Public and outpatients’ awareness of calling emergency medical services immediately by acute stroke in an upper middle-income country: a cross-sectional questionnaire study in greater Gaborone, Botswana

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Abstract

Objectives: In this cross-sectional study from Botswana, we investigated awareness of calling emergency medical services (EMS) and seeking immediate medical assistance by acute stroke among stroke risk outpatients and public.

Method: Closed-ended questionnaires on awareness of calling EMS and seeking immediate medical assistance by acute stroke were administered by research assistants to a representative selection of outpatients and public.

Results: The response rate was 96.0% (93.0% for public (2013) and 96.6% for outpatients (795)). Public respondents had mean age of 36.1 ± 14.5 years (age range 18–90 years) and 54.5% were females, while outpatients had mean age of 37.4 ± 12.7 years (age range 18–80 years) and 58.1% were females.

Awareness of calling EMS (78.3%), and of seeking immediate medical assistance (93.1%) by stroke attack was adequate. For calling EMS by acute stroke, outpatients had higher awareness than the public (p < 0.05) among those with unhealthy diet (90.9% vs 71.1%), family history of both stroke and heart diseases (90.7% vs 61.2%), no history of psychiatric diseases (93.2% vs 76.0%) and sedentary lifestyle (87.5% vs 74.8%).

Predictors of low awareness of both calling EMS and seeking immediate medical assistance were no medical insurance, residing/working together, history of psychiatric diseases, and normal weight.

Male gender, ≥50 years age, primary education, family history of both stroke and heart diseases, current smoking, no history of HIV/AIDS, and light physical activity were predictors of low awareness of need for calling EMS.

Conclusion: Results call for educational campaigns on awareness of calling EMS and seeking immediate medical assistance among those with high risk factor levels.
Introduction
Stroke was the second largest cause of death and third largest cause of disability-adjusted life-years (DALYs) lost globally in 2019 according to World Health Organization (WHO) estimates [1]. The burden of stroke shifted from high-income countries (HIC) to low- and middle-income countries (LMIC) already in 2010 [2]. The incidence of stroke decreased in most regions from 1990 to 2016 while it increased in east Asia and southern sub-Saharan Africa (SSA) [3]. Globally, the highest age-standardized incidence of stroke is in Africa [4].

Thrombolysis has shown to be an effective treatment for acute ischemic stroke within 4.5 h of onset due to revascularization, improving clinical outcome and dependency in DALYs [5–7]. The emergence of intravenous thrombolysis and thrombectomy has increased the focus on stroke as an urgent and emergency disease due to time-dependent therapies, and that benefit increases when onset-to-treatment-time (OTT) decreases [8, 9]. Several studies revealed patient’s delay as barrier to thrombolytic therapy as most acute stroke patients arrive late to hospital as none or only a few use emergency medical transport (EMT), contact family members or the family doctor [10–26]. According to several studies conducted in Europe and the United States of America, 50–70% of patients are transported to hospital by EMT [24, 27–33].

Decreasing time from stroke onset to hospital arrival might increase the proportion of patients available for therapy [34], hence improving outcomes. Use of EMS shorten the time to diagnosis and treatment and increase the frequency of revascularisation [27–33, 35–40]. Most of the previous studies have assessed likelihood of calling EMS when experiencing stroke (symptoms) but have never assessed awareness of the urgency of calling EMS immediately.

Objectives
1. To assess awareness of calling EMS, and awareness of seeking immediate medical assistance by acute stroke among public and outpatients in Botswana.
2. To assess if respondents’ sociodemographic and stroke risk factors influence awareness of calling EMS.

Methods
Study design and population
In this cross-sectional questionnaire survey study, participants were recruited from Botswana, which is an upper middle-income country under LMIC in SSA. The study purposively sampled a variety of respondents from the public with/without stroke risk factors, and outpatients with stroke risk factors in greater Gaborone. Respondents from the public were recruited from their homes or workplaces. Outpatients from both primary and secondary healthcare facilities while waiting for or after their medical consultation.

Trained research assistants interviewed respondents verbatim. Each interviewer conducted a standardized, structured, one-to-one interview, according to a multi-sectioned questionnaire designed to guide interview and avoid bias. For the public, no more than 2 respondents from same family/compound/ company were interviewed. The interviewer intervened only if asked to clarify any question, without giving correct answers. We sampled only odd numbers for outpatients in a queue at healthcare facilities and households for the public in each area. For the public, we further sampled from various socio-economic levels i.e., high, moderate and low socio-economic areas within greater Gaborone.

Data collection instrument
The survey instruments were adapted from previous surveys [41–43] with some modifications to reflect the recent American Heart Association/American Stroke Association (AHA/ASA) guidelines and European Stroke Organization guidelines [44, 45]. We tested the questionnaire in a pilot study with a sample of 25 respondents and changes were made in the wording of...
questions based on the result of the pilot study accordingly. The questionnaire instruments were anonymous, electronic-based, written, and administered in English or local language (Setswana), closed-ended in nature and categorized into sections.

The questionnaire was divided into 4 sections (eFigure 1). Section 1 included respondents’ sociodemographic factors. Variables included were age (18–34 years, 35–49 years or ≥50 years), gender, education (none/unknown/primary, secondary or tertiary), medical insurance, and residing or working status (same family/working place).

Section 2 covered responses to acute stroke, and individual stroke symptoms as described below. We assessed awareness of respondents for seeking immediate emergency care and for calling EMS in response to a perceived stroke and specified individual stroke symptoms:

“What would you do when you suspect you are having stroke?” Responses included call 991, 911/997/8 or another emergency number, call a family member, the pastor, contact a traditional doctor, go to the pharmacy, no idea/no wait and see. Answers were dichotomized into calling EMS vs other options. EMSs are first responders in the country. They comprise of a physician, nurses and paramedics. They offer services that include stabilising and transporting acute sick patients to hospitals in the country. EMS services in the county are provided by MedRescue services, Emergency assist, and Boitekanelo emergency.

“If you get stroke, how long would you take before seeking medical assistance?” Answers included immediately, 7 h, 1 day, 3 days, 1 week, or no idea/no answer. We then dichotomized the responses to seeking medical assistance immediately vs other options.

We also assessed the level of medical care respondents would seek if they got specified stroke symptoms in a closed-ended question as follows: “Which of the following would you do first if you suspected that you are having one of the following e.g., acute weakness on one side of the body?” Answers included call 911 EMS, contact medical clinic, no idea, nothing or wait and see. We then categorized the responses into 3: calling EMS vs medical clinic vs other options.

