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The need to develop health campaigns for obtaining the HPV vaccine in rural and medically-underserved college campuses

In recent years, a large effort has been made to promote the uptake of the human papillomavirus (HPV) vaccine, which can effectively prevent cervical cancer and treat genital warts. However, health campaigns are still needed to increase vaccination among both young men and women during their time at college. This is crucial because the vaccine has been found to benefit both genders (Reimer et al., 2014).

Widespread vaccination against HPV can reduce the cancers caused by the virus, and targeting young adults in particular is part of a US national priority to reduce cancers by accelerating HPV vaccine uptake (National Institutes of Health, 2014). In particular, students in rural communities would particularly benefit from additional educational efforts. Rural communities are often medically underserved, meaning that they have fewer primary care providers, higher rates of mortality, and higher rates of poverty. In these communities, creating health campaigns often presents unique challenges due to limited access to medical care, health information, and often, a greater need for healthcare interventions (Moscovice and Rosenblatt, 2000).

Rural students are often overlooked due to the challenges associated with creating tailored campaigns that require greater education as well as providing access to healthcare. Given this, this paper provides an overview of rural healthcare needs surrounding the HPV vaccine and young college students. Along with preliminary data, we propose several ways to increase the education of rural college students regarding the HPV vaccine.

Rural healthcare needs

Research has identified a need to maximize HPV vaccine uptake among those at high risk for cervical cancer and for those in medically underserved populations (Javanbakht et al., 2015). Rural health interventions have been modestly successful at achieving behaviour change in areas, such as reducing women's cardiovascular risks (Khare et al., 2014). Of the studies that have examined the inequalities in the HPV vaccination uptake, there has historically been little evidence showing that family income or education have influenced intent to get the vaccine, although there have been ethnic disparities, with African American women being less likely than Caucasian women to get the vaccine (Fisher et al., 2013; Roberts et al., 2011).

Several studies have begun to examine concerns about the HPV vaccine among rural populations, largely with respect to ethnic differences, vaccine acceptability and beliefs (Cates et al., 2009). For instance, in a study of rural women in North Carolina, only 20% of respondents (out of a possible 138) had heard of the HPV vaccine. Another study explored gender differences among 11-18 year olds in a rural Appalachian county in Ohio, finding that females were significantly more likely to report awareness, vaccine uptake, and parental and healthcare provider communication than males (Bhatta and Phillips, 2015).

Still, most studies have examined women, as opposed to men, in vaccination uptake and in barriers to getting the HPV vaccine, likely because the vaccination was not recommended for men until recent years.

HPV vaccination uptake in rural and medically-underserved communities

The factors associated with an increase in HPV vaccination uptake include people having a higher perception of risk, public acceptance of the vaccine, perceived efficacy of the vaccine, and increased knowledge. However, rural areas often struggle with both recruitment and retention of healthcare services that can provide education. Furthermore, there is a challenge in rural communities in having limited familiarity with nationally-funded programmes available to the community at large. For instance, rurally-located women still carry a disproportionate burden of cervical cancer (U.S. Department of Health and Human Services, 2015).

In some cases, national data do not adequately reflect the geographic disparity in HPV vaccination rates, nor in vaccination rates and health disparities in general. For example, HPV vaccination initiation and completion rates in high cancer risk populations are significantly lower than national rates in the Appalachia (Bhatta and Phillips, 2015). A variety of factors, including a lack of knowledge or misinformation about the vaccine, along with efficacy and other concerns, require ongoing investigation (Dorrell et al., 2011). Among studies of rural populations, parents tend to be queried most frequently (Darden et al., 2013), rather than young adults and even those over the age of 18 in rural and medically underserved communities, largely due to a lack of access in the community-at-large. Limited data, in an area where cervical cancer mortality is higher, have shown that health care providers are still reluctant to recommend the HPV vaccine for a variety reasons, including perceiving their patients to be less susceptible to HPV (Krieger et al., 2012).

Among the studies that have examined gender differences in HPV vaccine acceptability, females have been more likely to have heard of both HPV and the vaccine. In addition, past studies have found that young adult females have been more willing to receive a vaccine that prevents against both cervical and genital cancers, although acceptance rates of the vaccine have ranged from 55-100% for both males and females (Brewer and Fazekas, 2007). Rates of actual vaccine uptake remain lower, however, with slightly over 30% for females and about 2% for males (Reiter et al., 2010).

