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# Pandemic flu knowledge among dormitory housed university students: a need for informal social support and social networking strategies

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## ABSTRACT

**Introduction:** The declaration of a Phase 6 pandemic of influenza A (H1N1) by the World Health Organization in June 2009, triggered the activation of preparedness responses worldwide. During 2009 spring and fall, many US universities actuated their emergency pandemic preparedness plans. This article describes a research study that used a modified community based participatory research (CBPR) approach between August and November 2009 at New Mexico State University's main Las Cruces campus to determine influenza (pandemic influenza A (H1N1) 2009 and seasonal influenza knowledge, attitudes, and health communication (informal support networks and social networking) strategies specifically related to influenza among dormitory housed (on-campus living) undergraduate students. The goal was to produce data for use in the university's pandemic illness/disaster preparedness and response plans.

**Methods:** Following activation of the university's campus-wide efforts to educate students about pandemic flu, university community partners were asked for input regarding information for flu preparedness for the university's undergraduate students. Student participants were recruited for the present study from those housed in four campus dormitories. A purposive convenience sample was used to collect survey data from 175 students during the peak week of reported flu cases on campus. Each participant was given an anonymous, face-to-face, self-administered survey and 167 surveys were able to be analyzed. A $\chi^2$ goodness of fit test was used to determine whether observed proportions of categorical variables differed from hypothesized proportions.

**Results:** Four categorical data were analyzed by topics: (1) demographics; (2) flu awareness; (3) flu immunization knowledge and practices; and (4) communication and health information practices. The average age was 19.6 years (SD = 1.8), with no significant differences by sex (86 males and 76 females, 5 undisclosed) or race/ethnicity (57 White, 43 Hispanic, 44 Other). All questions

 

were tested with $\chi^2$ against sex, race, and dormitory; however, only three questions revealed statistically significant differences by any of these demographic categories.

**Conclusions:** Sex, race, age, and dormitory were demonstrated to have little impact on H1N1 health practices and knowledge. Three-quarters of students surveyed demonstrated awareness of the pandemic 2009 H1N1 flu. Despite public health and university health education campaigns, approximately 25% were not aware of the virus. Most students stated that they knew someone who had flu during the year, even if they had not. Students did not perceive (60%) dormitory living to be a greater health risk, even though the proximal distance among students diminishes by sharing bathrooms and sleeping quarters. Three main factors affected the students' knowledge, attitudes and behaviors: faculty attitudes and influenza knowledge; low levels of flu like illnesses at the university; and the utilization of health education strategies inconsistent with the mechanisms students use to gain health information (informal support networks and electronic social networking). Failure to utilize these student information mechanisms may result in less than optimal health education effectiveness. Health educators should ensure that identifiable intermediaries (eg faculty) understand and assist in health education efforts. However, the incidence of H1N1 at this university was relatively low, which may have affected the research results.

**Key words:** health education, informal support networks, modified community based participatory research (CBPR), pandemic influenza A (H1N1) 2009, university dormitory residence.

# Introduction

Following an early outbreak of pandemic influenza A (H1N1 - hereafter referred to as pandemic influenza) in North America (April 2009) and rapid global spread[1], the World Health Organization (WHO) declared a Phase 6 pandemic alert in June 2009. Although the WHO announced that the severity of the influenza pandemic was expected to be moderate, most countries reported cases of the disease by May 2010[2-3]. Perceptions of the severity and ramifications of acquiring the disease varied by population and country. In the USA, and especially among young adults 18-23 years and living on college campuses, a sense of non-vulnerability was common.

The pandemic influenza virus presents two main epidemiologic patterns that are different from the seasonal influenza[2]. First, high levels of summer infections occurred with the new virus in the northern hemisphere, which is atypical of seasonal flu. Second, patterns of morbidity and mortality differ from seasonal flu, with most deaths occurring among younger people, even otherwise healthy individuals. People with other chronic conditions (eg asthma or chronic obstructive pulmonary disorder) and pregnant women and younger children appear to be at higher risk for complications such as viral pneumonia, which is harder to treat than bacterial pneumonia. The higher incidence among younger individuals is thought to be due to antibody development to prior exposure with seasonal influenza that does not protect against the pandemic influenza virus. This is in contrast to persons 65 years and older who may have some immunity to the pandemic virus[2,4-5]. In addition, many of the younger or first and second year students live in on-campus dormitory units where common eating and bathing areas provide ample opportunities for virus transmission[6-11].