Each correct answer in section 2 scored 1 point and was considered being aware. Each incorrect, unanswered or unknown answer scored 0 point and was considered being unaware.

Section 3 and 4 comprised respondents’ stroke risk factors and sources of stroke information respectively.

**Respondents’ stroke risk factors**

Included hypertension, family history of stroke, heart diseases or both (at least in one family member in the first generation), history of Human immunodeficiency virus (HIV/AIDS): (yes or no), psychiatric diseases (depression/anxiety): (yes or no), smoking (non-smokers, former, or current), alcohol drinking (non-drinkers, former, or current), dietary status (perceived healthy or unhealthy) and one or more of four less common cardiovascular risk factors (CVDS: diabetes, dyslipidemia, prior stroke, or heart diseases). Lastly, perceived and calculated BMI categories (underweight, normal, overweight or obesity), and physical activity (none, light, moderate or high physical intensity).

Current smokers were individuals who smoked at least one tobacco product daily in the previous 12 months, including those who had quit within the past year. Former smokers had quit more than 1 year earlier, while non-smokers had never used tobacco products.

Current drinkers were individuals who drank alcohol regularly in the previous 12 months, including those who had quit within the past year. Former drinkers had quit more than 1 year earlier, while non-drinkers had never used alcohol.

Information on physical activity at work, at home, during recreational or sport, and leisure-time activities was obtained using part of the International Physical Activity Questionnaire with comparable variables [46]. Questions were asked about frequency of regular specific activities the individual performs that increase breathing rate for at least 10 minutes: the total duration per day, the number of days in a week, and whether they perceived the activity as heavy, moderate, light, or no activity. For everyone, the recorded activities were converted to metabolic equivalent task (MET)-minutes per week (min/wk) [46]. Individuals participating in activities of less than 3.5 MET-min/wk. were classified as no activity (sedentary lifestyle), 3.5–<600 MET-min/wk. as low, 600–<3000 MET-min/wk. as moderate, and ≥3000 MET-min/wk. as high level of physical activity.

Participants were asked if they perceived their weight as underweight, normal, overweight or obese. Weight and height were measured, BMI calculated, and classified as defined by the World Health Organization (WHO) and National Institutes of Health (NIH) i.e., underweight as BMI <18.5 kg/m², normal BMI 18.5–<25 kg/m², overweight 25–<30 kg/m², and obesity as ≥30 kg/m² [47, 48]. Height was measured twice to the nearest millimeter using a fixed plastic, non-elastic stadiometer, and average height calculated. Body weight was measured in kilograms (to the second decimal place) by a self-zeroing digital weight scale for adults dressed in light clothes without shoes. Safeway self-zeroing digital weight scales (Safeway Scale, South Africa) were used after calibration.

**Sources of stroke information**

We assessed respondents’ source of stroke information in a closed-ended question with six answers as follows,
“Where did you get information about stroke?” Answers included family/ friends, television/ radio, newspaper/ magazines, doctors/ nurses, social media (internet, Facebook, Instagram, WhatsApp), and others (own experience, school, or patients).

**Statistical analysis**
Continuous variables were expressed as mean ± standard deviation (SD). Categorical and ordinal variables were expressed as absolute frequency (n) and proportion (%) of the overall sample or subgroups. Outpatients and public groups’ awareness of stroke were compared using chi-square test.

Mann-Whitney U/ Kruskal-Wallis H was used to determine predictors of calling EMS or seeking immediate medical assistance by acute stroke among respondents’ sociodemographic and stroke risk factors. Bonferroni correction was used for multiple comparisons. Statistical tests were two-tailed and reported statistically significant at p<0.05. All statistical analyses were completed using SPSS 25 statistical software (SPSS Inc., Chicago, Illinois, USA).

**Results**
We interviewed 2987 respondents in a cross-sectional study in greater Gaborone from June–October 2019, excluded 179 participants (151 from the public and 28 outpatients) because of missing either consent or substantial information (eFigure 2). We had a valid response of 2808 respondents (94.0%), comprising 2013 from the public (93.0%) and 795 outpatients (96.6%). The public’s mean age was 36.1 ± 14.5 years (age range 18–90 years) and 54.5% were females, while for outpatients the mean age was 37.4 ± 12.7 years (range 18–80 years) and 58.1% were females. For more information on respondents’ characteristics, see Table 1.

**Responses to acute stroke**
Two thousand two hundred respondents (78.3%) were aware of calling EMS (84.3% outpatients vs 76.0% public, p=0.119), and 93.1% were aware of seeking immediate medical assistance by stroke attack (94.3% outpatients vs 92.5% public, p=0.754). Odds of calling EMS immediately by respondents was 3.8 times higher than of calling EMS not immediately (p<0.001) (Table 2). Similarly, for public and outpatients, odds were 3 and 8.1 times higher respectively.

For each of the specific stroke symptoms, outpatients and public would contact medical clinic or call EMS without any significance difference between them, even though the majority (about 50%) would rather contact a medical clinic than call the EMS or take other actions (wait and see, no idea, or nothing) (Table 3).

**Sources of stroke information**
A significantly higher percentage of outpatients than the public had television/ radio (66.9% vs 56.2%), and magazines/ newspapers (58.9% vs 38.2%) as sources of information than the public (p<0.05) (eTable 1). The public were most likely to get stroke information from family/ friends (61.2%) and lowest from others (15.7%). Outpatients were most likely to get information from TV/ radio (66.9%) and lowest from others (18.0%).

**Awareness differences of calling EMS when having acute stroke by respondents’ sociodemographic factors and other characteristics**

**Sociodemographic factors**
Outpatients had higher awareness than the public for calling EMS when perceiving stroke (p<0.05) among those aged ≥50 years (91.1% vs 64.2%), and not residing/ working together (93.9% vs 75.8%) (Table 4). The public residing/working together had higher awareness than outpatients for calling EMS (76.2% vs 24.5%, p<0.001).

**Stroke action**
Awareness rates of calling EMS by stroke among respondents who would call EMS by any specific stroke symptom was high (at least 88%) for all symptoms. Among those who would call medical clinic when experiencing stroke symptoms, outpatients had higher awareness than the public (p<0.05) for speech impairment (83.0% vs 68.1), dizziness/ loss of balance (87.2% vs 72.3%), acute headache (83.9% vs 69.8%), blurred/ double vision (84.0% vs 69.3%), weakness on one side of the body (80.2% vs 65.9%), and confusion (83.2% vs 68.9%).

