Factors Related to Advanced Stage of Cancer Presentation in Botswana

**Purpose** Botswana, a country with a high prevalence of HIV, has an increasing incidence of cancer-related mortality in the post–antiretroviral therapy era. Despite universal access to free health care, the majority of Botswana patients with cancer present at advanced stages. This study was designed to explore the factors related to advanced-stage cancer presentation in Botswana.

**Methods** Patients attending an oncology clinic between December 2015 and January 2017 at Princess Marina Hospital in Gaborone, Botswana, completed a questionnaire on sociodemographic and clinical factors as well as cancer-related fears, attitudes, beliefs, and stigma. Odds ratios (ORs) were calculated to identify factors significantly associated with advanced stage (stage III and IV) at diagnosis.

**Results** Of 214 patients, 18.7% were men and 81.3% were women. The median age at diagnosis was 46 years, with 71.9% of patients older than 40 years. The most commonly represented cancers included cervical (42.3%), breast (16%), and head and neck (15.5%). Cancer stages represented in the study group included 8.4% at stage I, 19.2% at stage II, 24.1% at stage III, 11.9% at stage IV, and 36.4% at an unknown stage. Patients who presented at advanced stages were significantly more likely to not be afraid of having cancer (OR, 3.48; \( P < .05 \)), believe that their family would not care for them if they needed treatment (OR, 6.35; \( P = .05 \)), and believe that they could not afford to develop cancer (OR, 2.73; \( P < .05 \)). The perception that symptoms were less serious was also significantly related to advanced stage (\( P < .05 \)). Patients with non–female-specific cancers were more likely to present in advanced stages (OR, 5.67; \( P < .05 \)).

**Conclusion** Future cancer mortality reduction efforts should emphasize cancer symptom awareness and early detection through routine cancer screening, as well as increasing the acceptability of care-seeking, especially among male patients.
a government-funded comprehensive human papillomavirus vaccination plan. Despite universal access to government-funded health care, the majority of Batswana patients with cancer, half of whom are infected with HIV, present at advanced stages. Although antiretroviral therapy coverage has reached 83% in Botswana, and median CD4 counts in previously published literature from the antiretroviral therapy era demonstrate a well-managed HIV population, HIV-infected Batswana individuals remain three to five times more likely to develop cancer than age-matched HIV-negative controls. Surprisingly, even HIV-infected patients with cancer with regular longitudinal contact with the health care system do not have faster linkages into cancer care. Median time from cancer symptom onset to treatment initiation in Botswana was reported to be 13 months, compared with 3 months in more developed settings.

Prior studies suggest that delays in oncologic treatment may be related to distance from the hospital, health insurance status, quality of health care systems, use of traditional healers, financial opportunity costs, limited cancer awareness, and cancer stigma or fear. A prospective study conducted in Botswana suggested that compared with patients with early-stage disease, patients with rapidly progressing symptoms and advanced disease entered into specialized oncology treatment earlier after initial symptom recognition. Perhaps additional improvements can be made through earlier symptom recognition at the individual or clinic level. However, additional efforts are needed to understand factors associated with advanced-stage presentation.

Given the existing literature, we suspect that the reason for advanced presentation is multifactorial. Therefore, we sought to describe sociodemographic and clinical factors, as well as the knowledge, attitudes, and beliefs associated with advanced stage at diagnosis in Botswana. We believe that understanding factors associated with advanced-stage presentation is crucial to facilitating earlier cancer detection and intervention, thus reducing cancer-related mortality in Botswana.

**METHODS**

**Procedure**

This was a cross-sectional study conducted from December 2015 to January 2017 at the Princess Marina Hospital in Gaborone, Botswana. This hospital provides oncology care for the majority of patients in southern Botswana. The study population consisted of a convenience sample of 214 newly diagnosed patients who were at least 18 years old and presented to Princess Marina Hospital for initial cancer treatment with a pathologically confirmed diagnosis of cancer.

Patients were approached by a member of the research team and asked whether they would like to participate in a study assessing delays in cancer care. The questionnaire was administered in Setswana and English, and research assistants administered the survey to patients who were illiterate in the study language. The study protocol was approved by the Institutional Review Board at the University of Pennsylvania and the Health Research Development Committee at the Botswana Ministry of Health. Written informed consent was obtained from each participant before completion of the questionnaire.

**Study Measures**

The first section of the questionnaire consisted of sociodemographic questions, including age, sex, relationship status, literacy level, and educational attainment. We also assessed the presence of comorbidities (diabetes, HIV, and tuberculosis), distance to the hospital, symptom severity, and cancer site (Table 1). Additional questions assessed place of residence, languages spoken, employment, economic status, ability to take time off from work, assets (home, land, or livestock ownership), family size, methods of transportation, travel time to the hospital, and religious background (Table 2).

The final section was adapted from a prior study among patients with breast cancer in South Africa. It assessed cancer-related fears, attitudes, beliefs, and stigma using a four-point summative scale ranging from strongly agree to strongly disagree (Table 3). For the analysis, patients who agreed or strongly agreed were categorized as agree and patients who disagreed or strongly disagreed were categorized as disagree. The questionnaire was piloted with Batswana
### Table 1. Patient Characteristics by Stage

