Addressing Human Papillomavirus Vaccination Uptake Among University Students: A Quality Improvement Initiative

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NURS 703B: DNP Project Planning

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Submitted to: Jonathan Soffer, DNP, ANP

This paper is submitted in partial fulfillment of the requirements for

the Doctor of Nursing Practice degree.

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Abstract

Background: Human Papillomavirus (HPV), the most common sexually transmitted infection spread primarily through sexual contact, constitutes a widespread public health concern within the United States (U.S.), with over 50% of reported infections occurring between the ages of 15 and 24 (Carney et al., 2024). Low vaccination rates among college-aged students demonstrate repercussions ranging from persistent HPV infection to the development of HPV-related malignancies. Efforts to address multifaceted barriers and enhance vaccination coverage within this demographic is essential. Literature suggests providers recommending vaccination has been identified as a key indicator for uptake, yet education has remained directed towards the patients or parents (Leung et al., 2019). To combat this barrier, enhancement of provider education on HPV vaccination, communication techniques, and cancer prevention strategies is warranted. **Methods:** This project utilized the Institute for Healthcare Improvement (IHI) Model for Improvement. A baseline assessment of the student health providers knowledge on HPV and comfort level surrounding discussion topics that align with the subject was acquired in the form of a survey consisting of five true or false questions and five Likert Scale questions one week prior to the educational intervention and re-evaluated immediately after the educational intervention. The survey results were then compared, evaluating for improvement in knowledge and comfort levels discussing the surrounding topics. **Findings:** A baseline knowledge score of 80% was identified with an average comfort rating of 4.28 out of 5. After the educational intervention, the knowledge score rose to 88% and comfort rating increased to 4.40 demonstrating a positive impact on both knowledge and comfort level discussing HPV and related topics. **Interpretation:** These findings suggest although there was improvement demonstrated on post-survey evaluations, further study is needed to identify significance in focusing educational interventions on providers caring for the college-age population.

Addressing Human Papillomavirus Vaccination Uptake Among University Students: A Quality Improvement Initiative

Problem Description

Human Papillomavirus (HPV) constitutes a widespread public health concern within the United States (U.S.), manifesting as one of the most prevalent sexually transmitted infections (STIs) (Yahia et al., 2024). This viral pathogen serves as a principal etiological factor in numerous cancers, including cervical, penile, anal, and oropharyngeal, and accounts for up to 5% of all cancer cases worldwide (Goldfarb & Comber, 2022). Annually, approximately 14 million individuals in the U.S. contract HPV infection, emphasizing its persistent impact on public health (Carney et al., 2024). HPV is primarily transmitted via sexual contact, resulting in universal exposure among sexually active individuals over their lifespan. The preferred vaccine currently available in the U.S. market is Gardasil-9, a nonvalent vaccine manufactured by Merck that confers immunity against nine distinct HPV genotypes, including those most closely linked to cancer pathogenesis (Goldfarb & Comber, 2022). Despite the efficacy and availability of this vaccine, vaccination rates in the U.S. remain suboptimal, hindering efforts to reduce HPV transmission and mitigate the associated disease burden (Goldfarb & Comber, 2022).

Efforts to address the disparity in HPV vaccination uptake are imperative to realize the full potential of primary prevention against HPV-related cancers. Recent epidemiological evidence stresses the heightened vulnerability to HPV acquisition, with over 50% of reported infections occurring between the ages of 15 and 24 (Carney et al., 2024). Among these young adults, college-aged students reveal significantly elevated rates of infection (Goldfarb & Comber, 2022). The multifactorial presentation of barriers hindering HPV vaccination rates among young adults includes misconception surrounding the HPV vaccine, vaccine hesitancy, and lack of comprehensive understanding regarding HPV due to lack of appropriate provider communication (Kellogg et al., 2019). Low vaccination rates among college-aged students demonstrate repercussions ranging from persistent HPV infection to the development of HPV-

related malignancies. Efforts to address these multifaceted barriers and enhance vaccination coverage within this demographic is essential.

