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Improving HPV Vaccine Series Compliance with Text Message Reminders in Military Women

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Acknowledgements

First and foremost, I would like to thank the Lord my God for giving me the opportunity, the strength, the perseverance, the peace, and the health to accomplish such a rich goal and achieve my doctorate of nursing practice. I am so blessed to be able to serve people and work 'as unto the Lord' in my daily practice as a nurse practitioner as I embark on this journey to ever be more like Christ Jesus in my love for others in every setting I may find myself.

I would also like to thank my husband, Nate, and my son, Corban, who have been so patient and supportive through this long and difficult road. Nate, I am the luckiest woman in the world to have a husband who loves his wife above himself. You have been my rock! And to the rest of my family, especially my parents, who have lovingly come along side us, thank you! Words will never repay your love and support.

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Opening Statement

From the time I was a junior in high school, I have been actively pursuing my dream to become a nurse practitioner. My passion is caring for the underserved and the undereducated. I have seen time and time again in my clinical experience how education and understanding for the patient can make the difference between life and death. Unfortunately, there are so many people locally and around the world who do not have access to basic primary health care and basic health education. During my college years, I served one summer at a hospital and surrounding clinics in Jos, Nigeria. My heart was forever impressed with the need for medical care and education in countries whose governments or economic situations have robbed the people of their opportunity for twenty-first century medicine. I cannot keep my mind and my heart from these people and know that there are thousands of communities like this that need excellent clinical care and health education. While I continue to care for all patients, my great desire is to initiate solutions for those who are dying because they have no one to offer even the simplest of health care. I am determined to help facilitate a change as a nurse practitioner.

I want to be the best doctorally trained nurse practitioner in order to change lives through the provision of health care and education. The DNP degree will allow me to be a well-developed clinician as I will be able to lead in realms of policy, quality improvement, management, and evidence-based practice. I know that by earning my DNP training at USD, I can achieve my lifelong dream of becoming the best nurse practitioner.

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IMPROVING HPV VACCINE SERIES COMPLIANCE WITH TEXT MESSAGE REMINDERS IN MILITARY WOMEN

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This evidence-based practice quality improvement project successfully completed the IRB process at the University of San Diego and has obtained permission to submit manuscript for publication.

The Doctor of Nursing Practice student, Alisha Keating has an anticipated graduation date of May 21, 2016.

Conflict of Interest

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, University of San Diego, or the United States Government. This work was prepared while the author was a student at the University of San Diego.

KEYWORDS
HPV, vaccine compliance, clinical reminders, text message

Background

In 2006, the U.S. Food and Drug Administration approved a vaccine that protects against the four most common Human Papillomavirus (HPV) strains administered in a series of three doses [1]. As the vaccine came on the market, developed to prevent genital warts and certain forms of cancer, unanticipated difficulties arose related to the successful implementation of this vaccine. One such barrier was the completion rate of the entire series. In 2014, the Centers for Disease Control and Prevention (CDC) reported that for girls age 13-17 years old, 60% initiated at least one dose of the HPV vaccine series, however, only 39.7% received all three doses, only a 2.9 percentage point increase from 2013 [2].

Specific populations have been particularly affected by low vaccine completion rates, including active duty military women. The incidence of high risk sexual behavior in this population is noted to be higher than the general public with sexually transmitted infection (STI) rates that are seven times higher compared to the general public [3]. HPV is the most prevalent STI in these women with an incidence rate of 333.9 per 10,000 person-years [4]. Evidence demonstrates that 66% of cervical cancers, 55% of vaginal cancers, 79% of anal cancers, and 62% of oropharyngeal cancers result from HPV infection [5]. There are 26,000 new cases of HPV-related cancers occurring each year and 17,000 of those cases occur in women [5].

In 2011, a study at the Naval Medical Center San Diego (NMCSD) found that the vaccine series completion rate in active duty military members was only 16% [6]. The Healthy People 2020 goal for HPV vaccine series completion is 80% for girls aged 13 to 15 years [7]. Currently, there are no national benchmarks for vaccine completion rates for

women 18 to 26 years old. Although there has not been extensive research on levels of immunity among females with delayed or non-completion of the vaccine schedule, it is noted that the three-dose vaccine, intended at 0, 2, and 6 months, was developed to provide the most optimal immunologic coverage against HPV [6]. Given all this, the issue of HPV vaccine completion in active duty military women is of concern.

Evidence for a Solution

There is substantial evidence for using reminders for increased vaccine adherence. Studies have demonstrated an increase in vaccine completion rates with reminder notifications via text messages, phone calls, letters, or emails. One recent study found that among post-card, email, and text-message reminders, text messages were the most effective in promoting completion rates [8]. Although text messages were the least popular option chosen in this study, it still was more effective than email or post-card reminders [8]. In addition to this study, there have been numerous studies that have validated the effectiveness of recall/reminder method for increased vaccination compliance since the 1980s [9]. Text messaging is just one of the newest reminder modalities.