| Characteristic                        | Early Stage (I and II) No. (%) | Late Stage (III and IV) No. (%) | Stage Unknown No. (%) | Response Rate % | Adjusted Probability (P) |
|---------------------------------------|-------------------------------|---------------------------------|-----------------------|-----------------|-------------------------|
| Age (years)                           |                               |                                 |                       |                 |                         |
| 20-39                                 | 18 (8.9)                      | 19 (9.4)                        | 20 (9.9)              |                 |                         |
| 40-59                                 | 28 (13.8)                     | 43 (21.2)                       | 39 (19.2)             |                 |                         |
| ≥ 60                                  | 10 (4.9)                      | 11 (5.4)                        | 15 (7.4)              |                 |                         |
| Sex                                   |                               |                                 |                       |                 |                         |
| Male                                  | 2 (0.9)                       | 8 (3.7)                         | 31 (14.5)             |                 |                         |
| Female                                | 54 (25.2)                     | 65 (30.3)                       | 50 (23.4)             |                 |                         |
| Relationship status                   |                               |                                 |                       |                 |                         |
| Single                                | 41 (19.5)                     | 40 (19.0)                       | 51 (24.3)             |                 |                         |
| Married/in a serious relationship     | 9 (4.3)                       | 24 (11.4)                       | 22 (10.5)             |                 |                         |
| Living with a partner                 | 3 (1.4)                       | 4 (1.9)                         | 1 (0.5)               |                 |                         |
| Divorced/separated/widowed            | 3 (1.4)                       | 6 (2.9)                         | 6 (2.9)               |                 |                         |
| Literate in own language              |                               |                                 |                       |                 |                         |
| Yes                                   | 47 (22.1)                     | 61 (28.6)                       | 64 (30.0)             |                 |                         |
| No                                    | 9 (4.2)                       | 15 (7.0)                        | 17 (8.0)              |                 |                         |
| Literate in English                   |                               |                                 |                       |                 |                         |
| Yes                                   | 24 (11.4)                     | 34 (16.1)                       | 40 (19.0)             |                 |                         |
| No                                    | 32 (15.2)                     | 41 (19.4)                       | 40 (19.0)             |                 |                         |
| Education level                       |                               |                                 |                       |                 |                         |
| No formal education                   | 6 (3.4)                       | 11 (6.3)                        | 11 (6.3)              |                 |                         |
| Primary school only                   | 20 (11.4)                     | 21 (12.0)                       | 18 (10.3)             |                 |                         |
| Secondary school                      | 19 (10.9)                     | 29 (16.6)                       | 22 (12.6)             |                 |                         |
| Tertiary/postbachelor’s degree        | 4 (2.3)                       | 6 (3.4)                         | 6 (3.4)               |                 |                         |
| Other                                 | 0 (0.0)                       | 2 (1.1)                         | 0 (0.0)               |                 |                         |
| Diabetic                              |                               |                                 |                       |                 |                         |
| Yes                                   | 2 (0.9)                       | 6 (2.8)                         | 2 (0.9)               |                 |                         |
| No                                    | 55 (25.8)                     | 69 (32.4)                       | 79 (37.1)             |                 |                         |
| HIV status                            |                               |                                 |                       |                 |                         |
| Positive                              | 38 (18.0)                     | 45 (21.3)                       | 45 (21.3)             |                 |                         |
| Negative                              | 18 (8.5)                      | 29 (13.7)                       | 36 (17.1)             |                 |                         |
| Hypertensive                          |                               |                                 |                       |                 |                         |
| Yes                                   | 12 (5.6)                      | 18 (8.5)                        | 17 (8.0)              |                 |                         |
| No                                    | 45 (21.1)                     | 58 (27.2)                       | 63 (29.6)             |                 |                         |
| History of tuberculosis              |                               |                                 |                       |                 |                         |
| Yes                                   | 3 (1.4)                       | 6 (2.8)                         | 15 (7.1)              |                 |                         |
| No                                    | 53 (25.1)                     | 68 (32.2)                       | 66 (31.3)             |                 |                         |
| Distance to hospital (km)             |                               |                                 |                       |                 |                         |
| 5-50                                  | 15 (7.3)                      | 29 (14.1)                       | 23 (11.2)             |                 |                         |
| 51-200                                | 20 (9.7)                      | 19 (9.2)                        | 22 (10.7)             |                 |                         |
| 201-400                               | 12 (5.8)                      | 7 (3.4)                         | 15 (7.3)              |                 |                         |
| ≥ 400                                 | 9 (4.4)                       | 19 (9.2)                        | 15 (7.3)              |                 |                         |
| Unable to locate village              | 0 (0.0)                       | 0 (0.0)                         | 1 (0.5)               |                 |                         |

(Continued on following page)
women to further refine it and adapt it to Botswanan culture.

Cancer diagnosis was made using pathologic confirmation. Cancers were staged according to the TNM staging system of the American Joint Commission on Cancer, seventh edition. Staging evaluation varied by cancer site but often included medical chart review, physical examination, and imaging with chest x-ray and ultrasound. Cancers were categorized as early (stage I and II) or advanced (stage III and IV). However, some patients were characterized as being in the unknown stage if they were not staged before treatment initiation or if imaging modalities were not functional at the time of diagnosis.

Statistical Analyses

Responses to the questionnaire were collected electronically using REDCap (Research Electronic Data Capture) tools hosted at the University of Pennsylvania. All statistical analysis was completed using commercially available analytic software (STATA, version 15.0; STATA, College Station, TX).

Nonparametric post hoc one-way analysis of variance between all measured and calculated variables for patients with early-stage disease (stage I and II) and advanced-stage disease (stage III and IV) were analyzed using the Kruskal-Wallis H test, which adjusts for ties between ordinal responses to a question. Unadjusted and adjusted probabilities were reported to indicate the significance of the difference between recorded categorical patient responses in the early- and advanced-stage groups (Table 3).

Univariable logistic regression was used to determine directionality of the difference between early- and advanced-stage group responses to the fears, attitudes, beliefs, and stigma portion of the survey, as well as unadjusted odds ratios (ORs) describing the impact of our population’s agreement or disagreement with survey questions on their relative probability of being in the advanced-stage group (Tables 3 and 4).