Available Knowledge

Literature suggests that increasing vaccination rates for HPV among college-aged students has been identified as a critical public health initiative. This population of young adults presents a unique and pivotal opportunity for enhancing health literacy and fostering positive independent health behaviors that can transition into adulthood (Barnard et al., 2017). Providers recommending vaccination has been identified as a key indicator for uptake, yet education has remained directed towards the patients or parents (Leung et al., 2019). To combat this barrier, enhancement of provider education on HPV vaccination, communication techniques, and cancer prevention strategies is warranted.

A search utilizing the PubMed database was conducted with parameters of articles published no earlier than 2018. Combinations of the following keywords were used for the search: “HPV”, “human papillomavirus”, “university students”, “vaccine uptake”, “vaccination”, “college-aged”, “provider communication”, “barriers”, and “patient education”. Key phrases utilized to narrow down the search included: “HPV; college students”, “HPV; provider education”, and “HPV; patient education”. Articles were evaluated for inclusion criteria involving HPV vaccine, barrier to vaccine uptake, provider communication, and identification of the college-aged population. Eight articles met all inclusion criteria and addressed this barrier on HPV vaccination uptake among the college-aged population.

Three systematic reviews and one meta-analysis examined the hindrances to HPV vaccine uptake among college-aged individuals and the role of healthcare providers. Despite extensive education, provider knowledge remains low, which adversely affects the dissemination of information and negatively impacts vaccination rates in this population (Leung et al., 2019). Barnard et al. (2019) and Balcezak et al. (2022) found that combined peer and provider encouragement was the most effective strategy for increasing vaccination rates. Patients' perceived susceptibility, self-efficacy, and lack of

knowledge about HPV were strongly associated with vaccine uptake, highlighting the critical role healthcare providers play as trusted advisors in promoting cancer prevention through HPV vaccination. Oh et al. (2021) identified that provider communication techniques and comfort levels, enhanced through educational training sessions, significantly increased vaccine initiation and completion rates by over 36%. Overall, the literature consistently shows that educational interventions for providers positively impact HPV vaccination uptake.

Four cluster randomized trials examined clinician communication training through quality improvement coaching, video-based modeling, and in-service education sessions. Utilizing convenience sampling, providers were evaluated pre- and post-intervention on their comfort discussing HPV, baseline knowledge, susceptibility to HPV, and cancer prevention. Grabert et al. (2022) and Kumar et al. (2018) investigated provider communication training using interactive virtual workshops and educational videos featuring clinical vignettes. Post-intervention surveys indicated substantial improvements in provider knowledge and comfort in these discussions, with over 40% of providers reporting enhanced knowledge with increased ease in addressing the topic of HPV and recommending subsequent vaccination (Kumar et al., 2018). Rand et al. (2018) demonstrated that a bundled intervention approach, including in-service training, provider prompts, and monthly feedback, resulted in a 16.4% increase in vaccination rates from baseline, confirming the positive impact on provider influence regarding vaccine uptake. Calo et al. (2018) compared in-person versus webinar training, finding that in-person training, although more costly, reached a larger number of providers. These findings demonstrate a positive correlation between communication training interventions aimed at enhancing providers' delivery of health-related information and increased patient willingness to participate in vaccination programs to promote health.

Rationale

Implementation of a provider in-service training program at a large public university student health center in Oregon, which focused on HPV vaccination and effective communication strategies for

articulating the importance of vaccination in cancer prevention, can significantly enhance providers' confidence and frequency in recommending the HPV vaccine. This, in turn, was expected to lead to an increase in HPV vaccination rates among college-aged students.

This project was guided by the Institute for Healthcare Improvement (IHI) Model for Improvement, a methodology recognized as the most widely used project improvement framework in healthcare (Lee & Larson, 2014). The IHI methodology, rooted in Dr. W. Edwards Deming's work and developed by the Associates for Process Improvement (API), is acclaimed for its simplicity and effectiveness in accelerating improvements (Institute for Healthcare Improvement [IHI], 2023). The model structures the project framework around three pivotal questions: "What are we trying to accomplish?", "How will we know a change is an improvement?", and "What changes can we make that will result in improvement?" (Lee & Larson, 2014).

