Assessment of Occupational Exposure and Infection Prevention Control of H1N1 Influenza among Healthcare Workers: A Multicentre KAP Study in Western and Southern India

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Abstract

Background: H1N1 influenza is an occupational hazard for healthcare workers (HCWs). In tropical country like India, influenza exhibits different seasonal patterns with a high baseline influenza-like illness rates and multiple epidemic peaks annually. Proper knowledge, attitude, and practices (KAP) are crucial to prevent and control the disease, particularly among nurses, registrars, residents who usually do not have any longtime experiences and therefore are at a greater risk in comparison to other experienced HCWs. We aim to determine the score of KAP of HCWs regarding occupational exposure and infection prevention control of H1N1 influenza and to understand the factors and probable predictors to formulate effective preventive strategy.

Methods: A multicentre KAP survey was done in 3 tertiary care hospitals in Western and Southern India recruiting random sample of 200 HCWs with closed-end questionnaire involving 38 questions on KAP. A scoring system was used to assess questions on KAP to evaluate the general knowledge on H1N1 influenza and recommended response measures, perceptions towards it and actual compliance/practice of these measures respectively.

Results: The response rate of this survey was 95%. Mean age of the overall responders was 30.37 (±2.17) years. Among responders, consultants, registrars, residents, ward nurses, ICU nurses accounted for 10.52%, 18.42%, 23.68%, 31.50%, 15.78% respectively. The mean percentage score of participants' knowledge, attitude and practice were 86.07%, 78.82% and 84.64% respectively. Practice scores showed significant linear positive correlation with knowledge and attitude scores. 12% had never participated in infection control training sessions. More than 80 % of participants considered H1N1 influenza as a occupational hazard. Even though knowledge scores were highest with registrar group, ICU nurses had maximum correct responses in practice scores.

Conclusions: High knowledge alone is not sufficient to improve attitude and practices. Traditional educational models are not efficient and needs introduction of new motivational education methods at postgraduate levels. HCW's knowledge, attitude and behaviors about the influenza disease are important as a role model to general population and play an essential role in distributing the disease to the community.

Keywords: H1N1; KAP; Healthcare

Background

Globally, influenza disease affects approximately 5 - 15% of population annually and is responsible for pandemics. H1N1 influenza is also an occupational hazard for healthcare workers (HCWs) [1]. In tropical country like India, influenza exhibits different seasonal patterns with a high baseline influenza-like illness rates and multiple epidemic peaks annually. Effective epidemic management requires support from the population at risk for measures undertaken to mitigate the spread. Proper knowledge, attitude, and practices (KAP) are crucial to prevent and control the disease, particularly among nurses, registrars, residents who usually do not have any longtime experiences and therefore are at a greater risk in comparison to other experienced HCWs. Moreover, HCW's work in close proximity to such patients and are at risk for both acquiring influenza from patients and spreading it to patients and may contribute to hospital influenza outbreaks in health-care facilities [2]. Effective influenza infection control management in the tropical setting requires understanding of the factors influencing behavioral changes which ultimately play an important role in the disease spread. However, there have been few studies on the KAP of healthcare workers towards the influenza epidemic as an occupational exposure in a tropical setting like India. As such, there is a need to understand the factors influencing such behavioral changes to promote effective preventive management of influenza epidemics in the tropical setting. Hence, the aim was to determine the score of KAP of HCWs regarding occupational exposure and infection prevention control of H1N1 influenza and to understand the factors and probable predictors to formulate effective preventive strategy.

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Methods

A multicentre KAP survey was done at 2 tertiary care hospitals in Mumbai and Navi Mumbai of Western India and 1 tertiary care hospital in Chennai, Southern India, namely Gurunanak hospital, Mumbai, Apollo Hospital, Navi Mumbai and Apollo Children's hospital, Chennai respectively during May 2016 to April 2017. HCWs were recruited in the study randomly. Study participants included doctors (consultants, registrars, residents) and nurses (ward nurses, ICU nurses). All participants were given a self-administered closed-end questionnaire involving 38 questions on KAP (Questionnaire attached as Fig 1). A scoring system was used to assess qu-

estions on KAP to evaluate the general knowledge on H1N1 influenza and recommended response measures, perceptions towards it and actual compliance of these measures respectively.