Studies have suggested that young men have lower knowledge of HPV levels than females, and that men are less likely to receive the HPV vaccine than women (Jones and Cook, 2008). One study found that male college students tend to rely on inaccurate information sources about HPV and as a result, need better education to assist in the decision-making process about getting the vaccine (Katz, Krieger, and Roberto, 2011). Other research has suggested that males tend to be less concerned about HPV than females (Daley et al., 2010). However, data available on young adult men's acceptability of the HPV vaccine are still fairly limited. As the HPV vaccine becomes more readily available across the country, there is a need to carefully examine behavioural factors.

Preliminary Survey Data

In a preliminary study of college students in a rural and medically-underserved campus, we conducted a survey about HPV with 327 students, following Institutional Review Board approval. Students were recruited through a research participation system and were awarded a small amount of extra credit for participation. They ranged in age from 18 to 21. Students were at various points in their academic career, including freshmen (30.2%), sophomores (20.1%), juniors (23.5%), and seniors (26.2%). There were slightly more women (51%) than men (49%) who took the survey.

Regarding vaccination behaviour, 158 of 327 (48.3%) reported having had none of the vaccination, 127 of 327 (38.8%) reporting one shot; 27 of 327 (8.4% percent) reporting two shots, and 15 of 327 (4.5%) reported having taken all three of the shots.

A confirmatory factor analysis was conducted using SAS software to examine the relationships between gender, attitudes towards the HPV vaccine, normative beliefs towards the vaccine, perceived behavioural control—the perception that one is able to get the vaccine, and actual intent to get the vaccine (Ajzen, 1991). A diagram of the model with coefficient estimates is provided in Figure 1 (page 76), and the results of the analysis are in Table 1 (page 76).

There was no significant relationship between gender, intent, normative beliefs, or attitudes towards getting the HPV vaccine; however, gender was a significant predictor of perceived

Figure 1: A model of gender, attitudes, subjective norms, and perceived behavioural control with intent to get the HPV vaccine. All numbers denote estimates from confirmatory factor analysis.

