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HPV Awareness, Knowledge and Vaccination Attitudes among Church-going African-American Women

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Abstract

Objectives—The purpose of this exploratory study was to better understand sociodemographic correlates of human papillomavirus (HPV) awareness, knowledge, and vaccination attitudes among a convenience sample of church-going, African-American women and how knowledge about HPV-related cancers relates to vaccination attitudes for girls and boys.

Methods—Participants (N = 308) answered survey questions about HPV awareness, knowledge, and vaccination attitudes. Associations between variables were assessed using Bonferroni-adjusted chi-square tests and regression analyses.

Results—Younger age was associated with having heard of HPV and willingness to vaccinate a daughter or son in covariate-adjusted analyses. Younger age and greater education were associated with knowledge that HPV causes cervical cancer. A positive association existed between willingness to vaccinate a daughter or son based on knowledge of the number of cancers associated with HPV. Knowledge that HPV was related to non-cervical cancers was significantly associated with greater willingness to vaccinate sons.

Conclusions—Knowledge that HPV causes multiple cancers is important to willingness to vaccinate a child. Education campaigns should emphasize that HPV is also related to non-cervical

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Human Subjects Statement

The Institutional Review Board at The University of Texas MD Anderson Cancer Center and the University of Houston approved this study. Written informed consent for all study procedures was obtained before data collection.

Conflict of Interest Statement

Authors have no competing interests pertaining to this research.

cancers. African-American women of older age and less education might benefit from church-based HPV educational campaigns.

Keywords

HPV; vaccination; African-American women; church

INTRODUCTION

The Human papillomavirus (HPV) is associated with a number of cancers including cervical, oropharyngeal, penile and anal.¹ Between 2008 and 2012, 23,000 HPV-related cancers were diagnosed among women and 15,793 were diagnosed among men.² Vaccination is available to prevent infection with HPV and is recommended for pre-teens to young adults. Originally approved in 2006 for girls and women aged 9–26, the HPV vaccine was approved for use with boys in 2009.³ However, since arriving on the market in 2006, uptake of the HPV vaccination is lower than that of other adolescent vaccines,⁴ at about 30% uptake for girls and 5% for boys.^{5,6} HPV vaccination provides an opportunity to reduce multiple HPV-related cancers; therefore, increasing uptake of the vaccine among youth of both sexes is a vital public health issue.

HPV vaccination was originally marketed as a preventive measure for cervical cancer, and many previous studies have specifically addressed knowledge of the link between HPV and cervical cancer to HPV vaccination attitudes and uptake.^{7–9} However, the HPV vaccine has the added benefit of reducing the burden of other HPV-related cancers for both men and women.^{10,11} Despite this, few studies address how knowledge of HPV and the incidence of non-cervical cancers might relate to attitudes about vaccination, especially as related to the vaccination of boys. Presumably, a lack of knowledge of the connection between HPV and the types of cancers that affect men might be associated with less willingness to vaccinate sons than daughters, or to support vaccination of boys within the family.

Acceptance of HPV vaccine among parents/guardians and rates of vaccination among adolescent girls may be lower among some religious communities, potentially due to perceptions of the link between HPV transmission and early/premarital sexual activity.¹² Racial and ethnic disparities in HPV vaccination have also been documented among African-American populations, with lower rates of uptake found among African-American girls and women relative to non-Hispanic White girls and women (18.2% vs. 33.1%).¹³ Currently, there is a lack of research regarding racial and ethnic disparities in relation to the vaccination of boys. In addition, research has not adequately addressed knowledge about HPV and attitudes regarding vaccination of both African-American girls and boys in the context of a religious community. Approximately 53% of African-American adults report attending religious services once a week in comparison with 39% of all American adults.¹⁴ The African-American church represents an important part of the African-American community and provides an opportunity to examine links between HPV awareness, knowledge, and vaccination attitudes among church-going, African-American women.

A recent publication using data from the larger, longitudinal parent study examined older church-going African-American women's views on HPV vaccination from the standpoint

that the family structure of African-American families is often intergenerational in terms of care-giving for children.¹⁵ Results supported associations between HPV knowledge and higher education, as well as between HPV awareness and younger age, higher education, a family history of cancer, and less endorsed spirituality. This study concluded that older African-American women with less education and no family history of cancer may benefit from HPV education. However, this study was only able to examine willingness to vaccinate daughters, with no attention to sons, and focused only on older African-American women (aged 40 and above).

