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Factors Influencing Cervical Cancer Screening: A Cross-Sectional Study Among Ethnically Diverse Women in the Kumasi Metropolis of Ghana

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ABSTRACT

Background: Globally, Ghana is one of the countries with the greatest cervical cancer (CC) burdens and mortality rates. Available research has focused primarily on women's experiences in the general population neglecting factors that influence cervical cancer screening (CCS) among ethnically diverse populations in Ghana.

Aim: This study explored the factors influencing CCS among ethnically diverse women in the Kumasi Metropolis of Ghana.

Method: From April to June 2023, a community-based cross-sectional study was carried out in the Aboabo and Asawase communities of the Ashanti Region. Binary and multivariable logistic regressions were employed to determine the relationships between the dependent and independent variables. Outcome variables with p-values < 0.05 were considered statistically significant.

Results: Habits, knowledge, perceived benefits, and facilitating factors influenced CCS among ethnically diverse women. An overall self-reported CCS rate of 7.2% ($n = 32$) with an early age of sexual initiation of 15–20 years was recorded. While habits (OR = 0.23, 95% CI 0.09, 0.58; $p = 0.002$), affect (OR = 0.00, 95% CI 0.00, 0.03; $p < 0.001$), and the perceived benefits of screening (OR = 3.07, 95% Cl 1.01, 10.8; $p = 0.059$) were associated with CCS. Norms (OR = 0.00, 95% CI 0.00, 20,948,726,859,075; $p > 0.9$), knowledge (OR = 1.27, 95% CI 0.61, 2.53; $p = 0.5$), and facilitating factors (OR = 1.02, 95% CI 0.51, 2.01; $p > 0.9$) were not statistically significant with CCS.

Conclusion: Poor knowledge, lower perceived benefits of CCS, and weak facilitating factors were identified as barriers to CCS. Implementing national CCS and vaccination campaigns to improve awareness, and screening to reduce women's risk is encouraged.

1 | Introduction

Globalization is merging cultures, people, religions, and perspectives and Ghana is no exception. Moreover, both sub-regional and regional migration are fast merging West African cultures through marriage, education, work, and trade. Regional and cultural integrations have implications for public health practice. Clinicians are increasingly encountering patients with a broad range of perspectives regarding health, often influenced by their social or cultural backgrounds. Patients may present their symptoms quite differently from conventional textbooks, have different thresholds of symptoms for seeking care, or differing expectations about their care. Patients may have limited English proficiency, and hold unfamiliar beliefs

that influence adherence to providers' recommendations. However, the Ghanaian health system appears not to be responding effectively to these emerging trends. These complex dynamics posed by migration certainly have a negative impact on the quality of communication between healthcare providers (HCPs) and minority patients in healthcare facilities in Ghana. Additionally, an interface between the principle of social justice and anthropological concepts has brought about a major paradigm shift that seeks to incorporate culture into nursing care for ethnically diverse populations. Subsequently, all health care providers are expected to render care that is highly individualized and culturally congruent with seekers of health care with complex needs and expectations.

Campinha-Bacote [1] argued that all seekers of health care have values, beliefs, and practices that influence health care. Research has shown a positive association between the cultural competence of HCPs and turnout for preventive public screening programs [2]. Culturally competent care has been shown to improve patient's satisfaction with healthcare services and later follow-up [3]. Challenges encountered by women among the general population wanting to access health care have included language barriers, issues with providers of the opposite sex, fatalism, and stigma associated with a positive diagnosis, thus generating poor interest in cervical cancer screening (CCS) [4]. In Ghana, cervical cancer awareness among women of reproductive age is low [5]. Most of the studies in Ghana concerning cervical cancer (CC) have involved women in the general population aggregating the unique experiences of culturally diverse women with women in the general population. However, culturally diverse women in Ghana can be CC's key population but are understudied. This population may be disproportionally vulnerable to CC due to their strong ties to their cultural and religious norms which may conflict with screening practices and female bodily exposure by HCPs [6] in a region different from their regions of ancestry.

Cervical cancer has been ranked as the second leading cause of female cancer but the third leading cause of cancer deaths in women aged 15–44 years in Ghana [7]. Cervical cancer-related morbidity and death among females in the reproductive age bracket in Ghana has an annual estimated crude incidence of 18.3 per 100,000 per year [8]. The WHO estimates Ghana's annual age-standardized cervical cancer incidence rate as 27.4 per 100,000 women which is four times the United States (US) rate [8], while the mortality rate is 23.3/100,000, or 10 times the US rate [8]. Ghanaian women have nearly three times the cumulative risk of dying from cervical cancer compared to the global average (Bruni et al., 2021). While the total incidence and death of cervical cancer globally has been on the decline, Ghana's case numbers and number of deaths continue to increase [9]. Ghana records an annual diagnosis rate of 2797 cases and 1699 deaths [10]. About 95% of the cases are not diagnosed until the palliative stage due to low awareness and treatment that is either challenging due to metastasis, expensive, or impossible [11].

Evidence suggests that the majority of cases of CC are caused by the highly oncogenic strains of Human Papillomavirus (HPV) [10]. Ghana is yet to include HPV vaccination in its national vaccination schedule and fewer than 1 in 10 women have been screened for CC in the last 5 years (World Health Organization, 2021). Cancer diagnosis and treatment services in Ghana are not widely available across the levels of care (World Health Organization, 2021).