A multivariable logistic regression analysis was performed for each variable contained in the surveys to determine the significance of any single item’s ability to predict advanced stage at diagnosis in a post hoc fashion. The significance of both the model and the categorical factors is listed for all items producing a significant predictive model in Table 4, with associated ORs. Any categorical factors with an SE of greater than 1,000 were excluded from the logistic regression performed on a variable.

| Characteristic     | Early Stage (I and II) No. (%) | Late Stage (III and IV) No. (%) | Stage Unknown No. (%) | Response Rate % | Adjusted Probability (P) |
|-------------------|--------------------------------|--------------------------------|----------------------|-----------------|---------------------|
| Severity of symptoms |                                |                                |                      |                 |                     |
| Not serious       | 10 (4.8)                       | 17 (8.1)                       | 22 (10.5)            | 97.66           | .0428               |
| A little serious  | 14 (6.7)                       | 14 (6.7)                       | 11 (5.3)             |                 |                     |
| Moderately serious| 3 (1.4)                        | 11 (5.3)                       | 9 (4.3)              |                 |                     |
| Serious           | 10 (4.8)                       | 3 (1.4)                        | 8 (3.8)              |                 |                     |
| Very serious      | 19 (9.1)                       | 29 (13.9)                      | 29 (13.9)            |                 |                     |
| Cancer diagnosis site |                                |                                |                      | 99.53           | .0523               |
| Cervical          | 38 (17.8)                      | 38 (17.8)                      | 14 (6.6)             |                 |                     |
| Breast            | 10 (4.7)                       | 19 (8.9)                       | 5 (2.3)              |                 |                     |
| Head and neck     | 0 (0.0)                        | 10 (4.7)                       | 23 (10.8)            |                 |                     |
| Vulvar            | 6 (2.8)                        | 5 (2.3)                        | 4 (1.9)              |                 |                     |
| Kaposi sarcoma    | 0 (0.0)                        | 1 (0.5)                        | 13 (6.1)             |                 |                     |
| Endometrial       | 1 (0.5)                        | 1 (0.5)                        | 5 (2.3)              |                 |                     |
| Penile            | 0 (0.0)                        | 2 (0.9)                        | 4 (1.9)              |                 |                     |
| Anal              | 1 (0.5)                        | 0 (0.0)                        | 4 (1.9)              |                 |                     |
| Esophageal        | 0 (0.0)                        | 0 (0.0)                        | 5 (2.3)              |                 |                     |
| Lymphoma          | 0 (0.0)                        | 0 (0.0)                        | 3 (1.4)              |                 |                     |
| Prostate          | 1 (0.5)                        | 0 (0.0)                        | 0 (0.0)              |                 |                     |
Table 2. Sociodemographic and Economic Factors by Stage

| Factor                        | All Stages No. (%) | Early Stage (I and II) No. (%) | Late Stage (III and IV) No. (%) | Response Rate | Adjusted Probability P |
|-------------------------------|--------------------|---------------------------------|---------------------------------|---------------|-------------------------|
| Place of residence           |                    |                                 |                                 |               |                         |
| Village                       | 83 (63.4)          | 38 (29.0)                       | 45 (34.4)                       | 98.50         | .3946                   |
| Town                          | 36 (27.5)          | 15 (11.5)                       | 21 (16.0)                       |               |                         |
| City                          | 12 (9.2)           | 3 (2.3)                         | 9 (6.9)                         |               |                         |
| Total                         | 131                | 56 (42.7)                       | 75 (57.3)                       |               |                         |
| Languages spoken by patients |                    |                                 |                                 |               |                         |
| Setswana                      | 129 (97.0)         | 57 (42.9)                       | 72 (54.1)                       |               | .0798                   |
| English                       | 60 (45.1)          | 24 (18.0)                       | 36 (27.1)                       |               | .5476                   |
| Sekalaka                      | 9 (6.8)            | 5 (3.8)                         | 4 (3.0)                         |               | .4270                   |
| Sekgalagadi                   | 4 (3.0)            | 3 (2.3)                         | 1 (0.8)                         |               | .1888                   |
| Afrikaans/Sesubiya/ Sesarwa   | 4 (3.0)            | 1 (0.8)                         | 3 (2.3)                         |               | 2189/2482/.3865        |
| Employment status at diagnosis|                    |                                 |                                 |               |                         |
| Employed                      | 47 (35.3)          | 21 (15.8)                       | 26 (19.5)                       |               | .7542                   |
| Unemployed                    | 86 (64.7)          | 36 (27.1)                       | 50 (37.6)                       |               |                         |
| Total                         | 133                |                                 |                                 |               |                         |
| Monthly salaries of those employed at diagnosis | 87.23 | .1582 |
| < P2,000                      | 4 (8.5)            | 0 (0.0)                         | 4 (8.5)                         |               |                         |
| P2,001-5,000                  | 34 (72.3)          | 17 (36.2)                       | 17 (36.2)                       |               |                         |
| > P5,001                      | 3 (6.4)            | 1 (2.1)                         | 2 (4.3)                         |               |                         |
| Not reported                  | 6 (12.8)           | 3 (6.4)                         | 3 (6.4)                         |               |                         |
| Difficulty taking time off from work | 97.87 | .3787 |
| Always                        | 5 (10.6)           | 2 (4.3)                         | 3 (6.4)                         |               |                         |
| Mostly                        | 2 (4.3)            | 1 (2.1)                         | 1 (2.1)                         |               |                         |
| Sometimes                     | 5 (10.6)           | 4 (8.5)                         | 1 (2.1)                         |               |                         |
| Not really                    | 34 (72.3)          | 13 (27.7)                       | 21 (44.7)                       |               |                         |
| Not reported                  | 1 (2.1)            | 1 (2.1)                         | 0 (0.0)                         |               |                         |
| Monthly family income         |                    |                                 |                                 |               | .5729                   |
| < P3,000                      | 17 (7.9)           | 9 (6.8)                         | 8 (6.0)                         |               |                         |
| P3,001-6,000                  | 65 (30.4)          | 26 (19.5)                       | 39 (29.3)                       |               |                         |
| > P6,001                      | 6 (2.8)            | 2 (1.5)                         | 4 (3.0)                         |               |                         |
| Not reported                  | 45 (21.0)          | 20 (15.0)                       | 25 (18.8)                       |               |                         |
| Home ownership                | 97.74              | 1.0000                          |                                 |               |                         |
| Owns a home                   | 72 (54.1)          | 31 (23.3)                       | 41 (30.8)                       |               |                         |
| Does not own a home           | 58 (43.6)          | 25 (18.8)                       | 33 (24.8)                       |               |                         |
| Not reported                  | 3 (2.3)            | 1 (0.8)                         | 2 (1.5)                         |               |                         |
| Land ownership                | 96.24              | .4315                           |                                 |               |                         |
| Owns land                     | 52 (39.1)          | 19 (14.3)                       | 33 (24.8)                       |               |                         |
| Does not own land             | 76 (57.1)          | 35 (26.3)                       | 41 (30.8)                       |               |                         |
| Not reported                  | 5 (3.8)            | 3 (2.3)                         | 2 (1.5)                         |               |                         |

