

Original article

Awareness of H1N1 influenza among Pakistani pharmacy students

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Abstract: *Aim* — This study was aimed to investigate knowledge and attitudes of H1N1 influenza among pharmacy students.

Material and Methods — A cross-sectional study was carried out among undergraduate and postgraduate students of the Punjab University College of Pharmacy, University of the Punjab, Lahore from February-May 2018. A self-administered questionnaire was used to evaluate knowledge and attitudes of H1N1 influenza. All data were analyzed using SPSS 22.

Results — The median age of study participants (N=420) was 20 years, with majority of females (72.4%), undergraduate students (96.7%) belonging to middle economic class (89.8%). The median knowledge score was 18, with 38.1% having poor, 55.7% moderate and 6.2% excellent knowledge score (score <17, 17-25, and 26-34, respectively). The median attitude score was 47 (9); around 52% of the participants were found to have positive attitudes. Initially, there was a significant difference of knowledge score, not attitude, among age categories. However, in post hoc analysis, after Bonferroni adjustment (P<0.017), individuals > 26 years of age had better knowledge scores than 21-25 years (p=0.015) and ≤20 years (p=0.005) age categories. Gender had no significant influence on the knowledge as well as attitude score. Furthermore, postgraduate students had significantly better knowledge scores, not attitude, than undergraduates (p=0.002).

Conclusions — Our findings highlight the need to equip pharmacy students with comprehensive knowledge of H1N1 influenza so that in future they can help increase the public awareness at community pharmacies, hospitals or the communities they reside.

Keywords: influenza, knowledge, pharmacy students.

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Introduction

Although the World Health Organization (WHO) marks 2018 the 100th anniversary of the most devastating influenza epidemic known to mankind, 'Spanish flu', which started during World War-I (1918-1920) and one third of the Earth's population suffered [1]. To efficiently combat with any future outbreak, in 1952, Global Influenza Surveillance and Response System was launched in 114 countries [1]. According to the Center of Diseases Control and Prevention, 0.64 million people died worldwide because of influenza-related diseases in 2017 despite the fact that many strategies were employed to avoid its outbreak [2]. Since its pandemic in Mexico in 2009 that affected 214 countries, WHO increased the influenza Pandemic alert from phase 5 to phase 6 [3].

In Pakistan the first H1N1 influenza case was confirmed by the Ministry of Health on 10th august 2009 and a total of 76 positive cases were reported by the end of that year [4]. The number of

H1N1 influenza cases increased to 570 till 2011 [5]. Pakistan is included in high risk country list of influenza outbreak and total of 300 cases were confirmed with 34 deaths in different parts of the country till January 2018 [6, 7]. Lack of sufficient public health facilities is the main hindrance in the accurate estimation of H1N1 influenza cases in Pakistan. Vaccination is the most effective way to combat this illness but other preventive measures should also be adopted which include using mask, proper hand hygiene, avoiding hand shaking, touching mouth and nose, hugging, kissing, and any close contact with infected individual [8]. Educational institutes are at high risk of such outbreaks because of permeable boundaries among its students as well as a robust social connection among students [9]. Therefore, the current study was aimed to investigate knowledge and attitude of H1N1 influenza among pharmacy students.

Table 1. Demographic details of the participants

Demographic details		N (%)
Age	≤20 years	253 (60.2)
	21-25 years	156 (37.1)
	≥26 years	11 (2.6)
Gender	Male	116 (27.6)
	Female	304 (72.4)
Marital Status	Married	10 (2.4)
	Unmarried	410 (97.6)
Education level	Undergraduate	406 (96.7)
	Post-graduate	14 (3.3)
Economic Status:	Lower class	15 (3.6)
	Middle class	377 (89.8)
	Upper class	28 (6.7)

Material and Methods

Research design, participants and setting

We conducted a cross-sectional study among students at the Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan during a period of 4 months (February-May 2018). Both undergraduate as well as postgraduate students of the aforementioned study setting were eligible for inclusion. Excluded were those who did not provide consent to take part in the study.

A Convenience sampling technique was used to recruit study participants.

Ethical approval

The protocol of this study was reviewed and approved by the Human Research Ethics Committee, Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan. The study was conducted in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. We obtained a written consent from study participants before administering them study instrument.