A meta-analysis involving 47 different studies using reminder or recall methods noted that the increased rates of vaccine uptake were between 1% and 20% [10]. Out of the 47 studies reviewed in this meta-analysis, 12 of the studies looked specifically at adult immunizations and included the Hepatitis B regimen, which has 3 doses in the series similar to the HPV vaccine series [10]. These studies specifically demonstrated a statistically significant increase in vaccine compliance anywhere from a 1.8 percentage point increase to a 27.4 percentage point increase with five of the studies showing at least a 20 percentage point increase [10]. All forms of reminder and recall were effective but

telephone calls and letters were observed to have the highest effect [10]. In addition, multiple reminders were more effective than just a single reminder [10]. This review is important because it demonstrates the broad effectiveness of reminder and recall systems that can be implemented in both the child and adult populations.

Intended Outcome and Setting

The setting for this project was a southern Californian Naval Medical Facility at one of the branch clinics that serves active duty service members only. The intended outcome for this project was to increase HPV vaccination compliance rates in an active duty military women population. The project was implemented by an active duty Navy nurse practitioner (NP) who performed active duty military women's annual well women exams (WWE). At this site, a previous quality improvement project focused on implementing education and provider recommendations for the HPV vaccine. For women 18-26 years old who had not been previously immunized, the provider offered education and recommendations for the vaccine. Provider recommendation has been demonstrated to be the most effective means of increasing vaccination rates [11]. The results of the previous project improved the receipt of one HPV vaccine dose from 50% to 92%. These results were significant; however, compliance for the full series was not addressed. Servicewomen returning for the 2nd and 3rd dose, although better than at baseline, were still only 34%.

One of the major factors making it difficult for this population of women to follow up with their vaccine series was the transient nature of their job in the Navy. Many of these women did not receive their WWE onboard for various reasons, therefore they came to this clinic to complete their annual requirement. Not only were these women

unfamiliar to this provider, but it was unlikely that the NP provider would see these women again in the future. This posed difficulties with follow-up regarding completion of the vaccine schedule. In addition, the computer system AHLTA used by the Navy did not have an automatic reminder system to flag the women who were non-adherent with their HPV vaccines, so each new provider who saw these women had to look into the individual electronic charts prior to the visit to obtain information regarding vaccine status.

The intended outcome of this project was to improve the HPV vaccine series compliance by utilizing a reminder system via text messages. The women had already received strong provider recommendation and education regarding the vaccine with written dates of when they should return to obtain the next dose in the series. The text reminders were intended to reinforce that recommendation and increase compliance.

Conceptual Model

The Iowa model was used as a framework for this project. This evidence-based practice model, originally published in 1994, was developed in an acute-care nursing environment but has been successfully used in a variety of other clinical settings to guide evidence-based practice[12]. The Iowa model has many strengths including ease of use and intuitive in nature. This model was selected because it helps the clinician visualize the health system in a more holistic manner and provides specific steps to facilitate the evidence-based process. The low HPV vaccine compliance rate was the issue that drove the process utilized in this model.

Intervention

Clinical reminders via text message were sent out to each woman who received her first dose of HPV vaccine in November or December 2014 and January 2015. The text was sent to all women who had not yet returned to the clinic to receive the second or third dose. The reminder notified them that their next vaccine dose was due and to obtain it within the next month. Only one reminder was sent out to each woman. The vaccines were already readily available and free of charge for all eligible servicewoman. Project effectiveness was evaluated based on changes in HPV immunizations series compliance rates before and after the quality improvement intervention.

Ethical Issues

This project was approved by the Institutional Review Board (IRB) of the University of San Diego (USD) with permission to disseminate findings. It was also reviewed by the Regional Director of Nursing Research for the Navy Medicine West region and was approved as a quality improvement project.

Results

There was an increase in vaccination rates among the women receiving the text message reminders for both the second and third dose. Of the 26 women who received their first HPV vaccine does between November 1st, 2014, and January 31st, 2015, thirteen of them had returned independently to obtain the 2nd dose in the series. The other 13 women who had not yet obtained their 2nd HPV vaccine by 2 months were sent text messages reminding them to come back to get their next vaccine in the series. Four women returned for their 2nd vaccine dose after the text message reminder was sent. One woman returned within 1 month of sending out the reminder, three more returned at 5

weeks, 7 weeks, and 5 months. A total of 17 out of 26 women returned for their 2nd vaccine increasing the rate to 65.3% of the women obtaining their 2nd dose in the series. Of the 17 women who had received their 2nd vaccine dose, 9 of them returned on their own. Four women who had not yet returned and were due for their 3rd vaccine received text message reminders to return for their 3rd dose in the series. Two of them returned within 1 month of the text message reminder. A total of 11 out of the 26 women completed their vaccine series. This project followed an initial effort three months before to educate patients about need for the HPV vaccine and the provider offered a strong recommendation for obtaining the vaccine when the woman was in the office. An increase from the previously reported rate of HPV vaccine series compliance among active duty military women was achieved. However, even with the education and provider recommendation, the rates were below the national averages. With the implementation of the clinical reminders via text message, there was an increase from 50% to 65% for the 2nd dose after the text message reminder with 17 out of 26 women receiving at least 2 HPV vaccine doses (figure 1).