The current, exploratory study seeks to understand the sociodemographic correlates of HPV awareness, knowledge, and attitudes among a convenience sample of church-going African-American women and how knowledge about HPV-related cancers relates to vaccination attitudes for both girls and boys. It expands the literature in this area by examining HPV knowledge of links with non-cervical cancers and vaccination attitudes. In addition, it captures vaccination attitudes regarding both girls and boys across a broader age range of church-going African-American women. It also expands on the previous study by collecting data from a different church of an alternate denomination (Baptist vs. Methodist) located in the same urban area. This research is an important next step in understanding how to best focus health promotion efforts to increase vaccination rates among African-American girls and boys.

METHODS

Design

Data were gathered from a Baptist church in Houston, Texas, that comprises predominately African-American attendees, with an overall membership of approximately 2000 parishioners. Previous publications detail the parent study design, which was replicated within the current setting.¹⁵⁻²³ Specifically, recruitment was accomplished via televised media and in-person solicitation for a study about African-American adults and cancer risk. Inclusion criteria were age ≥ 18 years old, resident of the Houston area with a functional telephone number, able to read and speak English, and an attendee of the church where data were gathered (membership was not a requirement). A convenience sampling method was used to achieve the targeted sample size of ≥400 men and women (actual N = 417). Surveys were completed in person at the church using a computerized questionnaire format administered at private stations. Participants were compensated with a \$30 gift card following survey completion. Data were collected between September 2013 and February 2014. The current study reports on one of several diverse project aims. Study procedures were approved by the Institutional Review Boards at the primary (The University of Texas MD Anderson Cancer Center) and affiliated (University of Houston) institutions and written informed consent was obtained from all participants.

Sample

Due to a skip pattern structure for men, data relevant to HPV were only asked among women (N = 308; 73.9% of those included in the study). Consequently, the current sample comprised 308 African-American women.

Measures

Participant characteristics—Participant characteristics included age (assessed continuously; categorized as 18–39, 40–59, 60). Other characteristics included education (<Bachelor's degree vs. Bachelor's degree), annual household income (<\$40,000/year vs. ≥\$40,000/year), employment status (employed vs. unemployed), partner status (partnered vs not partnered), parental status (“How many living children do you have?” 0 vs. 1), presence of related minors in the household (yes vs. no), recent family history of cancer (“Were any of your family members diagnosed with cancer in the last 12 months?” yes vs. no), lifetime personal cancer history (“Please indicate whether you ever had cancer.” yes vs. no), and spirituality (“I rely on God to keep me in good health” strongly agree, agree, disagree). Categorizations of these variables were based on a prior study.¹⁵ Participants were instructed to skip any items they did not wish to answer. Missing data included income (N = 18), partner status (N = 1), parental status (N = 1), and personal cancer history (N = 43).

HPV items—HPV items were investigator generated. The first HPV item assessed HPV awareness (“Have you ever heard of HPV? HPV stands for Human Papillomavirus.” yes vs. no or don't know). The second HPV item assessed HPV knowledge as related to HPV transmission (“Do you believe HPV can be transmitted from person to person from deep kissing?”). The 3rd through 6th HPV variables assessed HPV knowledge as related to cancers and all began with the same stem (“I believe HPV increases the risk of...”). Potential associated cancers were: 3) penile cancer; 4) anal cancer; 5) throat and mouth; and 6) cervical cancer. The final HPV items assessed HPV attitudes regarding vaccination. The 7th item assessed belief of vaccinating both sexes: “I believe HPV vaccine should be given to...” (females only, males only, both males and females, neither males or females, vs. I don't know). The 8th and 9th items assessed attitudes about vaccination by sex and age (“Would you vaccinate a daughter against HPV as early as 9 or 10 years old?” and “Would you vaccinate a son against HPV as early as 9 or 10 years old?” yes vs no or I don't know, respectively). All participants were asked the eighth and ninth items, regardless of response to previous items. Missing data included HPV knowledge as related to HPV transmission (n = 4), HPV knowledge as related to cancers (N = 6 for each), and HPV attitudes regarding vaccination (by sex N = 7; daughter N = 5; son N = 5).

