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Human Papillomavirus Immunization completion rates increased by the use of the American Academy of Pediatrics Tool Kit

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Abstract: *Human Papillomavirus is the most common sexually transmitted infection in the United States and world wide. Vaccination is a critical public health measure for lowering the risk of cervical genital and anal cancers. Overall vaccination rates in the United States are low. This study highlights the need to change practices in primary care clinics to increase Human Papillomavirus vaccination rates. The study compares vaccination rates before and after the introduction of the American Academy of Pediatrics Tool Kit and a staff training session.*
Keywords: *cervical cancer, HPV vaccine, Human Papilloma Virus, immunization rate, tool kit*

I. Introduction

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States and worldwide (Satterwhite et al., 2013). Vaccination is a critical public health measure for lowering the risk of most cervical, genital, and anal cancers caused by HPV (U.S. Food and Drug Administration [FDA], 2014). The American Academy of Pediatrics (AASP) recommends immunization against human papillomavirus (HPV) for all 11 through 12-year-old children as a part of the adolescent immunization program. The FDA approved Gardasil 9 in 2014 for females ages 9-26 and males ages 9-15. It is approved for the prevention of cervical, vulvar, vaginal, and anal cancers caused by HPV types 16, 18, 31, 33, 45, 52, and 58, and for the prevention of genital warts caused by HPV types 6 or 11. Gardasil 9 adds protection against five additional HPV types—31, 33, 45, 52, and 58—which caused approximately 20 percent of cervical cancers and are not covered by previously FDA-approved HPV vaccine for males. Females may receive either the bivalent vaccine (HPV 2) or HPV 4 (Etter, Zimet, & Rickert, 2012)

II. Methods

A pretested survey was developed to assess clinic staff knowledge of the HPV vaccine and intentions to administer prior to implementing a training program for clinic staff. The survey was administered post training to assess change in knowledge and perceptions after the training program. Staff at a large primary care clinic in north Jacksonville with 10 providers and 20 support staff were invited to participate in a study to assess their knowledge of the HPV vaccine before the implementation of the training program to increase the vaccination rate. The theory of planned behavior governed the development of this survey tool. The main outcome measure was assessed with this random question "How likely are you to prescribe the HPV vaccine for adolescent 11-12 years old?" Responses ranged from not at all likely to very likely on a 5-point Likert scale. The survey also elicited clinician's views and reservation regarding the ACIP recommendation of the vaccine. Data collection was done weekly to assess clinician's recommendation at every visit and HPV standing order was introduced. Continued education and update of cross-sections of staff was carried out as necessary.

The American Academy of Pediatrics (AAP) tool kit was also presented to the entire staff during the lunch and learn session. The tool kit provided background on HPV vaccine, attempted to reduce staff fears and concerns about the vaccine and EMR documentation and also the legal ramifications of administering the vaccine. Practical ways to modify clinic systems to incorporate standing orders and promote vaccine uptake by eligible patients were also presented. In addition, a chart review was performed prior to survey administration and training as well as six-month post training. A retrospective audit of 650 charts of eligible boys and girls was performed to assess baseline HPV vaccination of 11-12 year olds. This audit showed a very low HPV immunization rate in both male and female adolescents.

III. Results

A total of 28 questionnaires were completed, the sample consisted of 8 providers, 12 medical assistants, and 8 front office staff. Ninety-two percent of the clinic staff were comfortable with introduction of the tool kit and changing their practices to increase HPV vaccination rate. Approximately eighty-nine percent of the staff were comfortable with the idea of standing orders for HPV vaccination at the primary health clinic.

About 9% of the staff were uncomfortable with the idea of administering HPV vaccine with a standing order. The other 2% were undecided, did not vote for or against the implementing a standing order for HPV vaccination. A total of 482 charts of eligible patients were included in this analysis. Only 41.4% of eligible patients were vaccination. Only 14% of the sample completed the three-series HPV vaccine.

IV. Table 1

	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May
First Dose	10	15	8	17	10	20	40	35	50
Second Dose	25	12	12	10	13	10	30	48	44
Third Dose	15	18	15	15	9	20	42	32	40
No HPV Vaccine	40	45	35	25	42	32	5	3	6
Total	90	90	70	67	74	82	117	118	140

V. Statistical Analysis

MULTIVARIATE: MULTIPLE LINEAR REGRESSION

Model

The Multiple linear regression model, with 482 observations, used here relates the values of the (response) variables, y to independent (quantitative explanatory) variables, x_k and k=1,…,n. For this study, I used the first-order multiple regression model, where each of the independent variables appears, but there are no cross-product terms such as x_4=x_1*x_2 or terms in powers of the independent variables.

RESULTS

The multiple linear regression was done using the reduced data from the survey of clinic staffs' knowledge of the HPV Vaccine and intentions to administer. The months of September of 2015 through May of 2016 were analyzed by the number of doses administered or not administered.

ANOVA Table

	df	SS	MS	F	p-value
Regression	2	1058.371	529.1853	33.5926	0.000551043
Residual	6	94.5183	15.7531		
Total	8	1152.889			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	5.4716	2.5918	2.1111	0.0792	-0.8703	11.8136
First Dose (FD)	0.7394	0.1558	4.7463	0.0032	0.3582	1.1206
Second Dose (SD)	0.0254	0.1573	0.1613	0.8772	-0.3596	0.4103

The best-fit model is

$\widehat{(TD)}$=5.4716+0.7394*FD+0.0254*SD,

The computed F located in the ANOVA Table Summary above is approximately 33.5926. Since F>F_α , we reject H_0 and conclude that there is a strong evidence in the data to suggest that the explanatory variables collectively have at least some predictive value.

VI. Discussion

HPV infection is the cause of considerable morbidity and mortality worldwide. HPV vaccine can significantly reduce this burden. Low vaccination rate in the United States calls for efforts to improve vaccination strategies to optimize potential vaccination benefits. This study highlights the need to change practice in primary care clinics to increase HPV vaccination rates. Survery questionnaire showed that only fifty percent of the clinicians mentioned that they were routinely recommending the vaccine to their patients. However, the lack of recommendation exposes adolescents to HPV infections and suboptimal immunization rates. Studies have shown that a health provider recommendation is an important factor for increasing HPV vaccination (Kessels et al., 2012), (Valentino & Poronsky, 2016). Studies also indicate that clinicians who are well informed about safety and efficacy of the vaccine are more apt to put their feelings aside (Berkowitz, Malone, Rodriguez, & Saraiya, 2015). Gaps in knowledge and communication can be reduce by providing continuing education, lunch and learn sessions and additional educational materials. This will help make clinicians more comfortable about discussing HPV vaccination and prescribing for the intended age group.

VII. Conclusion

Programs to discuss increasing HPV vaccination rate should be multi-faceted and directed at increasing awareness in both providers and parents. Strong provider recommendation using the right word will allay the parent's anxiety and increase confidence leading to HPA vaccine acceptability. The study showed that the tool kit and standing order was effective. However, educational sessions need to be continued especially for new staff and tool kits will need to be updated as it becomes necessary. Additionally, due to the high cost of the vaccine, partnership with the county health department will be necessary to refer uninsured patients for vaccination. Two larger studies will be needed to further support these conclusions.

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