A root cause analysis, illustrated through a cause-and-effect diagram (Appendix B), revealed that insufficient provider communication is a significant factor contributing to the decreased uptake of the HPV vaccine among college-age population. This deficiency results in a lack of understanding regarding HPV and the benefits of vaccination. A thorough literature review indicated that educational interventions aimed at enhancing provider communication techniques lead to increased vaccination intentions and higher completion rates of the vaccination series, thereby offering greater protection against HPV and its potentially harmful sequelae. Employment of the Plan-Do-Study-Act (PDSA) cycles of change (IHI, 2023), the proposed interventions were tested for effectiveness, allowing for incorporation of additional insights gained throughout the process.

Specific Aims

The objective of this project was to enhance HPV vaccination uptake among university students at a large Oregon public university through initiatives at the student health center. This was pursued by implementing an educational intervention for full-time healthcare providers, focusing on improving

communication strategies related to HPV vaccination. This study aimed to evaluate the knowledge and comfort levels of providers regarding HPV vaccination and the discussions surrounding HPV both before and after the intervention. The target was to increase the frequency and quality of provider-patient communication about HPV vaccination, as well as the providers' comfort in discussing this topic, by 40% by the end of October 2024. This goal was set following the commencement of the educational intervention in the beginning of October 2024.

Methods

Context

The student health center, a mid-size facility located on the main campus, comprises a diverse healthcare team. This team includes twelve providers—five physicians, four physician assistants (PAs), and three nurse practitioners (NPs)—as well as registered dieticians, survivor advocates, substance use clinicians, registered nurses (RNs), medical assistants (MAs), and front office staff. The health center operates Monday through Friday from 9 am to 5 pm, with telehealth appointments available from 5 pm to 6 pm. As a public university, certain vaccinations are mandated for student enrollment. The student health center supports this requirement by offering a vaccine helpline and email address for students to inquire about vaccinations and schedule appointments. Quality improvement (QI) projects at the student health center are self-initiated by staff and submitted to the director of clinical services, who is responsible for approval, support, and oversight of these projects.

Educational and management initiatives aimed at improving HPV vaccination uptake at the university includes informational pamphlets available on the student health center’s webpage, inquisition about status during appointment intake, and direct provider recommendation during face-to-face interaction. Additionally, the Oregon HPV Summit has historically served as a collaborative event where providers from across Oregon convened to discuss strategies for increasing HPV vaccination rates statewide. However, since the summit has not been held since 2019, most current resources on HPV and

its vaccination are accessed through the CDC webpage. This gap presented an excellent opportunity for implementing the proposed quality improvement intervention focused on enhancing provider communication strategies regarding HPV vaccination.

Intervention

This project planned to improve provider baseline knowledge and patient-provider communication surrounding HPV vaccination by conducting an in-service educational session for all providers during clinic hours. The effectiveness of the intervention, in terms of understanding and comfort levels discussing the topic, was evaluated through a pre-and post-education survey provided. Stakeholders involved consist of the director of clinical services, and one designated NP. Project inclusion criteria consisted of all providers that are employed full-time at student health center. During the month of October 2024, one predetermined date for the educational in-service will be announced to all staff members meeting the inclusion criteria. A pre-education survey consisting of 10 questions was distributed via email to all participating staff members one week prior to the in-service date. These responses were then evaluated for baseline knowledge and comfort levels addressing HPV and supporting discussion topics such as sexual health, sexually transmitted infection, and vaccination with patients by the designated NP. The survey consisted of five true or false questions assessing baseline knowledge, and five Likert Scale questions providing a ranking scale from zero to five with zero being extremely uncomfortable, and five being very comfortable discussing the proposed topics. Participates then took part in a 30-minute educational in-service presentation highlighting HPV discussing topics such as what is HPV, why is it important, current guidelines, why is this population at such high risk, how to approach the topic in clinic effectively, and what we can do going forward to improve the conversation. Upon completion of the session, an identical post-in-service survey was provided via email by the designated NP to assess for improvement.

The NP that distributed the pre-and post-education survey, with results available for analysis via Qualtrics. This project ran over the span of 3 weeks, with the pre-survey sent out a week prior to the in-service education, and post-survey due 2 weeks after the in-service education, with the goal of 100% provider participation. The data was then evaluated at the end of the two weeks for improvement.