Generally, knowledge of CC risk factors, symptoms, treatment, and prevention has been very poor in Ghana [5, 12, 13]. However, Stuart et al. [14] reported knowledge and awareness of the disease varied sharply with one's sociodemographic characteristics. Contrary to the popular belief among earlier researchers that CC was common among specific occupations, Ebu et al. [15] reported in their study in Ghana that even among the general population 68.4% had never heard of CC, 93.6% were not aware of the risk factors, and 97.7% had not heard of CCS exercises.

Individuals professing the Islamic faith constitute approximately 25% of Ghana's population [16]. CCS services in Ghana appear to serve the cultural and religious needs of mainstream non-Muslim Ghanaians depriving Muslim women of respectful and culturally sensitive reproductive care needs [13]. Enyan et al., [13] reported a knowledge deficit among 95% of Muslim women with a corresponding increased risk of exposure to CC. Research shows that polygamous relationships and multiple sexual partners are risk factors for contracting HPV [17]. Therefore, committed Islamic women who find themselves in polygamous marriages have higher chances of being exposed to HPV, yet turnout was low in that population [13]. Meanwhile Enyan et al. [13] argued that knowledge was directly associated with women's screening participation intentions. Other barriers identified included violations of the Islamic code of modesty [13]. This implies the more committed women are to the Islamic faith, the less likelihood of their intention to be screened for CC. A positive attitude toward CCS was found to influence women's intention to screen and actual participation in CCS programs [13]. This study is a response to the persistent criticism of researchers in Africa for overfocussing on the biomedical barriers to cancer screening and neglecting the sociocultural aspects, which consider how social, cultural, and religious factors impact screening [18, 19-21]. The sociocultural perspective on cancer research is imperative given Africa's persistent cancer knowledge and education deficits [21]. Also, the sociocultural perspective addresses cancer prevention and early detection strategies in a culturally sensitive manner, especially for vulnerable populations in Africa [18, 19, 21]. Despite Ghana's diverse population, to the best of our knowledge, no studies on CC have been undertaken among Ghana's culturally diverse population. It was against this background that this study was carried out.

2 | Aim of the Study

This study sought to explore the factors influencing CCS among culturally diverse women in the Kumasi Metropolis of Ghana.

3 | Theoretical Models

The Theory of Care Seeking Behavior (TCSB) as developed by Lauver [22], was based on Triandis' Theory of Interpersonal

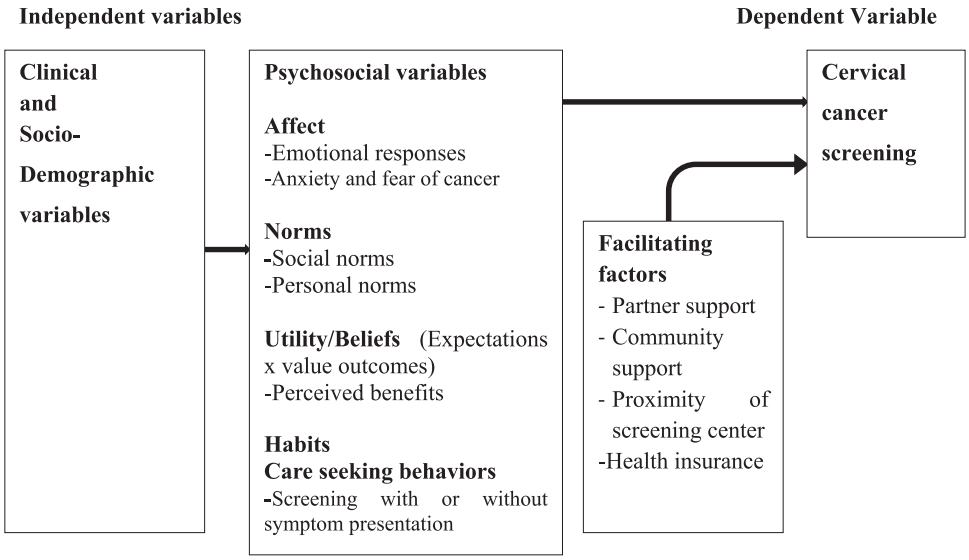

FIGURE 1 | The conceptual framework of the study adopted from the Theory of Care Seeking Behavior (TCSB) [18].

Behavior, and consists of four main constructs including practices, barriers, knowledge of cervical cancer, and sociodemographic factors as shown in Figure 1 The TCSB is based on assumptions that individuals will engage in preventive behavior if they (1) generally follow healthy practices; (2) have no negative emotions of fear, anxiety or embarrassment associated with the performance of the behavior but are optimistic about its outcome; (3) feel supported by significant others to do so; and (4) when the sociodemographic situations are conducive. The TCSB has also been used to explain population behavior on screening tests [23].

This study adopted TCSB to explain and predict CCS behavior which is a secondary prevention behavior (as opposed to an illness situation). The study was guided by the main constructs of the TCSB including habits, affect, norms, facilitating factors, expectations, and utility. Cultural sensitivity has been added as a modification of the original model. Figure 1 is the conceptual framework based on a modification of the TCSB chosen to guide this study. The theory of TCSB was chosen as evidence shows its ability to provide answers to research questions more effectively, especially in resource-limited settings.