The Questionnaire format included basic information to study demographics, questions on knowledge which were used to assess general knowledge on H1N1 influenza and on the recommended response measures, questions on attitudes used to assess perceptions towards H1N1 influenza and these measures and those on practices were used to assess the actual compliance and practice of these measures (Figure 1).

Knowledge, attitudes and practices of healthcare workers regarding occupational exposure and infection prevention control of H1N1 influenza: Survey

QUESTIONS

A. Basic Information:
- Employee ID:
- Age:
- Sex:
- Duration of employment:

- You are: *(tick any one)*
    - Doctor: Consultant/Junior consultant/Registrar/Resident
      Or
    - Nurse: ICU Nurse/Ward Nurse/paramedic

B. Knowledge Questions *(tick any one of options in each question)*

1. Basic Knowledge
- Symptoms of H1N1 Influenza include fever, cough, sore throat: Correct/Incorrect/Don't know
- H1N1 influenza can cause a serious disease: Correct/Incorrect/Don't know
- Influenza can never cause death of patient: Correct/Incorrect/Don't know

- High risk group for influenza are:
    - Children <5 yrs   Correct/Incorrect/Don't know
    - Pregnant women   Correct/Incorrect/Don't know
    - Elderly> 65 yrs   Correct/Incorrect/Don't know
    - Patients with Renal failure   Correct/Incorrect/Don't know
    - Patients with cardiac failure   Correct/Incorrect/Don't know

- Influenza causes less severe illness in pregnant patients: Correct/Incorrect/Don't know
- Categorizing H1N1 patients into different categories is important: Correct/Incorrect/Don't know

2. Mask Knowledge
- N-95 masks worn by HCW are effective in reducing spread of H1N1 Influenza: Correct/Incorrect/Don't know
- Surgical masks worn by HCW are effective in reducing spread of H1N1 Influenza: Correct/Incorrect/Don't know

3. Vaccination Knowledge
- Influenza vaccination is an effective measure against influenza: Correct/Incorrect/Don't know

4. Tamiflu Knowledge
- Tamiflu is effective for treatment of H1N1 Influenza : Correct/Incorrect/Don't know
- Treatment with Tamiflu is minimum 5 days: Correct/Incorrect/Don't know

5. Personal Habits Knowledge
- Following will reduce the spread of influenza:
    - Washing hands regularly with soap and water/Handrub: Correct/Incorrect/Don't know
    - Covering mouth during cough/sneeze: Correct/Incorrect/Don't know

- What type of isolation is needed for H1N1 prevention? *(choose any one of following)*
    - Air-borne isolation
    - Droplet isolation
    - Contact isolation

C. Attitudes *(tick any one of options in each question)*
1. Basic attitudes:
- I am at risk of getting H1N1 influenza: Definitely yes/Maybe/No

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- Immediate reporting of confirmed case is important:　　Very Important/Important/Not important
- Hand washing by HCWs is important for influenza prevention: Very Important/Important/Not important
- Isolating suspected H1N1 patients is necessary:　　Very Important/Important/Not important
- Isolating proven H1N1 patients is necessary:　　Very Important/Important/Not important

1. **Mask Attitudes**
   - Patient attenders should wear masks at all times:　　Definitely yes/Maybe/No
   - N-95 masks should be worn by patient in reducing spread of H1N1 Influenza: Very Important/Important/Not important

2. **Vaccination Attitudes**
   - All HCWs should be vaccinated against H1N1 influenza if available:　Very Important/Important/Not important
   - H1N1 vaccination gives 100% protection:　　Definitely yes/Maybe/No
   - H1N1 vaccine has many side effects and should be avoided:　　Definitely yes/Maybe/No

