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Perceived risk of cervical cancer among low-income women

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Abstract

Background—Risk perception is an important predictor of cancer prevention behaviors. We examined perceived risk of cervical cancer among an ethnically diverse population of women of lower socioeconomic status.

Materials and Methods—Females attending a women's health clinic were recruited for a study addressing cervical cancer prevention. Survey questions evaluated lifetime perceived risk of cervical cancer (0% to 100%), beliefs about the accuracy of the Pap test, and estimated incidence of abnormal Pap test results. Risk estimates for oneself were followed with an item seeking a brief, qualitative explanation of the risk estimate.

Results—Surveys were completed by 338 women. The mean ($M \pm SD$) age of respondents was 29.9 ± 8.6 years. Women self-identified as Hispanic/Latina (32%, $n=107$), White (34%, $n=116$), and African American (34%, $n=115$). Estimated perceived lifetime risk of getting cervical cancer ranged from 0% to 100% ($M=59.2 \pm 29.5$). Risk estimates were associated with perceived prevalence of abnormal results, $r=0.24$, $p<0.001$, and perceptions regarding the accuracy of the Pap test, $r=0.13$, $p<0.05$. On average, women estimated that nearly half of all women have ever had an abnormal result (49.2 ± 26.9 ; $n=335$; range 0%-100%), with African-American women estimating a higher percentage compared to Hispanic/Latina and White women. Women who themselves experienced an abnormal Pap test result reported higher proportions of other women experiencing an abnormal result, $t(333) = -3.67$, $p<0.01$.

Conclusions—This study advances our understanding of misperception of risk and how women qualitatively view their risk of cervical cancer. The findings underscore areas for practitioners to enhance patient education efforts.

Keywords

Cervical Cancer; Perceived risk; diverse population

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Conflicts of Interest

The authors have no financial conflicts of interest.

Introduction

Perceived risk is related to judgments about susceptibility to disease as well as the probability of benefit from preventive actions and interventions [1]. The literature regarding risk perception in low income and underserved populations is still relatively undeveloped for several cancers, including cervical cancer, where there is a clear, relatively defined set of risk factors and preventive actions.

In the U.S., disparities exist whereby Hispanics/Latinas have the highest incidence of cervical cancer and African Americans have the highest mortality [2]. This pattern may be explained in part by differences in screening utilization [3, 4]. Lower screening rates may be attributed to low perceived risk of cancer and limited knowledge of cervical cancer risk factors [5-8], which may mediate the relationship between risk perception and screening rates [9, 10].

Women who smoke, are exposed to second-hand smoke [11, 12], and who have been infected with particular HPV serotypes are at greater risk of cervical cancer [13]. Examining whether women who possess one or more of these known risk factors actually perceive greater disease risk remains an important question. Similarly, perceived test accuracy has also been found to be an influential factor on perceived risk of cervical cancer as many women have shown concern regarding the overall accuracy of their Pap test [14, 15].

The objective of this study was to examine perceived risk of cervical cancer among a low income, diverse population of women by comparing self-assessed risk of cervical cancer, perceived prevalence of abnormal test results for others, and perceived Pap test accuracy by sociodemographic variables (race/ethnicity, education, income), and known risk factors (smoking status, history of HPV, genital warts, abnormal Pap test result).

Methods and Materials

Study Design and Sample Selection

This investigation was part of a larger study that recruited women undergoing Pap testing at one of two University of Texas Medical Branch (UTMB) Regional Maternal & Child Health outpatient clinics between October 25, 2002 and June 1, 2003. Women were eligible for participation if they were between 18 and 55 years of age and self-identified as Hispanic/Latina, White, or African American. Written, informed consent was obtained from all women prior to participation. Participation involved completing a self-administered questionnaire in English or Spanish. The study was approved by the UTMB institutional review board.

Measures

A short questionnaire was used to gather data on age, race/ethnicity, marital status, education, household income (during the past 12 months), employment status, smoking status (currently smoke, previously smoked, or never smoked), and history of genital warts, HPV infection, and other sexually transmitted infections.

Perceived risk of cervical cancer was assessed by asking: “What do you think is your risk of ever getting cervical cancer in your life time from 0% to 100%? where 100% meant you definitely would get cervical cancer, and 0% meant that you definitely would not.” The questionnaire included the open-ended question: “*Please write why you think this is your risk.*”

Perceived prevalence of an abnormal result was measured by asking: “If you had to guess, what percent of women who come to the UTMB clinics have ever had an abnormal Pap smear?” using the same 0% to 100% metric. Estimates of Pap test accuracy were assessed by asking: “Out of 100 Pap test results, how many do you think are incorrect (the test is wrong/inaccurate)?” In addition, we measured the expectancy of obtaining an inaccurate Pap test result with a likelihood statement: “If I came back for follow-up of an abnormal Pap smear, I might find out that the first result was wrong” and an evaluation statement: “Finding out my abnormal result was wrong and my Pap smear is normal would be the best thing I can imagine hearing from the clinic.” A 6-point Likert-type scale ranging from “strongly agree” to “strongly disagree” was provided for each statement. For analysis, responses were recoded into “agree” and “disagree.”

