

## Willingness to accept novel H1N1 influenza A vaccine by Japanese athletic and non-athletic students in 2009

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### Abstract

We gave questionnaires to 503 female students (326 athletes, 177 non athletes) regarding their willingness to receive novel influenza A (H1N1) vaccine. A chi-squared test was used to examine the characteristics between athletic and non-athletic students based on their answers.

A total of 261 students (51.9%) answered that they did not want to receive the vaccine, while willingness to accept the vaccine was significantly greater among non-athletic (56.5%) as compared to athletic (43.6%) students. That finding might have been due the necessities of vaccitization for other viruses such as rubella and measles, causing them miss taking an important examination to acquire a registered dietitian certificate. Consciousness of accepting other viral vaccines might be related to acceptance of receiving the novel influenza A (H1N1) vaccine. In addition, our results suggest that non-athletic students have a higher level of consciousness of being willing to receive both the new influenza A (H1N1) vaccine and seasonal influenza vaccine.

The athletic students in our study showed a higher level of willingness to receive the seasonal influenza vaccine, which may contribute to preventing seasonal influenza from spreading among athletes. Individuals not willing to receive the novel influenza A (H1N1) vaccine should clearly understand that they do not have substantial cross tolerance from receiving the seasonal influenza vaccination. Students in both groups showed a favorable attitude in 2009 for the H1N1 vaccination, though further study is needed.

### I Introductions

A novel influenza A virus has been identified as the cause of outbreaks of feverish respiratory tract infections ranging from self-limited to severe illness<sup>1</sup>. That study noted that in April 2009, a novel influenza A (H1N1) virus started to spread in North America causing upper and lower respiratory tract infections. Molecular characterization of the virus by the U.S. Centers for Disease Control (CDC) revealed that the circulating virus was a completely novel recombinant of previously identified viruses with various avian, pig and human

origins<sup>1</sup>. Then, on June 11, 2009, the World Health Organization declared that an influenza pandemic was under way, after which the new influenza A virus spread rapidly throughout more than 70 countries. Based on the evidence of the efficacy of vaccination for control and prevention of seasonal influenza<sup>2, 3</sup>, vaccination for pandemic influenza is an important primary preventative method to avoid the risks associated with influenza A infection<sup>4</sup>.

The first domestic infection of the new strain of influenza A in Japan was reported on May 21, 2009 prompting the government to take actions to

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address the threat, including closure of some schools amid signs of further expansion (Japan Today: Sunday 22nd May, 01:22 AM JST). At that time, 3 students from a high school in Kobe, Hyogo Prefecture, with no recent history of traveling overseas, were confirmed as being infected, while 5 students at a different high school in the city were also later found to be infected. There were also suspected cases in Osaka Prefecture. The outbreak came despite attempts by the Japanese government to block entry of the virus through quarantines at airports. Four cases had been found through health inspections at Narita International Airport among a group of Japanese students and teachers who arrived May 8 on a flight from the United States after a trip to Canada (cited text partly omitted). In addition to the 3 students Kobe High School a 17-year-old male, 16-year-old male and 16-year-old female, 17 other students at the same school reported feeling sick, while more than 10 students from other schools in the prefecture developed a fever after playing volleyball with the infected student, according to local authorities (Japan Today Sunday 22nd May, 01:22 AM JST: 2009 Kyodo News).

Sports activities such as volleyball or basketball as well as other sports that feature close contact, may easily spread an influenza virus from an infected player. That it is very important for athletes to not spread airborne infections while practicing and playing games. In the present study, we evaluated the results of questionnaires concerning the willingness of Japanese athletic or non-athletic students to accept a novel H1N1 influenza A vaccine made available in 2009.

## II Methods

### Participants and Survey Methods

Subjects of the present study were recruited by convenience sampling conducted at Mukogawa Women's University, Department of Health and Sports Sciences (n=326) and Department of Food

Science and Nutrition (n=177), and all were female. Inclusion criteria were enrollment as a student and willingness to participate in the research study. The questionnaire was offered on a voluntary and anonymous basis to undergraduate students at class and organizational meetings. The survey instrument was designed to be brief, nonintrusive, with height and weight not asked, and easy to complete in order to ensure a high response rate. Written informed consent was obtained from all students who participated.

In this study, we defined the students of the Department of Health and Sports Sciences as athletic students and those of the Department of Food Science and Nutrition as non-athletic students. Students of the Department of Food Science and Nutrition who routinely participated in sports activities were placed in non-athletic student group, while those of the Department of Health and Sports Sciences who did not routinely participate in sports activities were placed in the athletic student group.