**Respondents’ stroke risk factors**
For self-reported risk factors, outpatients with the following characteristics had higher awareness than the public for calling EMS by stroke (p<0.05): unhealthy diet (90.9% vs 71.1%), physical inactivity (87.8% vs 75.0%), family history of both stroke and heart diseases (90.7% vs 61.2%), and no history of psychiatric diseases (93.2% vs 76.0%).

For calculated risk factors, physical inactive outpatients had higher awareness than the public for calling EMS (87.5% vs 74.8%, p=0.039).

**Source of information for stroke**
For those with TV/ radio as source of information, outpatients had higher awareness than the public for calling EMS (90.0% vs 74.6%, p=0.022). Awareness was highest for those with newspaper/ magazine as source of information (85.4% public vs 92.7% outpatients) while lowest for TV/ radio (74.6%) for public, and others (78.3%) for outpatients.
Table 1  Sociodemographic and stroke risk factors among respondents

|                                | Total n = 2808 | Public n = 2013 | Outpatients n = 795 | p   |
|--------------------------------|---------------|----------------|--------------------|-----|
| **Sociodemographic factors**   |               |                |                    |     |
| **Gender**                     |               |                |                    |     |
| Female                         | 1559(55.5)    | 1097(54.5)     | 462(58.1)          | 0.416|
| Male                           | 1249(44.5)    | 916(45.5)      | 333(41.9)          | 0.356|
| **Age category (years)**       |               |                |                    |     |
| missing                        | 6             | 5              | 1                  |      |
| 18–34                          | 1501(53.6)    | 1118(55.7)     | 383(48.2)          | 0.082|
| 35–49                          | 842(30.0)     | 588(29.3)      | 254(32.0)          | 0.409|
| ≥ 50                           | 459(16.4)     | 302(15.0)      | 157(19.8)          | 0.055|
| **Education level**            |               |                |                    |     |
| Primary, unknown, none         | 367(13.1)     | 252(12.5)      | 115(14.5)          | 0.371|
| Secondary                      | 1518(54.1)    | 1113(55.3)     | 405(50.9)          | 0.314|
| Tertiary                       | 923(32.9)     | 648(32.2)      | 275(34.6)          | 0.483|
| **Medical insurance**          |               |                |                    |     |
| Yes                            | 420(15.0)     | 0(0.0)         | 420(52.8)          | < 0.001|
| No, unknown                    | 2388(85.0)    | 2013(100.0)    | 375(47.2)          | < 0.001|
| **Marital status**             |               |                |                    |     |
| Married/cohabiting             | 982(35.0)     | 728(36.2)      | 254(31.9)          | 0.223|
| Others                         | 1826(65.0)    | 1285(63.8)     | 541(68.1)          | 0.381|
| **Residing/working together**  |               |                |                    |     |
| Yes                            | 1121(39.9)    | 1011(50.2)     | 110(13.8)          | < 0.001|
| No                             | 1687(60.1)    | 1002(49.8)     | 685(86.2)          | < 0.001|
| **Self-reported risk factors** |               |                |                    |     |
| **History of hypertension**    |               |                |                    |     |
| Yes                            | 276(9.8)      | 141(7.0)       | 135(17.0)          | < 0.001|
| No, unknown                    | 2532(90.2)    | 1872(93.0)     | 660(83.0)          | 0.073|
| **History of CVDS**            |               |                |                    |     |
| Yes                            | 196(7.0)      | 117(5.8)       | 79(9.9)            | 0.012|
| No                             | 2612(93.0)    | 1896(94.2)     | 716(90.1)          | 0.468|
| **Family history of stroke/heart diseases** | | | |     |
| Stroke                         | 372(13.2)     | 313(15.5)      | 59(7.4)            | < 0.001|
| Heart diseases                 | 347(12.4)     | 227(11.3)      | 120(15.1)          | 0.075|
| Both heart diseases and stroke | 389(13.9)     | 227(11.3)      | 162(20.4)          | < 0.001|
| None                           | 1700(60.5)    | 1246(61.9)     | 454(57.1)          | 0.294|
| **BMI**                        |               |                |                    |     |
| Underweight                    | 53(1.9)       | 33(1.6)        | 20(2.5)            | 0.302|
| Normal, unknown                | 2429(86.5)    | 1860(92.4)     | 569(71.6)          | < 0.001|
| Overweight                     | 215(7.7)      | 111(5.5)       | 104(13.1)          | < 0.001|
| Obesity                        | 111(4.0)      | 9(0.4)         | 102(12.8)          | < 0.001|
| **Healthy dietary status**     |               |                |                    |     |
| No, unknown                    | 1119(39.9)    | 802(38.8)      | 317(39.9)          | 0.993|
| Yes                            | 1689(60.1)    | 1211(60.2)     | 478(60.1)          | 0.994|
| **Alcohol consumption**        |               |                |                    |     |
| Current                        | 668(23.8)     | 406(20.2)      | 262(33.0)          | < 0.001|
| Former                         | 46(1.6)       | 24(1.2)        | 22(2.8)            | 0.054|
| No, unknown                    | 2094(74.6)    | 1583(78.6)     | 511(64.3)          | 0.004|
| **Smoking status**             |               |                |                    |     |
| Current                        | 337(12.0)     | 182(9.0)       | 155(19.5)          | < 0.001|
Awareness differences of seeking immediate medical assistance when having acute stroke by respondents’ sociodemographic factors and other characteristics

There were no significant awareness differences for seeking medical assistance between outpatients and public based on respondents’ sociodemographic or stroke risk factors, responses to acute stroke symptoms, or sources of stroke (Table 5). For both the public and outpatients, awareness of seeking immediate medical assistance was highest for social media (98.5% each) as source of information, and lowest for others (87.3% vs 90.2% respectively).

Predictors of calling EMS immediately by acute stroke
Outpatients had higher awareness of calling EMS than the public, with mean scores (95% CI) of 0.84(0.82–0.87) vs 0.76(0.74–0.78), p < 0.001. Predictors of low awareness of both calling EMS and seeking immediate medical assistance were no medical insurance, residing/working together, history of psychiatric diseases, and normal weight (eTable 2).

Male gender, ≥50 years age, primary education, family history of both stroke and heart diseases, current smoking, no history of HIV/AIDS, and light physical activity were predictors of low awareness of calling EMS, while predictors of low awareness of seeking immediate medical assistance were 18–34 years age, secondary education, family history of stroke, former smokers, former and current drinkers, being on a healthy diet, history of HIV/AIDS, and being underweight.