Analysis

Quantitative analyses were conducted using IBM SPSS Statistics (Version 20, IBM Corporation, Armonk, New York). Analysis of variance (ANOVA) was used to examine participants’ estimates of their own lifetime risk of cervical cancer, prevalence estimates of abnormal results, and Pap test accuracy by participant characteristics (e.g., age, education, race/ethnicity, smoking status, self-reported history of an abnormal Pap test result). Bonferroni adjusted *p* values were examined for pairwise comparisons. Pearson correlation coefficients (*r*) were computed to evaluate associations between continuous variables. A two-tailed alpha level of 0.05 was considered statistically significant. The open-ended responses were content analyzed and categorized.

Results

A total of 429 women met eligibility criteria; of these, 356 (83%) initially agreed to participate. Women who refused differed from those who initially agreed with respect to race/ethnicity, $\chi^2(2, N=429)=43.80, p<0.001$ and insurance status, $\chi^2(1, N=411)=7.48, p<0.01$. Disproportionately more Latinas refused the study, relative to White and African-American women (31% vs. 5% and 9%, respectively), while women insured through Medicaid or indigent care had higher refusal rates than privately insured women (20% vs. 7%, respectively).

Of the 356 who initially agreed to participate, 338 women completed the survey while 18 women did not. A greater proportion of women who had accepted the survey but did not complete it were Hispanic/Latina (12%) relative to White (3%) or African American (0%), $\chi^2(2, n=356)=17.56, p<0.001$. The mean age of the sample was 29.9 ± 8.6 years (range=18-49). Additional participant characteristics are shown in Table 1. One participant

was excluded from further analyses due to inappropriate responses on focal survey questions, leaving a sample size of 337.

Perceived risk of cervical cancer

Women's assessments of their own lifetime risk of cervical cancer ranged from 0%-100% with a mean of 59.2 ± 29.5 ($n=336$). Risk estimates were positively correlated with perceived prevalence of abnormal results, $r=0.24$, $p<0.001$, and perceptions regarding the accuracy of the Pap test, $r=0.13$, $p<0.05$. Perceived risk was not significantly associated with age, race/ethnicity, education, income, smoking status, expectancies regarding an inaccurate Pap test result, or self-reported history of an abnormal Pap test result, HPV, genital warts, or STI's (Table 2).

The open-ended responses regarding risk estimate justification are shown in Table 3. Of twelve [2] cervical cancer risk factors recognized by the American Cancer Society (HPV, smoking, immunosuppression, chlamydia, diet, oral contraceptives, IUD, multiple full term pregnancies, younger age at full term pregnancy, poverty, diethylstilbestrol [DES] exposure in utero and family history), women in this study recognized eight risk factors: HPV infection, sexual behavior, smoking, STI's, family history, contraceptives, multiple pregnancies, and DES exposure. Women who reported having a family history of cervical cancer or other kinds of cancers and having a history of an abnormal Pap test primarily used the upper end of the rating scale to reflect their own risk (80% to 100% range). Most women who indicated lower percentages (0% to 20% range) expressed that they do not have a family history of cancer, have regular check ups or have had a hysterectomy. It is important to note that while the lifetime risk of cervical cancer for the average woman is likely much lower than many of the risk estimates provided in this study, there were wide variations in the percentages offered for the same recognized risk factor. For instance, while a total of 10 women included smoking in their risk estimate justification, two current smokers reported highly discrepant lifetime risk estimates (5% and 65%; Table 3).

Estimated prevalence of abnormal Pap test results for others

On average, women estimated that nearly half of all women who receive Pap testing at the clinic have ever had an abnormal result (49.2 ± 26.9 ; $n=335$); these estimates were positively correlated with Pap test accuracy, $r=0.32$, $p<0.001$. Furthermore, the perceived prevalence of abnormal results for other women differed by race/ethnicity of the respondent, $F(2, 332)=4.89$, $p<0.01$ (Table 2). Specifically, African-American women estimated a higher percentage of other women who have abnormal Pap test results, compared to Hispanic/Latina and White women. Women who experienced an abnormal Pap test result (relative to those who did not, did not remember, or had never had a Pap test) reported higher proportions of other women experiencing an abnormal result, $t(333) = -3.67$, $p<0.01$ (Table 2).