Data Analysis

Analyses were performed using SPSS version 19 (IBM, NY). First, participant characteristics were examined using descriptive statistics. Next, associations between each participant characteristic and each HPV item were assessed using a series of exploratory chi-square tests. Significance was set at $p = .05$ and only participants with complete data on the variables (in each respective analysis) were analyzed.

Main analyses entailed the predictors of HPV awareness, knowledge, and vaccination attitudes. For these analyses, all participant characteristics emerging as significant in the previous analyses (when applicable) were entered in a single block logistic regression model with each HPV item, respectively, as the criterion variable. Significance was set at $p = .017$ ($.05 / 3$) for these main analyses, as only 3 full models were ultimately run. The presentation of these results below is organized by the respective criterion variable..

Finally, 2 unadjusted linear regression analyses were conducted to determine answers to the following health promotion application questions: 1) Is there a relationship between vaccinating a hypothetical daughter as young as 9 or 10 years old based on knowledge of the number of cancers associated with HPV?; and 2) Is there a relationship between vaccinating a hypothetical son as young as 9 or 10 years old based on knowledge of the number of cancers associated with HPV? Next, 2 unadjusted chi-square analyses were conducted to determine answers to the following health promotion application questions: 3) Are participants more likely to vaccinate a hypothetical daughter as young as 9 or 10 years old if they believe HPV is related to non-cervical cancers?; and 4) Are participants more likely to vaccinate a hypothetical son as young as 9 or 10 years old if they believe HPV is related to non-cervical cancers? Significance was set at $p = .013$ ($.05 / 4$) for these analyses.

Tables were not used for presentation of main analytic results due to the number of analyses conducted; however, they are available from the corresponding author upon request.

RESULTS

Participants ($N = 308$) ranged from age 18 to 83 ($M=52.28$, $SD = 13.83$). Overall, 20.5% of participating women were aged 18–39, 45.8% were aged 40–59, and 33.8% were aged 60 or older. See Table 1 for descriptive participant characteristics. Correlations between income, education, and employment status in this sample ranged from 0.12 to 0.37.

HPV Awareness

In this sample, 68.2% ($N = 210$) had heard of HPV. Younger age ($\chi^2=15.038$, $df = 2$, $p = .001$), greater education ($\chi^2=5.795$, $df = 1$, $p = .016$), and the presence of minors in the household ($\chi^2=9.603$, $df = 1$, $p = .002$) were each associated with greater HPV awareness in exploratory chi-square models. Specifically, 84% of those aged 18–39 (vs. 70% of those aged 40–59 and 56% of those aged 60 or older), 75% of those with greater education (vs. 62% of those with lower education), and 81% of those with a child in the house (vs. 63% without a child in the house) had ever heard of HPV. However, only age maintained independent significance in the main logistic regression model ($p = .007$).

HPV Knowledge

Overall, 17.8% ($N = 54$) of respondents knew HPV could be transmitted through deep kissing. In chi-square analyses, lower education ($\chi^2=7.989$, $df = 1$, $p = .005$), lower income ($\chi^2=11.345$, $df = 1$, $p = .001$), and unemployment ($\chi^2=6.595$, $df = 1$, $p = .010$) were associated with knowledge about HPV's relation to deep kissing. Specifically, 23.6% of respondents with lower education (vs. 11.2% of respondents with greater education), 28.1% of respondents with lower income (vs. 12.1% of respondents with higher income), and 24.4% of unemployed respondents (vs. 13% of employed respondents) endorsed knowledge of HPV transmission via deep kissing. However, none of these variables maintained independent significance when considered in the main joint model.

Overall, 58.6% of respondents knew of the association between HPV and cervical cancer, whereas only 11.3% of respondents knew of its association with mouth and throat cancers and 4% knew of its associations with penile and anal cancers, respectively. In chi-square

analyses, younger age ($\chi^2 = 15.121$, $df = 2$, $p = .001$), greater education ($\chi^2 = 22.316$, $df = 1$, $p < .0001$), and the presence of minors in the household ($\chi^2 = 5.516$, $df = 1$, $p = .019$) were each associated with knowledge of HPV's association with cervical cancer. Specifically, 77.4% of respondents aged 18–39 (vs. 59% of respondents aged 40–59 and 46.5% of respondents aged 60 or older), 72.7% of respondents with greater education (vs. 45.9% of respondents with lower education), and 69.5% of respondents with a child in the house (vs. 54.5% without a child in the house) endorsed knowledge of the connection between HPV and cervical cancer. In the main model, age and education each contributed independently significant variance to knowledge about HPV's relation to cervical cancer ($p = .008$ and $< .001$). No sociodemographic variables were associated with knowledge of HPV's relation with penile, anal, or oropharyngeal cancers in exploratory chi-square analyses, so main models were not run for these criterion variables.