3. **Tamiflu Attitudes**
   - Vaccination is better than Tamiflu for prophylaxis (prevention) against H1N1 Influenza : Definitely yes/Maybe/No
   - I would complete a course of Tamiflu if prescribed:　　Definitely yes/Maybe/No

A. **Practice:** *(tick any one of options in each question)*
- Have you ever been trained in Infection control:　　Definitely yes/Maybe/No

- Does you hospital have infection control strategy/policy for H1N1:　　Definitely yes/Maybe/No

- Have you attended any infection control education program on H1N1 recently: Definitely yes/Maybe/No

- Do you think there is need for more educational programs to create awareness for H1N1: Definitely yes/Maybe/No

- Have you taken Influenza vaccination:　　Definitely yes/Maybe/No

- Do you feel completely protected from H1N1 after taking vaccination & dont need for use of mask:　　Definitely yes/ Maybe/No

- Do you agree that isolation should be removed after 24 hrs of fever has settled: Definitely yes/Maybe/No

- Do you use handrub or soap & water after contact with patients:　　Definitely yes/Maybe/No

- Do you treat a patient who has sore throat, cough and mild fever with no other systemic features and no H1N1 contact with Tamiflu:　　Definitely yes/Maybe/No

- What type of isolation do you follow in this hospital for H1N1 prevention?*(choose any one of following)*
  - Air-borne isolation
  - Droplet isolation
  - Contact isolation

- Are you satisfied with infection control for H1N1 in this hospital:　　Definitely yes/Maybe/No

- Any suggestion to improve infection control (describe in few lines):

Figure 1: Questionnaire.

o **Knowledge questions:** Participant's knowledge was measured using 17 items. Options given were between "Correct", "Incorrect", and "Don't know". The score value of 1 was allocated to answers that were agreed to "WHO" and "CDC" guidelines [3]. Rest of answers were given a score of 0. In 3 questions amongst 17 knowledge questions, the valid answer was "No" to minimize the risk of halo effects. Thus, the Total score of knowledge questions ranged between 0 to17.

o **Attitude questions:** 12 questions were posed to assess the participants' attitude. According to the subject importance from participant's perspective the responses were made on a 3 point Likert scale (Very important or Definitely yes, Important or maybe, Not important or No). Three reverse phrases were asked to prevent from halo effects. Therefore, participants' score for each question ranged from 1 to 3, and the attitudes score for each participant ranged in between 12-36.

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o **Practice questions:** 9 questions were asked to assess the practices of the participants. According to the subject importance from the participant's perspective the responses were made on a 3 point Likert scale (Very important or Definitely yes, Important or maybe, Not important or No). One reverse phrase was asked to prevent from halo effect. Therefore, participants' score for each question ranges 1- 3, and the attitudes score for each participant ranged in between 3-27.

Results were analyzed applying appropriate statistical tests.

Results

The response rate of this survey was 95%. The mean age of the overall responders was 30.37 (±2.17) years. 51% of participants were female. Among responders, consultants, registrars, residents, ward nurses, ICU nurses accounted for 10.52%, 18.42%, 23.68%, 31.50%, 15.78% respectively. The mean percentage score of participants' knowledge, attitude and practice were 86.07%, 78.82% and 84.64% respectively. The mean score of knowledge, attitude and practice amongst various groups of participants was as shown in table 1,2 and 3 respectively. The cumulative group wise distribution of KAP about H1N1 amongst various groups is depicted in figure 2.

Group	Knowledge score
Consultants	85.58%
Registrars	89.70%
Residents	82.94%
Ward Nurses	87.82%
ICU Nurses	84.29%
Average	86.07%

Table 1: Knowledge score on H1N1 amongst various groups.

Group	Attitude score
Consultants	80.22%
Registrars	81.25%
Residents	80.83%
Ward Nurses	73.13%
ICU Nurses	78.69%
Average	78.82%

Table 2: Attitude score on H1N1 amongst various groups.

