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Willingness to Receive the Influenza A(H1N1) Vaccine and its Determinants among University Students during the 2009 Outbreak in Turkey

Türkiye'de 2009 Yılındaki Salgın Sırasında Üniversite Öğrencilerindeki Influenza A(H1N1) Aşısı Olmaya İstekli Olma Durumu ve Etkileyen Faktörler

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Abstract

Objective: The study aimed to determine the willingness to receive the Influenza A(H1N1) vaccine and its determinants in a large group of university students.

Materials and Methods: This is a self-administered questionnairre based cross-sectional study. Students being educated at health and non-health faculties were invited to participate in this attitude survey.

Results: A total of 974 students were included in the study, of whom 51.3% (n=500) were in health related faculties. The rate of willingness to receive the Influenza A(H1N1) vaccine was 11.9 and 7.5% for health and non-health groups, respectively (p<0.05). For the health group, having been vaccined with seasonal influenza was a significant determinant of being willingness to receive the Influenza A(H1N1) vaccine (O.R [95% C.I.]), (O.R: 2.9 [1.5-5.6]) and to believe that the Influenza A(H1N1) vaccine prevents swine flu (O.R: 1.7 [1.09-2.8]). For the non-health group, the only determinant was to believe that Influenza A(H1N1) vaccine prevents from swine flu (O.R: 19.1 [5.7-64.1]) which found to be affected by confusing news in media.

Conclusion: The public health professionals who will organize the efforts to improve the acceptability of Influenza A vaccines during influenza outbreaks should try to increase the vaccination rates of seasonal influenza. Information provided by the media should be organized in order not to cause fear and confusion, which was shown to decrease willingness and belief in the Influenza A(H1N1) vaccine.

Key Words: Influenza A, H1N1, vaccine, willingness, acceptability

Özet

Amaç: Üniversite öğrencilerinden oluşan geniş bir grupta Influenza A(H1N1) aşısı olamaya istekli olma durumunun ve bu durumu etkileyen faktörlerin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Katılımcıların kendisi tarafından doldurulan bir ankete dayalı kesitsel araştırmadır. Sağlık ve sağlık dışı fakültelerde eğitim gören öğrenciler bu tutum çalışmasına davet edilmiştir.

Bulgular: %51,3'ü (n=500) sağlıkla ilişkili fakültelerde okuyan toplam 974 öğrenci araştırmaya dahil edilmiştir. Grip aşısı yaptırmaya istekli olma durumu sağlık ve sağlık dışı gruplar için sırasıyla %11,9 ve 7,5 olarak belirlenmiştir (p<0.05). Sağlık grubu için daha önceden mevsimsel grip aşısı yaptırmış olma (O.R: 2,9 [1,5-5,6]), aşının domuz gribinden korudağuna inanma (O.R: 1,7 [1,09-2,8]), sağlık dışı grup içinse yalnızca medyadaki kafa karıştırıcı haberlerden etkilendiği bulunan aşının domuz gribinden korudağuna inanma (O.R: 19,1 [5,7-64,1]) anlamlı faktörler olarak belirlenmiştir.

Sonuç: Salgınlar sırasındaki Influenza A aşılarının kabul edilirliğini artırmayı hedefleyen çabaları organize eden halk sağlığı profesyonelleri mevsimsel grip aşısı yaptırma hızlarını artırmayı denemelidir. Aşının koruyucu olduğuna inanma ve istekli olma halini etkilediği gösterilen medya tarafından sağlanan bilgilerin korku ve kafa karışıklığı yaratmaması için organize edilmelidir.

Anahtar Kelimeler: Influenza A, H1N1, aşı, istekli olma, kabul edilirlik

Introduction

The Influenza A(H1N1) pandemic, which was declared to be at Phase 6 by the World Health Organization (WHO) on June 2009, caused 655 deaths of whom 128 (19.5%) were between 5-24 ages in Turkey [1, 2]. According to the Ministry of Health (MOH), 56% of the cases were between the ages of 5-24 on 12 December 2009, and the vaccination programme started on 02 November 2009 [3]. Children, adolescents and young adults were high risk groups with highest morbidity [4].

University students are under high risk of catching influenza A(H1N1) due to their age groups and they are also a risk

group to increase the transmission of the disease in public. The attitudes, beliefs and knowledge of the community which were found to affect the outspread of pandemics as they significantly affect the acceptance of the influenza vaccine and play a key role in evolving of H1N1 pandemics [3, 5, 6].