Discussion
Our study adds to the meagre literature in Sub-Saharan Africa on awareness of stroke responses and factors influencing them, in addition to comparing outpatients and the public awareness. Awareness of calling EMS or seeking immediate medical assistance was adequate among both respondents. There were some similarities and disparities in predictors of calling EMS and seeking immediate medical assistance by acute stroke.

Awareness of calling EMS by acute stroke was high among both outpatients and the public (84.3% vs 76.0%...
respectively). Some patients' studies [12, 13, 18, 20, 21, 24–26, 29, 33, 35, 39, 41, 49, 50] have shown variations and lower rates than ours (15.0–73.0%). This is further supported by one study that reported that time from symptom onset to first call for medical help accounted for 45% of the prehospital delay among stroke patients [15]. Some studies [26, 43, 51–60] conducted among the public also showed some variations in awareness of calling EMS (26.9–89.9%). Some have shown that despite high awareness of stroke symptoms in real life, a significant proportion still fails to call EMS by acute stroke [35, 50, 59, 61]. These discrepancies can be attributed to differences in study population (respondents' age, gender distribution, time and place of study, type of patients, comorbidities) and nature of questions (closed- or open-ended). This could also be due to that stroke as a medical emergency have been emphasized a lot in the past years, therefore, the population has probably better awareness now than in the past.

In contrast, when asked how they would respond to each of the eight stroke symptoms without reference to stroke, awareness rates of calling EMS by any specific stroke symptom was high (at least 88%) for each symptom among both outpatients and public, and without any significant differences between them. This contrasts some studies [7, 43, 60], that had lower awareness rates of calling EMS by blurred/ double vision (23.6–33%), weakness on the body (41.9–59%), speech impairment (41–72.4%), and dead sensation (30.3–51.0%). In addition, other studies showed also lower rates of calling EMS by weakness on one side of the body or speech impairment (44% each), weakness on one lower side of the face (64.3%), dizziness (3.2%) and headache (6.7%) [43, 60, 62]. Discrepancies in these studies can be attributed to differences in study population. Outpatients had higher awareness than the public (p < 0.05) for contacting medical clinic by speech impairment (83.9% vs 69.8%), blurred/ double vision (84.0% vs 69.3%), weakness on on one side of the body (80.2% vs 65.9%), and confusion (83.2% vs 68.9%). This could be explained by lack of awareness of EMSs existence since they are mostly available in urban areas, and that outpatients are more frequently in contact with the healthcare system.

The public had as highest source of information family/ friends (61.2%), followed by TV/ radio (56.2%). Outpatients had as highest source of information TV/ radio (66.9%), followed by family/ friends (60.6%). This resonates well with other studies [25, 42, 43, 49, 54, 62, 63] that reported doctors or healthcare professionals as one

|                           | Calling EMS | Seeking immediate medical assistance | OR | p       |
|---------------------------|-------------|--------------------------------------|----|---------|
|                           | n(%)        | Yes n(%)                             | No n(%) | <0.001  |
| Total respondents         |             |                                      |    |         |
| Aware                     | 2200(78.3)  | 2099(97.0)                           | 101(51.8) | 3.8     |
| Unaware                   | 608(21.7)   | 514(3.0)                             | 94(48.2)  |
| Public                    |             |                                      |    |         |
| Aware                     | 1530(76.0)  | 1449(77.8)                           | 81(54.0)  |
| Unaware                   | 483(24.0)   | 414(22.2)                            | 69(46.0)  |
| Outpatients               |             |                                      |    |         |
| Aware                     | 670(84.3)   | 650(86.7)                            | 20(44.4)  |
| Unaware                   | 125(15.7)   | 100(13.3)                           | 25(55.6)  |

|                           | Calling EMS | Seeking immediate medical assistance | OR | p       |
|---------------------------|-------------|--------------------------------------|----|---------|
|                           | n(%)        | Yes n(%)                             | No n(%) | <0.001  |
| Total respondents         |             |                                      |    |         |
| Aware                     | 2613(93.1)  | 2099(95.4)                           | 514(84.5) |
| Unaware                   | 195(6.9)    | 101(4.6)                             | 94(15.5)  |
| Public                    |             |                                      |    |         |
| Aware                     | 1863(92.5)  | 1449(94.7)                           | 414(85.7) |
| Unaware                   | 150(7.5)    | 81(5.3)                             | 69(14.3)  |
| Outpatients               |             |                                      |    |         |
| Aware                     | 750(94.3)   | 650(97.0)                            | 100(80.0) |
| Unaware                   | 45(5.7)     | 20(3.0)                             | 25(20.0)  |

EMS emergency medical services, OR odds ratio
of the lowest sources of information among patients and public. Highest sources of information at over 40% among outpatients was TV/ radio, family/ friends, and magazines/ newspapers, while for the public it was family/ friends, and TV/ radio. This is supported by other studies [42, 43, 49, 54, 62, 63] that reported mass media, family, and friends as highest sources of stroke information.

Outpatients had higher awareness of calling EMS than the public among those with the following characteristics: age ≥ 50 years, not residing/working together, unhealthy diet, family history of both stroke and heart diseases, no history of psychiatric diseases, calculated physical inactivity, and having TV/radio as source of stroke information. The differences could be explained by patients being more frequently in contact with healthcare professionals, well informed about stroke, also by that most of the public is not aware of EM services exist since they are found mostly in urban areas but not rural areas. However, awareness of calling EMS or seeking immediate medical assistance by source of information was more than 70% for the least source, which shows that all sources of information can be used effectively to relay information about stroke to both outpatients and the public.