Fig 1.

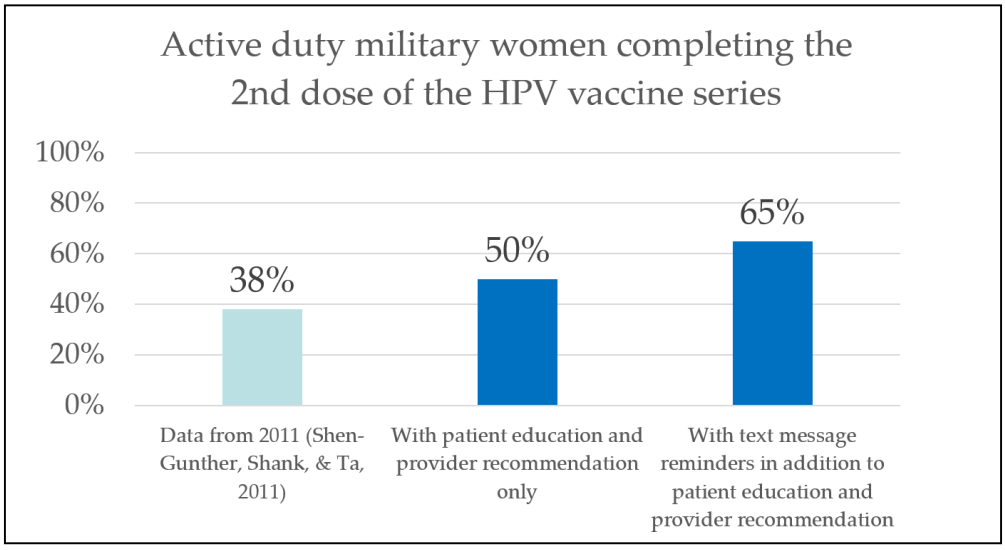
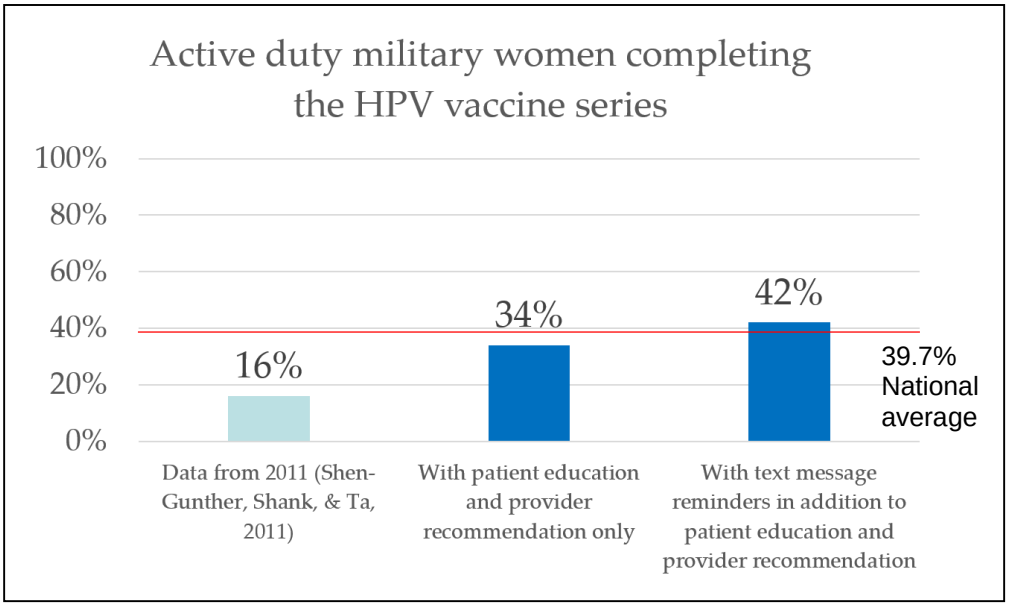


Fig 2.



