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Psychosocial Correlates of Ever Having a Pap Test and Abnormal Pap Results in a Sample of Rural Appalachian Women

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Abstract

Background—Despite known prevention and screening efforts, there are higher invasive cervical cancer rates in Appalachia than in other areas of the United States and higher mortality rates in the Appalachian region of Kentucky compared to Appalachian regions of other states.

Purpose—The primary purpose of this study was to investigate the association of psychosocial factors relevant to cervical cancer and the outcome of ever having a Pap test in a rural sample of women. The secondary purpose was to determine whether any of the same psychosocial factors were also associated with ever having an abnormal Pap test result among women with a self-reported history of having one or more Pap tests in their lifetime.

Methods—Data were collected in fall of 2013 from 393 women in 8 economically distressed counties of rural Appalachian Kentucky. Women completed an interviewer-administered survey assessing sociodemographic and health information as well as beliefs about cervical cancer.

Findings—Multivariate logistic regression results indicated that low income and greater perceived local fatalism were significant predictors of never having a Pap test. Lack of personal control over prevention, and peer and family influences were significant predictors of ever having an abnormal Pap test result.

Conclusions—Educational efforts targeted in rural Appalachia would be supported by encouraging the benefits of early and consistent screening, altering the established norms of community fatalism and lack of personal control over prevention, and creating targeted messages through public campaigns that convince rural Appalachian women that cervical cancer is highly preventable and screenable.

Keywords

Appalachian women; community fatalism; Pap screening; psychosocial predictors; women's cervical health

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Despite Papanicolaou (Pap) testing, effective treatment for preinvasive disease, and human papillomavirus (HPV) vaccination, about 12,000 cases of invasive cervical cancer (ICC) have occurred annually in the United States for more than 3 decades.¹ Moreover, 4,000 women die each year from ICC, with higher mortality rates in the Appalachian region of Kentucky compared to Appalachian regions of other states and non-Appalachian counties in Kentucky.²⁻⁵ Although Pap testing remains the primary screening method for cervical cancer,⁶ evidence suggests that important populations of women are not receiving these clinical services.³ One such population is women residing in rural Appalachia, a medically underserved, geographically unique area of the United States with high rates of ICC incidence and mortality.^{2,3,7,8}

Multiple studies suggest that Appalachian women may face cultural, economic, and environmental barriers that preclude Pap testing, such as fatalistic attitudes,⁹ poverty, and health care challenges.¹⁰⁻¹⁸ Barriers to Pap testing are particularly concerning because routine screening for cervical abnormalities, when combined with appropriate treatment, dramatically decrease the risk of developing ICC.¹⁹ Cultural barriers, unlike economic and environmental barriers, are especially important to identify because these may be somewhat amenable to social science intervention.

Consequently, a key step to reducing the burden of cervical cancer in rural Appalachia is the identification of culturally acquired psychosocial factors, the type of factors that are often prevalent and unique in a particular cultural climate that can be modified to promote more frequent screening. Accordingly, the primary purpose of this study was to investigate the association of psychosocial factors relevant to cervical cancer and the outcome of ever having a Pap test. The secondary purpose was to determine whether any of the same psychosocial factors were also associated with ever having an abnormal Pap test result among women with a self-reported history of having one or more Pap tests in their lifetime.

Methods

Study Sample

Data for this study were taken from a broader investigation¹² that determined the feasibility of having women self-collect cervicovaginal swabs for oncogenic HPV testing as an alternative cervical cancer screening method. Eligibility criteria were: (1) being between 30 and 65 years of age, (2) reporting not having a Pap test in the past 3 years, (3) reporting not currently being pregnant, and (4) reporting never testing positive for HPV.

Recruitment occurred between September 2013 and April 2014 in 8 economically distressed counties of rural Appalachian Kentucky, selected due to their high burden of cervical cancer. Specifically, the study catchment area was classified as extremely rural, with a 2013 Rural-Urban Continuum Code of either 7 or 9 for all 8 of the included counties, as defined by the US Department of Agriculture's Economic Research Service.²⁰ Recruitment flyers were posted in local health departments and the local office of the University of Kentucky Rural Cancer Prevention Center (RCPC), as well as on the RCPC Web site. RCPC research nurses also recruited women interpersonally through attendance at community outreach events such

as fall festivals, women's health days at local health departments, and community health fairs.

