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Fatalistic Beliefs and Completion of the HPV Vaccination Series Among a Sample of Young Appalachian Kentucky Women

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Abstract

Purpose: Uptake and completion of the 3-dose human papillomavirus (HPV) vaccine is important for the primary prevention of cervical cancer. However, HPV vaccination rates among adolescent females and young women remain low in certain geographic areas of the United States, including Appalachia. Although greater fatalistic beliefs have been previously associated with lower rates of preventive cancer behaviors among adults, little research exists on the impact of fatalism on HPV vaccination behaviors, especially among younger individuals. Therefore, the purpose of this study was to examine the association between fatalistic beliefs and completion of the full HPV vaccine series among young women, ages 18-26, in Appalachian Kentucky.

Results: Data from this study were from a baseline survey completed by 344 women randomized into a communication intervention trial focused on increasing adherence to the 3-dose HPV vaccine series. Principal components analysis was used to construct 2 fatalism-related sub-scales from 8 survey questions.

Findings: In a controlled analysis, one sub-scale—"lack of control over cancer"—was significantly associated with not completing the full HPV vaccine series. In a rural area that experiences higher rates of cervical cancer, poverty, limited access to health care, and negative cancer-related attitudes and experiences, fatalism may be common, even among young people.

Conclusion: Future educational and interventional research addressing fatalistic beliefs in a culturally sensitive manner may be warranted to improve HPV vaccination behaviors and impact cancer disparities among Appalachian women.

Key words: Appalachia, health disparities, health promotion, HPV vaccination, utilization of health services

Human papillomavirus (HPV) is the most prevalent sexually transmitted infection (STI) in the United States (US), affecting an estimated 79 million individuals.[1] High-risk HPV types are associated with various cancers, with HPV types 16 and 18 causing an estimated two-thirds of all cervical cancers.[1] Two vaccines (HPV4, Gardasil®; HPV2, Cervarix®) are now widely available for the primary prevention of HPV infection and cervical cancer.[2] The Centers for Disease Control and Prevention (CDC) recommends routine HPV vaccination for females ages 11-12 and catch-up vaccination for females ages 13-26. Current CDC guidelines recommend that the second dose of the HPV vaccine series be administed 1-2 months after the first injection; the third dose is administered 6 months after the first dose.[3] Unfortunately, HPV vaccination rates remain below *Healthy People 2020* targets, especially among young adult women and in regions of the country that may need this cancer prevention strategy the most, including Appalachia.[4-6] Lower HPV vaccination rates in Appalachia are problematic considering the higher prevalence of high-risk HPV infection and cervical cancer incidence and mortality rates in that region.[7-11]

Barriers to the initial uptake and eventual completion of the 3-dose HPV vaccine series among Appalachian women have been previously documented, with the high monetary cost of vaccination serving as a primary barrier.[12-14] However, Crosby et al found that even when the barrier of cost was removed, young women residing in rural Appalachian Kentucky were less likely than their urban counterparts to accept and complete HPV vaccination.[5] This finding suggests that factors unrelated to cost may serve as important barriers to HPV vaccination behaviors. Other noted barriers to HPV vaccination among Appalachian women include lack of transportation, limited parental/peer/health care provider support, cultural views, and lack of knowledge regarding cervical cancer prevention and HPV.[13,15-17]

There is an additional barrier to preventive cancer behavior, however, that has received limited attention as it relates to HPV vaccination, and that is the concept of fatalism. Fatalism has been examined as a potential determinant for engaging in preventive cancer strategies, including cancer information-seeking, screening (eg, colorectal cancer screening, Papanicolaou (Pap) testing, mammography) and preventive behaviors (eg, diet, exercise, smoking).[18-22] Although the definition of fatalism varies across studies and disciplines, the concept is often operationalized as mortality from cancer being inevitable and that the disease is beyond an individual's personal control.[19,23-25] Indeed, fatalistic beliefs have been previously identified as barriers to cancer prevention and screening among racial/ethnic minorities, individuals of lower socioeconomic status, the elderly, rural populations, and Appalachians.[23,25-33] However, there has been limited research on the potential impact of fatalistic beliefs on HPV vaccination behaviors as a preventive cancer strategy, specifically among young Appalachian adults.[13,34] Therefore, the purpose of this study was to examine whether fatalistic beliefs were associated with completion of the full HPV vaccine series among young women in Appalachian Kentucky.