(Continued on following page)
| Factor                               | All Stages No. (%) | Early Stage (I and II) No. (%) | Late Stage (III and IV) No. (%) | Response Rate % | Adjusted Probability P |
|-------------------------------------|--------------------|-------------------------------|--------------------------------|----------------|------------------------|
| Livestock ownership                 |                    |                               |                                | 94.74          | .4344                  |
| Owns livestock                      | 29 (21.8)          | 9 (6.8)                       | 20 (15.0)                      |                |                        |
| Does not own livestock              | 97 (72.9)          | 44 (33.1)                     | 53 (39.8)                      |                |                        |
| Not reported                        | 7 (5.3)            | 4 (3.0)                       | 3 (2.3)                        |                |                        |
| No. of family members               |                    |                               |                                | 96.24          | .9310                  |
| 0-1                                 | 9 (6.8)            | 4 (3.0)                       | 5 (3.8)                        |                |                        |
| 2-3                                 | 40 (30.1)          | 16 (12.0)                     | 24 (18.0)                      |                |                        |
| 4-5                                 | 34 (25.6)          | 14 (10.5)                     | 20 (15.0)                      |                |                        |
| > 5                                 | 45 (33.8)          | 21 (15.8)                     | 24 (18.0)                      |                |                        |
| Not reported                        | 5 (3.8)            | 2 (1.5)                       | 3 (2.3)                        |                |                        |
| No. of dependents                   |                    |                               |                                | 93.23          | .2474                  |
| 0-1                                 | 45 (33.8)          | 24 (18.0)                     | 21 (15.8)                      |                |                        |
| 2-3                                 | 51 (38.3)          | 21 (15.8)                     | 30 (22.6)                      |                |                        |
| 4-5                                 | 19 (14.3)          | 5 (3.8)                       | 14 (10.5)                      |                |                        |
| > 5                                 | 9 (6.8)            | 4 (3.0)                       | 5 (3.8)                        |                |                        |
| Not reported                        | 9 (6.8)            | 3 (2.3)                       | 6 (4.5)                        |                |                        |
| Most common method of transportation|                    |                               |                                | 95.49          | .6428                  |
| Taxi                                | 32 (24.1)          | 11 (8.3)                      | 21 (15.8)                      |                |                        |
| Bus                                 | 75 (56.4)          | 34 (25.6)                     | 41 (30.8)                      |                |                        |
| Personal or family car              | 19 (14.3)          | 9 (6.8)                       | 10 (7.5)                       |                |                        |
| Borrow a car or get a ride          | 1 (0.8)            | 0 (0.0)                       | 1 (0.8)                        |                |                        |
| Not reported/other                  | 6 (4.5)            | 3 (2.3)                       | 3 (2.3)                        |                |                        |
| Ease of transportation to the hospital|                    |                               |                                | 96.99          | .9937                  |
| I am independent                    | 88 (66.2)          | 38 (28.6)                     | 50 (37.6)                      |                |                        |
| I am dependent on others            | 34 (25.6)          | 14 (10.5)                     | 20 (15.0)                      |                |                        |
| Getting to the hospital can be burdensome | 7 (5.3)  | 3 (2.3)                       | 4 (3.0)                        |                |                        |
| Not reported/other                  | 4 (3.0)            | 2 (1.5)                       | 2 (1.5)                        |                |                        |
| Travel time to the hospital         |                    |                               |                                | 99.25          | .5916                  |
| < 30 minutes                        | 5 (3.8)            | 1 (0.8)                       | 4 (3.0)                        |                |                        |
| 30 minutes to 1 hour                | 51 (38.3)          | 23 (17.3)                     | 28 (21.1)                      |                |                        |
| 1 hour to 4 hours                   | 48 (36.1)          | 22 (16.5)                     | 26 (19.5)                      |                |                        |
| > 4 hours                           | 28 (21.1)          | 10 (7.5)                      | 18 (13.5)                      |                |                        |
| Not reported                        | 1 (0.8)            | 1 (0.8)                       | 0 (0.0)                        |                |                        |
| Religious beliefs                   |                    |                               |                                | 96.24          | .0569                  |
| Christian                           | 111 (51.9)         | 53 (39.8)                     | 58 (43.6)                      |                |                        |
| Muslim                              | 1 (0.5)            | 0 (0.0)                       | 1 (0.8)                        |                |                        |

(Continued on following page)
**RESULTS**

Demographics

A total of 214 patients presenting for specialized cancer care were included in the analysis. Of the 214 patients, 57 (28.2%) were younger than 40 years of age, 40 (18.7%) were male, and 174 (81.3%) were female. Half of the patients (50.3%) reported at least a secondary school level of education, and 55 (26.2%) reported being married or living with a partner. The most commonly represented cancers were cervical (n = 90; 42.3%), breast (n = 34; 16%), head and neck (n = 33; 15.5%), vulvar (n = 15; 7%), and Kaposi sarcoma (n = 14; 6.6%). The remaining 27 malignancies (12.7%) included endometrial, penile, anal, esophageal, lymphoma, and prostate. At least 49% of the patients with cervical cancer, 11% of the patients with breast cancer, 11% of the patients with head and neck cancer, and 9.5% of the patients with vulvar cancer and Kaposi sarcoma were HIV positive. All other cancers had less than 5% of patients who were HIV positive.

Other key patient characteristics are listed by stage in Table 1.