The enrollment goal for this study was 400 women. Four hundred and forty-one women were invited to participate in the study before the recruitment goal was reached, yielding a participation rate of 90.7%. Of these 400 women, 7 were excluded due to missing data on the key outcome variable regarding ever having had a Pap test, resulting in an analytic sample of 393 women. Of these women sampled, 379 answered the question about abnormal Pap results: 257 (68%) women indicated that they had never received an abnormal Pap test result and 122 (32%) affirmed a history of an abnormal Pap test result.

Female research assistants obtained participants' written informed consent prior to data collection, based on prior research that supports same-gender research assistance as more effective and approachable. Participants were provided with \$20 as an incentive to participate in the study. The Office of Research Integrity at the University of Kentucky approved all study procedures. Women completed an interviewer-administered survey assessing demographic and health information as well as beliefs about cervical cancer.

Measures

Primary Measures—The study outcomes were assessed as: (1) whether a woman had ever had a Pap test and (2) whether a woman who had a Pap test had ever been told the result was abnormal. Based on supporting literature^{21–24} and the research expertise and field-based experiences of the investigative team, 6 psychosocial factors hypothesized to be associated with these outcomes were assessed:

1. Frequency of worry about developing cervical cancer was assessed with the question, "How often do you worry that you might have cervical cancer?" and a 4-point response option of "never," "rarely," "sometimes," or "frequently," with higher scores indicative of greater worry.
2. Perceived likelihood of surviving cervical cancer was assessed with the question, "If you had cervical cancer, how likely do you think it is that you would survive?" Participants were given a 5-point response option ranging from "not at all likely" to "very likely," with higher scores indicative of higher perceived survival likelihood.
3. Personal control over cervical cancer prevention was assessed by the statement, "If I am supposed to get cervical cancer, there is nothing I can do to prevent it."
4. Fatalism pertaining to cervical cancer was assessed by the statement, "If I get cervical cancer I cannot control my odds of survival."
5. Perceived local cervical cancer fatalism was assessed with the statement "The odds are low that a woman in my county will survive cervical cancer." Responses to items 3, 4, and 5 were rated on a 6-point scale ranging from "strongly disagree" to "strongly agree," with higher scores indicative of less perceived personal control and higher personal and local fatalism.

6. Peer and familial influence was assessed by the question, “Have you ever had a family member or close friend tell you that she had cervical cancer?” with “yes” and “no” as response options.

Selection of Covariates—Women were asked to indicate their approximate monthly household income with the question, “In a typical month, about how much income (including government assistance) do you (and/or your husband) receive?” Response options were: “less than \$1,000,” “\$1,000–\$2,000,” “\$2,001–\$3,000,” “\$3,001–\$4,000,” “\$4,001–\$5,000,” and “more than \$5,000.” Based on a predominance of low-income women in the sample, this variable was recoded to compare those with an income of less than \$1,000 per month to the remainder of the sample. Cervical cancer knowledge was assessed using a series of 5 true-false questions: (1) “Cervical cancer is caused by a sexually transmitted disease” (true); (2) “Cervical cancer grows very slowly” (true); (3) “Pap testing can detect cervical cancer in its early stages” (true); (4) “Cervical cancer cannot be prevented” (false); and (5) “Cervical cancer is never life-threatening” (false). Higher scores indicated greater knowledge. Women’s age was also included as a covariate. Sexual behavior was assessed with questions related to number of sexual partners and frequency of condom use, neither of which was related to a woman having a Pap test or getting an abnormal result; thus they were not included as a covariate. The sample was not diverse enough to consider race as a covariate. Table 1 provides an overview of the data type of the variables of interest included in the analysis.

Data Analysis

The analytic sample for the analysis of whether the women had ever had a Pap test consisted of 393 women. All analyses were completed using SPSS 23.0.²⁵ To analyze whether the women had ever had an abnormal Pap test result, the analytic sample was limited to the 379 women who answered “yes” to the first outcome variable regarding whether they had ever had a Pap test and who also answered the question about their abnormal Pap test result history. Bivariate *t* tests between each of the 5 continuous psychosocial variables and the 2 primary measures were conducted in order to determine inclusion in 2 multivariate logistic regression models; one predicting history of Pap test and one predicting history of abnormal Pap test result. A chi-square test was conducted between the 2 primary measures and the measure of peer and familial influence to determine inclusion in the multivariate models. The 3 covariates—age, income, and cervical cancer knowledge—were included in the first block with direct entry for both models. The second block contained each psychosocial variable significant at the bivariate level.