Pap test accuracy

Estimates of Pap test accuracy ranged from 0% to 100% ($M=27.8 \pm 27.8$; $n=333$). Women who agreed with the statement, "If I came back for follow-up of an abnormal Pap smear, I might find out that the first result was wrong" reported higher estimates of Pap test

inaccuracy than women who disagreed with this statement, $t(194.6)=2.6, p<0.05$ (30.2% vs. 22.1%, respectively, Table 2). Estimates of Pap test inaccuracy were unassociated with participant age, race/ethnicity, education, income, smoking status, expectancy (evaluation) of an inaccurate Pap test result, or self-reported history of an abnormal Pap test result, HPV, genital warts, or STI's (Table 2).

Conclusions and Discussion

This study contributes to women's health by focusing on quantitative and qualitative perceptions of risk, perceptions regarding how common an abnormal Pap test result is among women attending routine screening, and beliefs regarding the accuracy of the Pap test.

No differences were observed in risk estimates based upon factors that would suggest higher risk, such as older age, smoking status, prior history of an abnormal Pap test result, or HPV infection. It is possible women do not recognize these factors as placing them at higher risk of cervical cancer. Indeed, a lack of knowledge about risk factors for cervical cancer is an explanation that is congruent with other findings [5-8] however qualitative data obtained in the present study suggest that women are not unaware of these risk factors. Other explanations exist beyond lack of knowledge, including optimistic bias, illusion of invulnerability or "wishful thinking." Importantly, if the current study stopped at examining quantitative risk estimates, a critical part of the story would have been missed.

The qualitative data reflecting women's rationale behind their risk estimate are unique to this study and suggest that women do in fact recognize several key behavioral risk factors for cervical cancer. In the current study, women recognized eight out of twelve risk factors acknowledged by the American Cancer Society [2]. In several cases, women's answers were not technically correct (nor were their risk estimates calibrated for individual risk estimates), but they provided explanations that indicated an appreciation for risk and protective factors such as having an abnormal Pap result in the past, skipping exams, and delaying treatment of an abnormal result.

In this study, African-American women reported higher proportions of other women experiencing an abnormal Pap test result relative to Hispanic/Latina and White women. It is possible that awareness of the higher death rate of cervical cancer among African Americans may contribute to this finding, although further work is needed to support this explanation. Historically lower participation rates in cervical cancer screening programs among African Americans may also provide insight into this finding [16, 17] but the relationship is unclear. Cognitive constructs such as risk perception are not necessarily interpreted in the same way in different cultures [18] thus further research is needed to explore cultural nuances, recognizing that the racial/ethnic groups examined in this study are not monolithic.

This study included a convenience sample of women within the southern region of the U.S. Latinas and women with public insurance were more likely to decline participation in the study therefore the conclusions that can be drawn are limited by these factors with regard to generalizability. Nevertheless, the geographic location is important for targeted education efforts, as Texas has one of the highest incidence rates for cervical cancer [2]. Similarly, this

study included women already attending a clinic appointment for Pap testing, thus the findings may be biased toward those who have a greater awareness of cervical cancer and its prevention. However, our data suggest that education remains essential so that women who attend screening are fully informed about the limitations of Pap testing.

Our results emphasize the importance of educating patients regarding cervical cancer screening, particularly given recent changes in recommended intervals. Screening intervals are now spaced out to 3-5 years. The change from annual or bi-annual screening to less frequent testing may be alarming to women who perceive an inflated personal risk of developing cervical cancer. Clearly communicating that the individual risk is low and that cervical cancer develops slowly from precursor lesions may help reduce patient anxiety while increasing acceptance of and adherence to the new testing intervals.

Findings from this study provide further understanding of the perceived risk for cervical cancer among a diverse population of relative socioeconomic disadvantage and underscore the general inaccuracy of women's perceived risk or personal susceptibility regarding cervical cancer and the importance of addressing this issue in clinical practice. The findings elucidate the complexities surrounding how women perceive their own numerical risk of cervical cancer, and how they rationalize this estimate, which pose a challenge for health professionals. It seems particularly important for health care professionals to appropriately calibrate women's perceptions regarding their lifetime risk of cervical cancer as well as inform patients of the limitations and importance of the Pap test with or without HPV testing in light of currently changing screening guidelines.

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Précis

This study advances our understanding of how women qualitatively view their risk of cervical cancer thus highlighting areas for practitioners to enhance patient education efforts.