HPV Vaccination Attitudes

Overall, 66.4% ($N = 200$) of respondents believed that the HPV vaccine should be given to both girls and boys, and 14.6% of respondents believed that the vaccine should be given to girls only. Stated differently, 81.1% of respondents believed that the HPV vaccine should be given to girls, and 66.4% of respondents believed it should be given to boys and girls. Overall, only 4.7% of respondents believed that the HPV vaccine should not be given to either sex. There were no sociodemographic variables associated with the likelihood of believing that the HPV vaccine should be given to girls and/or boys in exploratory chi-square analyses, so main models were not run for these criterion variables.

In total, 33.3% ($N = 101$) of respondents indicated that they would vaccinate a hypothetical daughter as young as 9 or 10 years old against HPV, and 31.4% ($N = 95$) of respondents indicated they would vaccinate a hypothetical son as young as 9 or 10 years old against HPV. Only younger age (18–39) was associated with a greater likelihood of a positive attitude toward vaccinating young daughters ($\chi^2 = 13.593$, $df = 2$, $p = .001$) or sons ($\chi^2 = 9.778$, $df = 2$, $p = .008$) in exploratory chi-square analyses, so main models were not run for these criterion variables. Specifically, 52.4% of respondents aged 18–39 (vs. 26.3% of respondents aged 40–59 and 31.1% of respondents aged 60 or older) indicated they would vaccinate a daughter as young as 9 or 10 years old. Similarly, 47.6% of respondents aged 18–39 (vs. 27% of respondents aged 40–59 and 27.2% of respondents aged 60 or older, respectively) indicated they would vaccinate a son as young as 9 or 10 years old.

HPV Vaccination Attitudes by Knowledge

Overall, 74.4% ($N = 215$) of respondents knew that HPV was related to 1 of the 4 cancers assessed, and an additional 2.4% of respondents knew of relations with 2 cancers, .7% with 3 cancers, and 2.8% with all 4 cancers. Overall, 13.2% ($N = 40$) of respondents reported knowledge that HPV was related to non-cervical cancers. The proportion of respondents who did not know of the association of HPV with any cancers was 19.7% ($N = 57$).

Results of these final analyses indicated that there was a positive association between vaccinating a hypothetical daughter or son, respectively, as young as 9 or 10 years old based on knowledge of the number of cancers associated with HPV (daughter: $\beta = .257$, $SE = .087$,

$t = 2.942, p = .004$; son: $\beta = .226, SE = .089, t = 2.533, p = .012$). Knowledge that HPV was related to non-cervical cancers was not associated with a greater likelihood of willingness to vaccinate daughters as young as 9 or 10 years old against HPV ($\chi^2 = 3.132, df = 1, p = .058$), but was significantly associated with a greater likelihood of willingness to vaccinate sons as young as 9 or 10 years old against HPV ($\chi^2 = 6.068, df = 1, p = .013$). Specifically, 47.5% of respondents endorsing knowledge of HPV's relation to non-cervical cancers would vaccinate a hypothetical son versus 28.2% of respondents who did not know of this link.

DISCUSSION

The present study expands on previous literature¹⁵ and was the first, to our knowledge, to address associations between knowledge of HPV's association with non-cervical cancers and vaccination attitudes for children of both sexes among a wide age range of church-going, African-American women. It also provided an opportunity to examine the associations between sociodemographic variables and HPV awareness, knowledge, and vaccination attitudes relative to those found within the previous sample of African-American church-going women from the same urban metropolitan statistical area in Texas.¹⁵