**Socioeconomic Factors**

Multiple languages were represented in the patient sample, with 129 patients (97%) speaking Setswana and 60 (45.1%) speaking English, normally as a second language. Most patients reported no transportation problems, with only 17 patients (12.8%) with early-stage cancer and 24 patients (18%) with advanced-stage cancer reporting that getting to the hospital was burdensome or that they were dependent on others to get to the hospital. Most of the patients (n = 86; 64.7%) who responded to the employment question were unemployed at the time of diagnosis. Of those who were employed, 34 (72.3%) earned in Botswana pula (P) between P2,001 and P5,000 per month ($209 to $522 in US dollars in June 2016). Other socioeconomic factors are listed by stage in Table 2. No significant relationships were noted between any socioeconomic variable and advanced-stage disease.

**Fears, Attitudes, Beliefs, and Stigma**

Patients who were not afraid of having cancer were more likely to present with advanced-stage cancer at diagnosis (OR, 3.48; P < .05). Patients who agreed that their family would not care for them if they needed treatment were more likely to have advanced-stage disease (OR, 6.35; P = .05). Patients who agreed that they could not afford to develop cancer were more likely to present with advanced disease (OR, 2.73; P < .05). Other fears, attitudes, beliefs, and stigmas are listed by stage in Table 3.

**Factors Associated With Advanced Stage in Multivariable Logistic Analysis**

Patients with non–female-specific cancers were more likely to present with advanced-stage disease (OR, 5.67; P < .05). Female-specific cancers were defined as cancers of the female reproductive organs (cervical, ovarian, uterine, vaginal, vulvar) and breast. There was also a nonsignificant trend toward male patients presenting with advanced-stage cancer (OR, 6.59; P = .08; Table 4). Patients with cervical and vulvar cancer were less likely to present with advanced-stage disease than patients with any other cancer type.

---

Table 2. Sociodemographic and Economic Factors by Stage (Continued)

| Factor                                                       | All Stages No. (%) | Early Stage (I and II) No. (%) | Late Stage (III and IV) No. (%) | Response Rate % | Adjusted Probability P |
|--------------------------------------------------------------|--------------------|--------------------------------|---------------------------------|-----------------|------------------------|
| Traditional African                                          | 2 (0.9)            | 0 (0.0)                        | 2 (1.5)                         |                 |                        |
| Believe in a god or higher power but not religious           | 10 (4.7)           | 1 (0.8)                        | 9 (6.8)                         |                 |                        |
| Do not believe in a god or higher power                      | 4 (1.9)            | 1 (0.8)                        | 3 (2.3)                         |                 |                        |
| Not reported/other                                           | 5 (2.3)            | 2 (1.5)                        | 3 (2.3)                         |                 |                        |

Abbreviation: P, Botswana pula.
Table 3. Fears, Attitudes, Beliefs, and Stigma by Cancer Stage

| Fears, Attitudes, Beliefs, and Stigma | Unadjusted Probability (P) | Adjusted Probability (P) | Responses | Stage I/II | Stage II/IV |
|---------------------------------------|---------------------------|--------------------------|-----------|-----------|------------|
|                                       |                           |                          |           | Agree     | Agree      |
|                                       |                           |                          |           | Responses | Responses (OR) |
| Fears                                 |                           |                          |           |           |            |
| Scared of having cancer               | .0368                     | .0148                    | 131       | 13        | 6 (0.287)  |
| Scared of job loss                    | .1927                     | .1276                    | 107       | 7         | 4 (0.374)  |
| Scared of surgery                     | .6518                     | .5977                    | 126       | 5         | 5 (0.706)  |
| Scared of missing appointments or treatment due to work | .6853 | .6367 | 116 | 4 | 7 (1.36) |
| Scared of missing appointments or treatment due to transport problems | .6500 | .5961 | 132 | 7 | 12 (1.31) |
| Scared of radiation therapy           | .8069                     | .7753                    | 132       | 6         | 7 (0.845)  |
| Scared of chemotherapy side effects   | .4228                     | .3491                    | 132       | 9         | 8 (0.614)  |
| Scared of dying from cancer           | .3906                     | .3159                    | 132       | 11        | 10 (0.619) |
| Attitudes                             |                           |                          |           |           |            |
| My family will not care for me if I need treatment | .0977 | .0527 | 131 | 1 | 8 (6.35) |
| I have no family history of cancer, so I should not have gotten cancer | .4446 | .3715 | 128 | 17 | 18 (1.410) |
| I can beat cancer                     | .7937                     | .7597                    | 131       | 54        | 74 (0.632) |
| I can’t afford to get cancer          | .0683                     | .0333                    | 129       | 32        | 29 (2.73)  |
| People with cancer can survive        | .9795                     | .9760                    | 130       | 52        | 71 (0.687) |
| Beliefs                               |                           |                          |           |           |            |
| Old people get cancer                 | .6926                     | .6434                    | 127       | 28        | 36 (0.386) |
| Cancer is a curse and the result of past sins or bewitchment | .6148 | .5574 | 130 | 5 | 9 (0.340) |
| Using contraceptive pills or injections can cause cancer | .0487 | .0211 | 129 | 19 | 13 (0.723) |
| Using hormone replacement pills after menopause can cause cancer | .0360 | .0142 | 128 | 17 | 10 (0.955) |
| My family will support me             | .5291                     | .4616                    | 131       | 53        | 71 (1.39)  |
| My faith in God will heal me          | .5753                     | .5120                    | 129       | 43        | 56 (2.23)  |
| Getting cancer is part of God’s plan  | .4496                     | .3755                    | 128       | 32        | 51 (1.55)  |
| If someone gets cancer, it doesn’t matter when they find out, they will still die | .2563 | .1851 | 129 | 4 | 11 (0.798) |
| Cancer kills most people who get it   | .6876                     | .6391                    | 128       | 10        | 11 (0.464) |
| People have been cured using traditional nonmedical healing | .8261 | .7971 | 129 | 3 | 5 (1.05) |
| People have been cured through prayer and faith alone | .1038 | .0566 | 128 | 41 | 46 (0.704) |
| Cancer can be treated in many ways, not just through medicine and surgery | .9170 | .9026 | 127 | 23 | 34 (0.560) |
| People with cancer will die when they go to the hospital | .6817 | .6313 | 129 | 4 | 4 (1.02) |
| There are treatments for cancer       | .4846                     | .4141                    | 130       | 52        | 68 (0.677) |
| People have been cured of cancer using alternative therapies | .3637 | .2883 | 128 | 24 | 26 (0.322) |
| Early detection and timely treatment will result in a longer life | .2143 | .1461 | 129 | 52 | 67 (1.45) |
| Some cancer treatments could kill me  | .5577                     | .4941                    | 128       | 6         | 11 (1.56)  |
| If someone gets cancer, a lot of different treatments won’t make any difference | .4932 | .4242 | 128 | 5 | 10 (0.769) |