The constructs have been operationally defined as follows. Affect relates to the feelings that a culturally diverse woman experiences when seeking care, such as anxiety over a possible positive diagnosis or embarrassment about an examination. Utility indicates the sum of corresponding expectations and values around CC care-seeking outcomes for culturally diverse women. Value refers to the significance of those outcomes. For this study, the perceived benefit construct describes a person's conviction that specific favorable outcomes would occur from a particular behavior. The term perceived benefit was used in place of the term utility to enhance understanding of the utility construct of TCSB. The perceived benefit of CCS is closely related to expectation and value outcomes because it describes the positive outcomes that an individual expects to obtain from seeking care (e.g., screening). In other words, the perceived benefit construct/beliefs pertain to the potential outcomes of seeking care or participating in health behaviors, such as the advantages of early detection, treatment, or improved health. Normative influences include both social and personal norms, as well as interpersonal agreements to seek care. Social norms are other people's beliefs about care-seeking. Personal norms are one's personal opinions about what is morally proper when seeking care. Habit relates to how an individual acts when experiencing symptoms (e.g., whether or not one gets medical attention right away). Habit reflects one's regular care-seeking conduct as well as previous care-seeking experiences. Facilitating factors are precise, objective, external conditions that allow one to seek care, such as proximity to screening facilities, without which care-seeking will be hampered.

Clinical factors include current and prior conditions such as the family history of cervical cancer, and a personal history of abnormal findings from screening that have been linked directly to cancer screening [23, 24]. However, clinical factors in the original model were replaced with participants' prior knowledge about cervical cancer, reproductive, lifestyle, and health services-related factors because environmental, reproductive, hormonal, and lifestyle factors have all been linked to individual chances of cancer development [25]. Furthermore, Lauver argued that cancer screening behavior could be explained solely by variables external to the theory through mediation with the four main theoretical variables [22]. Knowledge (inversely associated with breast cancer risk) as a composite variable, reproductive, lifestyle, and health services-related factors combined with sociodemographic data from culturally diverse women, is likely to improve understanding of culturally diverse women's CCS behaviors.

4 | Methods and Materials

4.1 | Study Design and Study Period

This study employed a cross-sectional design among ethnically diverse women in two migrant communities in the Asokore

Mampong District of the Ashanti Region from April to June 2023. This study was ethically approved by the Committee on Human Research Publication and Ethics at the School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology (Ref. CHRPE/AP/190/23). Permissions were obtained from the municipal chief executive of the Asokore Mampong Municipal Assembly, Kumasi. Participants were provided with information on the purpose and nature of the study. Each participant signed an informed consent form before data were collected. The anonymity of respondents and confidentiality were ensured by ensuring that personal information was kept safe on a computer secured with a password changed every 3 days. The principal investigator was the only researcher who had access to respondents' personal information. The Aboabo and Asawase communities in the Asokore Mampong District were selected for this study for several reasons.

4.2 | Study Area

Ghana's Ashanti Region is the second largest and most ethnically diverse region in Ghana, with an estimated population of 5,440,463 [16]. The Ashanti Region accounts for 14.2% of Ghana's overall migrant population. Not only is the Ashanti Region dominated by individuals of Ashanti ethnicity but has 39.3% of Ghana's overall Akan population [16]. Factors that contribute to Kumasi's ethnic and cultural diversity include the city's strategic location and growing urbanization, as well as the ability of many ethnic groups to coexist and share cultural values [26]. The study was carried out in the Asokore Mampong Municipality which is 1 of the 43 districts of the Ashanti Region with Kumasi as its capital. The Asokore Mampong Municipality is home to about 11.2% of the culturally diverse population in the region [16]. The municipality is made up of 14 clusters of communities with an estimated population of 42,037 people consisting of Akan (40.9%), followed by people from Northern Ghana (36.7%), the Guans (10.7%), Ewes (3.0%), and Ga Dangme (4.6%) [16]. The Islamic religion is most dominant among all the religious groups in the municipality with 55.4% representation, Christians follow with 41.8%, and other religious groups constitute 2.8% [16]. To focus on the factors that influence CCS among ethnically diverse women in the Asokore Mampong Municipality of the Ashanti Region, it was necessary to exclude natives of the Ashanti Region as evidence shows that the healthcare system tends to be respectful of the cultural norms of host regions [27]. Given the traditional and culturally strong nature of the Ashanti Region [16], it is not only possible that local cultural norms may have infiltrated healthcare systems in the region but can also negatively influence the healthcare experiences of non-natives who may not share similar cultural norms as the natives creating inequities and ethical challenges for culturally diverse women [27]. This exclusion allows for a detailed examination of the unique challenges that confront culturally diverse populations [28, 29]. By focusing on ethnically diverse women's experiences, researchers can better understand the impact of factors such as perceived benefits from health screening, health literacy levels, and cultural variations on healthcare utilization and outcomes [28]. Furthermore, the barriers to CCS that ethnically diverse populations face may represent the structural concerns of unequal access to screening services that these women frequently confront within the larger healthcare system [29, 30].

4.3 | Inclusion and Exclusion Criteria

4.3.1 | Inclusion Criteria

a. Women aged 18 years and above.

b. Immigrant women from other parts of Africa who can speak either Twi, Hausa, or English.

c. Ghanaian migrant women from other regions of Ghana who can speak either Twi, Hausa or English.

d. Residents in the Asawase, and Aboabo communities for at least 12 months.

e. Respondents with the above characteristics who were willing and consented to participate in the study were enrolled.

f. Women without any form of visual or hearing impairments.