Like the previous study in this area - despite that it was limited to women 40 and older¹⁵ - younger age was associated with HPV awareness in a multivariate model in this sample. However, in the present study, the youngest age group (18–39) for which significance was found was younger than women participating in the previous study. Unlike the previous study, however, education, spirituality and a family history of cancer were not. Reasons for these variations are not known, but may reflect sample differences. Overall, especially inasmuch as HPV awareness may open the door to further address knowledge and vaccination attitudes in this setting, results of this study support previous recommendations that older African-American women may benefit from increased HPV education. This is especially relevant if older African-American women have decision-making roles in the vaccination of children or grandchildren of vaccine-eligible age. Recent data indicate that 14% of African-American children lived with a grandparent in 2012 and 67% of all children living with grandparents had a grandparent as head of household.²⁴ Although not tested in the present study, it may be that African-American churches represent a promising setting for HPV awareness educational campaigns, given the importance of church to African-American culture and the presence of health-focused ministries and missions therein. Although discussion of HPV may be a sensitive issue among religious populations, due to its association with sexual transmission, spirituality itself has not been shown to be related to HPV vaccination attitudes among African-American church-going women who had knowledge of the HPV.¹⁵

Previous research supported a connection between educational achievement and knowledge that HPV causes cervical cancer in multivariate analysis (78.6% ($n=209$) of participants with a bachelor's degree or higher indicated this knowledge),¹⁵ which was echoed in the present sample (58.7% ($N = 104$) of those with a bachelor's degree or higher had knowledge that HPV is related to cervical cancer). In addition, the current study, which included a broader age range of participants supported that younger women had a greater likelihood of being aware of the connection between HPV and cervical cancer. Taken together, findings suggest

a need for HPV education among older African-American women with lower education. Increasing knowledge of the connection between HPV and cervical cancer, particularly among older African-American women who make or influence childcare decisions within the family, may ultimately impact vaccination uptake.¹⁵

The present study included several knowledge variables not examined previously among church-going African-American women, highlighting that HPV knowledge among this sample was low with regard to HPV's relationship to non-cervical cancers. The findings of low HPV related knowledge are consistent with the broader population^{25–27} as well as with previous studies among African-Americans in the literature.^{28–30} It is important to increase knowledge among this population in this area in order to emphasize the importance of vaccination not only for cervical cancers, but for penile, anal, head and neck cancers as well.

Interestingly and unexpectedly, knowledge that deep kissing could transmit HPV was associated with lower socioeconomic status in a multivariate model. Moreover, these associations were not attributable to young age (a group who might get more HPV education exposure and who might be of lower SES). However, none of the socioeconomic variables (education, income, employment status) maintained independent significance when in the same model. Nevertheless, these results warrants further investigation in future studies, particularly with regard to delineating information sources for knowledge of HPV transmission through deep kissing, and/or assuring there are no systematic misunderstandings of what HPV is by SES group (eg, that it is not the same as herpes simplex virus/HSV). Given that no sociodemographic variables were predictive of knowledge of the connection between HPV and non-cervical cancers, better understanding information sources that have successfully conveyed the HPV and deep kissing link may be capitalized upon to increase knowledge about HPV's link with non-cervical cancers among lower socioeconomic status church-going African-American women, especially because the rates of such knowledge were low overall. It will also be important to better reach higher socioeconomic status women to provide education in the ways in which HPV can be transmitted, especially inasmuch as this information (transfer via kissing) may mitigate some of the stigma associated with HPV, which appears much better known for transmission via intercourse – making vaccination a controversial topic among religious groups.

Similar to the previous study among African-American church-going women (89.1%, N = 404),¹⁵ over 80% of the sample endorsed that they would vaccinate a hypothetical daughter for HPV. This study is unique in finding this high percentage of willingness to vaccinate a daughter among a church-going population, when previous studies have suggested that acceptance may be lower in religious communities.¹² The current study supported that younger African-American women were more likely to endorse positive vaccination attitudes regarding hypothetical daughters and sons. The previous study in this area did not include younger women and failed to link age to vaccination attitudes regarding daughters.¹⁵ Further, it did not assess vaccination attitudes about sons. Therefore, the current study adds to the literature in this area and supports the need to improve HPV vaccination acceptability among older church-going African-American women. However, results also revealed that knowledge of HPV's causal link in non-cervical cancer incidence was significantly associated with willingness to vaccinate sons.

