

Original article

Modeling for appropriate awareness of H1N1 influenza among urban population of Vadodara, India

Suresh Kumar Rathi¹, Hardik Gandhi², B. S. Bhavsar³

¹Assistant Professor, Community Medicine Department, ² Internee student, ³Professor and Head, Community Medicine Department, S. B. K. S. Medical Institution and Research Center, Sumandeep Vidyapeeth, Piparia, Vadodara, Gujarat, India.

Correspondence to: Suresh Kumar Rathi, Email: rathisj@yahoo.com

Abstract

Background: H1N1 influenza is a viral disease. World Health Organization declared it phase 6 level of pandemic. India, especially Gujarat suffered most from its high case fatality rate. Hence, it was decided to assess awareness level through modelling about H1N1 influenza in urban population of 18 years and above of Vadodara, India.

Methods: A pre-designed self-rated instrument survey was conducted among 100 adults of 18 years and above through a cross-sectional study design. Multivariate analysis was performed.

Results: The study participants are adequately aware about H1N1 influenza. The final multivariate model reveals that compared to level of high to low level of education, study participants were more likely to be aware of prevention of H1N1 influenza through vaccine (Adjusted OR = 2.79, 95%CI = 1.13-7.65), through hand washing (Adjusted OR = 2.01, 95%CI = 0.93-4.58), more than 18 years as age of contracting H1N1 influenza (Adjusted OR = 6.17, 95%CI = 1.98-8.90) and isolation of infected person (Adjusted OR = 2.18, 95%CI = 1.22-4.81).

Conclusion: There is an appropriate awareness level regarding various aspects of H1N1 influenza among urban adult population. We believe that our model also helps us for dealing future pandemic not only in urban area but also in rural area.

Key Words: H1N1 influenza, Pandemic, Awareness, Modeling, India

Introduction:

H1N1 influenza (Swine flu, Hog flu, or Pig flu) is an infection by any one of several types of Swine influenza virus (SIV). SIV is any strain of the influenza family of viruses that is endemic in pigs¹. World Health Organization (WHO) declared H1N1 influenza as a phase 6 level pandemic on June 2009².

India ranked 3rd most affected country for cases and deaths of H1N1 influenza globally³ and it is probably one of the most dreadful words in the

lexicon of Gujarat, especially in Vadodara where people equate it to death because of its upward curve towards case fatality rate.

The panic affected behavior not only from closing the schools but also people become xenophobic and this stands for the importance of cultural transmission in our society, where such transmission affects the spread of the disease itself⁴. The distribution of proper information to the public on the status of the H1N1 influenza pandemic will be very crucial for achieving the awareness of the potential risks and the optimum code of behavior during the pandemic. Few modeling based studies revealed that behavioral interventions can be effective in mitigating the epidemic of H1N1 influenza⁵⁻⁶. Predictors for awareness of H1N1 influenza seem to operate at the individual-level and need to be taken into account while planning rational preventive measures. Hence modeling the predictors for awareness about H1N1 influenza would be the appropriate strategy for creating awareness and preventing the deadly infection. Hitherto, to our knowledge, none has quantified and evaluated the predictors associated with awareness level for H1N1 influenza among urban population. Therefore, the primary goal of this study was to identify the factors through model that might be associated with awareness level. In this context, we have made an effort to predict factors responsible for creating awareness for urban adult population of Vadodara.

Materials & methods:

The study procedures, including a description of study design, setting, and study population, have been described elsewhere,⁷ and are briefly outlined here. A cross-sectional study was conducted during January 2010. The study subject was defined as any person having age 18 years and above of either sex, residing in urban area of Vadodara for at least 2 years and belonging to lower middle and lower class according to Kuppaswamy's socio-economic classification modified in 2007. A pre-designed,

self-rated instrument was used to collect the data after taking verbal consent of the study subjects during house to house survey through convenience sampling methodology. In addition to one of the authors (HNG), one (intern doctor) was assigned the job of data collection. Both were quiet fluent in local (Gujarati) language. The data collector's team was clearly briefed on the process of data collection. Data were analyzed through Statistical Package for Social Science (SPSS) software program for Windows (version 11.5). We had previously computed and published descriptive statistics on the awareness level variables⁷. In this study, we are reporting the univariable associations and multivariate modelling through logistic regression analysis. Univariate logistic regression analysis was conducted by comparing two variables for each variable of interest using odds ratio (OR) and their 95% confidence intervals (CI). Likelihood ratio test was used to estimate odds ratio and 95% CI for odds ratio for all associations of interest. Because of the hierarchical structure of the data, study participants nested within households and the possibility of intra-household correlation regarding the likelihood of awareness and literacy status, we used in multilevel logistic regression analysis⁸.