The aim of this study was to determine the attitudes and knowledge of a large group of university students towards influenza A(H1N1) and their willingness to get vaccinated and its related factors during the 2009 pandemic.

Materials and Methods

This cross-sectional study was done with the participation of the students of Atatürk University, which is one of the largest universities in Turkey and is located in Erzurum province in the eastern part of the country. The university has 19 faculties, five of which are in health related areas.

Sampling

To be a student in health related faculties was accepted as a possible factor and the students were divided into two subgroups (health vs. non-health). An individual sample size was computed for both groups by considering their total number of students. A substitutional 10% excess was also added to each groups' sample size. All of the health related faculties and four of non-health faculties, which were drawn randomly, were included in the study (health group: medicine, dentistry, health sciences, pharmacy; non-health group: engineering, education, fine arts, agriculture). In order to calculate the sample size the formula of $n=(1.96)^2[P*(1-P)]/d*d$ was used with an alpha set of 0.05. After calculating the sample size, the total number of each group was distributed to faculties according to their total student number and sample size of each faculty was distributed to each class according to the number of students.

Data collection

The data was collected via structured questionnairres, which were filled in by students during their lectures with the supervision of researchers. The data collection was performed between the dates of 2.12.2009 and 29.02.2010. The questionnairre consisted of 26 questions about demographics, knowledge of H1N1, its vaccine and attitudes towards the H1N1 vaccine. The questions investigating the knowledge were about the infectios agent of swine flu, the way of transmission, symtoms of H1N1, the side effects of H1N1 vaccine, the source of knowledge, the measures that can be taken to avoid from swine flu. We attempted to measure the attitudes of the students with some key questions. These questions are 'does the H1N1 vaccine prevent swine flu?', 'are you willing to receive the H1N1 vaccine?'. Additionally, we asked if the

students have ever been vaccined with a seasonal influenza. There were questions regarding the news in the media about H1N1, the students were asked if they believed the news and did the news cause fear or confusion in their mind.

Statistics

The statistics were done with Spss 13.0. The Pearson Chi-Square test was used to discover the differences betweeen health and non-health groups. The determinants of willingness to receive the H1N1 vaccine was computed with binary logistic ression analysis (backward stepwise).

Ethics

In order to be fast during outbreak, instead of ethical approval, official permission was provided by the Rectorate of Ataturk University (ref.no:B.30.2.ATA.0.01.00.05/00/2498). It was announced that contribution was voluntary and all the participants were informed about the nature of the study.

Results

A total of 974 students were included in the study, of whom 51.3% (n=500) were at health related faculties. The mean age of the students were 21.0±2.3 (21.1 for the health and 20.9 for the non-health group) and 58.9% (n=574) were women. The percentage of women was higher in the health group (62.6 vs. 55.1, p<0.05).

7.2% (n=70) of the students reported a physician diagnosed chronic disease. The most often reported disease was asthma (3.0%, n=29). Reported egg allergy frequency was 1.1% 15.8% (n=153) stated that they had previously been vaccined with a seasonal influenza vaccine, which was significantly higher for the health group (18.6 vs. 12.7%, Pearson Chi-Square=6.4, p=0.011).

Knowledge of swine flu and the H1N1 vaccine is presented at Table 1.

The most often used source of knowledge among swine flu was the media (n=770, 79.3%). Students in non-health faculties stated much more use of media to reach knowledge of H1N1 than students in the health area (89.2 vs. 69.8%, Pearson Chi-Square=55.7, p=0.000). To resort to a health establishment to get information about H1N1 was 29.5% (n=286) overall, whereas it was significantly higher for students in the non-health group (42.1 vs. 16.2%, Pearson Chi-Square=77.7, p=0.000). Parents/friends were also an important source of information (20.5%, n=199).