In addition, the completion rate for all 3 doses increased from 34% to 42% (11 out of 26 women) (figure 2). The improved rate of compliance exceeded the national average of 39.5% for HPV vaccine completion by U.S. girls according to the CDC (2015)

Discussion

Clinical reminders, specifically text message reminders, increased HPV vaccination rates for active duty military women in addition to patient education and provider recommendation. Text messages were utilized in this population because of the age of the group, the availability of their cell phone information, and the relative stability of this information remaining the same over a long period of time. Other reminder systems could have been used. Although this project was evidence-based and effective in increasing the rate of compliance to a rate even above the national average, the compliance rate is still well below the Healthy People 2020 target of 80% [7]. This is a nationally prevalent problem in both the military setting and the civilian population.

Contextual factors influenced the poor rate of vaccine compliance prior to text message implementation. For example, the HPV vaccine is one of the few vaccines not mandated by the Navy as a requirement for force readiness. Therefore, the vaccine may not have been viewed as important. Other factors may have included the time that it might take away from the servicewomens' job to go and get the vaccine, pain from the injection, relocations, and deployments [6]. Even email addresses and phone numbers for these women change frequently because of relocations and deployments and therefore reminder contacts for vaccine adherence can be difficult. As a results of all these factors, text message reminders were chosen as the most effective means of communication with this population in order to increase the series compliance.

Another barrier to this quality improvement project was timing. Of the eight women who had received their 2nd but not yet their 3rd dose, only 4 of them were due for their 3rd vaccine because of the recommended 16-week time frame between dose 2 and 3. Therefore, only four of them were due for 3rd vaccine and therefor received reminders during the length of this project.

One of the positive contributing factors in this setting was the culture of respect for leadership, thereby increasing the influence the provider may have had in recommending the HPV vaccine. In addition, the Department of Defense (DOD) has already made the vaccine available to all servicewomen aged 17-26 years therefore there were few obstacles to eligible servicewomen obtaining the vaccine if and when desired [13].

There are alternative solutions to the problem of low vaccine completion rates for this population. One solution would be a policy change for the Navy that would require all eligible men and women to be vaccinated against HPV. Such a policy change would

ensure that all eligible men and women complete the vaccine series. If they did not, they would be considered unfit for duty. Another alternative would be to enhance the current electronic medical record (EMR) by developing automated reminder letters or emails to each individual needing the vaccine series. This would also create a more streamlined follow-up process for the provider since the electronic medical record would be flagged for the next dose of the vaccine series. At the time of the project, the process of looking up a patient's vaccine status in the Naval Medical facility was tedious and took multiple steps in the chart to retrieve the information. These alternatives might require financial and manpower investments and the change would need a significant amount of policy and or legislative work for approval. As long as there is no policy or EMR tracking system in this setting, it is crucial that the individual provider or clinic be aware of the importance of provider recommendation, patient education, and clinical reminders. The cost of reminders, specifically text message reminders, is as low as 1 cent per text message compared with the thousands of dollars saved by preventing cervical cancer and other HPV-related illness.

Conclusions and Implications

Long-term benefits of increasing the HPV vaccine series compliance will include a decrease in HPV infection rates, a decrease in HPV-related medical costs, and a decrease in the incidence of cervical cancer in this population. This was a pilot project with one provider and 26 women but it was demonstrated to be an effective means of improving vaccine compliance with little to no cost to the clinic. In military clinics such as the one where this project took place, there needs to be a more comprehensive

reminder system for HPV vaccine series compliance to further decrease the incidence and prevalence of HPV by ensuring that more women benefit from the full series.

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Concluding Essay: Reflections on Growth in Advanced Practice Nursing Role

As I reflect on the last 3 years of my time here at the University of San Diego Hahn School of Nursing, I am overwhelmed with the amount of growth I have experienced on both a personal and professional level. I had a very specific ideal of who I would be as a nurse practitioner when I graduated with my doctorate of nursing practice and I am happy to say that I am not who I thought I would be; indeed, I am much more compassionate, understanding, richer, and have a fuller knowledge as a provider than I had ever hoped or even dreamed of being.

There are many times when I feel I am too inadequate, unprepared, and indecisive to be an effective advanced practice nurse and the fears of inadequacy begin to trickle into my heart and mind and cloud my vision. But I love the quote by one of my heroes, Mother Teresa, who said "I alone cannot change the world, but I can cast a stone across the waters to create many ripples." I feel this is true of advanced nursing practice. There are so many barriers to access, to care, to tests, to funds, to health, to quality of life, and often still it seems the task list for NPs grows daily. But the truth is, I cannot change the whole world, but I might be able to change one patient's life or just one encounter that might save their life. My world changing starts in the quietness of listening compassionately, loving deeply, working fiercely, learning constantly, every day and with each patient I encounter.

The role of the advanced practice nurse is and always will be to provide excellent patient centered care that exudes the core principles of nursing and focuses on the holistic approach of health, healing, and improving the quality of life for all.