Since this was not an experimental or interventional study, ethical committee approval was not required. Subjects were recruited during the breaking time before lectures and after lectures during the 1-week period from October 10-17, 2009, just prior to the beginning of vaccination campaign of novel influenza A. Students who agreed to participate were given the study questionnaires to complete on their own and a total of 503 returned completed the questionnaires.

## III Questionnaires

The questions used in the questionnaire to determine willingness to accept the influenza A (H1N1) vaccination were as follow Question 1 "Will you receive the new influenza A (H1N1) vaccine?", Question 2 "Will you receive both the new influenza A (H1N1) vaccine and seasonal influenza vaccine?" Question 3 "Will you receive only the seasonal influenza vaccine?", Question 4 "Have you

received the seasonal influenza vaccine for these five years”, Question 5 “Have you infected influenza for these five months?”.

#### IV Statistical analysis

A chi-squared test was used to examine the characteristics between the athletic and non-athletic students that were willing to accept the influenza A (H1N1) vaccination against those who were not willing to accept the vaccine (Question 1). A chi-squared test was also used to examine the characteristics of the answers to question numbers 2 to 4 between the athletic and non-athletic students. The level of statistical significance was set at  $p < 0.05$ .

#### V Results

As for the overall willingness to accept the novel influenza A (H1N1) vaccination, 242 students (48.1%) answered that they would receive (Fig.1). That willingness was found in significantly larger proportion of the non-athletic students (56.5%) as compared to in athletic students (43.6%) (Fig.2).

The proportion of students willing to receive both the new influenza A (H1N1) vaccine and seasonal influenza vaccine among the non-athletic group (32.2%) was also significantly greater than that of the athletic group (21.1%) (Fig.3). However, the proportion of students who answered that were willing to receive only the seasonal influ-

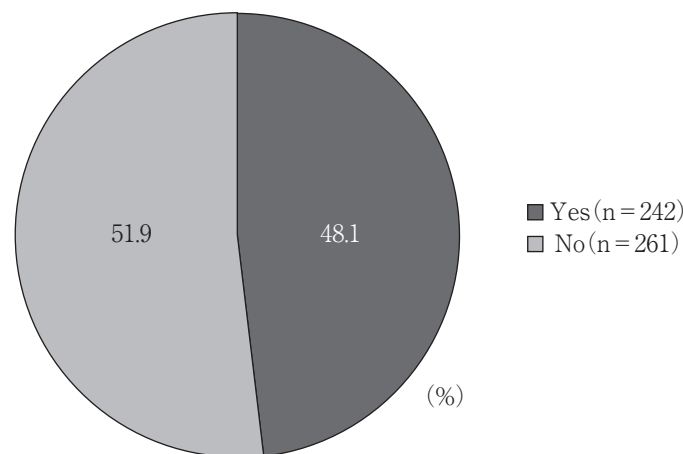


Figure 1 . Willingness to accept novel vaccination (n=503)

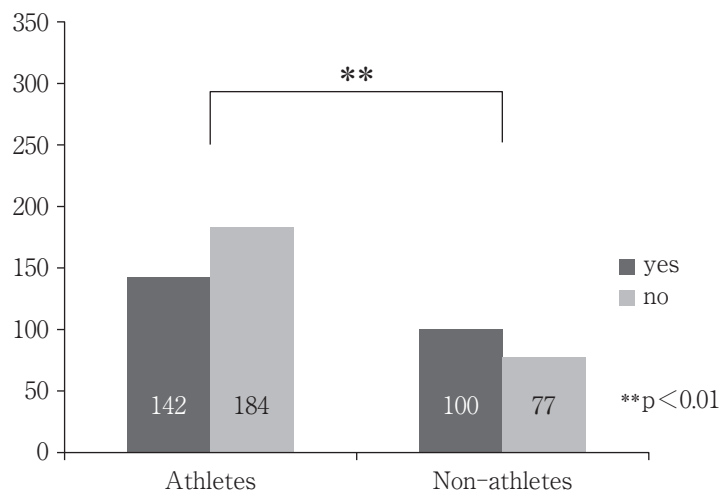


Figure 2 . Willingness to accept novel influenza vaccination. Comparison between athletic and non-athletic students