The non-health group reported that they beleived the media news about swine flu more than the health group (28.4 vs. 21.8, Pearson Chi-Square=5.4, p=0.019). 82.5% (n=799) said that information derived from the media caused confusion in their minds and that did not differ between groups

Table 1. Knowledge of swine flu and the H1N1 vaccine

	Health		Non-Health		Total		
	n	%	n	%	n	%	P
The infectious agent of H1N1							
Virus	483	96.6	435	91.8	918	94.3	*
Bacteria	10	2.0	21	4.4	31	3.2	*
Parasite	3	0.6	3	0.6	6	0.6	
Swine	5	1.0	12	2.5	17	1.7	
Fungus	-	-	-	-	-	-	
Ways of transmission							
Respiration	412	82.4	313	66.2	725	74.5	¡
Droplet	29	5.8	33	7.0	62	6.4	
Touching	151	30.2	255	53.9	406	41.7	¡
Blood	21	4.2	25	5.3	46	4.7	
Eating pork	7	1.4	13	2.7	20	2.1	
Kissing	10	2.0	33	7.0	43	4.4	¡
Symptoms of H1N1							
High fever	492	98.4	462	97.5	954	97.9	
Cough	291	58.2	234	49.4	525	53.9	*
Rhinitis	254	50.8	190	40.1	444	45.6	*
Myalgia & arthralgia	340	68.0	239	50.5	579	59.5	¡
Fatigue	452	90.4	414	87.3	866	88.9	
Loss of voice	71	14.2	26	5.5	97	10.0	¡
Headache	264	52.8	223	47.0	487	50.0	
Humidifier fewer	132	26.4	125	26.4	257	26.4	
Diarrhoea	301	60.2	228	48.1	529	54.3	¡
Convulsion	41	8.2	22	4.6	63	6.5	*
Side effects of the H1N1 vaccine							
The oedema in the field of injection	209	45.9	89	22.5	298	35.0	¡
Erytema	303	66.4	150	37.7	453	53.0	¡
Breathlessness	108	23.7	58	14.6	166	19.5	*
High fever	212	46.5	146	36.9	358	42.0	*
Guillan Barre Syn.	114	25.1	40	10.1	154	18.1	¡
Ensephalitis	83	18.2	69	17.4	152	17.9	
Convulsion	58	12.7	43	10.9	101	11.9	
Sepsis	45	9.9	19	4.8	64	7.5	*
Toksic shock syn.	95	20.9	40	10.1	135	15.9	¡

Pearson Chi-Square Test, *=p<0.05, ¡=p<0.001

(h vs, n-h, 80.9 vs. 84.1%, Pearson Chi-Square=1.6, p=0.197). Significantly higher percentage of non-health group reported that news appearing in the media caused fear (61.3 vs. 51.95, Pearson Chi-Square=8.5, p=0.003).

In the case of any symptom referring flu or flu like illness, 82.1% (n=777) stated that they would resort to a doctor, which was higher for the non-health group (h vs. n-h, 76.0 vs., 88.4%). The students in the health group tend to take pills

(2.3 vs. 0.4%), try to comsume more fruits and vegetables than usual (5.0 vs. 2.6%), have a rest (7.1 vs. 2.8%) as higher than the non-health group (Pearson Chi-Square=27.2, p=0.000).

Hand washing (95.9%, n=929), using face masks (66.1%, n=643), isolation of sick people (67.3%, n=654), adequate nutrition (79.4%, n=772), abstaining from being in public places (50.2%, n=488), using antibiotics (5.0%, n=49) were expressed as measures to aviod H1N1. Using face masks (74.5 vs. 57.2%), isolation of sick people (70.9 vs. 63.4%), adequate nutrition (83.6 vs. 75.1%) and abstaining from being in public places (54.3 vs. 45.9%) are stated significantly higher by the health group compared to the non-health group (p<0.05 for each). There was no significant difference in hand washing (96.0 vs. 94.9%) and using antibiotics (5.8 vs. 4.2%) (p>0.05 for each).

9.8% (n=94) were willing to receive the H1N1 vaccine, while 62.7% (n=599) did not want the H1N1 vaccine and 27.5% (n=263) were undecided. The proportion of students who were willing to receive the H1N1 vaccine was higher in the health group (11.9 vs. 7.5%), whereas those undecided were higher in the non-health group (n-h vs. h, 30.7 vs. 24.2%) (Pearson Chi-Square=8.7, p=0.013). 38.0% (n=370) of the students thought that the H1N1 vaccine prevents him/her from swine flu (h vs. n-h, 44.2 vs. 38.1%, Pearson Chi-Square=3.4, p=0.065). 7.9% of the students (n=77) did not answer the related question "does the H1N1 vaccine prevent swine flu".