Sample size estimation

The sample size for the present study was computed by Raosoft sample size calculator, keeping margin of error at 5%, 95% Confidence interval, population size of 2500 and 50% response distribution [10]. The minimum sample needed in the current study was 334. However, additional sample was taken in order to compensate errors such as incomplete/partially filled out questionnaires. Therefore, a final sample of 420 subjects was taken.

Table 2. Knowledge of the study participants regarding H1N1 flu

Items N (%)	Correct	Incorrect
1. Influenza signs and symptoms include fever, sneeze, malaise, vomiting, etc.	372 (88.6)	48 (11.4)
2. Influenza causes severe illness than common cold	339 (80.7)	81 (19.3)
3. Influenza does not cause atypical symptoms in children*	177 (42.1)	243 (57.9)
4. Fever and malaise are prominent and sometimes only symptoms of influenza in infants	211 (50.2)	209 (49.8)
5. Confusion, cyanosis, apnea and irritability are severe influenza symptoms in children.	193 (46.0)	227 (54.0)
6. Influenza may not lead to death*	131 (31.2)	289 (68.8)
7. The incubation period of influenza is 1-14 days	254 (60.5)	166 (39.5)
8. Transmission period of influenza is 1 day before onset of symptoms and 7 days after them	218 (51.9)	202 (48.1)
9. Sometimes contagious period is longer than 7 days.	267 (63.6)	153 (36.4)
10. Children are contagious for a shorter period than adults*	154 (36.7)	266 (63.3)
11. Influenza causes less severe illness in pregnant women*	196 (46.7)	224 (53.3)
12. Breast feeding is protective factor against influenza in infants	195 (46.4)	225 (53.6)
13. Children < 5 years	166 (39.5)	254 (60.5)
High risk groups for influenza are:		
14. Pregnant women	158 (37.6)	262 (62.4)
15. Patients with kidney failure	157 (37.4)	263 (62.6)
16. Patients with cardiovascular disease	213 (50.7)	207 (49.3)
17. Old persons	100 (23.8)	320 (76.2)
18. A person in good health with common cold symptoms may not need to see a doctor	240 (57.1)	180 (42.9)
19. Influenza needs immediate reporting	193 (46.0)	227 (54.0)
20. There is not an effective vaccine against influenza*	257 (61.2)	163 (38.8)
21. Seasonal influenza vaccination for all children aged 6 months to 18 years old is recommended	313 (74.5)	107 (25.5)
22. People should wash their hands regularly to avoid influenza	287 (68.3)	133 (31.7)
23. Isolation precautions should be performed by all patients	29. (69.0)	130 (31.0)
24. Wearing N95 mask by patient is an effective prevention strategy	295 (70.2)	125 (29.8)
25. Wearing N95 mask by health care workers is an effective prevention strategy.	330 (78.6)	90 (21.4)
26. Health care workers should wash their hands regularly	300 (71.4)	120 (28.6)
27. Following standard precautions during airway management is important.	203 (48.3)	217 (51.7)
28. Influenza has several complications including chronic diseases	165 (39.3)	255 (60.7)
29. Influenza causes less deaths among children than adults*	147 (35.0)	273 (65.0)
30. Salicylates are contraindicated in children younger than 18 years	194 (46.2)	226 (53.8)
31. The ideal duration of treatment is 5 days	288 (68.6)	132 (31.4)
32. Antiviral drugs can reduce the influenza symptoms	215 (51.2)	205 (48.8)
33. Antiviral drugs regimen should be initiated within 2 days of symptoms	74 (17.6)	346 (82.4)
34. Influenza virus is resistant to amantadine and rimantadine*	247 (58.8)	173 (41.2)

