total scores of different items of institutional preparedness among different hospitals. The Hospital C obtained the highest score regarding overall preparedness level (76%), while Hospital B obtained the lowest score of preparedness plan (54%). The weakest domains of preparedness in hospitals were health personnel and supplies (56%). Figure 6 shows that the highest mean scores were infection control and surveillance (5.7 &4.5 respectively) while the least mean score item was facility plan 1.25. Table 2 shows that center A had highest preparedness level (70%) among all centers with high score on facility plan, surveillance and health network while the center D had lowest overall preparedness level (28%) with zero score for facility plan. The weakest domain of preparedness in primary centers was infection control measures (41%).

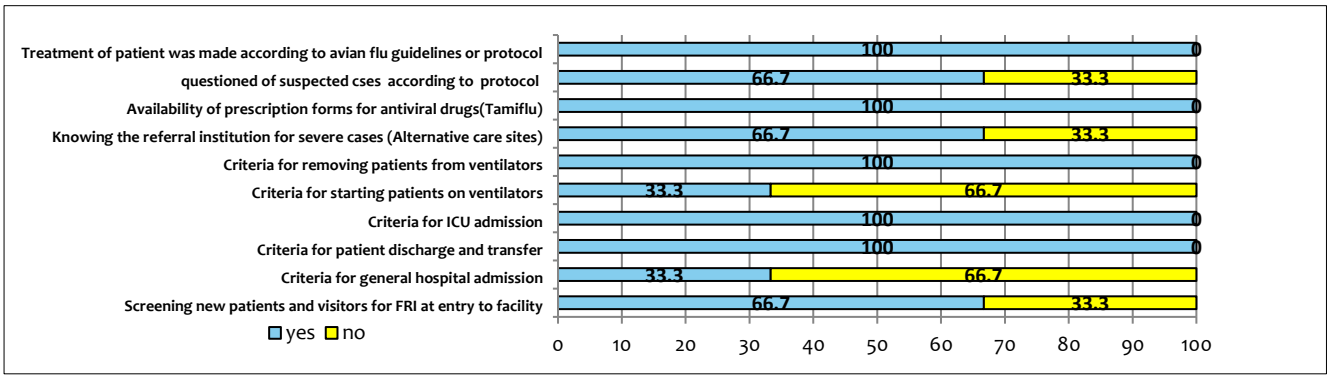

Figure 3: Distribution of clinical management items of preparedness plan in hospitals

Discussion

Regarding the plan and surveillance items of preparedness plan in hospitals. In our study all hospitals (100%) had a chest specialist and health team member responsible for dealing with influenza cases, this rate nearly to the study of Mai et al.[9] done on 7 hospitals in Japan showed that nearly 86% of hospitals had a specialist. The total surveillance level in all hospitals was 67%. This result is similar to the surveillance preparedness level in the

study of Mahdaviazad[10] conducted on Iran between teaching and private hospital revealed that total surveillance level was 66.7 % but our result was higher than that in Li et al.[11] was 55.5% and Higgins et al.,[12] was 56.5 % studies. We assessed the surveillance systems with nine items while Higgins assessed the surveillance system by a 5- item checklist. 100% of our hospital had surveillance system that track the influenza like illness was similar to the study of Mai et al., [9] done on 7 hospitals in Japan but higher than the study of Higgins et al.[12] done on Kentucky a state located in the east south-central region of the United States that revealed 28% of hospitals had surveillance system for tracking influenza like illness. Reporting system for staff member did not available in all our hospitals while in the study of Mai et al[9] was available in 5 hospitals of 7.