(Continued on following page)
stages (OR, 0.07 and OR, 0.06, respectively; \( P < .05 \)). Patients who reported serious symptom severity at presentation were less likely to have advanced-stage disease (OR, 0.176; \( P < .05 \)).

**DISCUSSION**

Half of the study participants at the Princess Marina Hospital presented with advanced-stage cancers. Understanding factors associated with advanced-stage presentation is crucial to facilitating earlier cancer detection and intervention, thus reducing cancer-related mortality. This is particularly important in cancers that are preventable through screening and vaccination, such as cervical cancer, human papillomavirus–related cancers, and breast cancer, which typically present at an advanced stage in Botswana and comprise more than half of the study population when combined.

Our study population is representative of the general population when considering age, sex, socioeconomic status, and cancer type. For example, the median age at diagnosis was 46 years, with 71.9% of patients older than 40 years. This is consistent with Botswana National Cancer Registry data reporting that the median age at cancer diagnosis was 47 years for women and 50 years for men.\(^1\) Our study also showed that 72.3% of the participants earned between P2,001 and P5,000 per month, which is within the limits of the average monthly salary of Batswana (P4,801) during the study period.\(^2\)

The most commonly represented cancers included cervical (42.3%) and breast (16%). These data are consistent with existing cancer incidence data, which show that cervical and breast cancer are the most commonly diagnosed cancers, as well as the most common causes of cancer death, representing 15.3% and 9.5%, respectively, of all newly diagnosed cancers. However, given the large number of female participants in our study, cervical and breast cancers had higher representation. Patients with Kaposi sarcoma comprised 6.6% of our sample, which is consistent with existing data that show Kaposi sarcoma represents 7.6% of all newly diagnosed cancers.\(^1\)

There is relatively good access to specialized cancer care in Botswana, with government-funded care being accessible to 90% of the population.\(^8\) Although patients with HIV might have closer linkages to the health care system through Botswana’s robust antiretroviral therapy program, our study did not show an association between HIV status and earlier stage at diagnosis. This is consistent with prior data that suggest that even HIV-infected patients with cancer

---

**Table 3. Fears, Attitudes, Beliefs, and Stigma by Cancer Stage (Continued)**

| Fears, Attitudes, Beliefs, and Stigma | Unadjusted Probability \((P)\) | Adjusted Probability \((P)\) | Responses | Stage I/II Agree Responses | Stage III/IV Agree Responses \((OR)\) |
|--------------------------------------|-------------------------------|-----------------------------|-----------|--------------------------|----------------------------------|
| It is my fault that I have a health condition | .2867 | .2128 | 126 | 4 | 2 (0.345) |
| Family members or neighbors visit less or stopped visiting due to stigma | .7965 | .7628 | 129 | 1 | 2 (1.45) |
| My relationship with my spouse has changed or worsened due to stigma | .4518 | .3785 | 110 | 2 | 1 (0.350) |
| I have been kept isolated in my home due to stigma | .5441 | .4784 | 130 | 1 | 3 (2.25) |
| People have prevented me from sharing food due to stigma | .5517 | .4862 | 131 | 1 | 3 (2.22) |
| People have prevented me from playing with their children due to stigma | .3150 | .2398 | 131 | 1 | 0 < (0.001) |
| Family members refused to sleep in the same room as me due to stigma | .5621 | .4970 | 130 | 1 | 3 (2.18) |
| Family members or neighbors have spoken badly of me due to stigma | .6977 | .6499 | 130 | 2 | 4 (1.49) |
| People have blamed me for my health problems | .9377 | .9271 | 131 | 2 | 3 (1.09) |

**NOTE.** Bold type indicates significant adjusted \( P \) values.

**Abbreviation:** OR, odds ratio.
with regular contact with the health care system do not have faster linkages into cancer care.11 This also suggests that there is a need to indiscriminately bolster existing methods for early diagnosis, provision of quality care, and efficient management of limited resources in patients with HIV-positive and HIV-negative disease. It is important to note that as antiretroviral therapy coverage has increased from 7.3% to 82.3% between 2003 and 2008, age-adjusted cancer incidence has decreased in patients with HIV by 8.3% per year. However, with a progressively larger and older HIV population, there is still a high number of incident cancers in the HIV population.22

Prior studies have suggested that advanced-stage presentation may be related to difficulty getting to the hospital; however, our study found that difficulty getting to the hospital was not a cause of advanced-stage presentation.15,18 This suggests that there may be other prevailing causes in Botswana. For example, gender-related factors predicted increased stage at presentation. A qualitative meta-analysis reported that men often view help-seeking as unmasculine, and women find help-seeking easier, given their greater contacts with health services for themselves and their families.18 One study reported that of 5,000 monthly patients attending a clinic in Gaborone, Botswana, 60% were female. Women were seen more frequently than men for reasons such as sexual and reproductive health, pre-employment medical examination, and consultation for various new symptoms.5 The discrepancies between male and female stage of presentation may also be related to differences in symptoms between gender-specific cancers (ie, vaginal bleeding may be more disturbing than urinary symptoms in prostate cancer).

