Associations of demographic variables and the
Health Belief Model constructs with Pap smear
screening among urban women in Botswana

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Purpose: Papanicolaou (Pap) smear services are available in most urban areas in Botswana. Yet most women in such areas do not screen regularly for cancer of the cervix. The purpose of this article is to present findings on the associations of demographic variables and Health Belief Model constructs with Pap smear screening among urban women in Botswana.

Sample and methods: The study included a convenience sample of 353 asymptomatic women aged 30 years and older who were living in Gaborone, Botswana. Data were collected using a demographic questionnaire and items of the Health Belief Model. Data analysis included descriptive statistics for demographic variables and bivariate and ordinal (logit) regression to determine the associations of demographic variables.

Results: Having health insurance and having a regular health care provider were significant predictors of whether or not women had a Pap smear. Women with health insurance were more likely to have had a Pap smear test than women without health insurance (91% vs 36%). Similarly, women who had a regular health care provider were more likely to have had a Pap smear test than women without a regular health care provider (94% vs 42%). Major barriers to screening included what was described as “laziness” for women who had ever had a Pap smear (57%) and limited information about Pap smear screening for women who had never had a Pap smear (44%).

Conclusion: There is a need for more information about the importance of the Pap smear test and for increased access to screening services in Botswana.

Keywords: cervical, screening, barriers, access, beliefs

Introduction
Cervical cancer is the second most common cancer among women worldwide, with approximately 500,000 new cases and 274,000 deaths each year. About 88% of the cases are in developing countries, accounting for 13% of all female cancers. The highest rates are found in South and Central America, sub-Saharan Africa (where Botswana is situated), and South and Southeast Asia. Cervical cancer is related to infection by Human papillomavirus (HPV) and is preventable. In developed countries, and in the United States in particular, the incidence of cervical cancer dramatically declined after the introduction of Papanicolaou (Pap) smear screening programs in the 1950s.

In developing countries, Pap smear screening is not routinely done because of the lack of screening programs or because of their lack of effectiveness.

In Botswana, however, Pap smear services are available for free in most urban areas. However, most women in these areas do not screen regularly for cancer of the cervix. Pap smear services are used largely for gynecological problems or as part of...
other services, such as family planning and maternal and child health, rather than for preventive purposes. As such, cervical cancer remains the most common cancer among women in Botswana. Cervical cancer accounted for 24% of all female cancers in Botswana between 1998 and 2008, 20% of which were in women who were HIV-positive. It is estimated that every year, 163 women are diagnosed with cervical cancer and 83 die from the disease. Projections further suggest that by 2025 there will be 224 new cases of cervical cancer and 122 deaths from the disease. Such deaths can be prevented with regular Pap smear tests. Pap smear detects minor cervical lesions at an early stage, when they can be effectively treated and before they can advance to invasive carcinoma.

In developed countries, demographic factors such as age, level of education, income, and ethnicity have been found to influence women’s participation in cervical cancer screening. Furthermore, women who are not screened are predominantly from low-income backgrounds and are ethnic minorities. Personal beliefs are also important determinants of individual’s participation in cervical cancer screening. In South Africa, researchers have concluded that attitudes and beliefs affect women’s cervical cancer screening behavior. However, such factors have not been fully explored in Botswana.

Previous research in Botswana has found that Pap smear use was lower in women who had low incomes, low education, and no health insurance. Furthermore, the majority of the women perceived susceptibility to cervical cancer, its severity, and the benefits of the Pap smear tests. However, women who perceived more barriers to screening had fewer Pap smear tests compared with women who perceived fewer barriers. Other researchers in Botswana reported a low cervical cancer screening rate, at 39%, and a significant association between perceived susceptibility and screening for cancer of the cervix. Women with high perceived susceptibility were more likely to screen for cancer of the cervix than those with low perceived susceptibility. Reports from another study indicated that nearly three-quarters of the women (72%) had ever had a Pap smear, and factors such as age and income were associated with the likelihood of getting a Pap smear. In yet another study in Botswana, screening was more common among women who were older, had higher incomes, and had heard of cervical cancer. Researchers in other sub-Saharan countries reported similar findings. In Zimbabwe, for example, the women who were more likely to access cervical cancer screening were those who were financially independent compared with those who were financially dependent on their husbands. The purpose of this study is to present findings on the associations of demographic variables and concepts of the Health Belief Model with Pap smear use among urban women in Botswana. The data were generated as part of a larger, ongoing study designed to develop an instrument to measure beliefs about cervical cancer and Pap smear testing based on the Health Belief Model. The information obtained could assist health care providers develop interventions that are effective and accessible to the majority of the women.