4.3.2 | Exclusion Criteria

a. Native of Ashanti (the study region).

b. Below 18 years or with visual and hearing impairments.

4.4 | Sample Size Determination

Data from the reference [16], Population and Housing Census, showed that 173,054 (17.6%) of the population in the metropolis are migrants. The sample size was estimated using Slovin's mathematical formula to determine the minimum sample size $n = N/(1 + Ne^2)$. Where n is the sample size, N (173,054) is the population size, and e (0.05) is the level of precision. The estimated sample size was then $173{,}054/1 + 173{,}054\ (0.05)^2 = = 399.07$. Assuming a nonresponse rate is 10 percent. Therefore, adjustment for nonresponse = 399.07/0.9. Thus, the estimated sample size was = 445.

4.5 | Data Collection Procedure and Tool

A two-stage selection approach was employed to identify communities and respondents from each of the communities. During stage one, two migrant communities were chosen out of six communities through balloting based on the fact that they were home to migrant populations. The principal investigator with the two field officers who were experts in both Hausa and three major languages spoken in both communities sampled respondents from both Aboabo and Asawaase.

In stage two, a simple random sampling technique and systematic proportional sampling technique were deployed to select participants from each selected household in the two migrant communities.

The household sampling intervals for both study sites were determined by the quotient of the number of households (N) and divided by sample size (n). Every N/nth household was selected for the study. For instance, for the Aboabo community, the sampling interval was determined as follows: 6626/

445 = 15th household, while for Asawase, the sampling interval was determined as 9144/445 = 20th household. The first household to be visited at Aboabo was determined by a random method. A number between 1 and 10 was assigned to the respondents and the respondent selected the first house based on counting that number from the closest house to the drop-off point. The population sizes for eligible women between the ages of 18–64 years at Asawase and Aboabo were 46,315, and 34,206 respectively, with a total population of the two communities as 80,521. The proportionate number of respondents to be recruited from each migrant community was determined as shown below:

$$\text{Asawase} = \frac{46315}{80,521} \times 445 = 255$$

$$\text{Aboabo} = \frac{34206}{80,521} \times 445 = 188$$

A migrant woman who met the inclusion criteria from each of the 15th and 20th households in Aboabo and Asawase respectively and expressed interest in the study was enrolled. This process was repeated separately for each of the two migrant communities until the required sample size for each of the communities was attained. First, for each household, the list of eligible women was retrieved from the head of the household. The respondents to be selected from each household were determined using probability sampling proportional to the total number of eligible respondents for that community. The number of respondents for each community was obtained by dividing the number of eligible women in each community by the total number of eligible women in the two selected communities and multiplying by the estimated sample size. To ensure that each eligible respondent had an equal chance of being selected, unique identifiers were assigned to all the names of respondents in each household. The unique identifiers were put in a bowl and randomly drawn. Respondents whose unique identifiers were drawn and met the inclusion criteria were invited to participate. Eligible women varied in age, profession, and different religious sects including different degrees of adherence to their cultural and religious values. A written consent was provided, and participation was entirely voluntary.

The principal investigator or a member of the research team personally invited women to participate in the recruitment process through the community address system. The heads of households and the employees of the Asokore Mampong Municipal Assembly assisted the process by sending out study leaflets developed by the research team informing eligible women that a researcher would be visiting their homes and encouraging them to volunteer. In addition, heads of households provided physical areas where the questionnaire could be completed. The respondents who agreed to participate in the study were enrolled. Each questionnaire had a 15-min completion time. The process was repeated until the proportionate estimated sample size for each migrant community relative to the total sample size was obtained. The questionnaires were completed during a time that did not interfere with family or household activities. All 445 questionnaires issued were completely and accurately filled out and returned on the spot. As a result, a 100% response rate was reached. Data collection began in Asawaase, followed by that of Aboabo lasting around 8 weeks. The researchers felt that this sampling procedure was the most effective for fulfilling the study objectives since it was likely to yield an objective outcome that was representative of the target population and could be generalized.

A modified version of the validated self-assessment tool for cervical cancer risk originally developed by Purwandari et al. [31] and adopted by several researchers was used as the data collection tool. The data collection tool measured the main constructs of TCSB which were selected through a literature search. The resulting questionnaire consisted of 2 sections. The first section consisted of 9 items, exploring participants' demographic and background characteristics including age, education, religion, and religious sect, occupation, ethnic affiliation, migrant status from within or outside Ghana. The second section explored participants' knowledge and risk factors for cervical cancer (awareness, cause, risk factors, and clinical features) using 46 items based on earlier work by Dsouza et al. [32]. Of the total items, 8 items measured the utility construct, 11 items measured the habits construct and 2 items measured the expectations construct of the TCSB. Each item had a dichotomous variable (Yes/No) and was assigned a composite score by summing the number of responses against the total number of correct responses. A correct response was determined by correctly identifying facts about CC. A correct response was categorized as low risk, while an incorrect response was categorized as high risk. Responses were scored as either correct (1) or wrong (0). The tool consisted of questions that explored participants' core knowledge about cervical cancer and screening, CCS behavior, and CCS intention. To validate the resulting questionnaire, the study team translated and culturally adjusted the research instruments using established research methodologies. The instrument usability, content validity, and conceptual construction validity were all evaluated through instrument piloting. The original tool was translated from English to Hausa and Twi (predominant languages spoken in the study communities) by the research team and health sciences language expert, who also did an independent back-translation to English to ensure accuracy. An expert group made up of Hausa and Twi language translators from the Ghana Institute of Languages and the Kwame Nkrumah University of Science and Technology reached a consensus and blended the two forward-translated versions to create the Twi and Hausa versions. This was done to create the best possible instrument. A multidisciplinary four-member committee in Ghana, including experts in transcultural psychiatry and family medicine, examined the questionnaire during the translation, reverse translation, and overall questionnaire assessment procedure. To examine for potential mistranslations and language misunderstandings, the research team observed the procedure and deliberated on the question items and data during regularly planned meeting sessions. After validation, the questionnaire was distributed in the two research locations from April to June 2023.