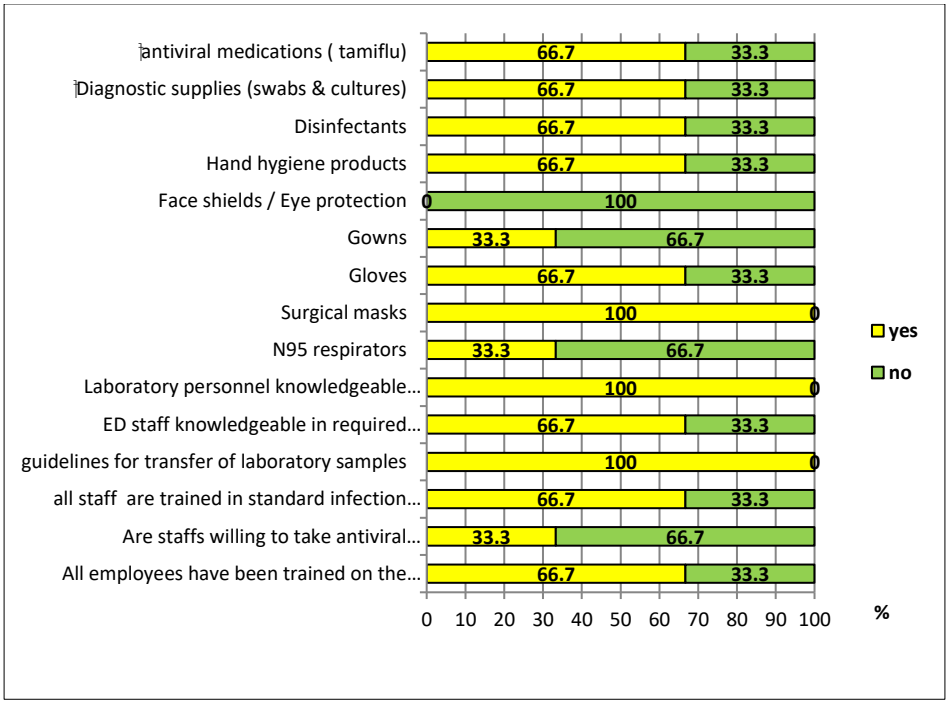

Figure 4: Distribution of health services personnel & laboratory capacity and supplies items of preparedness plan in hospitals

Regarding the infection control measures in hospitals, our study revealed that all hospitals had an infection control policies but only 33.3% of hospital gave information on influenza transmission and hand hygiene, while the study of Mai et al[9] 85% of their hospitals gave information on influenza transmission and hand hygiene presence. 66.7% of hospitals had a plan to prioritize hospital workers to receive vaccines these results was nearly to Reidy et al. study on iris hospitals (65%) have a plan to prioritize hospital workers to receive vaccines[13]. About two third (66.7%) of hospitals had the designed area for isolation and ventilated patients that more than Reidy et al[13] 52% of Irish hospitals had enough airborne isolation capabilities and capacity to meet the current routine needs compared to Rebmann et al., 2012[14] 85 % of American hospitals had sufficient numbers of negative-pressure rooms to accommodate their current isolation needs. The infection control score across our hospitals was 58% that less than study of Simatupang,[15] was 94% and study of Mai et al.[9] was 79%. The level of our preparedness in health per

sonnel was 56% that had an average level near that of Mahdaviazad study,[10] of (52%) and Daneshmand et al's study[16] of (4.3%), However, it was less than the study of Simatupang,[15] of (71%). One explanation is that their hospitals have inventoried the number of health workers owned and established mechanisms for mobilizing health personnel assistance in the event of a pandemic disaster characterized by mass casualties.

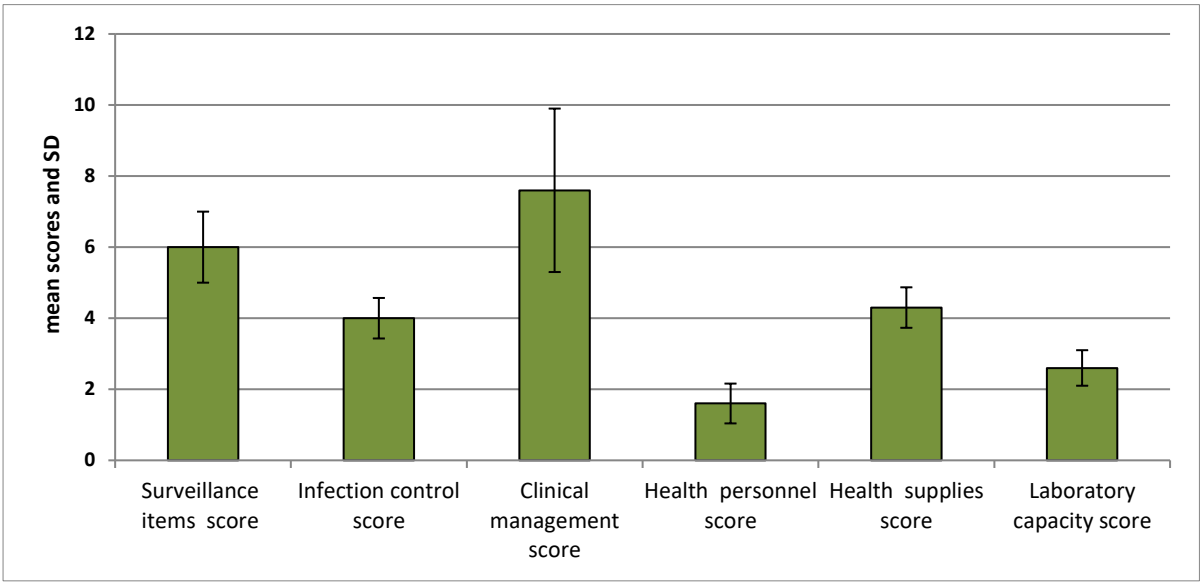

Figure 5: The mean and standard deviation scores of different items of hospital preparedness