Measures

The outcome measure for this project revolved around improving provider knowledge and comfort levels discussion surrounding HPV and its subsequent vaccination for college-aged students. A 20% improvement from baseline demonstrated by participants reporting an increase in knowledge post-education may be demonstrated by an average pre-education score increasing from 70% to 90%. An increase in comfort levels may be demonstrated by a one-to-two-point increase on the Likert scale from baseline outlined by the pre-survey responses, increasing from four to five.

Analysis

Quantitative data collected included pre-and-post-in-service survey responses from providers rating their knowledge and comfort levels in the style of true or false questions and on a scale of zero to five. Data collected was evaluated by a statistician and converted into mean scores and subsequent standard deviations with t-scores to be evaluated by the stakeholders. A data analysis was completed utilizing a clustered columnar chart that displays shifts, and outliers present due to potential variations such as lack of participation in completing the survey and inability to participate in the in-service. The information will provide guidance on changes to be made for future recreations of the PDSA cycle.

Ethical Considerations

One key consideration was the potential for stress or time management constraints among providers during clinic hours, which may arise due to scheduling challenges. These constraints could hinder participation and, consequently, impact the validity and comprehensiveness of the project's outcomes. Cultural sensitivity also plays a significant role, particularly when addressing a topic such as a

STI's and the associated vaccination. Providers may hold diverse personal beliefs and attitudes, which could influence their willingness to engage in the intervention. Recognizing and respecting these differences is essential to fostering an inclusive and non-judgmental learning environment. Equity in access is another fundamental ethical consideration. Ensuring that all providers had an equal opportunity to participate in the intervention and access the educational resources was critical to maintaining fairness and inclusivity.

Results

The project timeline is outlined in Appendix A. Initially, the project design included two separate educational in-service sessions; however, this was later adjusted to a single session to minimize disruptions to clinic operations and maximize provider participation. This session was strategically held during mandatory provider meetings. The inclusion of topics such as sexual health, sexual assault, and techniques for obtaining a comprehensive sexual health history was intended to enhance provider engagement and deepen the discussion surrounding HPV and its vaccination.

Identical surveys developed through the OHSU Qualtrics system were distributed anonymously to participating providers, with the pre-survey sent out one week prior to the educational in-service. The pre-survey achieved a 90% response rate, with ten of the eleven eligible providers submitting responses. Baseline knowledge, measured using true-or-false questions, revealed an average accuracy score of 80%. Comfort levels were assessed using a Likert scale, where responses were scored numerically: 1 for "very uncomfortable," 2 for "uncomfortable," 3 for "neutral," 4 for "comfortable," and 5 for "very comfortable." Initial comfort levels averaged a score of 4.28 out of 5, with a standard deviation of 0.76, indicating that most providers felt neutral to comfortable.

Following the completion of the educational in-service, eight of the ten original providers anonymously submitted the post-survey. To ensure comprehensive participation, a two-week period was allotted for survey completion, during which one reminder email was sent to encourage provider

responses prior to the evaluation of results. Knowledge scores improved to an average of 88%, demonstrating a modest increase from baseline. Post-survey comfort scores also improved slightly, with a mean score of 4.40 out of 5 and a reduced standard deviation of 0.59, though these changes were not statistically significant. See comparison of results in Appendix E. Two providers did not complete the post-survey, which may have affected the results due to differing participation across pre- and post-surveys and the reduced sample size. Despite this limitation, all respondents completed 100% of the survey questions, allowing for a comprehensive analysis of available data.

Summary

This project involved the development and implementation of an educational in-service aimed at enhancing healthcare providers' knowledge of HPV, promoting awareness of the associated vaccination, and increasing providers' confidence in discussing HPV-related topics during patient interactions. Participation in the in-service was robust, with 100% of providers in attendance. Of these, 90% completed the pre-survey, while 72% completed the post-survey. Statistical analysis of the survey data indicated a positive improvement in providers' knowledge and comfort levels following the educational intervention. Key strengths of this project included a comprehensive review of foundational facts about HPV, a thorough examination of current vaccination guidelines, and the integration of effective communication strategies to facilitate patient-centered discussions about HPV and its vaccination.

