

An Analysis of Factors that Influence Student Perceptions of Flu Shot Effectiveness

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ABSTRACT

Student influenza vaccine uptake on campus is significantly below national goals set by Healthy People 2020 and the American College Health Association. Students commonly view the flu vaccine as ineffective due to personal knowledge and experiences from the vaccine and the virus. This study expands the literature by examining the association of sociodemographic factors (culture, race/ethnicity, gender, and religion), beliefs, and behavior on a student's perception of flu shot effectiveness. A total of 33 college students completed a twenty-item survey. Fisher's exact analyses were conducted and general trends were analyzed. The Fisher's exact tests yielded no significant results for most items except for the belief that race/ethnicity has an effect on their perception ($p=.003$) and whether or not the student believes they can contract the flu from the vaccine ($p=.029$). Trend results suggested a connection between personal knowledge, past experiences, and culture on student perceptions of flu shot effectiveness. These results show that public health strategies to increase flu vaccine uptake should consider broader factors when targeting predisposing and enabling factors that shape student health behaviors surrounding flu prevention uptake.

1 INTRODUCTION

Studies have shown traditional college students (ages 18–24 years) struggle with taking health precautions such as the annual influenza vaccination. Student vaccination uptake falls between 8 and 39 percent (Nichol et al., 2008), far below the Healthy People 2020 goal of 80 percent (ODPHP, 2019). College campuses are prime settings for flu epidemics. Influenza can be highly contagious and spread easily within close quarters such as classrooms and dorms. During the pandemic of H1N1 in 2009, one study examined the outbreak in a boarding school. Findings demonstrated increased odds of infection in close quarters. Sharing a classroom increased the odds ratio to 2.17, while sharing a dorm room increased the ratio to 2.32 (Li et al., 2011). Other studies have shown that influenza can cause students to miss up to eight days of school (Nichol et al., 2008), delaying student learning, and placing large demands on students to complete accumulated assignments. There are numerous reasons that preclude students from vaccine uptake. Thus, identifying the influencing factors that motivate health behaviors is a public health priority.

Although influenza may not be considered a life-threatening disease, the effects can have a greater impact on specific segments of the population. Young children, elderly people, pregnant women, and those with other medical conditions are at higher risk of developing influenza that can manifest adverse effects into life-threatening conditions (CDC, 2018). These severe cases will require hospitalization, and in rare cases, can lead to death. More commonly, mild cases of influenza emerge in large numbers and in short periods of time leading to disease burden. The accumulation of

people missing work and school causes a direct impact by putting a strain on health care systems, public services, and productivity. Indirectly, the effects of influenza impact the country's economy (Carrillo-Santistevé et al., 2012).

A study conducted by Lawrence (2014) examined the perceptions of the flu vaccination among 569 college undergrad students. Results from their online survey identified three overarching perceptions: that the flu shot causes disease, that vaccines and medicines are toxic, and that the vaccine has long-term consequences that are unknown. The participants' reasoning behind not getting the flu vaccine was influenced by logical associations or personal experiences from themselves or their peers. Other reasonings include the spread of misinformation and rumors. For example, some people believe that the deactivated strain contained in the flu vaccine will cause disease. The participants' who see vaccinations as toxic are fueled by the fear of harming their health, leading to their decision to not be vaccinated. The final reasoning behind the participants' health behaviors highlights the unknown long-term effects of the vaccination and seeing the vaccine as an overall threat to society rather than a benefit in the short term. This reasoning is based on the lack of information present and misinformation about the history of vaccines. Although this study presents enlightening data, there are limitations. It does not provide any statistical evidence to describe these behaviors on the population scale, and it forgoes demographic factors that could contribute to certain behaviors.

In instances of a pandemic, people are more aware that they are at an increased level of risk. Nonetheless, the knowledge of risk alone has not propelled changes in behavior. For example, a Canadian study administered a survey during the second wave of the H1N1 pandemic in the Fall of 2009 (Decker et al., 2012). The study found that 70 percent of the student body did not plan on being vaccinated during the pandemic and 83 percent did not plan on receiving their seasonal flu shot; however, 70 percent of the sample were concerned about H1N1. While the threat of being infected with H1N1 was apparent, the possible risk was not enough to change the health behaviors of most of the students. On the contrary, a similar study conducted during the first wave of the pandemic on an Australian campus did not show an increased level of anxiety nor behavior change when surveying the students, faculty, and staff (Van et al., 2010). Among the 2,882 participants, 64.2 percent reported no anxiety about the pandemic situation. Only 43.7 percent of participants between the ages of 20–34 years believed they were at risk compared to the 95 percent of people aged 55 years or older. About 75.9 percent of participants had not made any lifestyle changes to the response of the pandemic. More specifically, 32.1 percent of students avoided prevention due to the belief it might lead to adverse health effects. Panic and preventative health behaviors as a result of a pandemic were shown to be low, especially among the younger population and students. Therefore,

the study concluded the current methods of health communication are ineffective and should be geared more towards the student age population. Thus, this exploratory study seeks to understand the factors (sociodemographic, beliefs, behavior) that influence perceptions and behaviors of the flu vaccine effectiveness in college students. The null hypothesis for this study is that there is no association between these factors and the behaviors and student perceptions on vaccine effectiveness.