### Table 3  Acute individual stroke symptom’s responses

|                          | Total  | Public | Outpatients | p  |
|--------------------------|--------|--------|-------------|----|
|                          | n = 2808 | n = 2013 | n = 795     |    |
| no. aware (% aware)      | no. aware (% aware) | no. aware (% aware) | no. aware (% aware) |    |
| **Speech impairment**    |        |        |             |    |
| Call EMS                 | 1103(39.3) | 785(39.0) | 318(40.0) | 0.788 |
| Contact medical clinic   | 1436(51.1) | 1007(50.0) | 429(54.0) | 0.357 |
| Other                    | 269(9.6) | 221(11.0) | 48(6.0) | 0.004 |
| **Dizziness/ loss of balance** |        |        |             |    |
| Call EMS                 | 793(28.2) | 565(28.1) | 228(28.7) | 0.846 |
| Contact medical clinic   | 1431(51.0) | 1009(50.1) | 422(53.1) | 0.487 |
| Other                    | 584(20.8) | 439(21.8) | 145(18.2) | 0.178 |
| **Acute headache**       |        |        |             |    |
| Call EMS                 | 873(31.1) | 624(31.0) | 249(31.3) | 0.922 |
| Contact medical clinic   | 1434(51.1) | 1012(50.3) | 422(53.1) | 0.510 |
| Other                    | 501(17.8) | 377(18.7) | 124(15.6) | 0.202 |
| **Blurred/ double vision** |        |        |             |    |
| Call EMS                 | 881(31.4) | 602(29.9) | 279(35.1) | 0.124 |
| Contact medical clinic   | 1468(52.3) | 1024(50.9) | 444(55.8) | 0.250 |
| Other                    | 459(16.3) | 387(18.2) | 124(15.6) | < 0.001 |
| **Numbness/ dead sensation on one side of body** |        |        |             |    |
| Call EMS                 | 1226(43.7) | 876(43.5) | 350(44.0) | 0.897 |
| Contact medical clinic   | 1467(52.2) | 1042(51.8) | 425(53.5) | 0.693 |
| Other                    | 115(4.1) | 95(4.7) | 20(2.5) | 0.049 |
| **Facial muscles weakness on lower part on one side** |        |        |             |    |
| Call EMS                 | 1184(42.2) | 840(41.7) | 344(43.3) | 0.690 |
| Contact medical clinic   | 1505(53.6) | 1078(53.6) | 427(53.7) | 0.971 |
| Other                    | 119(4.2) | 95(4.7) | 24(3.0) | 0.143 |
| **Weakness on one body side** |        |        |             |    |
| Call EMS                 | 1179(42.0) | 853(42.4) | 326(41.0) | 0.721 |
| Contact medical clinic   | 1501(53.5) | 1051(52.2) | 450(56.6) | 0.315 |
| Other                    | 128(4.6) | 109(5.4) | 19(2.4) | 0.009 |
| **Confusion**            |        |        |             |    |
| Call EMS                 | 701(25.0) | 497(24.7) | 204(25.7) | 0.744 |
| Contact medical clinic   | 1557(55.4) | 1081(53.7) | 476(59.9) | 0.167 |
| Other                    | 550(19.6) | 435(21.6) | 115(14.5) | 0.004 |
Table 4  Awareness of calling EMS by sociodemographic and stroke risk factors, stroke responses and sources of information

| Sociodemographic factors | Public n = 2013 | no. aware (% aware) | Outpatients no. of respondents | Outpatients no. aware (% aware) | *p  |
|--------------------------|----------------|---------------------|-------------------------------|--------------------------------|-----|
| **Gender**               |                |                     |                               |                                |     |
| Female                   | 1097           | 861 (78.5)          | 462                           | 402 (87.0)                     | 0.232|
| Male                     | 916            | 669 (73.0)          | 333                           | 268 (80.5)                     | 0.348|
| **Age**                  |                |                     |                               |                                |     |
| 18-34 yrs                | 1118           | 886 (79.2)          | 383                           | 306 (79.9)                     | 0.931|
| 35-49 yrs                | 588            | 447 (76.0)          | 254                           | 220 (86.6)                     | 0.268|
| ≥ 50 yrs                 | 302            | 194 (64.2)          | 157                           | 143 (91.1)                     | 0.028|
| **Education**            |                |                     |                               |                                |     |
| None/unspecified/ primary| 252            | 165 (65.5)          | 115                           | 101 (87.8)                     | 0.108|
| Secondary                | 1113           | 853 (76.6)          | 405                           | 346 (85.4)                     | 0.234|
| Tertiary                 | 648            | 512 (79.0)          | 275                           | 223 (81.1)                     | 0.819|
| **Medical insurance**    |                |                     |                               |                                |     |
| No                       | 2013           | 1530 (76.0)         | 375                           | 287 (76.5)                     | 0.939|
| Yes                      | 0              | NA                  | 420                           | 383 (91.2)                     | NA   |
| **Marital status**       |                |                     |                               |                                |     |
| Married/cohab            | 728            | 546 (75.0)          | 254                           | 218 (85.8)                     | 0.241|
| Other (single, divorcee, widowed, unspecified) | 1285     | 984 (76.6)          | 541                           | 452 (83.5)                     | 0.282|
| **Residing/working together** | 1002     | 760 (75.8)          | 685                           | 643 (93.9)                     | 0.005|
| Yes                      | 1011           | 770 (76.2)          | 110                           | 27 (24.5)                      | < 0.00001|
| **Stroke action**        |                |                     |                               |                                |     |
| Seeking immediate medical assistance by stroke | 150 | 81 (54.0) | 45 | 20 (44.4) | 0.571 |
| Yes                      | 1863           | 1449 (77.8)         | 750                           | 650 (86.7)                     | 0.109|
| **Stroke symptoms’ reaction** | 785 | 713 (90.8) | 318 | 298 (93.7) | 0.750 |
| Speech impairment        |                |                     |                               |                                |     |
| EMS                      | 1007           | 686 (68.1)          | 429                           | 356 (83.0)                     | 0.036|
| Medical clinic           | 221            | 131 (59.3)          | 48                            | 16 (33.3)                      | 0.089|
| Dizziness/loss of balance | 565 | 527 (93.3) | 228 | 214 (93.9) | 0.957 |
| EMS                      | 1009           | 730 (72.3)          | 422                           | 368 (87.2)                     | 0.042|
| Medical clinic           | 439            | 273 (62.2)          | 145                           | 88 (60.7)                      | 0.888|
| Acute headache           |                |                     |                               |                                |     |
| EMS                      | 624            | 577 (92.5)          | 249                           | 231 (92.8)                     | 0.976|
| Medical clinic           | 1012           | 706 (69.8)          | 422                           | 354 (83.9)                     | 0.049|
| Other                    | 377            | 247 (65.5)          | 124                           | 85 (68.5)                      | 0.800|
| Blurred/double vision    |                |                     |                               |                                |     |
| EMS                      | 602            | 566 (94.0)          | 279                           | 262 (93.9)                     | 0.991|
| Medical clinic           | 1024           | 710 (69.3)          | 444                           | 373 (84.0)                     | 0.037|
| Other                    | 387            | 254 (65.6)          | 72                            | 35 (48.6)                      | 0.214|
| Numbness/dead sensation on one side of the body | 876 | 797 (91.0) | 350 | 326 (93.1) | 0.801 |
| EMS                      | 1042           | 687 (65.9)          | 425                           | 335 (78.8)                     | 0.062|
| Medical clinic           | 95             | 46 (48.4)           | 20                            | 9 (45.0)                       | 0.886|
| Facial muscles weakness on the lower part on one side | 840 | 772 (91.9) | 344 | 325 (94.5) | 0.769 |
Table 4 (continued)