The highest percentage of health personnel items in our result (100%) was assigned to train our employees on the guide of dealing with influenza cases that more than the study of Reidy et al.[9] was (26%) and the study of Damery et al.[17] was 24.6%. Among hospitals we found that the highest mean score for clinical management measures was 7.6 of 31 total scores concerning preparedness plan, while the least mean score for health personnel was 1.6 of 31 total preparedness score was different to Hui et al.[18] where the highest mean score for plan and surveillance 7.9 and the least mean score for laboratory capacity 1.10 of 46 total preparedness score. This difference related to the difference in the maximum score among the preparedness items between two studies. On an average, the overall preparedness level in our hospitals was moderate level (67%), which more than the study of Mahdaviazad[10], 59.5 % and less than study of Mai et al.[9] was 74%. This difference is related to the type of hospitals and their mission where Mai et al., conducted their study on tertiary hospital while Mahdaviazad conducted their result on teaching and private hospitals. The weakest domain in our hospital preparedness was health personnel and supplies that similar to the study of study of Simatupang,[15] Regarding the mean and standard deviation scores of different items of primary health centers preparedness revealed that the highest mean scores were infection control and surveillance (5.7 & 4.5 respectively) while the least mean score item was facility plan 1.25 this result was similar to the study of Prateepko, & Chongsuvivatwong,[4] that conducted on Thailand primary health care revealed that the highest mean score for infection control and surveillance were (12.5 & 8.4 respectively). Our results differed from those found in a study of Chang et al.[19] in Taiwan, which showed high

average percentage of evaluation (78%), while our level of preparedness was 52% this difference related to that study evaluated elements addressed in the local plans via direct observation from an exercise, whereas our study assessed preparedness among the primary health centers by requesting information from heads of health centers. In addition, the focused areas of assessments were somewhat different. Our study also differed from a study of Doxtator,[20] among rural health units in a region of Ontario that conducted evaluations *via* a tabletop exercise. The weakest area of preparedness was for infection control among primary health centers as previously reported[4].

Table 1: The percentage score of different items of preparedness among different hospitals

Items of preparedness	hospital A	hospital B	hospital C	Total of each item
Surveillance and plan items score	67%	56%	78%	67%
Infection control score	50%	63%	63%	58%
Clinical management score	90%	50%	90%	77%
Health personnel score	67%	33%	67%	56 %
Health supplies score	56%	56%	56%	56%
Laboratory capacity score	100%	67%	100%	89%
Overall preparedness level	72%	54%	76%	67%

Each score was defined as the proportion of "Yes" answers in each hospital. The overall level was quantified by calculating all items scores in each hospital

Conclusion

We conclude that the weakest domains in our hospital preparedness are the health personnel and supplies, while the weakest area of preparedness is infection control among primary health centers.

References

1. Nelson C, Lurie N and Wasserman J. Assessing public health emergency preparedness: concepts, tools, and challenges. Annu Rev Public Health, 2010, 28:1–18.
2. World Health Organization. Avian influenza: Assessing the pandemic threat. 2005a, World Health Organization. From: https://www.who.int/influenza/resources/documents/h5n1_assessing_pandemic_threat/en/
3. World Health Organization. Hospital Preparedness for Epidemics, 2014, 71. Retrieved from http://apps.who.int/iris/bitstream/10665/151281/1/9789241548939_eng.pdf
4. Prateepko T, and Chongsuvivatwong V. Preparedness against an influenza pandemic of the frontline health facilities in southern Thailand: factor and cluster analyses. Asia Pac J Public Health. 2012 Jan;24(1):28-38.
5. Wong SY, Kung K, Wong MC, et al. Primary care physicians' response to pandemic influenza in Hong Kong: a mixed quantitative and qualitative study. Int J Infect Dis. 2012 Sep;16 (9): e687-91.
6. World Health Organization (2005b): WHO Checklist for Influenza Pandemic Preparedness Planning. Epidemic alert & response. Geneva: WHO; (WHO/CDS/CSR/GIP/2005.4).
7. Ministry of Health and Population (MOHP) (2016): Arab Republic of Egypt Integrated National Plan for Avian and Human Influenza 2014 – 2016. Egypt: Ministry of Health and Population.