4.6 | Data Processing and Analysis

Data were cleansed every day before being entered into the spreadsheet. Descriptive statistics such as frequencies and

percentages were used in analyzing the sociodemographic characteristics and the constructs of the TCSB. Data were analyzed using R version 4.3 (reference to R). Continuous data were summarized using median and interquartile range and categorical data were summarized with frequencies and percentages. To determine the predictors of women's knowledge of CC, respondents' responses were weighted and scored for each response. The scores were subsequently summed to have the total score. Scores below the median score were labeled as poor CC knowledge and scores above or equal to the median were labeled as adequate CC knowledge. However, to determine women's willingness to screen, initial responses from the TCSB domain areas such as cultural norms, affects, habits, and facilitating factors were weighted and split at the median to indicate the presence or absence of a domain. The TCSB domains and demographic variables were regressed for a final model selection. Subsequently, all the variables were included in an initial model. A backward stepwise approach was utilized to eliminate variables until the model Akaike Information Criterion (AIC) did not reduce significantly. Candidate models were developed and the model with the smallest AIC was selected. Variables with *p-values* of < 0.05 were considered statistically significant. In the third phase of the analysis, a binary logistic and multivariate analysis was carried out to explore the relationship and the strength of the variables associated with women's intention to undergo screening. Variables that were significant at $p < 0.05$ in the bivariate and multivariate analysis were regressed on intention to undertake cervical screening.

4.7 | Data Quality and Assurance

The research checklist was meticulously designed and pretested to ensure data quality. Before beginning fieldwork, the lead investigator provided two assistant field officers with 10 days of rigorous training on the study's goal, data collection instrument, sampling techniques, and suitable methods of eliciting responses from study participants. The questionnaire was pretested on 10% of the total sample size at another migrant community in the Ejisu-Juabeng Municipality of the Ashanti Region to ensure that the data collection tool assessed the necessary information for the study and that any ambiguous language was addressed. There were no significant revisions to the original draft.

5 | Results

Table 1 displays the sociodemographic information of migrants. Among the sampled participants, the majority were young with a median/interquartile range (IQR) age of 23 (21, 29) years with an early age of sexual initiation, (see Table 1). A significant proportion of participants were not married (337, 76%) but with an early sexual initiation and postsecondary level education. About 141 (32%) had an early sexual debut between the ages of 15 and 20 years. The majority (340, 76%) did not have a child. Despite the respondents' level of education, more than half were without occupations, ($n = 244$, 54.4%). Almost all the participants ($n = 427$, 96%) were Ghanaian migrants from other regions of Ghana other than the Ashanti Region, with a significant number ($n = 197$, 44.3%) from Ghanaian Northern

TABLE 1 | Demographic and sexual behavioral characteristics of participants.

Characteristic	*n* (%)
Age of sexual debut	
15–20	141 (32%)
21–25	75 (17%)
26–30	23 (5.2%)
31–40	6 (1.3%)
Do not remember	82 (18%)
Virgin	118 (27%)
Age of marriage	
< 20 years	9 (2.0%)
20 years and above	99 (22%)
Never married	337 (76%)
Parity	
1	38 (8.5%)
2	35 (7.9%)
3	21 (4.7)
4 and above	11 (2.5%)
None	340 (76%)
Education	
No secondary education	48 (11%)
High school graduate	115 (26%)
Postsecondary education	282 (63%)
Occupation	
Participants with no occupation	244 (54.4%)
Trader/self-employed	104 (23.6%)
Professions	97 (22%)
Income	
Less than GHS 366	162 (36.3%)
Between GHS 366 and 500	35 (7.9%)
Between GHS 500 and 700	50 (11%)
Between GHS 701 and 900	39 (8.8%)
GHS 901 and above	159 (36%)
Religion	
Christian	305 (68.7%)
Islam	134 (30%)
Nonreligious	5 (1.1%)
African traditional religion	1 (0.2%)
Islamic sect	
Ahmadiya	69 (51.4%)
Orthodox	35 (27%)
Shia	11 (8.3%)
Tijania	17 (13%)
Others	2 (0.3)

(Continues)

TABLE 1 | (Continued)

Characteristic	*n* (%)
Migration status	
Ghanaian migrants from other regions	427 (96%)
Non-Ghanaians from other African countries	18 (4.0%)
Ethnic affiliations of Ghanaian migrants	
Akan (non-Ashanti)	111 (24.9%)
Ewe	67 (15.1%)
Ga-Dangbe	47 (10.6%)
Non-Ghanaian	18 (4.0%)
Northern descent	197 (44.3%)
Other Ghanaian ethnic groups such as Guan, Nafana, Anlo, Avatime, Efutu	5 (1.1%)
Twi language	
Not fluent	121 (27%)
Fluent	324 (73%)
English language	
Not fluent	37 (8.3%)
Fluent	408 (91.7%)

Note: Median interquartile range (IQR); *n* = raw count; % = relative proportion of each subgroup.

ancestry and non-Ashanti Akan (111, 24.9%). Most respondents were Christians ($n = 305$, 68.7%) with Muslims accounting for 134 (30%) of the total number.