The Health Belief Model was developed in the 1950s by Rosenstock and colleagues to explore reasons for low participation in preventive programs that were offered free of charge. The model states that an individual’s decision to take a preventive measure against a particular condition is influenced by four beliefs: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Perceived susceptibility refers to the individual’s belief that he or she is at risk for contracting a particular disease or condition, such as cervical cancer. Perceived severity is the individual’s belief in the seriousness of the disease in question if contracted or left untreated. Perceived benefits refer to the belief that engaging in a preventive action will lower the risk of contracting cervical cancer. Perceived barriers are those obstacles the individual believes deter them from taking preventive action. The model further asserts that for preventive action to take place, the benefits must outweigh the barriers. In addition to the four beliefs, cues or stimuli such as fear of the disease or illness symptoms (internal cues) and publicity or educational materials (external cues) are needed to trigger appropriate action. Furthermore, modifying factors can influence all other factors; they include demographic factors such as age, education, and ethnicity; sociopsychological factors such as social class and personality; and structural factors such as knowledge about the disease and prior experience with the disease. Age, social class, and personality have been cited frequently as being very influential in decisions regarding screening for cancer of the cervix.

Materials and methods
A nonprobability convenience sampling was used to recruit asymptomatic women aged 30 years and older who were living in Gaborone, Botswana. Only black women of African descent were included in the study to avoid the influence of foreign belief systems. Because of the nature of the study, the sample selection was also limited to women who were able to complete an English questionnaire and who knew about the Pap smear test. Women with a history of hysterectomy (surgical removal of the womb) or cancer of the cervix were
excluded from the study, as their responses might influence the study negatively.

Permission to conduct the study was obtained from relevant authorities in Botswana and participants before administration of the questionnaires. Women who met the inclusion criteria and chose to participate were given letters of informed consent to read and sign. The informed consent letters were written in English, as all participants were able to read English. In the consent letter, participants were informed about the purpose of the study and that their participation was voluntary. Participants were also informed they could withdraw from the study at any time or refuse to answer certain questions if they so wished, with no adverse consequences. Participants were further informed they would not benefit directly by participating in the study and that they would not receive monetary incentive for their participation. Participants were also told there would be no harm associated with their participation in the study. Furthermore, participants were informed that the confidentiality of their responses would be assured through the use of numbers rather than their names to identify questionnaires, and that their responses would be reported as group rather than individual data.

Data from the participants included demographic items, Pap smear history, and an author-developed questionnaire based on the Health Belief Model. The demographic items included age, marital status, education, nature of employment, income, religion, and number of years participants had lived in the city. Items related to Pap smear determined whether the respondent had had a Pap smear, reasons for getting a Pap smear, the place where Pap smear was obtained, sources of information, number of Pap smears in the last 5 years, and what prevented the respondent from getting a Pap smear or the recommended number of Pap smears during the last 5 years.

The Health Belief Model items collected information on perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. These items were generated from literature review and qualitative data. Initially, the health belief items were reviewed for relevance to the constructs by five faculty members who had expertise in women’s health, instrument development, and the Health Belief Model. Content validity of the questionnaire was established by submitting the items to a panel of four experts who were advanced practice nurses of African descent and were familiar with the Health Belief Model. The content experts were asked to rate the content relevance of each item to the conceptually defined construct on a four-point Likert Scale ranging from 1 to 4, where 1 represents not relevant, 2 is somewhat relevant, 3 is relevant, and 4 is very relevant, as suggested by Lynn. Cronbach’s alpha of the scales ranged from 0.53 to 0.89.

The questionnaire was pilot-tested on 20 asymptomatic Batswana women. Fifty-five belief items were measured on a 5-point Likert scale (from 1, strongly disagree, to 5, strongly agree). Data were collected with the help of four trained research assistants. The research assistants made efforts to recruit relevant women from various places and parts of the city for possible participation in the study, including work places and shopping malls. Recruitment was by word of mouth on contact, and the questionnaires were hand-delivered. Women who agreed to participate completed the questionnaires independently. The completed questionnaires were collected at the convenience of the participants and delivered as soon as possible to the researcher for safe keeping.