Methods

Study Participants

This study used baseline data from a health communication intervention trial conducted in 2010-2011, which focused on promoting uptake and adherence to the HPV vaccine among women aged 18-26 in an 8-county region of Appalachian Kentucky.[35] The study catchment area is extremely rural; the 8 counties are assigned a 2013 Rural-Urban Continuum Code of either 7 or 9 as defined by the US Department of Agriculture's Economic Research Service.[36] A convenience sample of eligible women was recruited through a community-based social marketing campaign,

which advertised the availability of free HPV vaccination for women in the appropriate age range. Dose 1 of the HPV vaccine (HPV 4) was provided at no cost by research nurses at local health departments and other health care settings, community colleges, supermarkets, community gatherings (eg, fall festivals), and in women's homes.

Procedures

After dose 1 of the vaccine was given, women were asked to participate in a research study; all volunteers provided written informed consent. After consent was obtained, women were asked to complete a baseline questionnaire via audio computer-assisted self-interviewing. The purpose of the survey was to identify predictors of intent to complete the HPV vaccine series as well as predictors of actual series completion. Survey questions were informed by constructs from the Theory of Planned Behavior as well as previous research findings.[5,37-39] After completing the questionnaire, women were subsequently randomized into an intervention or comparison group. Women in the intervention group viewed a 13-minute educational DVD, called "1-2-3 Pap," while women in the comparison group received a standard-of-care pamphlet regarding HPV vaccination. The "1-2-3 Pap" DVD focused on the importance of HPV vaccination and guideline-concordant Pap testing for Appalachian Kentucky women. Messaging for the DVD was based on formative research conducted by Head et al and guided by the information, motivation, behavioral skills model.[14] The DVD included several key thematic messages, including the prevalence of HPV, the burden of cervical cancer in eastern Kentucky, the effectiveness of the HPV vaccine, and the recommended vaccination schedule. All women received reminder telephone calls for doses 2 and 3. Data on women's vaccine series completion were taken from medical records and reviewed for up to 9 months past the date of series

initiation. Results of the intervention trial are published elsewhere.[35] The University of Kentucky Institutional Review Board approved all research activities.

Measures

Fatalistic beliefs were assessed on the baseline survey via 8 questions measured on a 5-point Likert scale (Strongly Agree, Agree, Unsure, Disagree, Strongly Disagree). These questions were informed by a review of the literature, and the research expertise and field-based experiences of the investigators.[18,24,40]

Data Analyses

For the purposes of this study, demographic and clinical variables, as well as HPV vaccine efficacy beliefs, intention to complete the HPV vaccine series, and barriers to vaccination were first tested to determine equivalence between the intervention and comparison groups. Independent samples t-tests were used to test continuous-level variables. Fisher's exact tests were used to test all dichotomous-level variables. Responses to the fatalism questions were dichotomized into Agree (Strongly Agree, Agree) or Disagree (Unsure, Disagree, Strongly Disagree). To identify potential sub-scales within these 8 questions, a principal components analysis was conducted.[41,42] Sub-scales were identified, constructed, and tested for inter-item reliability. Multivariate logistic regression models were created in order to assess the possible associations between HPV vaccine series non-completion and fatalistic scales categorized as fatalistic or non-fatalistic/unsure. Models used backwards entry, initially controlling for all demographic, clinical, HPV vaccine efficacy beliefs, intention, and barrier-related variables listed in Table 1. Statistical significance was determined at $P \leq .05$. All data analyses were conducted using SAS Version 9.3 for Windows (SAS Institute Inc., Cary, North Carolina).

Results

During the study, 344 women received dose 1 of the HPV vaccine and completed the baseline survey prior to randomization into the intervention trial. Overall, the mean age was 22 years (SD = 2.4); the study sample primarily comprised non-Hispanic white females (94.0%). Almost all of the women (90%) had lived in southeastern Kentucky for over 5 years. Only one-quarter (25.6%) were employed full-time; almost half (48.0%) reported some college as their highest level of education. Nearly one-third (30%) of the women were married and 39.0% reported having children at home. As shown in Table 1, there were statistically significant between-group differences in age, history of an abnormal Pap test, the belief that all 3 doses of the HPV vaccine will decrease the chance of developing cervical cancer, intention to complete the entire vaccine series, and transportation barriers between comparison groups, and therefore adjustments were made in all subsequent models.