Table 1**Participant Characteristics**

Characteristic	<i>n</i>	%
Race/ethnicity		
Hispanic/Latina ^a	107	31.7
White	116	34.3
African American	115	34
Marital status		
Single, never married/separated/divorced/widowed	234	69.2
Married	102	30.2
Missing	2	0.6
Education		
High school ^b	205	60.6
> High school ^c	127	37.6
Missing	6	1.8
Employment		
20 hours/week	206	60.9
21-40 hours/week	95	28.1
> 40 hours/week	30	8.9
Missing	7	2.1
Annual household income		
< \$10,000	160	47.3
\$10,000	160	47.3
Missing	18	5.4
Residence in public housing project		
Yes	44	13
No	255	75.4
Don't know	33	9.8
Missing	6	1.8
Insurance Status		
Medicaid	67	19.8
Indigent	201	59.5
Privately insured/self-pay	69	20.4
Medicare	1	0.3

Note. N =338

^aOf these women, 43% (n = 46) were born in the United States.^bHigh school diploma/GED or less.

^cVocational training/Some college or more

Table 2

Bivariate Relationships

Characteristic	Perceived risk for self ¹		Perceived prevalence of abnormal results ²		Estimated Pap test accuracy ³	
	Mean (SD)	Test statistic (df)	Mean (SD)	Test statistic (df)	Mean (SD)	Test statistic (df)
Race/ethnicity						
Hispanic/Latina	62.3 (30.3)		45.6 (27.0)		27.4 (29.4)	
White	57.1 (25.0)	F(2,333) = 0.95	46.4 (24.5)	F(2,332) = 4.89**	26.1 (27.7)	F(2, 330) = 0.57
African American	58.3 (32.7)		55.6 (28.2)		30.0 (26.5)	
Education						
High school ^a	60.9 (27.7)	t(328) = 1.29	50.8 (27.4)	t(327) = 1.07	29.8 (29.6)	t(296.25) = 1.60
> High school ^b	56.6 (28.6)		47.6 (25.6)		24.9 (25.2)	
Income						
< \$10,000	57.1 (30.3)	t(317) = -1.70	47.9 (28.1)	t(316) = -0.61	27.3 (27.8)	t(314) = -0.42
\$10,000	62.7 (28.4)		49.7 (25.7)		28.7 (28.1)	
Smoking status						
Never smoked	58.1 (31.5)	t(321.7) = -0.62	49.5 (27.4)	t(332) = 0.30	30.6 (28.9)	t(330) = 1.70
Smoke ^c	60.1 (27.5)		48.7 (26.3)		25.4 (26.7)	
History of abnormal Pap result						
No ^d	59.7 (29.8)	t(334) = 0.38	44.5 (27.5)	t(333) = -3.67**	26.8 (27.9)	t(331) = -0.77
Yes	58.5 (29.1)		55.1 (25.0)		29.1 (27.8)	
History of HPV						
No/don't remember	59.0 (29.6)	t(334) = -0.46	49.1 (26.9)	t(333) = -0.33	27.6 (27.7)	t(331) = -0.68
Yes	62.3 (27.0)		51.3 (27.7)		32.3 (30.4)	
History of genital warts						
No/don't remember	59.2 (29.5)	t(333) = 0.38	49.1 (27.3)	t(332) = -0.32	28.1 (28.4)	t(330) = 0.73
Yes	56.8 (29.1)		50.9 (22.6)		23.7 (19.3)	

Characteristic	Perceived risk for self ^f		Perceived prevalence of abnormal results ²		Estimated Pap test accuracy ³	
	Mean (SD)	Test statistic (df)	Mean (SD)	Test statistic (df)	Mean (SD)	Test statistic (df)
History of STI						
No/don't remember	60.0 (30.3)	t(334) = 0.784	48.0 (28.0)	t(239.6) = -1.27	27.8 (28.6)	t(331) = -0.06
Yes	57.3 (27.6)		51.8 (24.3)		28.0 (26.4)	
Inaccurate Pap test result (Likelihood) ^e						
Agree	60.3 (29.1)	t(332) = 1.31	49.8 (26.3)	t(331) = 0.80	30.2 (28.8)	t(194.6) = 2.57*
Disagree	55.6 (30.4)		47.2 (28.3)		22.1 (24.2)	
Inaccurate Pap test result (Evaluation) ^f						
Agree	59.1 (28.6)	t(37.7) = 1.00	48.9 (26.5)	t(332) = -0.65	26.7 (27.1)	t(38.5) = -1.99
Disagree	58.5 (36.4)		52.1 (30.5)		38.1 (32.2)	

Note.