|                                 | Public n = 2013 | Outpatients no. of respondents | #p     |
|---------------------------------|----------------|--------------------------------|--------|
|                                 | no. aware (% aware) | no. aware (% aware) |        |
| Medical clinic                  | 1078            | 718(66.6)                     | 427    | 336(78.7) | 0.079 |
| Other                           | 95              | 40(42.1)                      | 24     | 9(37.5)   | 0.821 |
| **Weakness on one body side**   |                 |                               |        |
| EMS                             | 853             | 764(89.0)                     | 326    | 294(90.2) | 0.944 |
| Medical clinic                  | 1051            | 693(65.9)                     | 450    | 361(80.2) | 0.036 |
| Other                           | 109             | 73(67.0)                      | 19     | 15(78.9)  | 0.690 |
| **Confusion**                   |                 |                               |        |
| EMS                             | 497             | 465(93.6)                     | 204    | 180(88.2) | 0.635 |
| Medical clinic                  | 1081            | 745(68.9)                     | 476    | 396(83.2) | 0.035 |
| Other                           | 435             | 320(73.6)                     | 115    | 94(81.7)  | 0.531 |
| **Self-reported risk factors**  |                 |                               |        |
| History of hypertension         |                 |                               |        |
| No/unspecified                  | 1872            | 1424(76.1)                    | 660    | 551(83.5) | 0.195 |
| Yes                             | 141             | 106(75.2)                     | 135    | 119(88.1) | 0.399 |
| CVDS                            |                 |                               |        |
| No                              | 1896            | 1439(75.9)                    | 716    | 600(83.8) | 0.154 |
| Yes                             | 117             | 91(77.8)                      | 79     | 70(88.6)  | 0.564 |
| Smoking                         |                 |                               |        |
| No/unspecified                  | 1809            | 1390(76.8)                    | 619    | 533(86.1) | 0.119 |
| Current                         | 182             | 123(67.6)                     | 155    | 117(75.5) | 0.545 |
| Former                          | 22              | 17(77.3)                      | 21     | 20(95.2)  | 0.653 |
| Healthy diet                    |                 |                               |        |
| No /unspecified                 | 802             | 570(71.1)                     | 317    | 288(90.9) | 0.019 |
| Yes                             | 1211            | 960(79.3)                     | 478    | 382(79.9) | 0.924 |
| Alcohol consumption status      |                 |                               |        |
| None/unspecified                | 1583            | 1222(77.2)                    | 511    | 439(85.9) | 0.180 |
| Current                         | 406             | 287(70.7)                     | 262    | 216(82.4) | 0.230 |
| Former                          | 24              | 21(87.5)                      | 22     | 15(68.2)  | 0.599 |
| Family history of stroke/heart diseases |       |                               |        |
| None/unspecified                | 1246            | 997(80.0)                     | 454    | 360(79.3) | 0.917 |
| Both stroke and heart diseases  | 227             | 139(61.2)                     | 162    | 147(90.7) | 0.019 |
| Heart diseases                  | 227             | 158(69.6)                     | 120    | 108(90.0) | 0.152 |
| Stroke                          | 313             | 236(75.4)                     | 59     | 55(93.2)  | 0.333 |
| History of HIV/AIDS             |                 |                               |        |
| No/unspecified                  | 1724            | 1267(73.5)                    | 515    | 409(79.4) | 0.340 |
| Yes                             | 289             | 263(91.0)                     | 280    | 261(93.2) | 0.846 |
| History of psychiatric diseases |                 |                               |        |
| No                              | 2013            | 1530(76.0)                    | 706    | 658(93.2) | 0.002 |
| Yes                             | 0               | NA                            | 89     | 12(13.5)  | NA    |
| Calculated risk factors         |                 |                               |        |
| Physical activity status (MET min/week) |           |                               |        |
| None/unspecified                | 1585            | 1185(74.8)                    | 584    | 511(87.5) | 0.039 |
| Light                           | 66              | 47(71.2)                      | 46     | 26(56.5)  | 0.498 |
| Moderate                        | 290             | 238(82.1)                     | 146    | 122(83.6) | 0.909 |
| High                            | 72              | 60(83.3)                      | 19     | 11(57.9)  | 0.405 |
| BMI status                      |                 |                               |        |
| Underweight                     | 85              | 66(77.6)                      | 20     | 13(65.0)  | 0.670 |
| Normal, unknown                 | 904             | 673(74.4)                     | 274    | 207(75.5) | 0.896 |
Our study showed that predictors of low awareness of calling EMS in general were ≥ 50 years age, primary education, and no medical insurance. This is in line with some studies that demonstrated that lower education [51], older age [51], and no medical insurance [29] were low predictors. It contrasts some studies that showed older age [29, 35, 43] were associated with high awareness of calling EMS, but no association with age [24, 33], education [24, 33, 35], and medical insurance [24, 51]. Our study showed association of low awareness with residing/working together. It contrasts a study that showed those living alone [35] were low predictors, while another one did not show any association [24]. Our study showed association of low awareness with male gender, but no association with marital status, or history of cardiovascular diseases. This resonates with one study that showed association of low awareness with male gender [33] but contrasts some that did not show any association with gender [24, 51]. It partly resonates with some that did not show association with prior stroke [24, 29, 33, 35, 64–66]. It contrasts some studies that showed married marital status, history of cholesterol and history of angina [43] were associated with high awareness.

Awareness of seeking immediate medical assistance was adequate among outpatients and the public, with both achieving mean scores of at least 93.0%. In our study, predictors of low awareness of seeking immediate medical assistance were young age. This is in line with some studies [15, 18, 21], but contrasts some that did not show association with age [19, 30, 33, 67, 68]. Our study showed association of low awareness with secondary education and residing/working together. This contrasts one study that did not show association with education [30], while living alone [33] was associated with low awareness. Our study did not show association of awareness with gender, hypertension, and cardiovascular diseases. It resonates with one study [30] that did not show association with gender. However, it contrasts some studies that showed male gender [18, 33], low risk factor levels [15], and no history of cardiovascular diseases [18] were associated with low awareness. Discrepancies in these studies can be attributed to differences in study population.