* – Reverse pharsed items

Table 3. Attitude of participants related to H1N1 flu

Items	Very high	High	Moderate	Low	Do not have
	Importance N (%)	Importance N (%)	Importance N (%)	Importance N (%)	Importance N (%)
1. Understanding the influenza symptoms in children and pregnant women is important	254 (60.5)	111 (26.4)	48 (11.4)	5 (1.2)	2 (0.5)
2. Breast feeding is an easy way to prevention	79 (18.8)	144 (34.3)	134 (31.9)	26 (6.2)	37 (8.8)
3. Examining a person in good health with common cold symptoms is important*	13 (3.1)	22 (5.2)	129 (30.7)	155 (36.9)	101 (24.0)
4. Immediate reporting of confirmed cases is important	168 (40.0)	149 (35.5)	75 (17.9)	20 (4.8)	8 (1.9)
5. Hand washing is important for influenza prevention	195 (46.4)	121 (28.8)	77 (18.3)	19 (4.5)	8 (1.9)
6. Isolating patients is critically important	140 (33.3)	118 (28.1)	117 (27.9)	28 (6.7)	17 (4.0)
7. Using N95 masks by patients is critically important	173 (41.2)	131 (31.2)	84 (20.0)	24 (5.7)	8 (1.9)
8. Using N95 masks by helathcare workers is critically important	163 (38.8)	140 (33.3)	86 (20.5)	20 (4.8)	11 (2.6)
9. Following hand hygiene by healthcare workers is critically important	181 (43.1)	145 (34.5)	71 (16.9)	17 (4.0)	6 (1.4)
10. Avoid salicylates prescription in patients is important*	17 (4.0)	32 (7.6)	147 (35.0)	127 (23.1)	97 (23.1)
11. Rapid case identification and treatment is important	138 (32.9)	148 (35.2)	95 (22.6)	27 (6.4)	12 (2.3)
12. Prescribing amantadine and rimantadine drugs for patients is important	100 (23.8)	107 (25.5)	137 (32.6)	45 (10.7)	31 (7.4)

* – Reverse phrased items

Table 4. Comparison of knowledge and attitude score among selected variables

Variables	Knowledge score Mean rank	p-value	Attitude score Mean rank	p-value
Age				
≤ 20 years	202.44	0.014	214.51	0.664
21-25 years	216.75		205.29	
≥ 26 years	307.27		192.09	
Gender				
Male	191.72	0.051	215.30	0.616
Female	217.66		208.67	
Education level				
Undergraduate	207.17	0.002	211.89	0.205
Post-graduate	306.96		170.14	
Economic Status				
Lower class	242.73	0.495	196.80	0.784
Middle class	210.21		210.13	
Upper class	197.07		222.88	

Data collection tool

A self-administered questionnaire (Appendix 1) was designed to evaluate knowledge and attitudes toward H1N1 influenza based on an earlier study [11]. As university education in Pakistan is English medium, there was no need to translate the questionnaire in Urdu language. For content validation, the questionnaire was reviewed by an expert panel. All the revisions suggested by the panel were made. The final questionnaire had 3 sections (Appendix 1); Section-A had 5-items to collect demographic data. Section-B contained 34-items regarding knowledge about H1N1 influenza. Every correct response was given a score of 1 whereas incorrect responses were scored zero. The composite knowledge score ranged from 0-34. Seven out of 34 knowledge questions were reverse phrased in order to prevent cognitive bias. Section-C had 12-items about attitude, which were assessed on a 5-point Likert scale (very high importance, high importance, moderate importance, low importance and don't have importance). Moreover, there were 2 reverse phrased questions in this section to prevent cognitive bias. All the attitude-items were scored from 1-5 and total score was obtained by adding the scores of all the 12 questions (range 12-60). Lastly, one question was asked regarding the information source.

Data analysis

Categorical variables were expressed as number and percentages whereas continuous variables were presented as

median and interquartile range. Continuous variables were compared using Mann-Whitney U and Kruskal Wallis H test. Moreover, Bonferroni adjustment was used to assess significance among intergroup variables. All data were analyzed using Statistical program for Social Sciences (SPSS) Version 22 for Windows. A p-value <0.05 was considered statistically significant.

Results

Demographic data of the study sample is shown in Table 1. The median (interquartile range) age of study participants was 20 (2) years, with majority of females (72.4%), undergraduate students (96.7%) belonging to middle economic class (89.8%).

Frequencies of right and wrong responses to the H1N1 flu knowledge items are shown in Table 2. The median (interquartile range) knowledge score was 18 (6), with 38.1% having poor (knowledge score <17), 55.7% moderate (knowledge score from 17-25) and 6.2% excellent knowledge (knowledge score from 26-34) regarding H1N1. Predominant knowledge source was websites/internet/social media (46.2%) followed by electronic/print media (30.5%) and friends/family/relatives (10.5%).