5.1 | Reproductive Health History and Lifestyle

Table 2 presents women's reproductive history and behavioral-related factors. A slight majority, 232 (52%), engaged in douching. Less than half of the women, 181 (41%), used a contraceptive as a regular method but 145 (33%) had used emergency contraceptives. HIV testing was high among them with 250 (56%) previously tested for HIV. Among participants, only 32 (7.2%) had genital checks for CC. Only 19 (4.3%) had been vaccinated for HPV and 37 (8.3%) had tested for HPV.

5.2 | Norms, Habits, Affect, and Facilitating Factors

Table 3 shows the distribution of norms, affects, habits, and facilitating factors for cervical screening of the participants. Participants who indicated a "yes" to a facilitating factor or/a norm item were awarded a point, while those who stated a "no" to a facilitating factor or/a norm item were scored a 0. The accumulated scores for facilitating factors or norm constructs were averaged, and participants with accumulated scores below the median (norm = 0 and facilitating factors = 1) were identified as having weak facilitating factors or norms related to cervical cancer. However, respondents who scored higher than the median were regarded as having stronger facilitating factors and norms. Almost all participants had no negative norms against CC screening.

TABLE 2 | Reproductive and behavioral-related factors.

Characteristic	No	Yes
Done genital checks regarding CC	413 (92.8%)	32 (7.2%)
HPV vaccinated	426 (96%)	19 (4.3%)
HPV screened	407 (92%)	37 (8.3%)
Polygamy	414 (93%)	31 (7.0%)
Douching	213 (48%)	232 (52%)
Douche with water	13 (5.5%)	224 (95%)
Douche with salt	237 (100%)	0 (0%)
Douche with herbs	145 (61%)	92 (39%)
Wash genitals after sex	134 (30%)	311 (70%)
Routine use of contraceptives	264 (59%)	181 (41%)
History of contraceptive use	300 (67%)	145 (33%)
STI history	405 (91%)	40 (9.0%)
Genital warts	430 (97%)	15 (3.4%)
HIV test	195 (44%)	250 (56%)
Alcohol use	361 (81%)	84 (19%)

Note: *n* (%); *n* = raw count; % = relative proportion.

Participants with a routine screening schedule (in the absence of vaginal symptoms) were regarded as having a positive habit and thus were allotted a positive score. However, women who neither indicated screening routinely (without a positive habit) nor screening upon presentation of vaginal symptoms scored 0. Participants with a score below the median (habit = 1) were labeled as having negative habits. Just like the computation of the scores for the other constructs, all the respective items for affect were scored with a median of 1. Participants who had no concerns with the screening procedure and a positive diagnosis were regarded as having a negative affect. Women who indicated that they avoided screening due to the heat experience of the screening procedure or were anxious about a positive CC diagnosis associated with screening were assigned a positive score. Respondents whose cumulative scores were below the median were classified as having a negative affect, while women whose cumulative scores were above the median were allotted a positive affect.

While the majority of women, 283 (64%) indicated that they would screen upon the presentation of two or fewer vaginal symptoms, 36% indicated that screening would not be needed until the presentation of two or more vaginal symptoms. Less than one-tenth of respondents avoided CCS due to cultural, and religious norms. Overall, 44 (11%) of the respondents were impacted by norms, 299 (73%) had affective concerns but many of respondents ($n = 148$; 36%) believed that CCS was necessary before the presentation of symptoms (see Table 3 for details).

5.3 | Women's Knowledge of Cervical Cancer

Table 4 presents the knowledge distribution of participants on CC. A maximum score of 11 was earned from correctly identifying all the facts about CC. The cumulative responses of participants for the knowledge items were scored weighted with the

TABLE 3 | Norms, affect, habits, and facilitating factors.