The attitudes of the students towards receiving the vaccine in relation to beliefs towards the vaccine are shown in Figure 1. 21.7% (n=80) of the students who believed in the
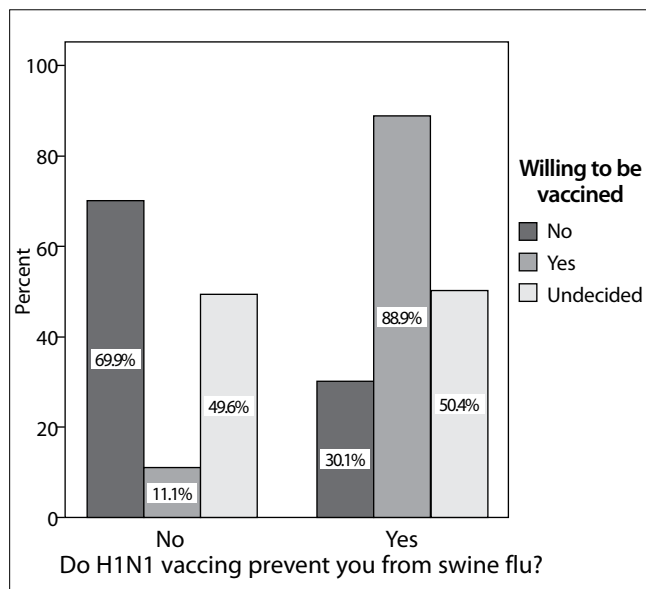
H1N1 vaccine were willing to be vaccinated, while it was 1.9% (n=10) for students who did not think that the H1N1 vaccine prevents swine flu. 69.9% (n=391) of the students who were not willing to be vaccinated did not believe in the H1N1 vaccine. 32.8% of the students who believed in the H1N1 vaccine were undecided to be get vaccinated (Pearson Chi-Square=121.2, p=0.000).

The most common reason for not being willing to receive the vaccine was the unreliability of the vaccine (22.0%, n=165) and side effects (20.3%, n=152), respectively. 8.8% (n=66) said that they did not want the H1N1 vaccine because of confusing news in the media. 24.0% (n=136) of the students who did not want to get the H1N1 vaccine and 15.2% (n=26) of the undecided students stated that the H1N1 vaccine is not reliable.

The determinants of willingness to receive the H1N1 vaccine are shown in Table 2.

Discussion

In order to manage and organize an infectious disease outbreak, the knowledge and attitudes of target groups towards related disease and its vaccine if available should be known. The 2009 Influenza A(H1N1) was an opportunity for public health professionals to understand the determinants of responses to pandemics and vaccine uptake [7]. The Influenza A(H1N1) pandemi occured during 2009, which was announced to be in the post-pandemic period by WHO on August 2010 affected mostly children and young adults differently from seasonal influenza [8]. This cross-sectional study was conducted in order to understand their attitudes and knowledge towards the Influenza A(H1N1) vaccine with the participation of university students who were belong to risky population and guide public health professionals in the management of future influenza pandemics.

Most of the students knew the infectious agent was a virus like similar ones [9, 10]. Breathing was known as the most familiar way of transmission of H1N1, although the term 'droplet' was also almost unknown for the health group. The level of knowledge about the symptoms of the disease was not good enough, except for high fever and fatique. Hand washing was the most reported measure like other studies, although Griffiths et al. showed that student responsiveness to H1N1 pandemics and sensitivity towards these measures like hand washing may differ from country to country [11-13]. However, there was an approximately 5.0% antibiotic usage for both groups, which is not appropriate. The low level of knowledge towards H1N1 of the health group students who shall be a reliable source of knowledge for the public derives a necessity of education and training.