Interpretation

The intervention effectively enhanced provider knowledge and comfort levels regarding HPV and the discussion of related topics by presenting current guidelines and demonstrating effective communication techniques for use during patient encounters. These findings align with the research of Oh et al. (2021), which suggests that emphasizing provider education and communication strategies can improve knowledge and patient interactions, ultimately supporting increased vaccine uptake within the targeted population.

By focusing on HPV guidelines and communication techniques, this educational intervention aimed to equip student health center providers with the tools necessary to navigate discussions about HPV, sexual health, and vaccination. This approach fostered open, informed conversations that could enhance patient education and improve health outcomes. While the intervention's immediate impact on the student health center may be modest, it provided valuable opportunities for professional growth, strengthening provider skills and knowledge without incurring additional costs or disrupting clinic workflow. This project highlighted areas for improvement within individual providers' practices, enhancing their ability to deliver care and promote health maintenance for the college-age population. In doing so, the intervention contributed to a culture of continuous improvement and reinforced the critical role of provider education in advancing patient-centered care.

Limitations

The generalizability of the findings is influenced by the varying protocols and practices each public or private university employs to address vaccination discussions with patients, as well as how these interactions are documented within their systems. Limitations to internal validity included the hybrid format of the educational in-service, with five providers attending in person and six participating via Teams. Potential confounding biases, such as pre-existing attitudes toward discussing sexual health or skepticism about vaccinations, may have affected both participation in the in-service and responses to the surveys. Additionally, the anonymity of the surveys introduced the possibility that the same individuals may not have completed both the pre- and post-surveys, limiting the ability to directly correlate individual responses.

To address these limitations, several measures were implemented. Staff were provided with a one-month advance notice of the presentation date to optimize attendance. The in-service was streamed virtually as well to accommodate those unable to attend in person, with active encouragement

for engagement through the Teams chat feature. Reminders to complete both the pre- and post-surveys were distributed before and after the session to maximize participation and enhance data completeness.

Conclusions

Focusing educational interventions on not just patients and their families but also on providers creates educational interventions that target not only patients and their families but also healthcare providers offer a valuable opportunity to enhance understanding of HPV and its associated vaccination. This quality improvement project served as an initial framework for improving communication strategies regarding HPV. The implementation of these strategies during patient interactions has the potential to increase vaccination uptake within the college-age population, thereby contributing to broader cancer prevention efforts. Further research is recommended to evaluate the effectiveness of these communication techniques, with an emphasis on identifying correlations between their application and improved vaccination rates in this demographic.

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Appendix A

Project Timeline

July 2024: Finalized project design and IRB letter of determination received – exempt

08/28/2024: Adjust predetermined implementation dates from two separate session to one singular session to ensure maximum participation

10/7/2024: Pre-survey sent out via email to all clinic providers

10/14/2024: Reminder email sent by site champion encouraging providers to complete pre-survey

10/15/2024: Pre-survey closed

10/16/2024: Educational in-service during mandatory provider meeting held in person and via Teams

10/16/2024: following in-service, post-survey sent out to all participating providers via email

10/21/2024: Reminder email sent by site champion encouraging providers to complete post-survey

10/29/2024: Second reminder email sent by site champion encouraging providers to complete post-survey

10/30/2024: Post-survey closed

11/21/2024: Final analysis

11/24/2024: Write sections 13-17 of final paper

11/25/2024: Prepare for project dissemination

Appendix B

Letter of Support from Implementation Site

Letter of Support from Clinical Agency

Date: 08/09/2024

Dear OHSU School of Nursing,

This letter confirms that I, Kathryn Lederer. FNP, allow Jordyn Gerlach (OHSU Doctor of Nursing Practice Student) access to complete his/her DNP Final Project at our clinical site. The project will take place from approximately September 2024 to December 2024.