Responses to the 8 fatalism questions were subjected to a principal component analysis. The principal axis method was used to extract the components, followed by a varimax (orthogonal) rotation. Only the first 2 components displayed eigenvalues greater than 1, and the results of a scree test also suggested that only the first 2 components were meaningful. Therefore, only the first 2 components were retained for rotation. Combined, components 1 and 2 accounted for 52.03% of the total variance. Questionnaire items and corresponding factor loadings are presented in Table 2. In interpreting the rotated factor pattern, an item was said to load on a given component if the factor loading was .40 or greater for that component, and it was less than .40 for the other. Using these criteria, 5 items were found to load on the first component, which was subsequently labeled the “inevitability of cancer” component. Three

items loaded on the second component, which was labeled the "lack of control over cancer" component.

We tested 3 scales for these fatalistic questions: 1) a total scale summed over all 8 questions, 2) a summed sub-scale over the 5 questions representing the "inevitability of cancer," and 3) a summed sub-scale over the 3 questions representing the "lack of control over cancer." We then categorized these 3 scales into fatalistic (> scale mid-point) or not fatalistic/unsure (≤ scale mid-point). Table 3 displays the raw scores and ranges for all women as well as the percent categorized as fatalistic or not-fatalistic/unsure. The first adjusted model, utilizing the total fatalism score and controlling for randomization, vaccine efficacy beliefs, intention to complete series, and transportation barriers, showed that women who answered fatalistically had no statistically significant difference in the odds of not completing the entire series as compared to those that were not fatalistic or unsure (OR = 1.53, 95% CI: 0.86-2.70, $P = .15$) (data not shown). We then constructed a logistic model incorporating the 2 created fatalism sub-scales (Table 4). In this model, the "inevitability of cancer" scale was not significant; however, women scoring above the mid-point on the "lack of control over cancer" scale had 2.44 times the odds of not completing the full dose series as compared to those scoring below the mid-point (95% CI: 1.34-4.45, $P = .004$). As reported elsewhere, the DVD intervention was significantly associated with higher rates of HPV vaccine series completion (OR = 2.72, 95% CI: 1.59-4.65, $P < .001$), and intention to not complete the vaccine series also increased the risk of not completing the full regimen (OR = 2.12, 95% CI: 1.13-4.00, $P = .020$).[35] In addition, women indicating that transportation would be an issue to returning for subsequent vaccinations had significantly higher odds of not completing the series (OR = 3.81, 95% CI: 1.84-7.91, $P < .001$).

Discussion

Among this sample of young Appalachian Kentucky women, ages 18-26, who received at least dose 1 of the HPV vaccine, several fatalistic beliefs resulted in a higher likelihood of not successfully completing the full HPV vaccine series. Specifically, women indicating agreement with the 3 beliefs related to limited control over their health (generally) and cervical cancer (specifically) were significantly less likely to complete the series. Although the inevitability of cancer scale was not significant, several of the included fatalistic beliefs have been previously found among rural and Appalachian populations, specifically those beliefs pertaining to the inevitability of developing cancer due to familial history, the perception that cancer is unavoidable, and that cancer is a death sentence.[43-46] Notably, this is the first study to measure the impact of fatalism on HPV vaccination outcomes among a younger population of Appalachian women. Katz et al reported that fatalism could be a perceived barrier to HPV vaccination acceptability among Appalachian Ohio residents, but this finding was a result of qualitative focus groups and interviews with health care providers, parents, young women, and community members. Furthermore, only 1 fatalistic belief, specifically fear of cancer, was described in that study.[13]