¹“What do you think is your risk of ever getting cervical cancer in your life time from 0%-100%?”

²“If you had to guess what percent of women who come to the UTMB clinics have ever had an abnormal Pap smear?”

³“Out of 100 Pap test results, how many do you think are incorrect (the test is wrong/inaccurate)?”

^aHigh school diploma/GED or less.

^bVocational training/Some college or more.

^cPast smoker/currently smoke.

^dNo/don't remember/ none prior.

^elikelihood statement: “If I came back for follow-up of an abnormal Pap smear, I might find out that the first result was wrong.”

^fevaluation statement: “Finding out my abnormal result was wrong and my Pap smear is normal would be the best thing I can imagine hearing from the clinic.” *p*<0.05.

**
p<0.01

Table 3

Themes and quotes for Participants' Risk Estimate Justification

Themes	Representative quotes
Family history (n = 85)	<p>"...cervical cancer is very common on both sides of my family"-White, age 22 (94%)</p> <p>"...doesn't run in my family..." -White, age 24 (0%)</p> <p>"Because my female family members have abnormal Pap in the past I think it is hereditary"-African American, age 28 (70%)</p>
Chance (n = 42)	<p>"Anything can happen."-Hispanic/Latina, age 42 (20%)</p> <p>"Everyone is at risk"-White, age 29 (20%)</p>
Previous diagnosis of cervical cancer/abnormal Pap smear (n = 42)	<p>"Because I have had an abnormal exam several times."-Hispanic/Latina, age 24 (70%)</p> <p>"Because cancer cells where [sic] detected in my cervix..."-White, age 22 (50%)</p> <p>"I have already has 3rd stage dysplasia"-White, age 26 (50%)</p>
Self care [19]	<p>"I have had abnormal Pap smear before and the feeling of waiting to come back to so long for treatment!"-African American, age 33 (60%)</p> <p>"Because I don't attend at times"-Hispanic/Latina, age 20 (50%)</p> <p>"I can develop cancer if I'm not careful, I have periodical check-ups"-Hispanic/Latina, age 31 (20%)</p>
Don't know (n = 26)	<p>"I think that no one really knows when they will have it..."-Hispanic/Latina, age 19 (20%)</p> <p>"... because nobody knows until is detected"-Hispanic/Latina, age 24 (50%)</p>
Pregnancy difficulties (n = 12)	<p>"Because of the [miscarriage]..."-White, age 28 (80%)</p> <p>"Because of one abortion!"-White, age 25 (10%)</p>
Smoking (n = 10)	<p>"I'm a smoker."-African American, age 23 (5%)</p> <p>"Because I smoke, and on the Birth Control Patch..."-White, age 22 (65%)</p>
Menstrual abnormalities (n = 8)	<p>"Because I don't menstruate monthly..."-Hispanic/Latina, age 21 (60%)</p> <p>"...I started my menses early in life at 11."-White, age 43 (20%)</p>
Sexual behavior (n = 8)	<p>"I think that if my husband only has sex with me then there is no chance of it."-Hispanic/Latina, age 37 (10%)</p> <p>"Because I use protection and I am only with one person"-Hispanic/Latina, age 18 (10%)</p> <p>"All sexually active women are inclined to get uterine cancer or breast cancer, or if you already have kids..."-Hispanic/Latina, age 25 (20%)</p>
Contraception (n = 6)	<p>"I am on birth control and thought that helps reduce the risk."-White, age 33 (10%)</p> <p>"Because of my birth control (Norplant) not having regular periods or any at all..."-Hispanic/Latina, age 32 (50%)</p>
Human Papillomavirus (HPV) history (n = 6)	<p>"I have the virus that causes cervical cancer."-White, age 37 (50%)</p> <p>"... of Papilloma virus"-Hispanic/Latina, age 28 (85%)</p>
Hysterectomy (n = 6)	<p>"Because I've had a hysterectomy"-Hispanic/Latina, age 49 (0%)</p> <p>"I do not have a cervix I have had a complete hysterectomy"-White, age 42 (0%)</p>
Age (n = 5)	<p>"As you get older the risk gets greater."-African American, age 22 (65%)</p>

Themes	Representative quotes
History of STI or urinary tract infection (n = 5)	<p><i>“multiple bladder infections”-Hispanic/Latina, age 19 (70%)</i></p> <p><i>“I have had a STD before and I strongly believe that maybe ...a risk factor...”-Hispanic/Latina, age 19 (20%)</i></p>
Faith (n = 2)	<i>“I have God on my side and I'm not claiming anything...”-African American, age 29 (99%)</i>