This article describes the results of a modified community based participatory research (CBPR) strategy conducted during the fall semester 2009 at New Mexico State University's main campus in Las Cruces, which is approximately 68 km (42 miles) from the US–Mexico border and has a primarily rural-based constituency. The majority of students (60–65%) who attend the university come from the many rural, non-urban areas throughout New Mexico and the southwest. The objective of the research was to determine what knowledge and understanding college-aged students who resided in dormitories on campus had about influenza (H1N1 2009 and seasonal). The goal of the study was to use the information (data) to develop a guide that could be used

 

to plan for university preparedness and response with influenza (H1N1 2009 and seasonal).

### *Context*

As the state's land-grant institution (each state has one university that received federal lands to develop a college which is called a land-grant institution), New Mexico State University (NMSU), serves approximately 29 500 multi-cultural students (at October 2009) through teaching, research, extension education, and public service to the state's predominantly rural population. The main campus has approximately 18 500 undergraduate, professional, and graduate students of whom 60–65% are from rural communities in New Mexico and surrounding areas[12]. The NMSU is also designated as a Hispanic serving institution, that is, one that serves a student population in which at least 25% are Hispanic. Based on government recommendations[3,10] the NMSU Communicable Disease Planning Committee (CDPC) decided to emphasize campus-wide health education efforts based on the idea of *social distancing* as a mechanism to limit H1N1 cases among the university population[13]. For the purposes of this study, social differences refers to the steps to decrease contact among people to decrease the risk of spreading communicable diseases. For students, this might mean not attending class or staying away from crowded areas such as cafeterias and sporting events. Webb reports the following actions and timeline for pandemic flu at NMSU[13]. First, CDPC contingency planning updates and strategies for a severe pandemic impact on campus continued over the summer break months through September. Second, during the planning phase, the committee developed contingency plans for dormitory closure, social distancing, home care protocols and other health education action items, along with vaccine distribution and special care protocols. Third, the CDPC anticipated vaccine would be available in October 2009 and made arrangements for distribution at campus clinics and various vaccination points of distribution (PODs), with family housing and the very young set to receive the first doses of vaccine.

The university implemented several health education actions across campus such as setting up a 'health and wellness' webpage, updated regularly with announcements and links to information on H1N1 flu, seasonal flu, colds and other health issues[14]. The Student Health Center (SHC) also conducted department briefing sessions and each academic department received flyers about H1N1 and other concerns during the Fall 2009 semester (August–December). To ensure that students were aware of flu precautions, flyers were placed on every desk in dormitory rooms the week before students arrived for the fall semester and utilized other outreach efforts via campus-wide, electronic media.

The SHC and University Health Center (UHC) for university employees, administered seasonal flu shots until supplies ran out early in the effort. The SHC requested 13 000 doses of H1N1 vaccine; however, early shortages of vaccine and low population density in New Mexico resulted in fewer than anticipated doses of vaccine available to the SHC during October–December. According to Webb, 1297 H1N1 vaccinations were given between October 2009 and February 2010 at various venues around the main campus and at branch campuses[13]. Summary statistics for cases of H1N1 seen at the SHC and the UHC are shown (Table 1)[13].

## Methods

### *Survey*

This project began as a service-learning project for a Master of Public Health (MPH) graduate course. A modified CBPR served as the basis for developing questions, selecting survey sites, and implementing the study[15-17]. For the purposes of this research, the geographic expanse of the main NMSU campus in Las Cruces was defined as the *community*. Community partners were identified and involved throughout the research process. An advisory committee representing the campus community (administration, faculty, health professionals, and students) participated in all phases of the project except the actual survey administration, which was conducted by the graduate student group. Results were reported to community partners via a face-to-face presentation and a written report for incorporation in next year's seasonal plan.