Importantly, all of the women in the study received dose 1 of the HPV vaccine, regardless of their fatalistic beliefs. However, similar to Vanderpool et al, our findings suggest there may be different barriers to HPV vaccine series completion as compared to barriers associated with initial vaccine uptake.[35] In this case, having negative perceptions related to the control of cancer was associated with not completing the full HPV vaccine series. This is an important finding because rural Appalachian residents often perceive cancer as pervasive, inevitable, and mostly hereditary.[45,46] For example, participants' perceived lack of control over

cancer may be related to cultural practices of storytelling, wherein family, friends, and community members' negative experiences with the disease are perpetuated over time. Because of the small, tight-knit nature of these rural communities, an individual's cancer experience—and the associated anxiety, fear, and consequences—is projected onto family members, their broader peer group, and the community as a whole.[45] As a result, individuals may forgo preventive behaviors as a way to avoid or deny the health issue altogether, particularly if they believe their personal risk is elevated.[47] Appalachian residents may also exhibit lower self-efficacy in regards to controlling cancer due to multiple ecological barriers, including limited access to health care, lower socioeconomic status, poorer health status, and poor patient-provider communication.[12,13,33,46] These circumstances, in the context of a high-poverty region with limited resources such as Appalachia, may lead to fatalistic beliefs, including those identified in the current study. Thus, fatalism, negative attitudes towards health, and health care avoidance may be more commonplace in rural Appalachia, even among young people.[25,44,48]

There are noted limitations to our study, including the design of our baseline survey which did not allow for measuring changes in fatalistic beliefs over time, and the limited generalizability of our findings to other rural and/or Appalachian populations. In addition, this study focused on women who had already initiated the HPV vaccine series; fatalistic beliefs among women who have chosen to initiate the HPV vaccine series may differ from those who have not initiated the series. Therefore, our findings may not be generalizable to women who have yet to receive dose 1. In addition, we recognized the moderate Cronbach alpha coefficients for the 3 fatalism scales.

Conclusions

As suggested by the study findings, we identified a potentially modifiable determinant of HPV vaccine series non-completion among a group of women living in a region of the country which experiences an undue burden of cervical cancer and low HPV vaccination rates. Indeed, the efficacy of the HPV vaccine is based on the completion of the entire series; thus, identifying and intervening on individual-level barriers to vaccine series completion is necessary to improve HPV vaccination rates among young women.[2] For example, inclusion of fatalism-related questions on patient screening forms could be used to proactively identify women at risk of failing to complete the HPV vaccine series and intensify patient tracking and reminder systems. As previously mentioned, fatalistic beliefs among women who have initiated the HPV vaccine series may differ from those who have not. Further research efforts should compare fatalistic beliefs between these 2 groups of women. Additional tailored communication messages may also be needed to educate and empower Appalachian women to participate in evidence-based cervical cancer prevention and screening strategies. In sum, future educational and interventional research which addresses fatalistic beliefs in a culturally sensitive manner may be warranted to improve HPV vaccination rates and impact cancer disparities among women in Appalachia.

References

1. Genital HPV infection – fact sheet. Centers for Disease Control and Prevention website. Available at: http://www.cdc.gov/STD/HPV/STDFact-HPV.htm. Updated March 20, 2014. Accessed June 11, 2014.
2. Centers for Disease Control and Prevention (CDC). FDA licensure of bivalent human papillomavirus vaccine (HPV2, Cervarix) for use in females and updated HPV vaccination recommendations from the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep.* 2010;59(20):626-629.
3. Markowitz LE, Dunne EF, Saraiya M, et al. Human papillomavirus vaccination: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep.* 2014;63(Rr-05):1-30.
4. Williams WW, Lu PJ, O'Halloran A, et al. Noninfluenza Vaccination Coverage Among Adults - United States, 2012. *MMWR Morb and Mort Wkly Rep.* 2014;63(5):95-102.
5. Crosby RA, Casey BR, Vanderpool R, Collins T, Moore GR. Uptake of free HPV vaccination among young women: a comparison of rural versus urban rates. *J Rural Health.* 2011;27(4):380-384.
6. Reiter PL, Katz ML, Paskett ED. HPV vaccination among adolescent females from Appalachia: implications for cervical cancer disparities. *Cancer Epidemiol Biomarkers Prev.* 2012;21(12):2220-2230.
7. Reiter PL, Katz ML, Ruffin MT, et al. HPV prevalence among women from Appalachia: results from the CARE project [published correction appears in *PLoS One.* 2013;8(10): 10.1371/annotation/7a4cfd0a-cf77-430e-89a0-b2576268e2eb]. *PLoS One.* 2013;8(8):e74276. doi: 10.1371/journal.pone.0074276.