Characteristic	No	Yes
Norms		
Composite score for norms	401 (90%)	44 (9.9%)
CCS violates religious beliefs	429 (96%)	16 (3.6%)
Favor same-sex provider screening	424 (95%)	21 (4.7%)
CCS practices violate cultural beliefs	426 (96%)	19 (4.3%)
Husband/partner consent for CCS	438 (98%)	7 (1.6%)
Affects		
Composite score for affect	144 (32%)	301 (68%)
Heat experience	398 (89%)	47 (11%)
Shy	284 (64%)	161 (36%)
Virginity	426 (96%)	19 (4.3%)
Anxiety-related to CC diagnosis	364 (82%)	81 (18%)
Aware of the screening center	303 (68%)	142 (32%)
Habits		
Composite score for habits	162 (36%)	283 (64%)
Screen on two or fewer vaginal symptoms	162 (36%)	283 (64%)
Routine care	390 (88%)	55 (12%)
Absence of symptoms	296 (67%)	149 (33%)
Pre-employment screening	391 (88%)	54 (12%)
Health promotion seminar	380 (85%)	65 (15%)
Bleeding between periods	362 (81%)	83 (19%)
Bleeding related to intercourse	308 (69%)	137 (31%)
Menopausal bleeding	401 (90%)	44 (9.9%)
Odorous discharge	305 (69%)	140 (31%)
Blood-stained vaginal discharge	319 (72%)	126 (28%)
Pelvic pain	324 (73%)	121 (27%)
Facilitating factors		
Composite score for facilitating factors	255 (57%)	190 (43%)
Proximity	228 (51%)	217 (49%)
Ability to pay	174 (39%)	271 (61%)
Husband's permission	418 (94%)	27 (6.1%)
Religious support	359 (81%)	86 (19%)
Community support	347 (78%)	98 (22%)

Note: *n* (%); *n* = raw count; % = relative proportion.

median (IQR) being 5 (4, 6). The scores were then categorized as low or adequate knowledge based on the participant's median score. The knowledge of the women then was scored and graded as either low CC knowledge or adequate CC knowledge. Most women (310, 70%) scored low on their knowledge of CC.

5.4 | Predictors of Knowledge of Cervical Cancer

Table 5 shows a logistic regression model to predict women's knowledge relative to age, contraceptives, history of sexually transmitted infection (STI), and alcohol consumption (formula: score ~ age + contraceptives + history of STI + alcohol). Interaction with the healthcare system for alcohol-related problems, treatment for STIs, contraceptive services, and age-related gynecological examinations can be significant predictors of CC knowledge [33–37]. Holding other variables constant, a year age increase was associated with a 3% increase in knowledge, 1.03 (95% CI 1.01, 1.06; $p = 0.037$), Women who indicated they used contraceptives had a lower knowledge score compared to those who did not use a contraceptive (OR = [0.53, 95% CI 0.33, 0.82; $p = 0.005$]). Women with a history of STI exhibited higher knowledge (OR = 1.53, [95% CI 0.74, 3.06; $p = 0.236$]). Alcohol consumption among the women was statistically significant and

TABLE 4 | Cervical cancer knowledge.

Characteristic	No	Yes
Cervical cancer affects the mouth	420 (94%)	25 (5.6%)
Postcoital bleeding	162 (36%)	283 (64%)
Offensive blood	90 (20%)	355 (80%)
Cervical cancer is hereditary	279 (63%)	166 (37%)
Early cervical screening offers a better prognosis	87 (20%)	358 (80%)
Cervical cancer affects the face	408 (92%)	37 (8.3%)
Cervical cancer is not preventable	395 (89%)	50 (11%)
Vulva itching is a sign of cervical cancer	141 (32%)	304 (68%)
Transfusion is a risk	329 (74%)	116 (26%)
Multiple sex partners are a risk	46 (10%)	399 (90%)
A trained person must screen	14 (3.1%)	431 (97%)
Cervical cancer knowledge categorization		
Low cervical cancer knowledge	310 (70%)	
Adequate cervical cancer knowledge	135 (30%)	

Note: *n* (%); *n* = raw count; % = relative proportion.
Abbreviation: IQR, interquartile range.

TABLE 5 | Predictors of knowledge of cervical cancer.

Characteristic	OR	95% CI	*p*-value
Age	1.03	1.01, 1.06	0.037
Contraceptives			
No	—	—	
Yes	0.53	0.33, 0.82	0.005
STI history			
No	—	—	
Yes	1.53	0.74, 3.06	0.2
Alcohol usage			
No	—	—	
Yes	1.72	1.01, 2.90	0.042

Abbreviation: CI = confidence interval; OR = odds ratio.

positively associated with knowledge of cervical cancer (OR = 1.72, [95% CI 1.01, 2.90]; $p = [0.042]$).

TABLE 6 | Perceived benefits of cervical screening.

Characteristic	No	Yes
Screening is necessary	237 (53%)	208 (47%)
Women must prioritize screening	241 (54%)	204 (46%)
Early detection of CC	35 (7.9%)	410 (92%)
Increase survival chances	114 (26%)	331 (74%)
Better prognosis	172 (39%)	273 (61%)
Quality of life improvement	128 (29%)	317 (71%)
Routine screening is cost-effective	282 (63%)	163 (37%)
Perceived benefit categorization of CCS		
No benefit	128 (29%)	
Some benefit	183 (41%)	
Beneficial	134 (30%)	

Note: *n* (%); *n* = raw count; % = relative proportion.
Abbreviation: IQR, interquartile range.

5.5 | Women's Perceived Benefits of Screening

Table 6 summarizes participants' perceived benefits of CCS. The respective variables for perceived benefits of screening were scored and weighted as was done with previous TCSB constructs. Based on the score for the perceived benefit of screening a median of (IQR) = 4 (3, 6) was obtained. Respondents with a score below the median (IQR) were regarded as having negative views on perceived benefits of screening while those with a score above the median (IQR) were deemed as having positive perceived benefits. Most respondents ($n = 410$, 92%) perceived that CCS could identify cervical alterations before the cervix develops cancer. Almost half of the respondents agreed that screening was necessary for women. Less than one-third of women perceived CCS to be beneficial.