 

**Table 1: Summary statistics of influenza cases seen at the student health center and university health center**[13]

| Clinic | April 2009 – February 2010 *n* | | Totals |
|---|---|---|---|
| | Definite Flu [ICD-9-CM Diagnosis 487] | Probably Flu [ICD-9-CM Diagnosis 487.1] | |
| Student Health Center | 201 | 189 | 390 |
| University Health Center | 48 | 48 | 96 |
| Totals | 249 | 237 | 486 |

ICD-CM, International Classification of Diseases - Clinical Modification.

An anonymous, face-to-face survey instrument was developed based on literature review and information from community partners on campus. The selected partners are seasoned preparedness experts for the campus and included representatives of the graduate school, the College of Health and Social Services; the Emergency Medical Services/Fire Department; the Office of Environmental and Health Safety; the Office of Health and Wellness; the Southern Area Health Education Center; Housing and Residential Living; and the Association of Students of New Mexico State University. Community partners were initially asked to express their thoughts and concerns regarding 2009 H1N1 preparedness on campus and to indicate information that would be useful for future planning efforts. Based on community partner needs, the survey was designed, tested among students who were enrolled in the MPH class, and modified accordingly. The self-administered survey sought information to assess knowledge, attitudes, and behavior among students housed in university dormitories and included 38 questions. This article reports results of analysis of four types of categorical data: (i) demographics; (ii) flu awareness; (iii) flu immunization knowledge and practices; and (iv) communication and health information practices.

## *Consent and ethics approval*

Agreement to participate in the study was acquired by signed informed consent forms that were collected separately from surveys to ensure no cross-comparison that could identify participants with survey answers. The use of human subjects protocol was approved by the NMSU Institutional Review Board.

## *Sample*

A cross-sectional, purposive sample targeting only students living in university dormitories was selected as the basis of the study. Participants in selected dormitories were then selected on the basis of convenience, that is, they came into the data collection area during the time sampling was underway and agreed to participate in the study. The initial target sample size was a total of 200 responses; however, a total of 175 student surveys were completed during the data collection week. Data were collected 19–31 October 2009, which was the peak week of reported influenza cases on campus. Eight surveys were subsequently disqualified because the students did not live in dormitories, resulting in a revised total of 167 surveys that were analyzed; however, missing data accounted for fewer numbers for some questions. The sample consisted of undergraduate students housed in four NMSU dormitories. One additional dormitory was not surveyed due to a logistical problem; university housing complexes for families and graduate students were not surveyed; and, invitation-only housing was not surveyed. Researchers set up and staffed a station in each dormitory surveyed to facilitate self-administration of surveys. After signing the consent form, students were given the survey to complete. All surveys were collected upon completion by the research administrators.

 

### *Analysis*

Data were analyzed using SPSS v16.0.1 (SPSS Inc; Chicago, IL, USA; www.spss.com). Summary statistics were performed on all variables. A Pearson $\chi^2$ goodness of fit test was used to determine whether observed proportions of categorical variables differed from hypothesized proportions. A probability of $p \leq 0.05$ was considered significant.

## Results

### *Demographics*

Of the 167 valid responses, 86 surveys were completed by males; 76 were completed by females; and 5 respondents did not disclose sex. The average age of 165 respondents who indicated age was 19.6 years (SD = 1.8); with no significant differences by sex or race/ethnicity.

Due to the close proximity in ages among all students, age was discounted from further analyses. Race/ethnicity was identified by 144 respondents: 57 White (39.6%), 43 Hispanic (25.7%), and 44 Other (26.3%). The 'Other' category includes Black Non-Hispanic, American Indians or Alaskan Native, Asian or Pacific Islanders, and those who listed their race/ethnicity as other or unknown and were merged due to small numbers.

Regarding dormitory housing arrangements, almost all students shared a bathroom with other students ($n$ = 151; 90.4%) either as a suite bathroom or dormitory community bathroom. Greater than half ($n$ = 104 or 62.3%) reported sharing a dormitory room with someone, while the remaining 63 students (37.7%) had a private room.