**Data analysis**

Four hundred questionnaires were distributed, and 368 were analyzed. Demographic and Pap smear history data were summarized descriptively, using SPSS software, version 16.0 (IBM Corporation, Armonk, NY, USA). Frequencies and percentages were calculated on all demographic and Pap smear items. Associations of demographic data and the Health Belief Model constructs with having had a Pap smear were determined through bivariate and ordinal (logit) regression analyses. Because of the very low frequency of participants aged 60 years or older (n = 2), this category was combined with the 50–59-year category and renamed 50+ years. The small number of participants who were not sure whether they had ever had a Pap smear (n = 15; 4%) were excluded from the analysis because of the nature of the survey, which asked about perceptions about Pap smears. As would be expected, this group also had a higher frequency of a “not sure” or no response to survey items. The two small categories of marital status (divorced or separated, n = 30; widowed, n = 18) were combined.

**Results**

**Demographic variables**

Ninety percent of the participants were between 30 and 49 years of age, with just under half (46%) married and more than three-quarters (77%) having greater than secondary education. The vast majority were employed (92%) and in the service delivery sector (42%). Just more than three-quarters had health care insurance (76%), and 69%
had a regular health care provider, with the majority (69%) having a physician as their regular health care provider. Each of the four categories of religion was well represented (≥19%). A clear majority (69%) had lived in Gaborone for between 6 and 20 years. Demographic variable distributions are displayed in Table 1.

### Pap smear practices

Just over three-quarters (77%) of the respondents had ever had a Pap smear, with half (50%) of those having asked for this test to be included in their regular checkups. Two thirds (67%) had their Pap smear at a private doctor’s office, with 62% having heard about it from their health care providers. The rest of the participants (33%) had a Pap smear either at a clinic or a hospital. Just more than half of the participants (52%) had one to two Pap smears in the last 5 years. Only 18% had the recommended four or five Pap smears during the last 5 years, and the majority attributed this to “laziness.” Those women who had never had a Pap smear cited lack of information (44%) or financial constraints (31%) as their barriers to screening. These findings are summarized in Table 2.

### Table 1 Sample demographics results (n = 368)

| Characteristic                        | Frequency | %  |
|--------------------------------------|-----------|----|
| Age in years (no response = 12)      |           |    |
| 30–39                                | 206       | 58 |
| 40–49                                | 115       | 32 |
| 50+                                  | 35        | 10 |
| Marital status (no response = 5)     |           |    |
| Single/never married                 | 145       | 40 |
| Married                              | 167       | 46 |
| Divorced/separated/widowed           | 51        | 14 |
| Education (no response = 6)          |           |    |
| Primary                              | 21        | 6  |
| Secondary                            | 63        | 17 |
| Vocational                           | 141       | 39 |
| University degree                    | 137       | 38 |
| Nature of employment (no response = 10) |       |    |
| Clerical                             | 73        | 22 |
| Teaching                             | 54        | 17 |
| Management                           | 61        | 19 |
| Service delivery                     | 136       | 42 |
| Monthly income (no response = 32)    |           |    |
| <P5,000 ($833)                       | 87        | 26 |
| P5,000–P9,999                        | 183       | 55 |
| P10,000–P14,999                      | 48        | 14 |
| P15,000+ ($2,500)                    | 18        | 5  |
| Religion (no response = 19)          |           |    |
| Catholic                             | 125       | 36 |
| Protestant                           | 67        | 19 |
| Faith healing                        | 90        | 26 |
| None                                 | 67        | 19 |