8. Centers for Disease Control and Prevention (CDC). Cancer death rates--Appalachia, 1994-1998. *MMWR Morb Mortal Wkly Rep.* 2002;51(24):527-529.

9. Wingo PA, Tucker TC, Jamison PM, et al. Cancer in Appalachia, 2001-2003. *Cancer.* 2008;112(1):181-192.

10. Yabroff KR, Lawrence WF, King JC, et al. Geographic disparities in cervical cancer mortality: what are the roles of risk factor prevalence, screening, and use of recommended treatment? *J Rural Health.* 2005;21(2):149-157.

11. Reiter PL, Fisher JL, Hudson AG, Tucker TC, Plascak JJ, Paskett ED. Assessing the burden of HPV-related cancers in Appalachia. *Hum Vaccin Immunother.* 2013;9(1):90-96.

12. Lyttle NL, Stadelman K. Assessing awareness and knowledge of breast and cervical cancer among Appalachian women. *Prev Chronic Dis.* 2006;3(4):A125.

13. Katz ML, Reiter PL, Heaner S, Ruffin MT, Post DM, Paskett ED. Acceptance of the HPV vaccine among women, parents, community leaders, and healthcare providers in Ohio Appalachia. *Vaccine.* 2009;27(30):3945-3952.

14. Head KJ, Cohen EL. Young women's perspectives on cervical cancer prevention in Appalachian Kentucky. *Qual Health Res.* 2012;22(4):476-487.

15. Head KJ, Vanderpool RC, Mills LA. Health care providers' perspectives on low HPV vaccine uptake and adherence in Appalachian Kentucky. *Public Health Nurs.* 2013;30(4):351-360.

16. Mills LA, Head KJ, Vanderpool RC. HPV vaccination among young adult women: a perspective from Appalachian Kentucky. *Prev Chronic Dis.* 2013;10:E17.

17. Casey BR, Crosby RA, Vanderpool RC, Dignan M, Bates W. Predictors of initial uptake of human papillomavirus vaccine uptake among rural Appalachian young women. *J Prim Prev.* 2013;34(1-2):71-80.

18. Powe BD, Finnie R. Cancer fatalism: the state of the science. *Cancer Nurs.* 2003;26(6):454-467.

19. Niederdeppe J, Levy AG. Fatalistic beliefs about cancer prevention and three prevention behaviors. *Cancer Epidemiol Biomarkers Prev.* 2007;16(5):998-1003.

20. Miles A, Voorwinden S, Chapman S, Wardle J. Psychologic predictors of cancer information avoidance among older adults: The role of cancer fear and fatalism. *Cancer Epidemiol Biomarkers Prev.* 2008;17(8):1872-1879.

21. Miles A, Rainbow S, von Wagner C. Cancer fatalism and poor self-rated health mediate the association between socioeconomic status and uptake of colorectal cancer screening in England. *Cancer Epidemiol Biomarkers Prev.* 2011;20(10):2132-2140.

22. Flynn PM, Betancourt H, Ormseth SR. Culture, emotion, and cancer screening: an integrative framework for investigating health behavior. *Ann Behav Med.* 2011;42(1):79-90.

23. Shen LJ, Condit CM, Wright L. The psychometric property and validation of a fatalism scale. *Psychol Health.* 2009;24(5):597-613.

24. Hall AG, Khoury AJ, Lopez EDS, Lisovicz N, Avis-Williams A, Mitra A. Breast cancer fatalism: the role of women's perceptions of the health care system. *J Health Care Poor Underserved.* 2008;19(4):1321-1335.

25. Powe BD, Johnson A. Fatalism as a barrier to cancer screening among African-Americans: Philosophical perspectives. *J Relig Health.* 1995;34(2):119-125.

26. Ramirez AS, Rutten LJF, Oh A, et al. Perceptions of cancer controllability and cancer risk knowledge: the moderating role of race, ethnicity, and acculturation. *J Cancer Educ.* 2013;28(2):254-261.