Results

Description of the Sample

The average age of the sample was 40 years (Mdn = 37 years, SD = 9.3). The majority of the women were white ($n = 369$, 93.9%), with 10 (2.5%) black women, 7 (1.8%) Native American women, and 2 (0.5%) Asian women (the remaining 5 women did not provide a response for race); only 4 (1.0%) of the women were of Hispanic origin. The majority of the women, 233 (59.3%), had incomes of less than \$1,000 in a typical month. Twenty-one

(5.3%) women had incomes of more than \$5,000 per month. One hundred and seventy-six (44.8%) of the women reported being married at the time of data collection, and only 48 (12.2%) women did not have any children. However, 161 (41.0%) women did not have any children currently living in the home with them.

Regarding sexual history, 95 (24.2%) of the women reported 10 or more male sexual partners in their lifetime, 153 (38.9%) reported between 4 and 9 male sexual partners, and 137 (34.9%) reported between 1 and 3 male sexual partners. Most women ($n = 309$, 78.6%) reported no lifetime experience with a female partner, though 5 (1.3%) women reported 10 or more, 16 (4.1%) reported between 4 and 9 female sexual partners, and 60 (15.3%) reported between 1 and 3 lifetime female sexual partners. Most women ($n = 276$, 70.2%) indicated they did not use a condom any of the last 3 times they engaged in sex.

Bivariate Findings

At the bivariate level, having ever had a Pap test was significantly associated with 3 of the 6 psychosocial factors. The mean score on the item assessing personal control over cervical cancer prevention was 2.21 for women never having a Pap test compared to 1.66 for those having one or more; this difference was significant, $t(378) = -2.92$, $P < .01$. The mean score on the item assessing fatalism was 1.84 for women never having a Pap test compared to 1.33 for those having one or more; this difference was significant, $t(378) = -3.11$, $P < .01$. The mean score on the item assessing local perceptions of cervical cancer fatalism was 1.81 for women never having a Pap test compared to 1.29 for those having one or more; this difference was also significant, $t(378) = -3.44$, $P < .01$.

Among those with a history of a Pap test, having ever had an abnormal Pap test result was significantly associated with 4 of the 6 psychosocial factors. The mean score on the measure of frequency of worry about developing cervical cancer was 0.93 for those never having an abnormal Pap test result compared to 1.23 among those having one or more ($t(373) = -2.71$, $P < .01$). The mean score on the measure of perceived likelihood of surviving cervical cancer was 2.50 for women never having an abnormal Pap test result compared to 2.75 among those having one or more ($t(369) = -2.26$, $P < .05$). The mean score on the measure of personal control over cervical cancer prevention was 1.92 for those never having an abnormal Pap test result compared to 1.52 among those having one or more ($t(364) = 2.41$, $P < .05$). Finally, having a friend or family member who had been diagnosed with cervical cancer was significantly ($P < .01$) associated with ever having an abnormal Pap test result such that abnormal Pap test results were more likely in women with a family or friend history of cervical cancer.

Multivariate Findings

Psychosocial variables associated with each of the 2 outcome variables at the bivariate level were entered into the second block of a logistic regression model predicting ever having had a Pap test, after controlling for age, income, and cervical cancer knowledge in the first block. Income and local fatalism were significant predictors of ever having had a Pap test (see Table 2 for coefficients). Women whose income was more than \$1,000 a month were 2.61 times more likely to have received a Pap than women whose income was less than \$1,000 a

month; this was the most salient predictor in this model. For every 1-unit increase in local fatalism, the log odds of a woman having received a Pap test was 1.37.

Personal control over prevention, and peer and familial influence were the only 2 significant predictors of ever having had an abnormal Pap test result (see Table 3 for coefficients). For each 1-unit increase in personal control over prevention, the log odds of a woman having an abnormal Pap result was 0.84. Women who reported being influenced by peers and family were 2.26 times more likely to have an abnormal Pap test result than women who were not influenced by peers and family; this was the most salient predictor in this model.