Multivariate logistic regression analysis was performed to adjust for simultaneous effects of multiple factors or to control the effects of confounding factors on the outcome variable. The criteria for inclusion of factors in the multivariate analysis were to include all variables from the univariate analysis with a p-value of ≤ 0.1 along with all the variables of known biological importance⁹. To assess the importance of each variable included in the model, Wald statistic for each variable was used.

Results:

The participation rate was 100% (100) when the study participants were explained the benefit of the study. Of 100 participants, 94 heard about H1N1 influenza. Hence, 94 participants were retained for further analysis.

The mean age (years) of participants was 35.64 ± 13.68. Educational status of the majority of the participants were graduate and above and approximately 60% of the participants were employed (Table-1).

TABLE-1- Socio-demographic characteristics of the study participants

Characteristics	Number (n = 94)	Percentages*
Sex		
Male	53	65
Female	41	44
Age (years)		
18 – 30	11	12
31 – 40	22	23
41 – 50	29	31
> 50	32	34
Education		
Up to Primary	03	03
2ndary and higher	18	19
Secondary		
Graduate	51	54
Post-graduate	22	24
Occupation		
Govt. Service	18	19
Private Service	13	14
Self-employed	24	26
Unemployed	30	41
Socio-economic Class (Kuppuswamy's modified for 2007)		
Lower Middle (III)	31	33
Upper Lower (IV)	39	41
Lower (V)	24	26

*All percentages rounded to whole numbers

Although majority of the participants (96%) were of the opinion that H1N1 influenza is an infectious disease and 83% participants correctly ticked the response that it can be prevented but almost 50% participants were not aware of origin of H1N1 influenza.

Coupled with this, relatively good percentage of participants (61%) was quick to respond that vaccination can prevent H1N1 influenza pandemic.

Approximately 87% participants were aware of the causative organism for H1N1 influenza (Table - 2).

TABLE-2 Awareness about H1N1 influenza among study participants

Characteristics	Number (n = 94)	%*
Infectious Disease		
Yes	90	96
No	04	04
Causative Organism		
Virus	82	87
Bacteria	01	01
Fungi	04	04
Parasite	07	08
Reservoirs of H1N1 flu		
Swine	28	30
Human	30	32
Swine and Human (Both)	30	32
Others (Birds, Animals)	06	06
Preventable by Vaccine		
Yes	57	61
No	37	39
Vaccine availability in India		
Yes	26	28
No	68	72
Preventable by Hand washing		
Yes	77	82
No	17	18
Preventable by mask/ handkerchief		
Yes	87	93
No	07	07
Availability of Medicine		
Yes	56	60
No	38	40
Freely Roaming of Infected Person		
Yes	12	13
No	82	87
Visiting Crowded Places		
Yes	06	06
No	88	94
Age of contracting H1N1 influenza		
Up to 5 yrs	19	20
6 – 18	15	16
19 – 60	14	15
> 60	46	49
Isolation of infected person		
Yes	74	79
No	20	21

*All percentages rounded to whole numbers

TABLE-3 Univariate analysis for Awareness about H1N1 influenza

Variable	Education		*OR (95% CI)
	Graduation and above	Up to Higher Secondary	
Age (yrs)			
Up to 40	25	08	0.85 (0.28 - 2.60)
> 40	48	13	
H1N1 Influenza Prevented by vaccine			
Yes	50	07	4.35 (1.40 - 13.90)
No	23	14	
H1N1 Influenza Prevented by hand washing			
Yes	62	15	2.25 (0.62 - 8.08)
No	11	06	
Age of Contracting H1N1 Influenza			
>18 yrs	52	08	4.02 (1.31 - 12.61)
Up to 18 yrs	21	13	
Isolation of infected person			
Yes	59	15	1.69 (0.48 - 5.79)
No	14	06	
Roaming of infected person			
Yes	06	06	0.22 (0.05 - 0.93)
No	67	15	
Visiting crowded places			
Yes	02	04	0.12 (0.01 - 0.86)
No	71	17	