Figure 1. *Willingness to receive the H1N1 vaccine according to belief in the H1N1 vaccine (Does the H1N1 vaccine prevent swine flu?).*

Table 2. Determinants of willingness to receive the H1N1 vaccine with binary logistic regression

	Health			Non-health		
	O.R	95% C.I	p	O.R	95% C.I	p
Does the H1N1 vaccine prevent swine flu?						
No (ref)						
Yes	11.1	4.8-25.7	0.000	19.1	5.7-64.1	0.000
Have you ever been vaccinated with a seasonal influenza vaccine?						
No (ref)						
Yes	2.9	1.5-5.6	0.002	-	-	-
Does the news in the media about swine flu cause fear?						
Yes (ref)						
No	2.5	1.3-4.7	0.004	-	-	-

If a student beleived that the Influenza A(H1N1) vaccine prevents swine flu then they were willing to get the vaccine (O.R: 11.1 for the health and O.R: 19.1 for the non-health group, p=0.000 for each group). The determinants of believing in the Influenza A(H1N1) vaccine is presented in Table 3

Table 3. Determinants of believing in the H1N1 vaccine (does the H1N1 vaccine prevent swine flu?) with binary logistic regression

	Health			Non-health		
	O.R	95% C.I	p	O.R	95% C.I	p
Have you ever been vaccinated with a seasonal influenza vaccine?						
No (ref)						
Yes	1.7	1.09-2.8	0.020	-	-	-
Does the news in the media about swine flu cause confusion?						
Yes (ref)						
No	-	-	-	2.1	1.2-3.6	0.004
Media as a source of information						
No (ref)						
Yes	-	-	-	0.5	0.3-1.05	0.072

The willingness to receive the Influenza A(H1N1) vaccine was quite low in our study like other studies in Turkey, although lower than studies in other countries, especially for the health group compared to international health profesionals [3, 5, 10, 14-16]. Additionally, a considerable proportion of the study group was undecided. Most of the students who were not willing to be vaccinated did not beleive that the vaccine prevents swine flu. In this study, the unreliability and side effects were the main reasons for unwillingness. That was similar to other surveys, apart from the study of Jaramillo AE et al [3, 14-16]. One of an interesting results of our study was the effect of the media on the attitudes of students. The media was determined to be most often used information resource of the H1N1 vaccine and also a source of fear and confusion as discussed worldwide [3, 4, 6, 17, 18].

If a student believed that the influenza A(H1N1) vaccine prevents swine flu, he/she was significantly more willing to receive the vaccine than students who did not believe in the vaccine (O.R: 11.1 for the health and O.R: 19.1 for the non-health group, p=0.000 for each group). That was the only determinant for the non-health group. Wong LP et al. [5] found a similar result, although Ozer et al. [19] reported a differential one for pregnant women. Interestingly, the students who reported that the news in the media causes confusion were less likely to believe in the vaccine, which was the main determinant of willingness.

For the health group, one of the significant determinants of willingness to receive the Influenza A(H1N1) vaccine was previously being vaccinated against seasonal influenza (O.R: 2.9 [1.5-5.6]).This result was similar to the study of Pfeil A et

al [20, 21]. Like willingness, it was determined that seasonal influenza was also an important factor to beleive in the vaccine. Efforts to improve seasonal influenza vaccination coverage are seen to be the key point to enhance the vaccination rates during ınfluenza A outbreaks. Next to seasonal influenza vaccination, the efforts to remove the media from being a source of fear were determinants of willingness to receive the vaccine. That was an interesting and unexpected result. Lack of knowledge of H1N1 may lead to such fear of the news in the media. We expected this result for the non-health group. This dramatic result should be evaluated and the education level of students must be improved with increased efforts, as they must be the sources of reliable information.

Another interesting point was whether the vaccine had been provided with a cost. While Lau et al. [22] found that the cost of the Influenza A(H1N) was a barrier to be willing to receive the vaccine, we determined this low rate although it was announced that the H1N1 vaccine was free of charge.

There were some limitations of our study. First, during the data collection period the vaccination campaign had begun but pregnant women, children under the age of two, health workers and chronically ill patients were given priority and it was not widened to the entire age groups. Therefore, we could not ask the students directly to be vaccined and investigate only the willingness. Additionally, we did not ask deeply the reasons for unreliability. A qualitative study added to a questionnairre based survey will be more useful for future studies.

The public health professionals who will organize and plan the efforts to improve the acceptability of Influenza A vaccines during influenza outbreaks should try to increase the vaccination rates of seasonal influenza, especially for students in health related faculties who are accepted to be reliable sources of information. Additionally, the debates and information provided by the media should be organized in order not to cause fear and confusion, which were shown to decrease willingness and belief in the Influenza A(H1N1) vaccine.

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Informed Consent: Written informed consent was obtained from patients who participated in this study.

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