Discussion

Of the 6 psychosocial variables investigated in this study, 3 were significant predictors of ever having a Pap test or having an abnormal Pap test result (among those ever having a Pap test): personal control over prevention of cervical cancer, local fatalism, and peer and familial influence. This finding is important because it suggests that one effective intervention method may involve public campaigns and targeted messages to convince rural Appalachian women that cervical cancer is highly preventable and screenable if they are willing to engage in periodic screening. Indeed, it may be true that public education about the etiology of cervical cancer (ie, that it is primarily caused by a sexually transmitted infection), its prevention and early detection (ie, that cervical cancer develops slowly so periodic screening is highly effective at arresting the process before cancer develops or detecting it at very early stages), and HPV vaccination has been lacking. This lack of education is easy enough to rectify in communities willing to provide open and frank education to women about their sexual health. The earlier the women are provided comprehensive sex education and taught that sex and sexuality are health issues, rather than something of which they should be ashamed, the better. Alternatively, rural Appalachian communities that avoid education pertaining to sex, sexual health, and sexually transmitted infections (such as HPV) may be unwittingly perpetuating ignorance about HPV and cervical cancer, leaving women in a state of helplessness regarding their control over cervical cancer. In essence, a critical question becomes whether public health professionals are willing to empower rural Appalachian women through comprehensive sexual health education. Appalachian women already face issues with inequitable health care and an inadequate number of providers,²⁶ and they experience low cancer care expectations.¹⁴ Based on these findings, public health professionals currently working with women in rural Appalachian communities would benefit from including sexual health education within their educational efforts. Crosby et al²⁷ found that rural Appalachian women, despite abnormal Pap results, did not actively seek education about cervical cancer and its prevention. Additionally, in this sample, 70.8% of the women did not use condoms in their last 3 sexual events. We think it is because of this low condom use rate that sexual behavior and condom use were not significantly related to whether women got a Pap or whether they had an abnormal result. Perhaps integrating comprehensive sex education into existing educational programs would aid in empowering women to understand their level of personal control.

In addition to the finding pertaining to lack of personal control over cervical cancer prevention, we found that perceptions of community fatalism regarding cervical cancer were

associated with whether women ever had a Pap test. Again, this finding represents a challenge for public health professionals in rural Appalachian settings to alter this norm. Hutson et al¹⁴ found that cancer collectivism, placing the needs of family and community before self-care in cancer screening, was a common theme in Appalachian communities. It is probable that community fatalism simply results from false impressions about surviving cervical cancer. The impressions are possibly false because they are based on women's exposure to cases of cervical cancer diagnosed too late to be treated without radical procedures such as the loop electrosurgical excision procedure (LEEP) or hysterectomy. A socially responsible public health campaign would ease this fatalism by teaching women that LEEP and hysterectomy can be easily avoided through periodic screening.

With recent changes in US Preventive Services Task Force and American Congress of Obstetricians and Gynecologists guidelines for cervical cancer screening, recent Food and Drug Administration approval of HPV testing as a primary method of screening for cervical cancer,²⁸ and the favorable acceptance of self-collected cervicovaginal swabs among Appalachian women,²⁹ public health professionals are perfectly poised to begin community-level education campaigns designed to make women aware of their ability to avert cervical cancer. Studies of urban communities have demonstrated the efficacy of such programs^{30,31}; however, few of these same efforts have been tested in rural Appalachia. The current findings support the efforts of continuing with programs that have had success in Appalachia.¹⁴ Unfortunately, it may be that seemingly frequent changes in guidelines contribute to some of the negative perceptions around prevention and treatment within this population.³² Although there are few solutions to this limitation, educating women about advances in cervical cancer prevention and screening is still of importance.

Peer and family influence was significantly associated with a history of an abnormal Pap test result. Despite no genetic link with ICC,³³ the influence of a peer or family member going through treatment of cervical cancer may have a negative impact on the likelihood of seeking screening, increasing the likelihood of eventual abnormal Pap results. This finding emphasizes the importance of encouraging the benefits of early and consistent screening in these communities. Research also suggests that we engage in health behaviors similar to friends and family around us, for better or worse.³⁴ It is plausible that the diagnosis of a friend or family member with cervical cancer prompts a woman to seek a Pap test, and perhaps these women are waiting to get the Pap test until it is too late, resulting in abnormal cells.