Frequency of responses regarding attitude of participants toward H1N1 influenza are shown in Table 3. The median (interquartile range) attitude score was 47 (9), with 51.7% of participants having positive attitude (attitude score ≥48). As shown in Table 4, there was a significant difference of knowledge score (p=0.014), not attitude score (p=0.664), among age categories. In post hoc analysis, after Bonferroni adjustment (P <0.017), individuals above 26 years of age had better knowledge scores than 21-25 years (p=0.015) and ≤20 years (p=0.005) age categories. Gender had no influence on the knowledge (p=0.051) as well as attitude score (p=0.616). Furthermore, postgraduate students had significantly better knowledge scores, not attitude score, than undergraduates (p=0.002).

Discussion

Influenza outbreaks had been reported amongst university populations [12, 13] and these outbreaks were associated with decreased ability to perform routine activities, higher school absenteeism, poor school performance, and an increased health care utilization [14]. Therefore, in order to combat the transmission of H1N1 flu, it is very crucial that people have ample knowledge and awareness about its sign and symptoms. In the

present study, although overall knowledge of the study participants was moderate (55.7%), however, around 38% were found to have poor knowledge. Contrary to the findings of Ahmed et al. [15], majority of our study respondents knew about the signs and symptoms (88.6%) of the H1N1 flu in adults. However, knowledge regarding signs and symptoms in children was low. In our study, around 61% of the students knew the incubation and contagious period but 48% did not know the relationship between the transmission period and onset of action of typical symptoms. These findings were comparable to the results of a qualitative study conducted in Australia where there was a lot of confusion about the mode of transmission of H1N1 influenza among University population [16]

The knowledge regarding the preventive strategy against the flu was somewhat satisfactory as 61.2% individuals knew about the H1N1 flu vaccine, a little more than two third of individuals knew that the good hand hygiene practices as well as isolation technique could prevent them from this infection, and 70.2% knew that it could be prevented by wearing face masks. Askarian et al. reported that majority of Iranian medical and dental students were not aware of H1N1 influenza vaccine, however, they had good knowledge about other preventive strategies [11]. Similarly, a Turkish study also reported that more than half of the participants were well aware of the H1N1 flu preventive strategies [17]. Contrary to the findings of Seale et al [16] and Askarian et al. [11], there was low level of knowledge about high risk individuals as substantial proportion of the participants did not consider children <5 years, pregnant females, older people, renal as well as cardiovascular patients as high risk patients.

Regarding the treatment options, there was less awareness about the usage of antiviral drugs in the treatment of H1N1 flu in this study. Moreover, the knowledge about fatality related to the disease in high risk groups (such as in children and in pregnant females) was also not satisfactory among the study participants which was contrary to the findings of Ahmed and colleagues [15]. All in all, although overall knowledge of H1N1 flu was found to be moderate among pharmacy students, many misperceptions were prevalent which may be attributable to the fact that majority of the participants acquired information from social media or other websites. Sharma et al. examined the use of social media as an information source for Zika virus pandemic and found out that misleading posts were far more popular than the posts disseminating accurate information [18]. Moreover, TV, radio, newspapers and friends/colleagues, cannot provide comprehensive information. Our findings highlight the need to equip pharmacy students with inclusive knowledge of H1N1 influenza as well as other infectious diseases so that in future they help increase the public awareness at community pharmacies, hospitals or the community they reside in.

Conclusions

Although the overall knowledge of H1N1 influenza was found to be moderate among pharmacy students, many misconceptions and misperceptions were prevalent. Our findings highlight the need to equip pharmacy students with comprehensive knowledge of influenza as well as other infectious diseases so that in future they can help to increase public awareness at community/retail pharmacies, hospitals or the communities they reside in.

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Conflict of interest

The authors declare that they have no conflict of interest.