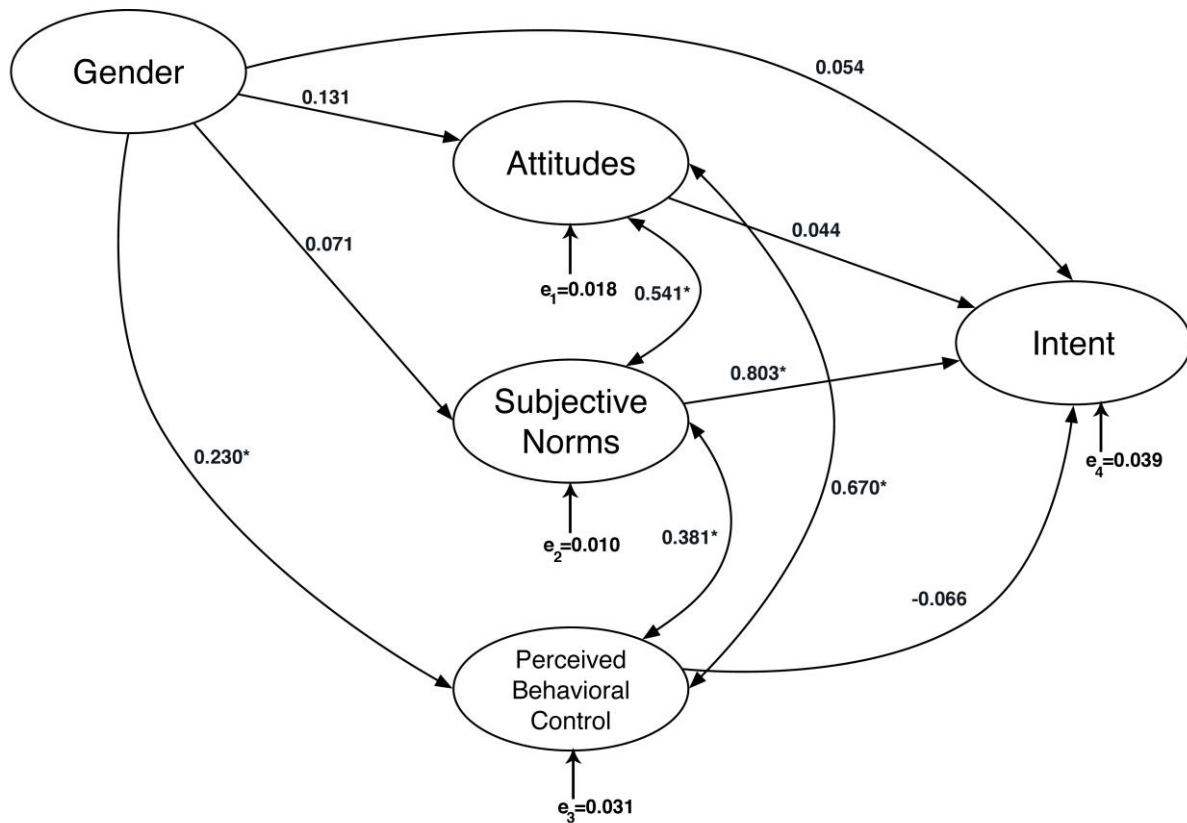


Table 1: Confirmatory Factor Analysis results

	Path	Estimate	Standard Error	t Value
Intent	<=== Norms	0.80335	0.03696	21.73289*
Intent	<=== Attitudes	0.04438	0.06373	0.69642
Intent	<=== PBC	-0.06642	0.05909	-1.12409
Intent	<=== gender	0.05427	0.04259	1.27408
Norms	<=== gender	0.07116	0.06983	1.01908
Attitudes	<=== gender	0.13140	0.06897	1.90512
PBC	<=== gender	0.22992	0.06648	3.45864*
Norms	<==> Attitudes	0.54147	0.04930	10.98263*
Norms	<==> PBC	0.38081	0.05838	6.52245*
Attitudes	<==> PBC	0.66954	0.03949	16.95395*

* denotes significant relationships at the $\alpha = .05$ level.

behavioural control ($p = .0005$). However, we found that women felt they were more likely to be able to get the HPV vaccine. This means that men need to be provided with education that helps them to recognize that they are also able to receive the vaccine.

Furthermore, neither attitudes nor perceived behavioural control were identified as significant predictors of intent, but subjective norms did serve as a significant predictor of getting the HPV vaccine ($p < .0001$). This means that the influence of family, friends, and others influences the intent to get the vaccine. In developing educational materials, talking to friends and family can provide positive benefits, and also provide them with education on the vaccine.

Based on the results of this preliminary survey, we offer several recommendations for rural and medically underserved college campuses to increase HPV vaccine education—and, recommendations that can be used more broadly.

Conclusions and Recommendations

Targeting vaccine acceptability is important because it may determine factors such as gender differences, barriers, and factors that assist in whether or not students begin and finish the vaccination process. The intent to receive the HPV vaccine is often linked to a doctor's recommendations, the perception of benefits and few barriers such as cost and perceived susceptibility. Positive attitudes towards the HPV vaccine and the influence of significant others (such as peers and parents), are consistently associated with increased vaccination rates (Allen et al., 2009; Kahn et al., 2008). However, most research has naturally targeted females, since the vaccine itself has been marketed towards women. Given this, we make the following recommendations:

- For college campuses located in rural or medically underserved communities, health campaigns need to be conducted that target both women and men to a) begin and b) complete the HPV vaccination process.
- Campaign efforts need to focus on increasing awareness about the vaccine, increasing knowledge, and creating favourable attitudes that can motivate students to begin the vaccination process.
- Campaign efforts on college campuses in rural communities need to make use of both

social media and print media to target students, as well as on-campus events, since not all students will have access to technology.

Educational interventions that provide informational materials, involve healthcare providers, and increase availability and awareness of vaccine access for adults can also be helpful. Involving the student healthcare clinic in an intervention will also enhance vaccine uptake because they can provide additional resources to improve vaccination intent—and, can provide an overview of resources for students. Furthermore, there may be local, trusted healthcare leaders that have been in the community for long periods of time who may be seen as valuable resources in a campaign for young adults. Ultimately, though, there are many challenges that many rural and medically underserved populations face, and through the use of community-based strategies and the integration of organizations, vaccine uptake—and other healthcare challenges can be addressed.

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