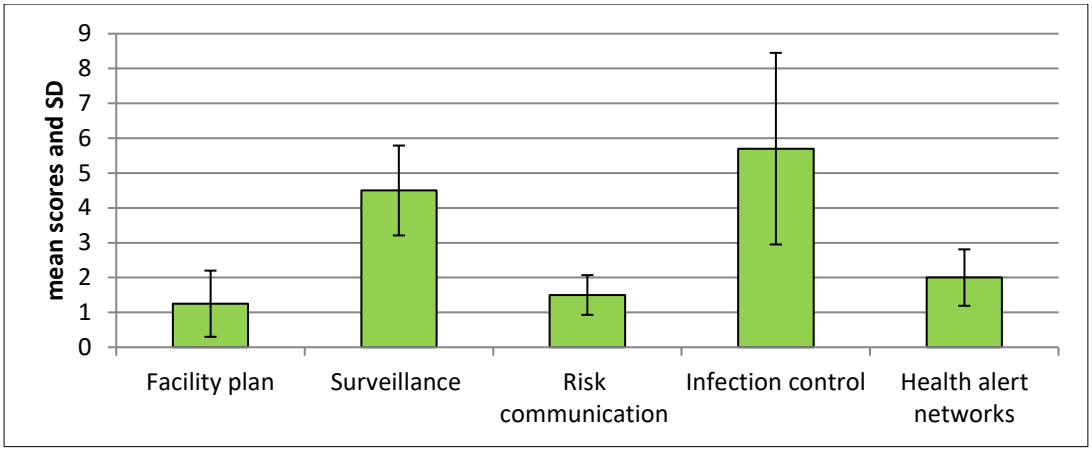

Figure 6: The mean and standard deviation scores of different items of primary health centers preparedness

Table 2: The percentage score of different items of preparedness among different hospitals

Items of preparedness	Center A	Center B	Center C	Center D	Total of each item
Facility plan	100%	100%	50%	0	63%
Surveillance	75%	38%	50%	63%	57%
Risk communication	33%	67%	67%	33%	50%
Infection control	64%	50%	29%	21%	41%
Health alert networks	75%	50%	50%	25%	50%
Overall preparedness level	70%	61%	49%	28%	52%

Each score was defined as the proportion of "Yes" answers in each hospital. The total level was quantified by calculating all items scores in each hospital

8. World Health Organization Influenza (2007): Everybody's business. Strengthening health systems to improve health outcomes. WHO's Framework for Action. Geneva.
9. Imai T, Takahashi K, Todoroki M, et al. Perception in relation to a potential influenza pandemic among healthcare workers in Japan: implications for preparedness. J Occup Health. 2008;50(1) :13-23.
10. Mahdaviazad H, and Abdolahifar GR. Assessing hospital disaster preparedness in Shiraz, Iran 2011: teaching versus private hospitals. Am J Dis Med.; 2013, 8:65–73.
11. Li X, Hung J and Zhang H. An analysis of hospital preparedness capacity for public health emergency in four regions of China: Beijing, Shandong, Guanqxi, and Hainan. BMC Public Health; 2011, 8: 319.
12. Higgins W, Wainrigh C, Lu N, Carrico R. Assessing hospital preparedness using an instrument based on the mass casualty disaster plan checklist: Results of a statewide survey. Am J Infect Control; 2014, 32:327-32.
13. Reidy M, Ryan F, Hogan D, Lacey S, Buckley C. Preparedness of Hospitals in the Republic of Ireland for an Influenza Pandemic, an Infection Control Perspective. BMC Public Health, 2015, 1–9.
14. Rebmann T, Wilson R, LaPointe S, Russell B, Moroz D. Hospital infectious disease emergency preparedness: A 2007 survey of infection control professionals. Am J Infect Control; 2012, 37:1.
15. Simatupang RB. Hospital disaster preparedness of Indonesian army central hospital gatot soebroto for pandemics to anticipate bioterrorism threat, 2017, Journal of Disaster management volume 3 (2); 49–80. (Retrieved from http:// jurnalprodi.idu.ac.id/index.php/ MB/article/view/106)

16. Daneshmandi M, Amiri H, Vahedi M, Farshi M, Saghafi A, Zigheymat F. Assessing the level of preparedness for confronting crisis such as flood, earthquake, fire and storm in some selected hospitals of Iran. Iranian J Military Med. 2010, 12, 3(45); 167-171.
17. Damery S, Wilson S, Draper H, Gratus C, Greenfield S, Ives J, Sorell T. Will the NHS continue to function in an influenza pandemic? A survey of healthcare workers in the West Midlands, 2012; UK. BMC Public Health. From: https://research-information.bristol.ac.uk/files/76657538/art_3A10.1186_2F1471_2458_9_142.pdf
18. Hui Z, Jian-Shi H, Xiong H, Peng L, Da-Long Q. An analysis of the current status of hospital emergency preparedness for infectious disease outbreaks in Beijing, China. Am J Infect Control. 35(1), 62–67.
19. Chang CC, Chou YM, Chen CH, Chou SM, Lu MS, Du CR. Evaluation of local preparedness for influenza pandemic in Taiwan. Int J Infect Dis. 2008;12(suppl1): e442.
20. Doxtator LA. Gardner CE, Medves JM. Responding to pandemic influenza: a local perspective. Can J Public Health; 2011; 95:27-31.