2 MATERIALS AND METHODS

This study employed a cross-sectional study design. Students were recruited through student class pages on social media as well as flyers posted campus wide. The survey was distributed through a link on the flyers and social media posts. The survey was open for about three weeks to gain a representative sample.

The Sample

A sample of undergraduate students at the same medium-sized liberal arts institution in the state of Florida was acquired. The sample only included participants that were above the ages of 18 years. A total of 33 students participated in the survey. Eligible participants were undergraduate college students age 18 years or older.

Survey Development

The 20-item survey consisted of questions regarding the students' demographics (age, race, gender, religion, ethnicity) and questions about their perceived benefits, barriers, and susceptibility of contracting the flu. In addition, questions were asked about predisposing and enabling factors surrounding whether or not they received their seasonal flu shot. The survey utilized the constructs of the Health Belief Model and the PRECEDE-PROCEED model. The survey was then pilot-tested with five people that met eligibility criteria (Jones et al., 2016).

Data Analysis

Sample size calculation yield a sample size between 24-43 participants to provide at least 80–85% power needed to conduct univariate analysis. The collected data was input into IBM SPSS Version 24. Descriptive statistics and Fisher's exact test of association were conducted. Bonferroni adjustment was also conducted to control for Family-Wise Error rate. The data was combed for any missing data, resulting in less than 3% of data missing within the entire set. For both the analyses performed, the alpha level was set at 0.05.

3 RESULTS

Sample Description

A total of 33 students participated in the survey. The majority of the participants were female (Female 87.9%, $n=29$; Male 12.1%, $n=4$). The mean age of the sample population was 20.8 years (SD 1.81; males mean=22, SD=0.81; females mean=20.7, SD=1.86). The majority of the population self-identified their race as non-Hispanic White (White=82%, $n=27$; Asian=6%, $n=2$; Hispanic=3%, $n=1$; Multiracial=6%, $n=2$; Black=3%, $n=1$). The majority reported their ethnicity as White (White=70%, $n=27$; Asian=6%, $n=2$; Hispanic=9%, $n=3$; multi-ethnic=9%, $n=3$; black=3%, $n=1$)(Table 1).

Age	Mean = 20.8	SD = 1.81
Gender	Frequency (n)	Percent (%)
Female	29	87.9
Male	4	12.1
Ethnicity		
White/Caucasian	23	70.0
Asian	2	6.0
Hispanic/Latino	3	9.0
Multiethnic	3	9.0
Black	1	3.0
Missing	1	3.0
Race		
White/Caucasian	27	82.0
Asian	2	6.0
Hispanic/Latina	1	3.0
Multiracial	2	6.0
Black	1	3.0
Religion		
Hindu	1	3.0
Roman Catholic	9	27.3
Non-denominational Christian	5	15.2
None	13	39.4
Other	5	15.2

Table 1. Sample Description ($N=33$). Patients self-identified their religion, ethnicity, and race.

Descriptive Statistics on Variables of Interest

Approximately a third of the sample agreed/strongly agreed with the belief that the flu vaccine can give you the flu; 27.3% strongly disagreed ($n=9$), 21.2% disagreed ($n=7$), 6.1% neither agreed nor disagreed ($n=2$), 33.3% agreed ($n=11$), and 3.0% strongly agreed ($n=1$).

It was found that 69.7% of the participants agreed that the culture they grew up in shaped their perceptions ($n=23$). Only 21.2% believed their culture did not shape their perceptions ($n=7$). Out of the people who believed their culture impacted their perceptions, 30.4% ($n=7$) did not believe the flu shot was effective while 56.5% did ($n=13$). When it came to religion influencing perceptions, 57.6% believed their religion had no effect on their flu vaccine perceptions ($n=19$) while 15.2% believed that it did ($n=5$). Out of the 5 people that believed their religion affected their perceptions all of them agreed/strongly agreed the flu vaccine is effective. Thirty-nine point four percent of participants indicated their religion as "None". Personal knowledge influenced perceptions in 75.8% of participants ($n=25$).

	Frequency (n)	Percent (%)
Culture		
Agree	23	69.7
Neither Agree nor Disagree	3	9.0
Disagree	7	21.2
Past Experiences		
Agree	23	69.7
Neither Agree nor Disagree	2	6.1
Disagree	8	24.2
Personal Knowledge		
Agree	25	75.8
Neither Agree nor Disagree	2	6.1
Disagree	6	18.2
Religion		
Agree	5	15.2
Neither Agree nor Disagree	9	27.3
Disagree	19	57.6

Table 2. Descriptive Statistics. Participants reported whether or not the following variables effect or did not affect their perceptions on the flu vaccine.