### *Influenza Awareness: Pandemic 2009 H1N1*

The pandemic flu awareness questions and answers asked in the survey are presented (Table 2). The only question that showed statistically significant differences was the question 'Do you know someone who has had the flu this year?' Females reported that they knew someone who had the flu during the year significantly more often than males ($p \leq 0.011$). When this question was analyzed by race/ethnicity, the differences were statistically significant ($p \leq 0.007$), with Whites significantly more likely to know someone who had influenza during the study year.

### *Influenza Immunization knowledge and practices*

Questions and responses to four questions related to immunization knowledge and practices are presented (Table 3). Approximately three-quarters of students did not take a seasonal flu vaccine during the previous year. More than half of students (54.8%) thought the flu shots were safe; however, 57.5% thought a person could get the flu from flu shots. Most (77.1%) did not think the seasonal flu vaccine provided any immunity to the Pandemic H1N1 flu. When asked, 'Do you plan to take a flu shot this year?', 75 students (43.1%) stated they would definitely not take a flu shot if available, 52 (29.0%) had already taken a flu shot, and 47 (27.0%) had not made a decision at the time of the survey.

### *Communication and health information practices*

Communication and health information responses are presented (Table 4). Most students reported that they did not receive or did not recall receiving the flyer titled *What you need to know about H1N1 and seasonal flu* distributed by the SHC.

Females derived information from TV significantly more often than did males ($p \leq 0.034$); members of the Others racial group received information from family more often ($p \leq 0.035$) than either Whites or Hispanics. The top four sources for health information were (in order):

1. Family
2. Online
3. Friends
4. TV.

 

**Table 2: Influenza knowledge, awareness and beliefs among students**

| Pandemic flu questions | Answer *n* (%) | | Total valid responses *n* |
|---|---|---|---|
| | Yes | No/ Don't know | |
| Have you heard of novel 2009 H1N1 (aka *swine flu*)? | 124 (74.7) | 42 (25.3) | 166 |
| Have you ever had the flu? | 115 (69.7) | 50 (30.3) | 165 |
| Have you had the flu this year? | 28 (16.8) | 139 (83.2) | 167 |
| Do you know someone who has had the flu this year? | 127 (76.0) | 40 (24.0) | 167 |
| Do you believe you are more likely to get the flu because you live in a dorm than if you lived off campus? | 99 (59.3) | 68 (40.7) | 167 |
| Do you think you should stay home if you have a fever? | 144 (86.7) | 22 (13.2) | 166 |
| Can anti-viral drugs make you feel better and shorten the time you are sick? | 86 (51.5) | 81 (48.5) | 167 |
| Do you think that people with flu symptoms should isolate themselves? | 110 (67.1) | 54 (32.9) | 164 |
| Have any of your professors told you not to come to class if you have a fever? | 97 (58.1) | 70 (41.9) | 167 |

**Table 3: Flu Immunization knowledge and practices**

| Immunization questions | Answer *n* (%) | | Total valid responses *n* |
|---|---|---|---|
| | Yes | No/ Don't Know | |
| Did you take a seasonal flu shot last year? | 43(25.7) | 124 (74.3) | 167 |
| I believe flu shots are safe. | 91 (54.8) | 75 (45.2) | 166 |
| I believe I can get the flu from taking a flu shot. | 71 (42.5) | 96 (57.5) | 167 |
| Do you believe a vaccination for ordinary seasonal flu will give you some immunity against H1N1 flu? | 38 (22.9) | 128 (77.1) | 166 |

The four least likely places for students to get health information were from:

1. university flyers
2. the SHC
3. their professors
4. course content.

# Discussion and Conclusions

The NMSU service area includes the state of New Mexico, which is largely rural, along with contiguous rural areas in Texas and Arizona in the southwest desert region of the USA. The university does enroll students from the two main urban sites in the state, Albuquerque and Santa Fe, as well as El Paso, Texas and Ciudad Juarez in Mexico. The sample chosen for this research included students living in undergraduate dormitory housing at New Mexico State University. Out of a total 1650 residents in the four selected dormitories, 175 or 10.6% completed surveys for this study. Almost all responders were first or second year students who were closely related in age. Although one cannot rule out bias in the sample, it appears likely that these students do not misrepresent the typical undergraduate dormitory resident at this university. Furthermore, it is likely that their attitudes, knowledge, and beliefs reflect a largely rural upbringing because approximately 60–65% of students attending the university are from rural areas. The sample did not include any commuter students, graduate students, or students living in family or invited housing on or immediately surrounding campus.