An important finding is that only a small proportion of the sample (4% to 11.3%) had knowledge of the link between HPV and non-cervical cancers. The early focus of HPV vaccination on preventing cervical cancer among women seems to have led to a feminization of HPV, which may play a role in lower levels of knowledge surrounding HPV-related cancers affecting men.³¹ Thus, results suggest that education campaigns to increase vaccination acceptability for boys might capitalize on its connection with non-cervical cancer incidence.

Unlike the findings regarding hypothetical sons, knowledge of HPV's association with non-cervical cancers was not significantly associated in bivariate testing with positive attitudes about vaccinating hypothetical daughters in this sample. This might suggest that increased education about HPV's relation to non-cervical cancers has a greater likelihood of affecting vaccination acceptability as it relates to sons but not daughters, and campaigns to increase the latter should capitalize on other foci. However, because these results were only marginally non-significant ($p = .058$), they should be interpreted with caution and require replicability to assure null results in larger samples of church-going African-American women.

This study has many strengths including an adequate sample size of a unique population of church-going African-Americans. As an exploratory study, this study was able to identify information from a population that has not often been surveyed in regards to the specific questions asked in this study. In addition, it includes questions regarding vaccination attitudes for both boys and girls, while a majority of HPV vaccination studies have focused solely on the latter. This study also contains limitations worth noting. The longitudinal cohort study from which these data were analyzed used convenience sampling to select participants. The use of a convenience sample limits the conclusions that can be drawn and generalized to a larger population. Due to a skip pattern, the study was limited to women; thus, awareness, knowledge, and attitudes of church-going men remain unknown. In addition, although the majority of the sample were parents, with 28% endorsing minors in the household, it is not known if study participants are the decision-makers regarding the vaccination of children. The socioeconomic variables used were limited and may have missed important aspects such as health insurance status and neighborhood environment (cf.³¹). We also do not have information on whether the participants had prior exposure to HPV education, which has implications for better understanding the degree to which such exposure relates to vaccination attitudes. Also, due to the secondary nature of this study, the wording of the question, "Would you vaccinate a daughter/son as young as 9 or 10 years old?" does not allow ascertainment regarding whether participants would vaccinate a child at an older age, or not at all. Also, awareness, knowledge, or willingness to vaccinate a son or daughter may not equate to actual vaccination uptake or compliance with the 3 dose administration schedule. Thus, future studies that target or include women with youth under their care might also assess actual HPV vaccination uptake and compliance. The current sample had a high level of education (46.8% bachelor's degree or higher) which was similar to the previous study in the area (49.7% bachelor's degree or higher),¹⁵ but which may not be representative of all African-American church-going women. Moreover, the results obtained from this study may not be generalizable outside a population of church-going African-American women in a Southern metropolitan area.

Implications for practice include increasing knowledge and awareness of non-cervical HPV-related cancers among African-American church populations, particularly of male-susceptible cancers. In response to these findings, church-based educational campaigns can increase awareness and knowledge, and ultimately affect attitudes regarding the vaccination of boys and girls among this population. Future research in this area may target the specific family decision makers of HPV vaccination, which may include caregivers not specified in this study (eg., men). In addition, future research is needed to understand the links between willingness to vaccinate both males and females as young as ages 9 or 10 and actual HPV vaccine uptake in order to improve the health outcomes of African-American girls and boys in adulthood.

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Table 1

Participant Characteristics (N = 308 African-American Women)

Characteristic	N	Valid %
Age		
18–39	63	20.5
40–59	141	45.8
>=60	104	33.8
Education		
< Bachelor's degree	164	53.2
>= Bachelor's degree	144	46.8
Annual Household Income		
< \$40,000	97	33.4
>= \$40,000	193	66.6
Employment Status		
unemployed	128	41.6
employed	180	58.4
Partner Status		
partnered	131	42.7
not partnered	176	57.3
Parental Status		
not parent	61	19.9
parent	246	80.1
Minors in Household		
none	222	72.1
>= 1	86	27.9
Family History of Cancer		
no	240	77.9
yes	68	22.1
Personal History of Cancer		
no	255	96.2
yes	10	3.8
Spirituality		
Strongly agree	215	69.8
agree	90	29.2
disagree	3	1.0

Note: Family history of cancer was over the last 12 months, whereas personal history of cancer was in reference to the lifetime. Some questions contain missing data and do not represent all 308 participants.