In this study, patients who perceived their symptoms to be serious were more likely to present at early stages. This is consistent with prior studies that suggest that severe symptoms, symptoms that interfere with everyday life, or well-recognized symptoms (ie, lump) are potent triggers of early illness recognition and help-seeking.18,24 In contrast, patients with vague or nonspecific initial symptoms are known to have delayed illness recognition.

We also found that certain fears, attitudes, and beliefs were predictive of advanced stage at presentation. Patients who were not afraid of having cancer were more likely to present with advanced-stage disease. This suggests that those who present with advanced-stage cancer may not understand the mortality risks associated with a cancer diagnosis or may not be concerned about this within their belief structures. This is a direct contradiction of the other highly prevalent belief that early detection and early treatment results in a longer life. These contradicting beliefs represent a cognitive dissonance that aids in the avoidance of their own mortality, particularly in advanced-stage cancer. Most of the participants also felt that their faith would cure their disease. This belief in faith-based cure has been previously reported in other African countries.19 Patients who believed that their family would not care for them or that they could not afford to develop cancer were more likely to present with advanced-stage disease. This is consistent with prior studies that suggest responsibility for the needs of other family members often prevents patients from prioritizing their own health needs.18 Often, patients do not seek health care until their symptoms start to affect their ability to work.25,26 These findings suggest

Table 4. Logistic Regression Analysis for Variables Predicting Advanced Stage of Presentation

| Variable                  | Model Significance (P) | Factor Significance (P) | Odds Ratio |
|---------------------------|------------------------|-------------------------|------------|
| Gender                    | .0313                  |                         |            |
| Male                      | .08                    | 6.59                    |            |
| Cancer diagnosis site†    | .0057                  |                         |            |
| Cervical                  | .013                   | 0.0714                  |            |
| Vulvar                    | .019                   | 0.0596                  |            |
| Breast                    | .071                   | 0.136                   |            |
| Anal                      | .990                   | < 0.0001                |            |
| Prostate                  | .990                   | < 0.0001                |            |
| Symptom severity          | .0361                  |                         |            |
| Not serious               | .828                   | 1.11                    |            |
| A little serious          | .378                   | 0.588                   |            |
| Moderately serious        | .220                   | 2.16                    |            |
| Serious                   | .024                   | 0.176                   |            |
| Very serious              | .828                   | 0.898                   |            |
| Predominantly female cancer | .0089                 |                         |            |
| Female cancer             | .026                   | 0.176                   |            |
| Nonfemale cancer          | .026                   | 5.67                    |            |

NOTE. Model significance P values reflect χ² differences between early-stage and advanced-stage groups for each.
†Excluded head and neck plus penile because of SE > 1,000; endometrial used as base.
that future interventions should target increasing cancer symptom awareness and promotion of early care-seeking among primary wage earners in the family.

Most of the patients with early- and advanced-stage disease held appropriate fears, attitudes, and beliefs regarding cancer and its treatment options. They also indiscriminately reported low levels of cancer stigmatization in their homes and communities, which is consistent with prior African studies that report low levels of cancer stigma.27-29 This is important to note because stigma has been previously reported as a potential barrier to participation in cancer screening or cancer care-seeking activities.30 Although interventions targeted toward reducing stigma might improve the psychosocial well-being, interpersonal relationships, and financial opportunities for patients with cancer and can even increase early health care–seeking behaviors, the lack of stigma experienced in this patient population suggests that an emphasis on stigma reduction may not play an important role in the Botswana population of patients with cancer.31,32

This study is not without limitations. The sample size was small, which may affect the reliability of the survey’s results. Individuals with early-stage cancer may not know that they are sick, and thus may not be well represented in the study sample. Furthermore, we were only able to capture patients who present for care. In addition, self-reported fear, attitude, belief, and stigma data might be biased because of social desirability and recall bias after diagnosis. Issues with survey-item nonresponse may also introduce bias; however, the majority of survey items had a greater than 90% response rate. We do not have data on patients who refused to participate in the study. Patient refusal could present as a study limitation; however, it is unclear in which direction this might bias the study. Last, the heterogeneity of the cancer sites makes it difficult to form cancer site-specific conclusions that may reduce advanced-stage cancer presentation in the cancer site of interest. Regardless, these findings are important and provide significant insight into causes of advanced-stage cancer presentation in Botswana.

This study examined the sociodemographic and clinical factors, as well as the knowledge, attitudes, and beliefs, associated with delayed stage at diagnosis in Botswana. Patients who presented at advanced stages were more likely to not be afraid of having cancer, believe that their family would not care for them if they needed treatment, and believe that they could not afford to develop cancer. Advanced stage at presentation was found to be associated with non–female-specific cancers and the perception that symptoms were less serious. Future cancer mortality reduction efforts should emphasize cancer symptom awareness and early detection through routine cancer screening, as well as increasing the acceptability of care-seeking through education about cancer outcomes if detected early, especially among male patients.

DOI: https://doi.org/10.1200/JGO.18.00129
Published online on jgo.org on December 11, 2018.

AUTHOR CONTRIBUTIONS

Conception and design: William Rate, Kebatshabile Ngoni, Mohan Narasimhamurthy

Administrative support: Lame Bakwenabatsile

Provision of study materials or patients: Lame Bakwenabatsile, Kebatshabile Ngoni

Collection and assembly of data: Rohini Bhatia, William Rate, Lame Bakwenabatsile

Data analysis and interpretation: Chidinma Anakwenze, Rohini Bhatia, William Rate, Sarah Rayne, Preet Dhillon, Ari Ho-Foster, Doreen Ramogola-Masire, Surbhi Grover

Manuscript writing: All authors

Final approval of manuscript: All authors

Accountable for all aspects of the work: All authors

AUTHORS’ DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the subject matter of this manuscript. For more information about ASCO’s conflict of interest policy, please refer to www.asco.org/rwc or ascopubs.org/jco/site/ifc.