### Limitations

Our study is one of the very few studies worldwide if not the first in Sub-Saharan Africa assessing awareness of calling EMS and seeking immediate medical assistance by acute stroke among public and outpatients concurrently. All information from the questionnaires was collected through standardized face-to-face interviews. We compared our results with mostly previous closed-ended studies for the public and patients. There are some limitations to this study. First, the survey was conducted in only communities and healthcare facilities in greater Gaborone and not all communities/healthcare facilities were represented, therefore it may not represent all communities in the country. Second, despite all similarities and variations between studies, some studies considered better/ high awareness differently with some either considering awareness based on sums of awareness questions while we resorted to lowest or highest mean score. Third, self-reported factors/characteristics are prone to bias. Lastly, there may be differences in demographic and other factors between responders and non-responders that we are unable to account for. Despite these limitations, a reasonable high response rate of 94% was attained and therefore these results represent current knowledge of the public and outpatients in greater Gaborone.

### Table 4 (continued)

| Source of stroke information | Public n = 2013 | no. aware (% aware) | Outpatients no. of respondents | #p |
|-----------------------------|----------------|---------------------|-------------------------------|----|
| Overweight                  | 458            | 359(78.4)           | 211                           | 189(89.6) | 0.299 |
| Obesity                     | 566            | 432(76.3)           | 290                           | 261(90.0) | 0.142 |
| Family or friends           | 1231           | 951(77.3)           | 482                           | 414(85.9) | 0.208 |
| T.V or radio                | 1132           | 845(74.6)           | 532                           | 479(90.0) | 0.022 |
| Newspaper or magazine       | 769            | 657(85.4)           | 468                           | 434(92.7) | 0.351 |
| Social Media (Internet, Facebook, WhatsApp) | 527       | 436(82.7)           | 202                           | 187(92.6) | 0.369 |
| Doctor or nurse             | 754            | 599(79.4)           | 316                           | 281(88.9) | 0.275 |
| Others (school, patients, experience) | 316     | 249(78.8)           | 143                           | 112(78.3) | 0.970 |

NA not applicable

* between outpatients and public
Table 5  Awareness of seeking immediate medical assistance by sociodemographic and stroke risk factors, stroke responses and source of information

|                          | Public n = 2013 |          | Outpatients n = 795 |          | \( ^4p \) |
|--------------------------|----------------|----------|---------------------|----------|----------|
| **Sociodemographic factors** |                |          |                     |          |          |
| Gender                   |                |          |                     |          |          |
| Female                   | 1097           | 1023(93.3) | 462                | 437(94.6) | 0.861    |
| Male                     | 916            | 840(91.7) | 333                | 313(94.0) | 0.793    |
| Age                      |                |          |                     |          |          |
| 18-34 yrs                | 1118           | 1021(91.3) | 383                | 357(93.2) | 0.814    |
| 35-49 yrs                | 588            | 551(93.7) | 254                | 243(95.7) | 0.849    |
| ≥ 50 yrs                 | 302            | 287(95.0) | 157                | 149(94.9) | 0.992    |
| Education                |                |          |                     |          |          |
| None/unspecified/primary | 252            | 234(92.9) |                    |          |          |
| Secondary                | 1113           | 1011(90.8)| 405                | 377(93.1) | 0.775    |
| Tertiary                 | 648            | 618(95.4) | 275                | 266(96.7) | 0.892    |
| Medical insurance        |                |          |                     |          |          |
| No                       | 2013           | 1863(92.5)| 375                | 345(92.0) | 0.943    |
| Yes                      | 0              | 0(0.0)   | 420                | 405(96.4) | NA       |
| Marital status           |                |          |                     |          |          |
| Married/cohab            | 728            | 671(92.2) | 254                | 239(94.1) | 0.847    |
| Other (single, divorcee, widowed, unspecified) | 1285 | 1192(92.8) | 541 | 511(94.5) | 0.809 |
| Residing/working status  |                |          |                     |          |          |
| Not from same company/ compound/ family | 1002 | 946(94.4) | 685 | 659(96.2) | 0.793 |
| Same                     | 1011           | 917(90.7) | 110                | 91(82.7)  | 0.546    |
| Stroke action            |                |          |                     |          |          |
| Awareness of calling EMS |                |          |                     |          |          |
| No                       | 483            | 414(85.7) | 125                | 100(80.0) | 0.658    |
| Yes                      | 1530           | 1449(94.7)| 670                | 650(97.0) | 0.719    |
| Stroke symptoms' reaction|                |          |                     |          |          |
| Speech Impairment        |                |          |                     |          |          |
| EMS                      | 785            | 728(92.7) | 318                | 302(95.0) | 0.807    |
| Medical clinic            | 1007           | 924(96.7)| 429                | 414(96.5) | 0.978    |
| Other                    | 221            | 161(72.9) | 48                 | 34(70.8)  | 0.916    |
| Dizziness/Loss of Balance|                |          |                     |          |          |
| EMS                      | 565            | 546(96.6)| 228                | 224(98.2) | 0.883    |
| Medical clinic            | 1009           | 955(94.6)| 422                | 404(95.7) | 0.892    |
| Other                    | 439            | 362(82.5)| 145                | 122(84.1) | 0.892    |
| Acute Headache           |                |          |                     |          |          |
| EMS                      | 624            | 586(93.9)| 249                | 242(97.2) | 0.752    |
| Medical clinic            | 1012           | 957(94.6)| 422                | 408(96.7) | 0.792    |
| Other                    | 377            | 320(84.9)| 124                | 100(80.6) | 0.750    |
| Blurred/Double Vision    |                |          |                     |          |          |
| EMS                      | 602            | 575(95.5)| 279                | 267(95.7) | 0.985    |
| Medical clinic            | 1024           | 982(95.9)| 444                | 426(95.9) | 0.995    |
| Other                    | 387            | 306(79.1)| 72                 | 57(79.2)  | 0.995    |
| Numbness/Dead Sensation on one side of the body | | | | | |
| EMS                      | 876            | 822(93.8)| 350                | 328(93.7) | 0.989    |
| Medical clinic            | 1042           | 968(92.9)| 425                | 406(95.5) | 0.695    |
| Other                    | 95             | 73(76.8) | 20                 | 16(80.0)  | 0.918    |
| Facial Muscles weakness on the lower part on one side | | | | | |
| EMS                      | 840            | 783(93.2)| 344                | 322(93.6) | 0.964    |
Table 5 (continued)