This letter summarizes the core elements of the project proposal, already reviewed by the DNP Project Preceptor and clinical liaison (if applicable):

- **Project Site(s)**: Oregon State University Student Health Center
  850 SW 26th St., Corvallis, OR, 97331
- **Project Plan:**
  - **Identified Clinical Problem**: Low human papillomavirus (HPV) vaccination rates among university students, with lack of education and understanding contributing as a primary barrier in vaccine uptake.
  - **Rationale**: Literature suggests use of educational interventions focused on improving provider baseline knowledge of HPV and implementation of communication strategy training surrounding this topic improves patient vaccination uptake.
  - **Specific Aims**: Improvement among staff regarding baseline knowledge of HPV and its subsequent vaccination as well as improved comfort in discussing the topic with patients at this clinic.
  - **Methods/Interventions/Measures**: An educational in service focused on improving knowledge about HPV and its subsequent vaccination as well as appropriate communication strategies when discussing this topic with the patient population will be provided during an all-clinician in-service during regular work hours. A pre- and post-in-service survey will be distributed to assess baseline knowledge utilizing 5 true/false questions and will also assess comfortability discussing the topic utilizing 5 Likert-scale rating questions.
  - **Data Management**: Data will be distributed via email prior to the in-service date and re-distributed in person immediately post-in-service for evaluation.
  - **Site(s) Support**: Adequate time and space to provide and in-service for the 12 clinicians employed at this site and assistance in distribution of the survey to ensure staff participation.

During the project implementation and evaluation, Jordyn Gerlach will provide regular updates and communicate any necessary changes to the DNP Project Preceptor.

Our organization looks forward to working with this student to complete their DNP project. If we have any concerns related to this project, we will contact Jordyn Gerlach and Jonathan Soffer, DNP, ANP (student's DNP Project Chairperson).

Regards,

DNP Project Preceptor (Name, Job Title, Email, Phone): Kathryn Lederer (541) 737-4355
Family Nurse Practitioner, QI Co-Chair, Kathryn.lederer@oregonstate.edu

Kathryn E

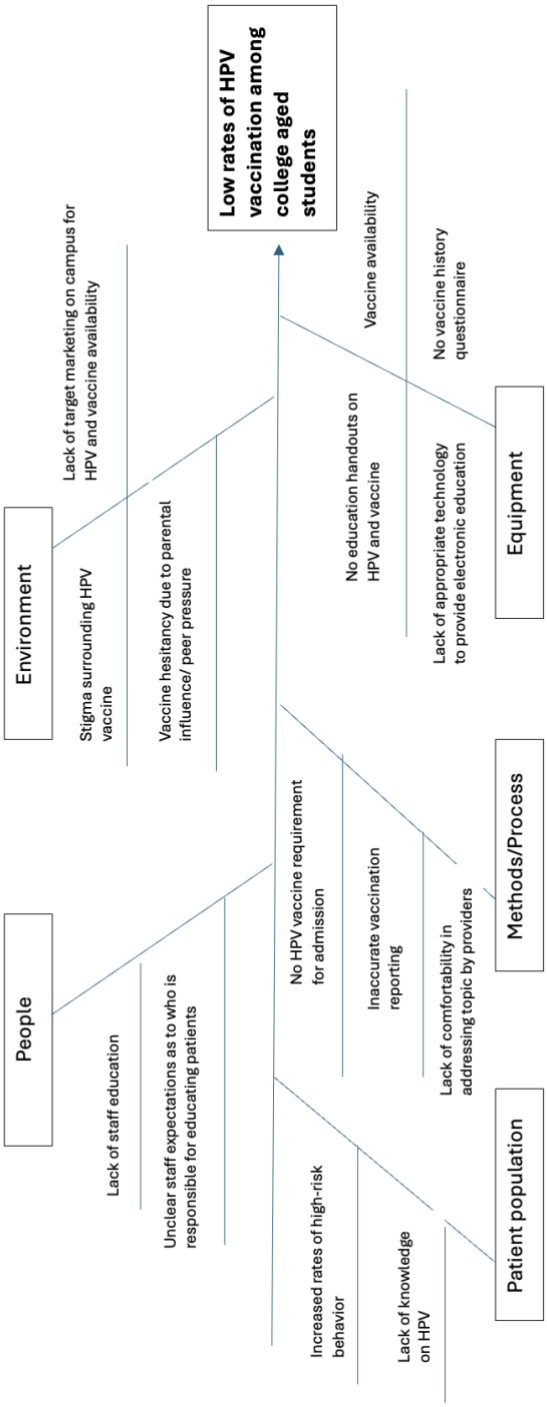
Signature

Kathryn Lederer

Date Signed 8/13/24

Appendix C

Cause and Effect Diagram



Appendix D

IRB Exemption Letter

IRB MEMO

Research Integrity Office
3181 SW Sam Jackson Park Road - L106RI
Portland, OR 97239-3098
(503)494-7887 irb@ohsu.edu