27. Fernandez ME, McCurdy SA, Arvey SR, et al. HPV knowledge, attitudes, and cultural beliefs among Hispanic men and women living on the Texas-Mexico border. *Ethn Health.* 2009;14(6):607-624.

28. Beeken RJ, Simon AE, von Wagner C, Whitaker KL, Wardle J. Cancer fatalism: deterring early presentation and increasing social inequalities? *Cancer Epidemiol Biomarkers Prev.* 2011;20(10):2127-2131.

29. Mayo RM, Ureda JR, Parker VG. Importance of fatalism in understanding mammography screening in rural elderly women. *J Women Aging.* 2001;13(1):57-72.

30. Befort CA, Nazir N, Engelman K, Choi W. Fatalistic cancer beliefs and information sources among rural and urban adults in the USA. *J Cancer Educ.* 2013;28(3):521-526.

31. Shell R, Tudiver F. Barriers to cancer screening by rural Appalachian primary care providers. *J Rural Health.* 2004;20(4):368-373.

32. Royse D, Dignan M. Fatalism and cancer screening in Appalachian Kentucky. *Fam Community Health.* 2011;34(2):126-133.

33. Friedell GH, Linville LH, Hullet S. Cancer control in rural Appalachia. *Cancer.* 1998;83(8):1868-1871.

34. Nan X, Zhao X, Briones R. Parental cancer beliefs and trust in health information from medical authorities as predictors of HPV vaccine acceptability. *J Health Commun.* 2014;19(1):100-114.

35. Vanderpool RC, Cohen EL, Crosby RA, et al. "1-2-3 Pap" intervention improves HPV vaccine series completion among Appalachian women. *J Commun.* 2013;63(1):95-115.

36. Rural-Urban Continuum Codes. United States Department of Agriculture website. Available at: http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx. Updated May 10, 2013. Accessed October 13, 2014.

37. Ajzen I, Fishbein M. *Understanding attitudes and predicting social behavior.* 1st ed. Englewood Cliffs, NJ: Prentice-Hall; 1980.

38. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: a theory-informed, systematic review. *Prev Med.* 2007;45(2-3):107-114.

39. Crosby R, Schoenberg N, Hopenhayn C, Moore G, Melhan W. Correlates of intent to be vaccinated against human papillomavirus: an exploratory study of college-aged women. *Sex Health.* 2007;4(1):71-73.

40. Wallston KA, Wallston BS, DeVellis R. Development of the multidimensional health locus of control (MHLC) scales. *Health Educ Monogr.* 1978;6(2):160-170.

41. Tabachnick BG, Fidell LS. *Using multivariate statistics*. 4th ed. Boston, MA: Allyn and Bacon; 2001.

42. O'Rourke N, Hatcher L, Stepanski EJ, Hatcher L. *A step-by-step approach to using SAS for univariate & multivariate statistics*. 2nd ed. Cary, NC: SAS Institute Inc.

43. Hatcher J, Dignan MB, Schoenberg N. How do rural health care providers and patients view barriers to colorectal cancer screening? Insights from Appalachian Kentucky. *Nurs Clin North Am.* 2011;46(2):181-192, vi.

44. Drew EM, Schoenberg NE. Deconstructing fatalism: ethnographic perspectives on women's decision making about cancer prevention and treatment. *Med Anthropol Q.* 2011;25(2):164-182.

45. Hutson SP, Dorgan KA, Phillips AN, Behringer B. The mountains hold things in: the use of community research review work groups to address cancer disparities in Appalachia. *Oncol Nurs Forum.* 2007;34(6):1133-1139.

46. Vanderpool RC, Huang B. Cancer risk perceptions, beliefs, and physician avoidance in Appalachia: results from the 2008 HINTS survey. *J Health Commun.* 2010;15 (Suppl 3):78-91.

47. Witte K. Putting the fear back into fear appeals: The extended parallel process model. *Communication Monohgraphs*. 1992; 59(4):329.