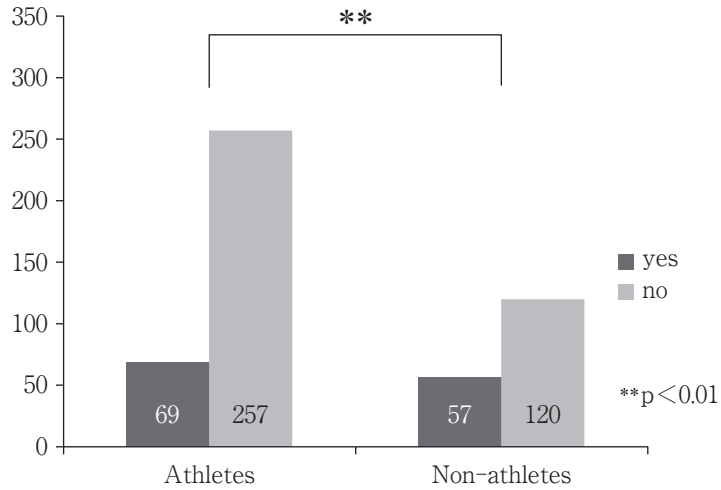


Figure 3. Comparison of number of students willing to receive both new influenza A (H1N1) vaccine and seasonal influenza between non-athletic and athletic students.

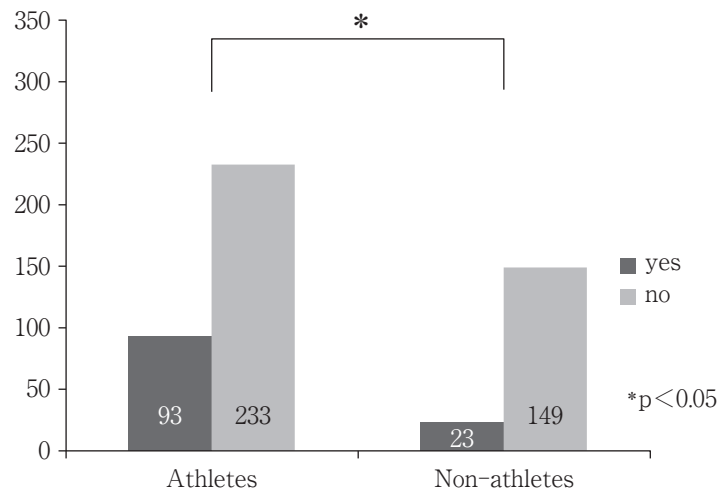


Figure 4. Comparison of number of students willing to receive only seasonal influenza vaccine between non-athletic and athletic students.

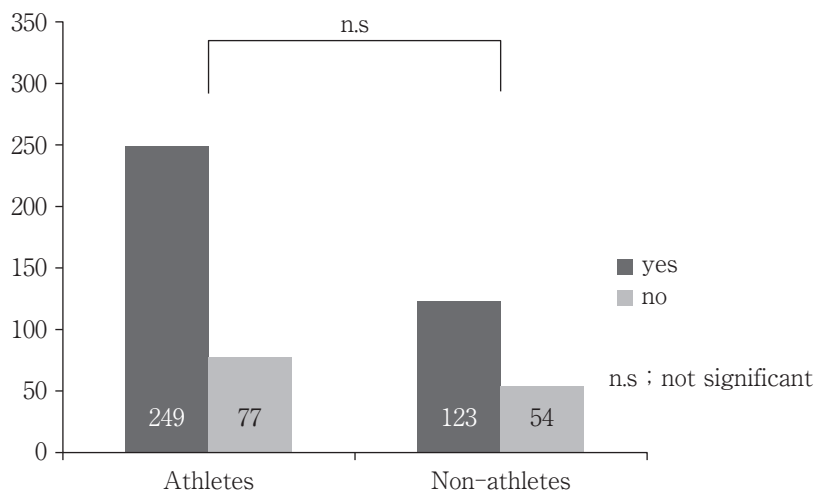


Figure 5. Comparison of number of students who received seasonal vaccination in past 5 years between athletic and non-athletic students.

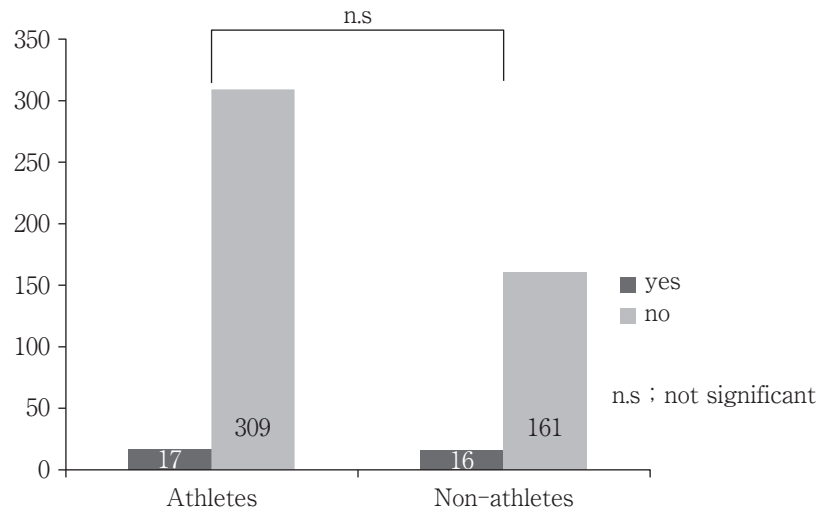


Figure 6 . Comparison of number of students with influenza in past 5 months between athletic and non-athletic students.

enza vaccine was significantly higher among athletic (28.5%) as compared to non-athletic (13.4%) students (Fig.4).