NOT HUMAN RESEARCH

July 19, 2024

Dear Investigator:

On 7/19/2024, the IRB reviewed the following submission:

Title of Study:	Addressing Human Papillomavirus Vaccination Uptake Among University Students: A Quality Improvement Initiative
Investigator:	Jonathan Soffer
IRB ID:	STUDY00027539
Funding:	None

The IRB determined that the proposed activity is not research involving human subjects. IRB review and approval is not required.

Certain changes to the research plan may affect this determination. Contact the IRB Office if your project changes and you have questions regarding the need for IRB oversight.

If this project involves the collection, use, or disclosure of Protected Health Information (PHI), you must comply with all applicable requirements under HIPAA. See the HIPAA and Research website and the Information Privacy and Security website for more information.

Sincerely,

The OHSU IRB Office

Appendix E

Provider Pre/Post-Survey

Highlighted: Correct answers

True or false questions to identify knowledge surrounding Human Papillomavirus (HPV):

1. HPV is the most common sexually transmitted infection and is often asymptomatic. (True)

2. HPV can result in malignancy in assigned female at birth patients only. (False)

3. Most HPV-associated cancer is preventable through vaccination. (True)

4. If you have been exposed to or infected with HPV, you are no longer eligible to receive the vaccine. (False)

5. HPV vaccination is recommended for those assigned male at birth between the ages of 13 – 21 years old and those assigned female at birth from 13 – 26 years old if not received when first recommended at age 11 – 12. (False)

Rate your personal comfort level in discussing the topics listed below during a patient encounter.

Rating options listed as follows: (1) very uncomfortable, (2) uncomfortable, (3) neutral, (4) comfortable, (5) very comfortable.

1. Sexual health, including types of sex the patient is having and number of partners.

2. Vaccination status, including personal belief of vaccinations.

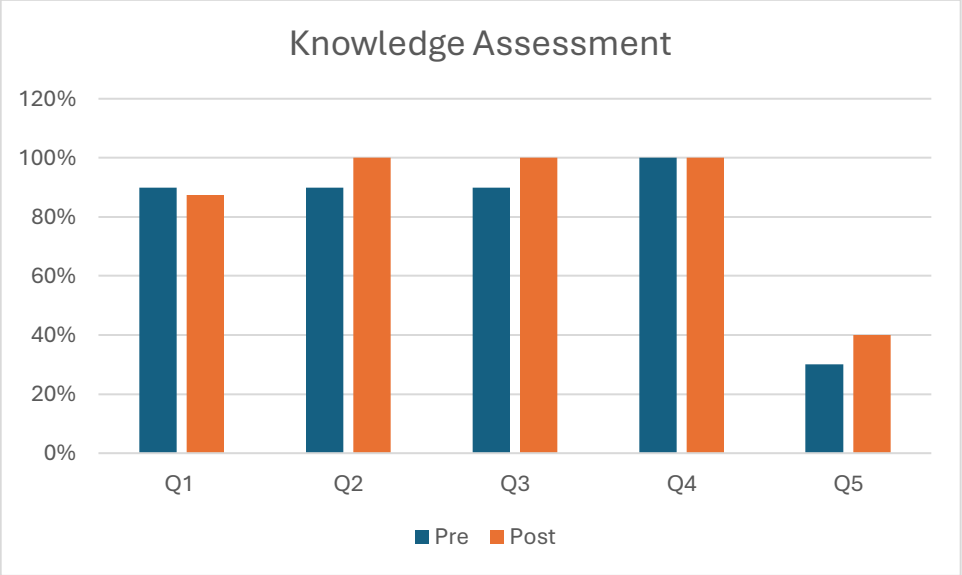
3. STI exposure/screening.