48. Freeman HP. Cancer in the socioeconomically disadvantaged. *CA Cancer J Clin.* 1989;39(5):266-288.

Table 1. Sample Characteristics (N = 344)

	DVD Intervention (N = 178) n (%)	Control Group (N = 166) n (%)	*P*[a]
Demographic			
Age, mean (SD)	22.2 (2.5)	21.7 (2.3)	.05
Highest level of education completed			.53
Less than high school	15 (8.4)	9 (5.4)	
High school graduate	55 (30.9)	51 (30.7)	
More than high school	108 (60.7)	106 (63.9)	
Clinical			
Ever had an abnormal Pap test result?			.05
Yes	72 (44.4)	79 (51.6)	
No	90 (55.6)	74 (48.4)	
Ever been diagnosed with an STI?			.22
Yes	39 (21.9)	36 (21.7)	
No	139 (78.1)	130 (78.3)	
Vaccine Intention/Efficacy Beliefs/Barriers			
Intend to complete the 3-dose HPV vaccine series			.02
Yes	103 (58.2)	117 (70.9)	
No	74 (41.8)	48 (29.1)	
3 doses of the HPV vaccine will decrease my cervical cancer risk			.03
Unsure/Agree/Strongly Agree	120 (67.4)	130 (78.3)	
Disagree/Strongly Disagree	58 (32.6)	36 (21.7)	
Would return for doses 2 and 3 if friend came with me			.22
Unsure/Agree/Strongly Agree	62 (34.8)	69 (41.6)	
Disagree/Strongly Disagree	116 (65.2)	97 (58.4)	
Transportation issues would prevent return for doses 2 and 3			.02
Yes	50 (28.3)	29 (17.6)	
No	127 (71.7)	136 (82.4)	
Work schedule would prevent return for doses 2 and 3			.73
Yes	56 (31.6)	49 (46.7)	
No	121 (68.4)	116 (70.3)	

Abbreviations: SD= standard deviation, STI= sexually transmitted infection

[a] *P values from Independent Samples T-test or Fisher's Exact Tests*

Table 2. Rotated Factor Pattern and Final Communality Estimates From Principal Components Analysis of Fatalistic Questions

	Component		
	1	2	h^{2*}
1. Cancer of the cervix is beyond my control	.34	.66	0.55
2. Cancer of any kind is a death sentence	.76	-.11	0.58
3. Cancer of the cervix is almost always fatal	.64	.12	0.42
4. Cancer is a disease that cannot be avoided	.63	.27	0.47
5. If it were fated for me to get cervical cancer getting vaccinated against HPV would not prevent it	.11	.83	0.70
6. Women in my family get cervical cancer so I will probably get it also	.69	-.12	0.49
7. Faith is all I need to prevent diseases and illness	.48	.31	0.32
8. I am not in control of my own health	-.27	.75	0.63

*N=344. Communality estimates appear in column headed h^2.
"Inevitability of cancer" = Questions 2, 3, 4, 6, 7
"Lack of control over cancer" = Questions 1, 5, 8

Table 3. Summary Statistics for the 3 Fatalistic Scales

	Mid-point and Possible Range	Cronbach's Alpha	Summed Score Mean (SD)		Categorized n (%)
Total Scale - Sum of 8 (Questions 1-8)	16 (0-32)	0.66	14.06 (5.0)	Fatalistic	107 (31.1)
				Not Fatalistic/Unsure	237 (68.9)
Inevitability of Cancer - Sum of 5 (Questions 2, 3, 4 ,6, 7)	10 (0-20)	0.67	7.75 (3.6)	Fatalistic	66 (19.2)
				Not Fatalistic/Unsure	278 (80.8)
Lack of Control Over Cancer - Sum of 3 (Questions 1, 5, 8)	6 (0-12)	0.65	6.31 (3.0)	Fatalistic	175 (50.9)
				Not Fatalistic/Unsure	169 (49.1)

Table 4. Multivariate Associations Among HPV Vaccine Series Non-Completion and Fatalism

	Odds of Series Non-Completion (95% CI)	***P*[a]**
Inevitability of cancer scale	0.94 (0.51-1.76)	.854
Lack of control over cancer scale	2.44 (1.24-4.45)	.004
Transportation issues would prevent return	3.81 (1.84-7.91)	<.001
Did not receive DVD intervention	2.72 (1.59-4.65)	<.001
Did not intend to complete the series	2.12 (1.13-4.00)	.020

[a] *P values from multivariate logistic regression modeling the probability of series dose non-completion. Model chosen using backwards selection from covariates described in the text.*