Only 18.2% of participants believed personal knowledge had no influence on their perceptions. Of those who agreed, 60.0% agreed/strongly agreed flu vaccines are effective (n=15), 20.0% neither agreed nor disagreed (n=5), and 20.0% disagreed/strongly disagreed (n=5). Of those who disagreed, 50.0% agreed/strongly agreed flu vaccines are effective (n=3), 16.7% of people neither agreed nor disagreed (n=1), and 33.3% of people disagreed/strongly disagreed (n=2).

Past experiences shaped the perceptions of 69.7% of participants. Of the participants whose experience shaped their perceptions, 56.5% agreed/strongly agreed the flu vaccine is effective, while 26.1% believed it is ineffective. Of the participants whose past experiences did not affect their perceptions, 62.5% agreed/strongly agreed the flu vaccine is effective in preventing the flu (n=5), while 25% believed it was not (n=2)(Table 2).

No statistical tests to examine associations between the independent factors and outcomes (Fisher's exact) were indicative of statistical significance, except for two factors (Table 3). The first was the belief that race/ethnicity has an effect on their perception

Variables*	Fisher's Exact Test	P value
Sociodemographic		
Age	12.873	3.06
Ethnicity	93.364	0.082
Race	42.457	0.166
Gender	11.923	0.081
Religion	14.695	0.610
Ability to Provide Basic Needs	11.383	0.477
Beliefs		
How likely to Contract Flu	10.101	0.967
How Serious is the Flu	6.760	0.559
Believe Most People get Vaccine	5.962	0.134
Believe Race/Ethnicity Effects	18.663	0.003*
Believe Culture Effects	5.332	0.825
Past Experiences	6.784	0.591
Personal Knowledge	5.948	0.783
Believe Religion Effects	9.242	0.254
Vaccine Will Cause Flu	22.420	0.029*
Behaviors		
Received Vaccine	2.870	0.604
Plan to be Vaccinated	12.013	0.618
Diagnised with Flu	3.964	0.443

Table 3. Association between study factors and perceptions of flu shot effectiveness. Fisher's Exact Test were ran. *Statistically Significant P-Values

($p=.003$) and whether or not the student believes they can contract the flu from the vaccine ($p=.029$).

4 DISCUSSION/CONCLUSION

The majority of participants agreed that the culture they grew up in, past experiences, and personal knowledge were factors that influenced their perceptions on flu vaccines. Religion was not reported significant by the majority, but the participants that reported it as a factor all responded they believed the flu vaccine is effective.

The majority of participants who reported culture as a factor influencing their flu shot perceptions believed the vaccine was effective. Interestingly, there was a statistically significant association between the belief that the students' race/ethnicity and the perception of flu shot effectiveness. Although culture was not explicitly defined to the participant, race/ethnicity is embedded within culture; yet, only one dimension of what is culture (Johnson, 1990). Future research with a more ethnically and culturally diverse sample could potentially isolate which groups have more

positive perceptions. It could also disentangle how this relationship influences perceptions.

It was concluded past experiences negatively impacted vaccine uptake. Those who responded that their past experiences influenced their perceptions reported less belief in the effectiveness and more belief in ineffectiveness. On the other hand, participants whose past experiences had no influence on their perceptions reported slightly more belief in the effectiveness of the flu shot and less belief in ineffectiveness.

The participants who believed their personal knowledge influenced their perceptions showed more agreement to the effectiveness of the vaccine than those who disagreed their personal knowledge was a factor. In addition, those who believed their knowledge influenced also showed less disagreement of the vaccine effectiveness. The participants who disagreed their knowledge influenced showed a higher percentage of disagreement regarding effectiveness.

According to the Florida Department of Health's (FDOH) influenza surveillance, during the time of data collection, between January and March of 2017, there was a widespread outbreak of influenza activity (FDOH, 2017). However, 51.5% of the participants thought it was unlikely they would contract the flu while only 33.3% had received the vaccine. The studies previously described in the introduction showed that fear of contraction was not sufficient enough to motivate vaccine uptake. This is consistent with what was observed in this study. Misconceptions such as the relationship found in this study that vaccine will cause the flu could contribute to poor vaccine uptake rates in light of the imminent threat.

The purpose of this exploratory study was to analyze the factors that influence perceptions of the flu vaccine in college students. The study was conducted within an ideal time period relevant to the flu, but due to the small sample size, lack of male representation, and race ethnicity and religious diversity, results should be interpreted cautiously. Overall findings support that strategies to increase vaccine uptake must consider the role that race/ethnicity, past experience, knowledge, and misconceptions about the flu shot

influence perceptions. Although not seen in this study, these perceptions could be a key precipitous factor to improved vaccine uptake. The trend findings can be applied to future research looking at what is effecting lack of behavioral motivation and ideas for increasing uptake. Increasing personal knowledge, spreading awareness through cultural groups, controlling the spread of misinformation, and decreasing the number of negative experiences are all ways to increase uptake following the trends gathered.

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