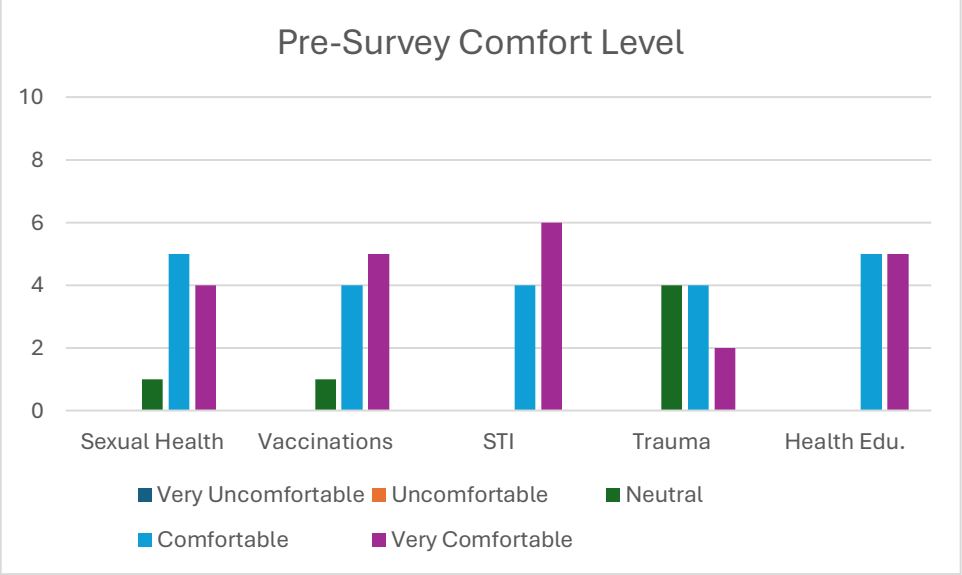
4. Previous trauma, including sexual assault.

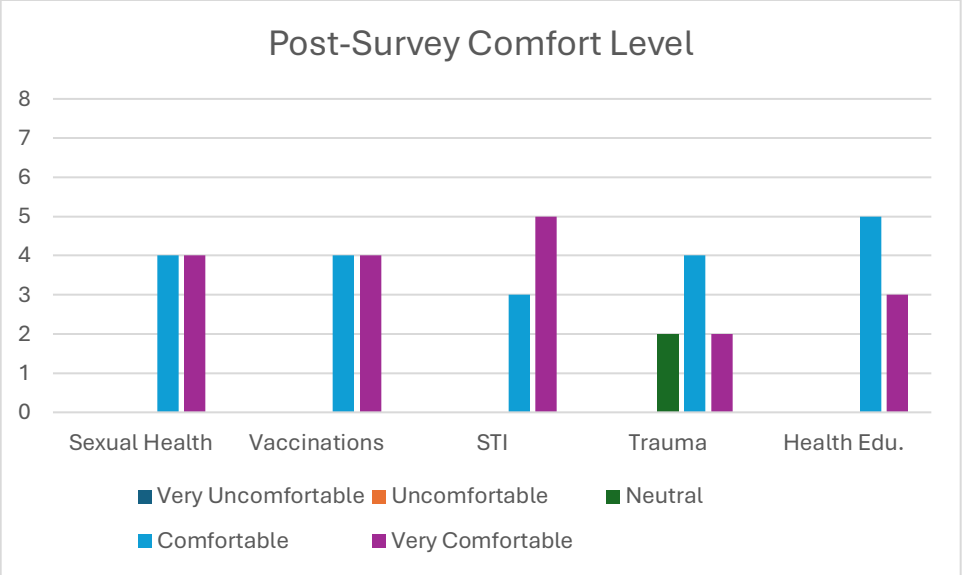
5. Educating patients on how to improve their health practices going forward.

Appendix F

Graphs






Post-Survey Comfort Level
8
7
6
5
4
3
2
1
0
Sexual Health
Vaccinations
STI
Trauma
Health Edu.
Very Uncomfortable
Uncomfortable
Neutral
Comfortable
Very Comfortable