 

**Table 4: Communication and Health Information practices**

| Communication questions | Answer *n* (%) | | Total valid responses *n* |
|---|---|---|---|
| | Yes | No / Don't know | |
| Did you receive a flyer in your room entitled 'What you need to know about H1N1 and seasonal flu'? | 41 (24.8) | 124 (75.2) | 165 |
| Where do you usually get health information? (check all that apply) | | | |
| Family | 117 (70.1) | 50 (29.9) | 167 |
| Online | 108 (64.7) | 59 (35.3) | 167 |
| Friends | 99 (59.3) | 68 (40.7) | 167 |
| TV | 84 (50.3) | 83 (49.7) | 167 |
| Doctor | 71 (42.5) | 96 (57.5) | 167 |
| Radio | 50 (29.9) | 117 (92.8) | 167 |
| University flyers | 48 (28.7) | 119 (71.3) | 167 |
| Student Health Center | 43 (25.7) | 124 (74.3) | 167 |
| Professor | 26 (15.6) | 141 (84.4) | 167 |
| Course content | 12 (7.2) | 155 (92.8) | 167 |

Analysis of survey data suggest three main factors affect student knowledge, attitudes and behaviors towards pandemic H1N1 and seasonal flu:

1. Low levels of flu like illnesses at the university.
2. Faculty attitudes and flu knowledge.
3. The utilization of health education strategies that are not consistent with the mechanisms students use to gain health information.

The SHC employee/s placed a health flyer on each dormitory desk approximately one week prior to students arriving to campus for the fall semester 2009. Throughout the semester, PODs were set up to distribute flyers and offer flu vaccinations. Additionally, flyers were posted in many public places across the campus. Only 24.8% of students stated that they received the flyer in their dormitory room demonstrates that this approach is ineffective with this population. Informal support networks and electronic social networking, either person-to-person or using the electronic media, appear to be the main sources for health education communication among this group. The least likely places for dormitory students in this population to obtain health information include announcements in class from professors, course content, flyers, and SHC services.

The survey sample included 167 undergraduate students living in one of four dormitories during the fall semester of 2009. Sex, race, age, and dormitory of residence were shown to have little impact on H1N1 health practices and knowledge. Three-quarters of students surveyed demonstrated awareness of the pandemic influenza A (H1N1) 2009. Despite public health and university health education campaigns, approximately 25% were not aware of the virus. Most students stated that they did know someone who had flu during the year, even if they had not had it themselves. Students in this sample do not perceive (60%) dormitory living to be a greater health risk, even though the proximal distance among students diminishes by sharing bathrooms and sleeping quarters.

Students demonstrated moderate knowledge about anti-viral medications; whether they should isolate themselves if they have flu symptoms; and, personal isolation practices. It should be noted that faculty were not specifically briefed on university influenza planning protocol or the need for self-isolation on campus. The fact that less than 60% of students were told by faculty that they should avoid class with a fever indicates that many faculty recognize the general need to limit flu exposure within the campus; however, the fact that 40% did not speak to this issue needs to be addressed. One

 

cannot rule out the possibility that student responses reflect a lack of recollection rather than proof that faculty did not mention attendance issues in class.

Many studies have shown that perception of risk is often a key factor that elicits precautionary behavior changes[18-21]. Survey questions did not specifically address the perception that apparently low levels of flu were encountered on campus. However, it is suggested that low levels of flu-like illness on this campus may have contributed to what appear to be casual attitudes towards flu vaccinations.

Failure by community health planners to identify and focus on informal support networks and electronic social-networking practices among the intended population may result in less than optimal health education effectiveness. Further, if there are intermediaries (eg faculty), health educators should ensure that identifiable intermediaries understand and assist in health education efforts. Although relatively few cases of pandemic H1N1 and other flu like illnesses occurred on this campus, it is unclear if students' use of informal support and electronic social networking strategies would expand or contract if the influenza epidemic was more widespread.

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