*OR = Odds Ratio

^95%CI = 95% Confidence Interval

Airborne route was most common mode of spread of H1N1 influenza and fever (46%), common cold and cough (39%) were the most common symptoms of H1N1 influenza reported by the participants. As for the common age for contracting H1N1 influenza, 20% participants put forth up to 5 years and for half of the participants above 60 years was the answer.

On univariate analysis, literacy status of the participants is significant with prevention of H1N1 influenza by vaccine (OR = 4.35; 95%

CI: 1.40 – 13.94), awareness about age of contracting H1N1 influenza (OR = 4.02; 95% CI: 1.31 – 12.61) and marginally significant for knowledge on isolation of the infected person (OR = 1.69; 95% CI: 0.48 – 5.79) (Table –3).

The final multivariate model reveals that compared to level of high to low level of education, study participants were more likely to be aware of prevention of H1N1 influenza through vaccine (Adjusted OR = 2.79, 95%CI = 1.13-7.65), through hand washing (Adjusted OR = 2.01, 95%CI = 0.93-4.58), more than 18 years as age of contracting H1N1 influenza (Adjusted OR = 6.17, 95%CI = 1.98-8.90) and isolation of infected person (Adjusted OR = 2.18, 95%CI = 1.22-4.81) (Table – 4).

TABLE-4 Multivariate model for Awareness about H1N1 influenza

Variable	*aOR	^95 %CI
H1N1 Influenza Prevented by vaccine		
Yes	2.79	1.13 - 7.65
No	1	-
H1N1 Influenza Prevented by hand washing		
Yes	2.01	0.71 - 4.58
No	1	-
Age of Contracting H1N1 Influenza		
>18 yrs	6.17	1.98 - 8.90
Up to 18 yrs	1	-
Isolation of infected person		
Yes	2.18	1.22 - 4.81
No	1	-

*aOR = Adjusted Odds Ratio

^95%CI = 95% Confidence Interval

Discussion:

The pandemic of H1N1 influenza posed a serious threat to the general population, a cause of great concerns of various health organizations and Governments which has given sleepless nights to health officials. Significant implications for informing the general masses are depending on whether decisions are made collectively (socially) or independently. If decisions are made independently, then knowledge of the predictors through modeling could have a powerful effect on people. To the best of our knowledge, this is the first study of awareness model among urban adults in India so we are unable to compare the results of this study with other Indian studies. However, globally information on behavioral and

attitudinal responses to H1N1 influenza pandemic is available¹⁰⁻¹⁴.

If we want to reduce the burden of H1N1 influenza significantly then we have to strengthen the interventions (antiviral drugs, vaccine and behavioral) with utmost force. Although drug Tamiflu is available but effectiveness is demonstrated in early diagnosed cases which is not always the case in resource constraint settings especially in India. Furthermore, scarcity of published literature on effectiveness of vaccine has limited the role of vaccine in prevention of H1N1 influenza. Hence the only practical choice is behavioral intervention, till date.

The present study was an attempt to understand the behavioral intervention by assessing the awareness level of the participants. Our study showed that majority of the participants were adequately aware of the H1N1 influenza regarding causative agent and prevention. The important findings of our study were the knowledge on preventive aspects of H1N1 influenza like vaccine, hand washing, isolation of infected person and age of contracting the infection, through multivariate model.

This cross sectional study also demonstrated that the respondents were appropriately aware about avoiding going out and in crowded places (94%) consistent with findings by Hao H A et al¹⁵. Our findings for isolation of infected persons (79%) were also consistent with study by Balkhy et al¹⁶.

Limitations:

We have selected the study population only from urban area through convenience sampling strategy. Hence there will be limited generalizability.

Recommendations:

Based on our findings, we recommend an awareness program on H1N1 influenza for urban as well as for rural area. Further research may be directed for the evaluation of the factors associated with awareness level for urban as well as rural area to improve the knowledge and awareness level on H1N1 influenza.

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