There was no significant difference in seasonal vaccinations during the past 5 years between the athletic (76.4%) and non-athletic (69.5%) students (Fig.5). There was also no significant difference in the percentage who had influenza in the past 5 months between athletic (yes: 5.2%, no: 94.8%) and non-athletic (yes: 9.0%, no: 91.0%) students (Fig.6).

## VI Discussion

In the present study, 261 of all students (51.9%) answered that they did not want to receive the novel influenza A (H1N1) vaccine, though the willingness to receive vaccine was significantly greater in non-athletic (56%) than athletic (44%) students. In a previous study of nurses, 194 (73%) participants did not want to receive the novel influenza A (H1N1) vaccine<sup>5</sup>. That study investigate the characteristics of respondents who were willing and not willing to receive the vaccination using chi-squared test. Nurses willing to receive influenza A (H1N1) vaccine were different with respect to “being vaccinated against seasonal influenza vaccination in the previous 12 months.”

In contrast to that study, general practitioners working in a community in France had a high rate of acceptability (62%) of the influenza A (H1N1) vaccination<sup>6</sup>. In another study of medical workers, 67% of physicians and 31% of nurses indicated their acceptance to receive vaccinated against the pandemic H1N1 influenza in 2009 ( $p < 0.001$ )<sup>7</sup>. In contrast, that study also reported that nurses were more prone (79.5%) than physicians (64.7%) to wash their hands or use hand sanitizers more frequently in response to reports of pandemic influenza ( $p < 0.001$ ). Our result (56%) showing the greater willingness among non-athletic students to accept the novel influenza A (H1N1) vaccine might have been related to necessities of vaccination for other viruses such as rubella and measles prior to the examination and to acquire the registered dietitian certificate. Consciousness of acceptance other viral vaccines might be lead to the acceptance of the novel influenza A (H1N1) vaccine. Our findings also demonstrated that non-athletic students have a higher level of consciousness of willing to receive both the new influenza A (H1N1) and seasonal influenza vaccines.

We found that athletic students were more willing to receive the seasonal influenza vaccine, which may contribute to preventing seasonal influenza from spreading among athletes. If athletic

students answered “no” to the question regarding vaccination in the previous 5 months against seasonal influenza, they should be clearly instructed that they do not have substantial cross-tolerance, as it is very important to understand that receiving the seasonal influenza vaccination does not develop cross-tolerance for the novel influenza A (H1N1) virus.

As compared to previous reports of the lower percentage of receiving of the novel influenza A (H1N1) vaccine among nurses<sup>5-7</sup>, both athletic and non-athletic students in our study had a higher level of consciousness of regarding the seasonal influenza vaccination. There was no significant difference for the proportion of our students in the 2 groups who experienced influenza in the 5 months before the survey. Thus, we speculated that athletic students might have a favorable consciousness for prevention of influenza infections. A newspaper report (Japan Today Sunday 22nd May, 01:22 AM JST: 2009 Kyodo News) noted that the 3 students of a Kobe high school had contracted the H1N1 virus and 17 other students at the same school were feeling sick, while more than 10 students from other schools in the prefecture developed fever after playing volleyball with an infected student. Thus, athletic students infected with influenza virus may easily transmit influenza to other athletes.

Both groups of students in the present study showed favorable attitudes in 2009 for the influenza vaccination as compared to others previously reported<sup>5-7</sup>. However additional studies are needed that included students of other majors.

The CDC: CDC recommends a yearly vaccination as the first and most important step in protecting against influenza. The 2010-2011 seasonal influenza vaccine provided in the United States will protect against H3N2 virus and influenza B viruses, as well as the 2009 H1N1 virus that emerged last year to cause the first global pandemic in more than 40 years and resulted in substantial illness, hospitalizations, and deaths. This seasonal vaccine has begun shipping from manufacturers,

and the CDC recommends that all individuals 6 months and older receive the 2010-2011 flu vaccine for the upcoming season, as it is available (<http://www.cdc.gov/H1N1flu/>).

Based on the present results, we recommend that athletes receive the influenza virus vaccine in order to avoid spreading of the disease. In addition, correct information regarding influenza vaccinations is important for athletic students.

## VII References

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