Chidinma Anakwenze
No relationship to disclose

Rohini Bhatia
No relationship to disclose

William Rate
No relationship to disclose
ACKNOWLEDGMENT
We thank the Department of Radiation Oncology, University of Pennsylvania, for funding; Suneeta Krishnan, Botswana-University of Pennsylvania Partnership; Princess Marina Hospital; and all our patients with cancer.

REFERENCES
1. Ferlay J, Soerjomataram I, Ervik M, et al (eds): GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11. [Internet]. Lyon, France, International Agency for Research on Cancer, 2013
2. Sankaranarayanan R, Swaminathan R, Brenner H, et al: Cancer survival in Africa, Asia, and Central America: A population-based study. Lancet Oncol 11:165-173, 2010
3. UNAIDS: Country factsheets, Botswana, http://www.unaids.org/en/regionscountries/countries/botswana2017
4. Bolaane M, Mgadla PT: Batswana. New York, NY, Rosen Publishing Group, 1997
5. Tieng’O JG, Pengpid S, Skaal L, et al: Knowledge, attitude and practice of breast cancer examination among women attending a health facility in Gaborone, Botswana. Gend Behav 9:3513-3527, 2011
6. Jalloh M, Niang L, Ndoye M, et al: Prostate cancer in Sub Saharan Africa. J Nephrol Urol Res 1:15-20, 2013
7. Johnson RH: The cases of cancer seen at a Botswana hospital 1968-1972. Cent Afr J Med 21:260-264, 1975
8. Suneja G, Ramogola-Masire D, Medhin HG, et al: Cancer in Botswana: Resources and opportunities. Lancet Oncol 14:e290-e291, 2013
9. Ramogola-Masire D, de Klerk R, Monare B, et al: Cervical cancer prevention in HIV-infected women using the “see and treat” approach in Botswana. J Acquir Immune Defic Syndr 59:308-313, 2012
10. Raesima MM, Forhan SE, Voetsch AC, et al: Human papillomavirus vaccination coverage among school girls in a demonstration project-Botswana, 2013. MMWR Morb Mortal Wkly Rep 64:1147-1149, 2015
11. Brown CA, Suneja G, Tapela N, et al: Predictors of timely access of oncology services and advanced-stage cancer in an HIV-endemic setting. Oncologist 21:731-738, 2016
12. Botswana MoH: Botswana National Cancer Registry 2001-2010. Gaborone, Botswana, 2010
13. Grover S, Bvochora-Nsingo M, Yeager A, et al: Impact of human immunodeficiency virus infection on survival and acute toxicities from chemoradiation therapy for cervical cancer patients in a limited-resource setting. Int J Radiat Oncol Biol Phys 101:201-210, 2018
14. Hansen RP, Vedsted P, Sokolowski I, et al: Time intervals from first symptom to treatment of cancer: A cohort study of 2,212 newly diagnosed cancer patients. BMC Health Serv Res 11:284, 2011
15. Robinson D, Massey T, Davies E, et al: Waiting times for radiotherapy: Variation over time and between cancer networks in southeast England. Br J Cancer 92:1201-1208, 2005
16. Jones AP, Haynes R, Sauerzapf V, et al: Travel time to hospital and treatment for breast, colon, rectum, lung, ovary and prostate cancer. Eur J Cancer 44:992-999, 2008
17. Langenbach MR, Schmidt J, Neumann J, et al: Delay in treatment of colorectal cancer: Multifactorial problem. World J Surg 27:304-308, 2003
18. Smith LK, Pope C, Botha JL: Patients' help-seeking experiences and delay in cancer presentation: A qualitative synthesis. Lancet 366:825-831, 2005
19. Rayne S, Schnippel K, Benn C, et al: The effect of access to information on beliefs surrounding breast cancer in South Africa. J Cancer Educ 33:806-813, 2018
20. Edge S, Byrd DR, Compton CC, et al (eds): AJCC Cancer Staging Handbook. New York, NY, Springer, 2010
21. Harris PA, Taylor R, Thielke R, et al: Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 42:377-381, 2009
22. Dryden-Peterson S, Medhin H, Kebabonye-Pusoentsi M, et al: Cancer incidence following expansion of HIV treatment in Botswana. PLoS One 10:e0135602, 2015 [Erratum: PLoS One 10:e0138742, 2015]
23. Trading Economics ; Botswana Wages: https://tradingeconomics.com/botswana/wages
24. Macdonald S, Macleod U, Campbell N, et al: Systematic review of factors influencing patient and practitioner delay in diagnosis of upper gastrointestinal cancer. Brit J Canc 94:1272-1280, 2006
25. Burgess C, Hunter MS, Ramirez AJ: A qualitative study of delay among women reporting symptoms of breast cancer. Br J Gen Pract 51:967-971, 2001
26. Vaartio H, Kiviniemi K, Suominen T: Men’s experiences and their resources from cancer diagnosis to recovery. Eur J Oncol Nurs 7:182-190, 2003
27. Ohaeri JU, Campbell OB, Ilesanmi AO, et al: Psychosocial concerns of Nigerian women with breast and cervical cancer. Psychooncology 7:494-501, 1998
28. Ohaeri JU, Campbell OB, Ilesanmi AO, et al: The psychosocial burden of caring for some Nigerian women with breast cancer and cervical cancer. Soc Sci Med 49:1541-1549, 1999
29. Fort VK, Makin MS, Siegler AJ, et al: Barriers to cervical cancer screening in Mulanje, Malawi: A qualitative study. Patient Prefer Adherence 5:125-131, 2011
30. Sankaranarayanan R, Ramadas K, Frie KG, et al: Challenges for Breast and Gynecological Cancer Control by Early Detection in Less-Developed Countries, Breast and Gynecological Cancers. New York, NY, Springer, 2013
31. Tod AM, Craven J, Allmark P: Diagnostic delay in lung cancer: A qualitative study. J Adv Nurs 61:336-343, 2008
32. Michielutte R, Dignan MB, Sharp PC, et al: Skin cancer prevention and early detection practices in a sample of rural women. Prev Med 25:673-683, 1996