Group	Practice score
Consultants	82.29%
Registrars	82.03%
Residents	81.85%
Ward Nurses	88.14%
ICU Nurses	88.88%
Average	84.64%

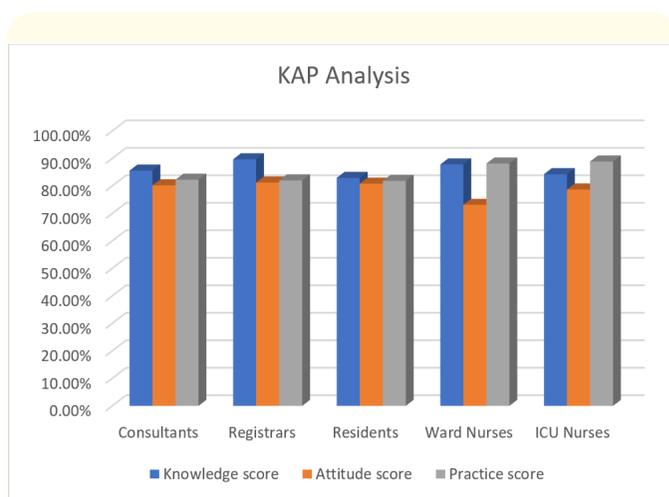**Table 3**: Practice score on H1N1 amongst various groups.

Figure 2: Cumulative Groupwise analysis of KAP regarding H1N1.

Practice scores showed significant linear positive correlation with knowledge and attitude scores. Our data was not sufficient enough to show significant correlation between attitude and knowledge. 90% of them believed that vaccination and/or educational course about influenza is necessary.12% had never participated in infection control training sessions. More than 80 % of participants considered H1N1 influenza as a occupational hazard. Even though knowledge scores were highest with registrar group, ICU nurses had maximum correct responses in practice scores.

Discussion

Healthcare workers timely and appropriate response plays an important role in controlling H1N1 pandemic. Nurses (ICU and wards), residents and registrars visit patients immediately after hospitalization and are one of the most important health care providers in major hospitals especially during epidemics like H1N1. They are also usually the first who have maximum exposure to infected patients and play an important role in prevention of nosocomial infection.

The response rate in this study was 95% which was similar to study by Askarian M., *et al.* [4] which was 98%. Majority of participants answered the knowledge questions correctly. Their answers to attitude and practice questions were good but weaker than knowledge questions.

Detailed analysis revealed that knowledge was influenced by educational qualification when compared between doctors and nurses. Registrars' knowledge scores were better than consultants; this finding is not surprising because registrars were pursuing fellowship programs and were better updated. Despite knowledge scores being highest with registrar group, ICU nurses had higher scores in practice reflecting high knowledge is not sufficient alone for improving attitudes and practices. With the help of motivati-

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onal educating models one can convert individual's knowledge to correct attitudes and behaviors [5].

Similar to our study, Yap J., *et al.* [6] also demonstrated that practice scores had significant linear positive correlation with knowledge and attitude scores. Nurses reported media as their source for their information about influenza disease. Nurses and residents should be educated to use evidence based medicine resources.

Vaccination can reduce the burden of influenza. In this study, 90% of them believed that vaccination and/or educational course about influenza is necessary which was much higher than the study by Bharadva N., *et al.* [7] in which only 30.7% knew that vaccine is available for disease. However, this difference was mainly because this study was done among HCWs while the one by Bharadva N., *et al.* was done amongst the general population. This also emphasises that health authorities should propagate the role of vaccine as a preventive measure.

However, this study has some limitations, such as self-reported questionnaires was used which can cause several biases including recall and social desirability bias. We suggest use of more comprehensive variables to be included for better understanding of behavioral patterns.

Conclusion

High knowledge alone is not sufficient to improve attitude and practices. Traditional educational models are not efficient and needs introduction of new motivational education methods at postgraduate levels. HCW's knowledge, attitude and behaviors about the influenza disease are important as a role model to general population and play an essential role in distributing the disease to the community.

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