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Appendix 1. Questionnaire: Evaluation of knowledge and attitudes towards H1N1 influenza in pharmacy students

Age: _____ years

Gender: (A) Male (B) Female

Category: (A) Undergraduate student (B) Post-graduate student

Economic status: (A) Lower economic class (B) Middle economic class (C) Upper economic class

Marital status: (A) Single (B) Married

1. Influenza Signs and symptoms include fever, sneeze, malaise, vomiting, etc.
(1) Yes (2) No (3) Don't know
2. Influenza causes severe illness than common cold.
(1) Yes (2) No (3) Don't know
3. Influenza does not cause atypical symptoms in children.
(1) Yes (2) No (3) Don't know
4. Fever and malaise are prominent and sometimes only symptoms of influenza in infants.
(1) Yes (2) No (3) Don't know
5. Confusion, cyanosis, apnea and irritability are severe influenza symptoms in children.
(1) Yes (2) No (3) Don't know
6. Influenza may not lead to death.
(1) Yes (2) No (3) Don't know
7. The incubation period of influenza is 1-14 days.
(1) Yes (2) No (3) Don't know
8. Transmission period of influenza is 1 day before onset of symptoms and 7 days after them.
(1) Yes (2) No (3) Don't know
9. Sometimes contagious period is longer than 7 days.
(1) Yes (2) No (3) Don't know
10. Children are contagious for a shorter period than adults.
(1) Yes (2) No (3) Don't know
11. Influenza causes less severe illness in pregnant women.
(1) Yes (2) No (3) Don't know
12. Breast feeding is protective factor against influenza in infants.
(1) Yes (2) No (3) Don't know
13. Children < 5 years are at high-risk of influenza.
(1) Yes (2) No (3) Don't know
14. Pregnant women are among high-risk groups for influenza.
(1) Yes (2) No (3) Don't know
15. Patients with renal failure are at high-risk of influenza.
(1) Yes (2) No (3) Don't know
16. Patients with cardiovascular disease are at high-risk of influenza.
(1) Yes (2) No (3) Don't know
17. Old people are at high-risk of influenza.
(1) Yes (2) No (3) Don't know
18. A person in good health with common cold symptoms may not need to see a doctor.
(1) Yes (2) No (3) Don't know
19. Influenza needs immediate reporting.
(1) Yes (2) No (3) Don't know
20. There is not an effective vaccine against influenza.
(1) Yes (2) No (3) Don't know
21. Seasonal influenza vaccination for all children aged 6 months to 18 years old is recommended.
(1) Yes (2) No (3) Don't know
22. People should wash their hands regularly to avoid influenza.
(1) Yes (2) No (3) Don't know
23. Isolation precautions should be performed by all patients.
(1) Yes (2) No (3) Don't know
24. Wearing N95 mask by patient is an effective prevention strategy.
(1) Yes (2) No (3) Don't know
25. Wearing N95 mask by health care workers is an effective prevention strategy.
(1) Yes (2) No (3) Don't know
26. Health care workers should wash their hands regularly.
(1) Yes (2) No (3) Don't know
27. Following standard precautions during airway management is important.
(1) Yes (2) No (3) Don't know
28. Influenza has several complications including chronic diseases.
(1) Yes (2) No (3) Don't know
29. Influenza causes less deaths among children than adults.
(1) Yes (2) No (3) Don't know
30. Salicylates are contraindicated in children younger than 18 years.
(1) Yes (2) No (3) Don't know
31. The ideal duration of treatment is 5 days.

(1) Yes (2) No (3) Don't know

32. Antiviral drugs can reduce the influenza symptoms.

(1) Yes (2) No (3) Don't know

33. Antiviral drugs regimen should be initiated within 2 days of symptoms.

(1) Yes (2) No (3) Don't know

34. Influenza virus is resistant to amantadine and rimantadine.

(1) Yes (2) No (3) Don't know

Attitudes towards H1N1 influenza

35. Understanding the influenza symptoms in children and pregnant women is important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

36. Breast feeding is an easy way to prevention.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

37. Examining a person in good health with common cold symptoms is important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

38. Immediate reporting of confirmed cases is important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

39. Hand washing is important for influenza prevention.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

40. Isolating patients is critically important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

41. Using N95 masks by patients is critically important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

42. Using N95 masks by health care workers is critically important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

43. Following hand hygiene by health care workers is critically important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

44. Avoid salicylates prescription in patients is important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

45. Rapid case identification and treatment is important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance

46. Prescribing amantadine and rimantadine drugs for patients is important.

(1) Don't have importance (2) Low importance (3) Moderate importance (4) High importance (5) Very high importance