| Factor                              | Public n = 2013 | no. aware (% aware) | Outpatients n = 795 | no. aware (% aware) | p  
|-------------------------------------|----------------|---------------------|---------------------|---------------------|-----
| Medical clinic                      | 1078           | 1009 (93.6)         | 427                 | 409 (95.8)          | 0.781  
| Other                              | 95             | 71 (74.7)           | 24                  | 19 (79.2)           | 0.876  
| **Weakness on one body side**       |                |                     |                     |                     |     
| EMS                                | 853            | 789 (92.5)          | 326                 | 307 (94.2)          | 0.851  
| Medical clinic                      | 1051           | 987 (93.9)          | 450                 | 429 (95.3)          | 0.854  
| Other                              | 109            | 87 (79.8)           | 19                  | 14 (73.7)           | 0.842  
| **Confusion**                       |                |                     |                     |                     |     
| EMS                                | 497            | 469 (94.4)          | 204                 | 194 (95.1)          | 0.949  
| Medical clinic                      | 1081           | 1022 (94.5)         | 476                 | 456 (95.8)          | 0.869  
| Other                              | 435            | 372 (85.5)          | 115                 | 100 (87.0)          | 0.917  
| **Self-reported risk factors**      |                |                     |                     |                     |     
| Hypertension                        |                |                     |                     |                     |     
| No/unspecified                     | 1872           | 1733 (92.6)         | 660                 | 623 (94.4)          | 0.769  
| Yes                                | 141            | 130 (92.2)          | 135                 | 127 (94.1)          | 0.909  
| CVDS                                |                |                     |                     |                     |     
| No                                 | 1896           | 1755 (92.6)         | 716                 | 675 (94.3)          | 0.775  
| Yes                                | 117            | 108 (92.3)          | 79                  | 75 (94.9)           | 0.895  
| Smoking                             |                |                     |                     |                     |     
| No/unspecified                     | 1809           | 1685 (93.1)         | 619                 | 581 (93.9)          | 0.911  
| Current                            | 182            | 160 (87.9)          | 155                 | 150 (96.8)          | 0.551  
| Former                             | 22             | 18 (81.8)           | 21                  | 19 (90.5)           | 0.829  
| Healthy diet                        |                |                     |                     |                     |     
| No/unspecified                     | 802            | 761 (94.9)          | 317                 | 305 (96.2)          | 0.885  
| Yes                                | 1211           | 1102 (91.0)         | 478                 | 445 (93.1)          | 0.775  
| Alcohol consumption status         |                |                     |                     |                     |     
| No/unspecified                     | 1583           | 1496 (94.5)         | 511                 | 482 (94.3)          | 0.980  
| Current                            | 406            | 349 (86.0)          | 262                 | 248 (94.7)          | 0.414  
| Former                             | 24             | 18 (75.0)           | 22                  | 20 (90.9)           | 0.675  
| Family history of stroke/heart diseases |        |                     |                     |                     |     
| None/unspecified                   | 1246           | 1171 (94.0)         | 454                 | 424 (93.4)          | 0.937  
| Both stroke and heart diseases     | 227            | 206 (90.7)          | 162                 | 155 (95.7)          | 0.726  
| Heart diseases                     | 227            | 212 (93.4)          | 120                 | 116 (96.7)          | 0.833  
| Stroke                             | 313            | 274 (87.5)          | 59                  | 55 (93.2)           | 0.766  
| History of HIV/AIDS                |                |                     |                     |                     |     
| No/unspecified                     | 1724           | 1616 (93.7)         | 515                 | 487 (94.6)          | 0.904  
| Yes                                | 289            | 247 (85.5)          | 280                 | 263 (93.9)          | 0.451  
| History of psychiatric diseases    |                |                     |                     |                     |     
| No                                 | 2013           | 1863 (92.5)         | 706                 | 674 (95.5)          | 0.626  
| Yes                                | 0              | 0 (0.0)             | 89                  | 76 (85.4)           | NA    
| Calculated risk factors            |                |                     |                     |                     |     
| Physical activity status (MET min/week) |        |                     |                     |                     |     
| None/unspecified                   | 1585           | 1481 (93.4)         | 584                 | 550 (94.2)          | 0.911  
| Light                              | 66             | 53 (80.3)           | 46                  | 44 (95.7)           | 0.546  
| Moderate                           | 290            | 262 (90.3)          | 149                 | 137 (93.8)          | 0.800  
| High                               | 72             | 67 (93.1)           | 19                  | 19 (100.0)          | 0.846  
| BMI status                          |                |                     |                     |                     |     
| Underweight                        | 85             | 70 (82.4)           | 20                  | 19 (95.0)           | 0.702  
| Normal, unknown                    | 904            | 814 (90.0)          | 274                 | 251 (91.6)          | 0.867  
| Overweight                         | 458            | 431 (94.1)          | 211                 | 202 (95.7)          | 0.887  

Conclusion
Despite adequate awareness of calling EMS or seeking immediate medical services by acute stroke, there are still gaps in awareness among some subgroups. Therefore, results call for policy makers together with other stakeholders for educational campaigns on awareness of calling EMS/seeking immediate medical assistance by stroke targeting these subgroups using all sources of information available.

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12883-022-02859-z.

Additional file 1: eFigure 1. Awareness of calling EMS by acute stroke study.

Additional file 2.

Additional file 3: eTable 1. Sources of stroke information among respondents.

Additional file 4: eTable 2. Mann-Whitney U/Kruskal-Wallis H - Association of awareness of calling EMS, and seeking immediate medical assistance with sociodemographic factors among respondents.

Additional file 5.

Availability of data and materials
The datasets used and analyzed during the current study are available in the attached file.

Declarations
Ethics approval and consent to participate
Ethical clearance for this study was granted in accordance with the Helsinki declaration for medical research from the following institutional review committees: Human Research Ethics of University of Botswana, Ministry of Health and Wellness in Botswana, Health Research and Development Division (ref. no. HPDME: 13/18/1) and Regional Committee for Medical Research Ethics South East Norway, section C (ref. 2018/774/REK), Norway. All eligible respondents were given oral and written information on the study including publication of the results, and written informed consent sought prior to inclusion in the study. Questionnaires were anonymous.

Consent for publication
Not applicable.

Competing interests
None declared.

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