**Notes:** Monthly income is given in Pula (P), the currency in Botswana. $ are USD.

### Table 2 Pap smear practices (n = 353)

| Characteristics                                   | n | %  |
|---------------------------------------------------|---|----|
| Ever had a Pap smear (not sure = 15)              |   |    |
| No                                                | 80| 23 |
| Yes                                               | 273| 77|
| Reasons for getting a Pap smear (no response = 17)|   |    |
| Asked at check-up                                  | 128| 50|
| Had uterus problems                                | 65 | 25 |
| Part of service                                    | 62 | 25 |
| HIV status                                        | 1 | <1 |
| Place where Pap smear was done (no response = 18) |   |    |
| Private doctor’s office                            | 170| 67 |
| Clinic                                            | 39 | 15 |
| Hospital                                          | 46 | 18 |
| Sources of Information (no response = 16)         |   |    |
| Health care provider                              | 160| 62 |
| Mass media                                        | 66 | 26 |
| Family/friends                                    | 31 | 12 |
| Number of Pap smears in the past five years (no response = 3) |   |    |
| None                                              | 19 | 7  |
| One or two                                        | 141| 52 |
| Three                                             | 62 | 23 |
| Four or five                                      | 48 | 18 |
| Reasons for getting fewer Pap smears in the past 5 years (no response = 2) |   |    |
| Laziness                                          | 126| 57 |
| Pap smear not seen as important                    | 43 | 19 |
| Negative attitude of Pap smear provider            | 23 | 10 |
| Financial constraints                              | 32 | 14 |
| Reasons for never getting a Pap smear (no response = 16) |   |      |
| Limited information                               | 28 | 44 |
| Limited access                                    | 12 | 19 |
| Negative attitude of providers                    | 4  | 6  |
| Financial constraints                              | 20 | 31 |

**Abbreviation:** Pap, Papanicolaou.

### Associations of demographic variables

Bivariate analysis explored the associations of demographic variables, using $P = 0.01$ as the significance level to partially compensate for multiplicity. Older women more often had health care insurance ($P = 0.001$) and a regular health care provider ($P = 0.002$) and were more frequently divorced, separated, or widowed ($P < 0.0005$). Level of education was highly associated with employment status ($P < 0.0005$), income ($P < 0.0005$), having health care insurance ($P < 0.0005$), and having a regular health care provider but was not associated with marital status ($P = 0.02$). Employment status was associated with having health care insurance ($P < 0.0005$) and having a regular health care provider ($P < 0.0005$), and more single women were not employed ($P = 0.004$). Religion was not associated with age, education, employment status, monthly income, or marital status, but women who chose faith healing or none for religion were less likely to have health care insurance or a regular health care provider ($P = 0.007$).
Associations of demographic variables with ever or never had Pap smear

Because of the significant associations between demographic variables, ordinal regression (logit) was conducted for those variables that demonstrated significant association with ever having a Pap smear. There was no significant relationship among age, marital status, level of education, employment, income, religion, and Pap smear testing. Only two variables were significant predictors of whether or not a participant had ever had a Pap smear: having health care insurance ($P \leq 0.0005$) and having a health care provider ($P \leq 0.0005$). Women with health insurance (Medical Aid) were more likely than those without health insurance to have had a Pap smear test (91% vs 36%). Similarly, women who had a regular health care provider were more likely than those without a regular health care provider to have ever screened for cancer of the cervix (94% vs 42%). These results are displayed in Table 3.

Sources of information and number of Pap smears in the last 5 years

In the data, there was a significant association between where women heard about Pap smears and their number of smears in the last 5 years ($P < 0.0005$). Women who never had a Pap (n = 80) stated they get their information from the mass media mostly, and then family/friends. Women who had ever had a Pap were informed mainly by their health care provider and then the mass media. These findings are summarized in Figure 1.

Associations of the Health Belief Model components with ever or never had a Pap smear

To analyze the associations of different dimensions of the Health Belief Model, the component scores were averaged as constructed using the factor analysis solutions (1, strongly disagree; 2, disagree; 3, neutral; 4, agree; and 5, strongly agree). Women strongly perceived the benefits of getting Pap smears and the severity of cervical cancer. The averaged responses to both perceived severity and perceived benefits were greater than the averaged responses of perceived susceptibility and perceived barriers. There was no significant relationship between Pap smear screening and components of the Health Belief Model. Women who had ever had a Pap smear and women who had never had a Pap smear were very similar with respect to beliefs of the Health Belief Model. Profiles of responses for both groups were very similar. This information is displayed in Figure 2. Table 4 shows no significant differences between yes and no responses to getting Pap smear and beliefs of the Health Belief Model. The means and standard deviations are very similar for both groups.

### Discussion

Having health insurance and having a regular health care provider were the only two variables significantly associated with getting a Pap smear test. Women with medical insurance were more likely to have had a Pap smear test than women without medical insurance, yet only a few of them had four to five Pap smears in the last 5 years, largely because of what the women described as “laziness.” Similarly, women who had a regular health care provider were more likely to have had a Pap smear test than women without a regular health care provider. These findings are consistent with those of an
In that study, the majority of the women had medical insurance and received their Pap smear tests from private practitioners, who reportedly informed them about the importance of early detection. However, only a few of the respondents had regular Pap smear tests.