Noteworthy in this study is that women's level of worry about cervical cancer, perceived likelihood of survival, and personal fatalism were not significantly associated with either outcome. Vanderpool and Huang found that Appalachian women rarely or never worried about getting cancer despite their high perceived risk, helping to explain the nonsignificance of worry in either model.³² Despite significant associations in previous studies,³⁵ perceived likelihood of survival was not a significant predictor of either outcome. Women of Appalachia may have a different notion of "survival" compared to women in other areas of the United States, with survival being part of their daily rhetoric.³⁶ Regarding personal fatalism, research from Drew and Schoenberg suggests that personal fatalism may be

trumped by collective community fatalism and this fatalistic fear is simply reality for these women.³⁶

Limitations

Our findings are limited by the use of a convenience sample and the cross-sectional study design. These are self-reported data and therefore we do not have confirmation that the women: (1) ever got a Pap test and (2) ever had an abnormal result. This lack of clinical verification of Pap testing and verification of abnormal results may pose potential recall bias, which may also result in misclassification bias with our outcome variable. We encourage future researchers to utilize clinical verification in conjunction with self-report to avoid some of these biases. Additionally, our data do not provide temporal association regarding the timing of their last Pap test or abnormal result. Furthermore, the selection of psychosocial measures was limited, thereby suggesting that other factors may be important. Psychosocial variables included in this study are limited by asking only 1 question per construct of interest. Future research incorporating psychometrically sound scales to assess psychosocial variables would be beneficial. In addition, it is likely that sample bias may have influenced the findings given that women enrolled in a study (the broader study) under the premise that they would self-collect a cervicovaginal swab for HPV testing. In essence, the sample of 400 women may have been predisposed to this alternative screening, thereby making the results less generalizable to rural Appalachian women as a whole.

Implications for Practice

These data provide additional support for implementing cancer-related educational programs in high need areas such as rural Appalachia. Improving the general living conditions related to income will help to reduce some health disparities that exist and contribute to lower rates of Pap testing and, in turn, higher rates of ICC. Providing education to encourage the benefits of early and consistent cancer screening, altering the established norms of community fatalism and lack of personal control over prevention, and creating targeted messages through public campaigns may convince rural Appalachian women that cervical cancer is highly preventable and screenable. Communities willing to provide open and frank education to women about their sexual health are ideal candidates for this type of targeted intervention.

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Table 1

Variable Type for the Variables of Interest

Variable of Interest	Variable Type
Age	Continuous
Income	Categorical
Cervical cancer knowledge	Ordinal
History of pap test	Dichotomous
History of abnormal pap test result	Dichotomous
Frequency of worry about cervical cancer	Ordinal
Perceived survival from cervical cancer	Ordinal
Personal control of prevention of cervical cancer	Ordinal
Fatalism of cervical cancer	Ordinal
Perceived local fatalism of cervical cancer	Ordinal
Peer/family history of cervical cancer influence	Dichotomous

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Table 2

Multivariate Predictors of Ever Having Had a Pap Test (n = 393)

Predictors	B	SE _B	Wald	95% CI	OR
Age	-0.01	0.02	0.64	0.96-1.02	0.99
Income	0.96	0.32	89.12	1.40-4.87	2.61**
Cervical cancer knowledge	0.02	0.17	0.01	0.73-1.43	1.02
Personal control over prevention	0.17	0.10	2.86	0.97-1.45	1.19
Fatalism	0.11	0.12	0.90	0.89-1.40	1.12
Perceived local fatalism	0.32	0.12	7.32	1.09-1.73	1.37*

* $P < .05$,

** $P < .01$,

*** $P < .001$.

Table 3
Multivariate Predictors of Ever Having Had an Abnormal Pap Test Result (n = 311)

Predictors	B	SE _B	Wald	95% CI	OR
Age	-0.01	0.01	1.11	0.96-1.01	0.99
Income	0.37	0.26	2.09	0.88-2.40	1.45
Cervical cancer knowledge	0.13	0.15	0.82	0.86-1.53	1.14
Frequency of worry	0.21	0.12	2.86	0.97-1.57	1.23
Perceived likelihood of survival	0.23	0.13	3.24	0.98-1.61	1.25
Personal control over prevention	-0.18	0.09	4.09	0.70-0.99	0.84*
Peer and familial influence	0.82	0.26	10.21	1.37-3.74	2.26***

* $P < .05$,

** $P < .01$,

*** $P < .001$.