Similarly, women with access to sources of information cited “laziness” or lack of motivation as their major barrier to regular Pap smear screening. The majority of the women received Pap smear tests from private physicians and were informed about Pap smear testing by their health care provider. In an earlier study by McFarland,¹⁸ in that study, the majority of the women had medical insurance and received their Pap smear tests from private practitioners, who reportedly informed them about the importance of early detection. However, only a few of the respondents had regular Pap smear tests.

**Figure 1** Sources of information and number of Papanicolaou (Pap) smears in the past 5 years (n = 353).

**Figure 2** Box plot of association of smear use with the Health Belief Model variables (n = 353).

**Note:** The circles shown in the graph represent outliers and the star represents an extreme value.

**Perceived barriers**

**Perceived benefits**

**Perceived severity**

**Perceived susceptibility**

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**McFarland**

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**Perceived barriers**

**Perceived benefits**

**Perceived severity**

**Perceived susceptibility**

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**Note:** The circles shown in the graph represent outliers and the star represents an extreme value.
Women who had higher levels of education were more likely than women with lower levels of education to have had a Pap smear, and other researchers in Botswana have reported similar findings.\textsuperscript{18–22}

Women with no religion or who belonged to the faith healing churches were less likely than women of other religious affiliations to have had a personal health care provider or to have been screened for cancer of the cervix. Perhaps these women hold beliefs about preventive health care that are different from those of other women, suggesting the need for further exploration of such belief systems as they relate to taking a preventive action against cervical cancer.

There were no significant associations between concepts of the Health Belief Model and whether or not a woman had a Pap smear. Women in this study perceived the severity of cervical cancer and benefits of the Pap smear tests, yet few had the recommended tests. Conversely, respondents perceived lower susceptibility to cervical cancer. This could mean that women do not know what puts them at risk for cervical cancer. These findings are inconsistent with earlier findings,\textsuperscript{18,19} in which case, respondents were aware of their perceived susceptibility to cervical cancer. Respondents also perceived fewer barriers to obtaining Pap smear tests. However, the study identified “laziness” as a major barrier for women who ever had Pap smear test and lack of information about Pap smear testing for women who had never had a Pap smear test.

There were no significant relationships between all demographic variables and components of the Health Belief Model constructs in this sample of mostly long-term residents of Gaborone. The overall pattern seen in one graph was generally repeated for all demographic variables; for example, for all ages, the pattern was the same with no real differences. There were also no significant differences between yes/no as to whether or not the respondent ever had a Pap smear and components of the Health Belief Model, which was not expected. This could be explained by limited knowledge about cervical cancer and importance of the Pap smear in detecting it.

**Conclusion**

The author concludes that women in this study are informed about cancer of the cervix and have access to screening. However, attitudes toward screening play a major role as a barrier to screening for women who had ever screened. These attitudes were evidenced by the women reporting “laziness” as a major reason why they did not screen regularly. In light of the high incidence of HIV/AIDS in Botswana, these attitudes toward Pap smear use could significantly contribute

| Beliefs                  | Ever had Papanicolaou smear? | n   | Mean | Standard deviation |
|--------------------------|------------------------------|-----|------|--------------------|
| Perceived susceptibility | Yes                          | 273 | 3.3  | 0.79               |
| Perceived severity       | Yes                          | 273 | 3.7  | 0.36               |
| Perceived benefits       | Yes                          | 273 | 4.1  | 0.47               |
| Perceived barriers       | Yes                          | 273 | 3.2  | 0.43               |

**Note:** Women perceived severity and benefits.

**Abbreviation:** Pap, Papanicolaou.
to an increase in the incidence of cervical cancer, and they suggest a need to be further explored. The study was limited in several ways. The study used women identified by convenience sampling, which could raise an issue of potential sampling bias. Furthermore, the data were collected through a self-reporting approach. As such, the findings could have been affected by a social desirability response. Further studies are needed to identify limited use of the available Pap smear services, using probability sampling and instruments that are reliable and valid.

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Disclosure
The author reports no conflicts of interest in this work.

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