5.6 | Fitted Regression Model for Predictors of Screening for Cervical Cancer

The multiple logistic regression was used to examine the number of predictor variables to determine those variables of the TCSB that best predict cervical screening among the study population. Results are shown in Table 7 below. Women with

TABLE 7 | Predictors of screening for cervical cancer.

Characteristic	OR	95% CI	*p*-value
Habit			
No	—	—	
Yes	0.23	0.09, 0.58	0.002
Perceived benefit			
No benefit	—	—	
Some benefit	2.07	0.61, 7.65	0.3
Beneficial	3.07	1.01, 10.8	0.059
Facilitating factors			
No	—	—	
Yes	0.98	0.28, 3.19	> 0.9
Affective concerns			
No	—	—	
Yes	0.00	0.00, 0.03	< 0.001
Knowledge categorization			
Low CC knowledge	—	—	
Adequate CC knowledge	0.52	0.14, 1.63	0.3
Facilitating factors * Knowledge			
Yes * Adequate CC knowledge	5.37	0.86, 38.0	0.080

Abbreviations: CI, confidence interval; IQR, interquartile range; OR, odds ratio.

more than two vaginal symptom presentations (habits) were less likely to undergo CCS, 0.23 (95% CI 0.09, 0.58; $p = 0.002$). Women who believed that CCS had some perceived benefits were twice as likely to screen, 2.07 (95% Cl 0.61,7.65; $p = 0.3$) and those who perceived CCS to be beneficial were three times more likely to screen 3.07 (95% Cl 1.01, 10.8; $p = 0.059$), relative to their counterparts who did not perceive any benefits of CCS. Regardless of the categorization of CCS perceived benefits, neither association was statistically significant. Women without affective concerns about the screening process were more likely to be screened than those with unmet affective needs, 0.00 (95% CI 0.00, 0.03; $p < 0.001$). Women with facilitating factors such as the proximity of screening centers to their places of residence, and husbands/partner support for CCS were less likely to screen, 0.98 (95% CI 0.28, 3.19; $p > 0.9$). Having adequate knowledge of CC was less likely to impact screening, 0.52 (95% CI 0.14, 1.63; $p = 0.3$). However, with the availability of facilitating factors and adequate knowledge of CC, women were most likely to screen, 5.37 (95% CI 0.86, 38.0; $p = 0.080$). Nonetheless, the relationship between the availability of facilitating factors and adequate knowledge is marginally significant. The model has a substantial explanatory power (Tjur's $R2 = 0.33$).

6 | Discussion

Cervical cancer disproportionately affects culturally diverse women [38], and Ghana may not be an exception. The factors influencing CCS among culturally diverse women in the Ashanti region's Asokore Mampong Municipality were the main focus of this study. A significant portion of the municipality's mostly culturally diverse women [16]. Four hundred and forty-four participants were chosen from the municipality's dense population, defined by many people living in an urban environment and being influenced by social and personal norms. Women's access to preventative health screening is impacted by socioeconomic and cultural sensitivity issues in the municipality's population [39].

A significant majority of ethnically diverse women were Ghanaian migrants consisting of women of Ghanaian Northern ancestry as well as women from non-Ashanti Akan ancestry. According to UNICEF Ghana's [40] report, Ghana's secondary school completion rate is about 35%, however, a significant majority of women (63%) sampled in this study had post-secondary education with half of them without an occupation. The high postsecondary education among participants in this study could be due to the government's inclusive education policy, also known as the "Free Senior High School" policy introduced 7 years ago [41]. The goal of the policy was to remove financial barriers to education and increase access to all Ghana children [41]. Although there was an increase in educational attainments among respondents, however many were unemployed. This could be due to the freeze on employment as a condition imposed by the International Monetary Fund program for Ghana's economic recovery [42]. A study in the French West Indies showed a direct correlation between occupation, income levels, and cervical screening [43]. According to Menvielle et al., [43], women with qualified occupations had higher CCS participation compared to those who never worked or had occupations. Menvielle et al. [43] argued that a skilled occupation is a good predictor of household income in the French West Indies, serving as a proxy for women's ability to pay for CCS services. In this study, income levels showed a split majority (Table 1), between women within the lowest income bracket and those within the highest income bracket. It is not surprising that more than half of respondents raised the ability to afford the cost of screening as the most preferred facilitating factor that could increase screening (Table 3). The lack of income-generating occupations could hinder respondents' ability to afford the cost of screening as authors have established a strong association between professional streams of occupation and financial access to preventive health services, wealth index, and employment status [44–51]. Authors have established a direct relationship between the educational attainment of women and higher screening rates [45, 52]. Ba et al. [45]; and Compaore et al. [53], contended that higher education is associated with higher CCS because educated women are more likely to be aware of the negative implications of avoiding CCS. The high screening rates among highly educated women underscore the need for more CC educational programs to promote and raise awareness in low-resource settings. Research shows that higher levels of education among women are linked to improved health awareness and information-processing skills, leading to enhanced adherence to CCS guidelines

[54, 55]. Furthermore, women with more education were more likely to comprehend screening information and processes, as well as the benefits and costs of avoiding screening which influenced their screening compared to women with lower educational attainment [56–58]. Although most of the respondents ($n = 262$, 63%) in this study had postsecondary qualifications, ethnically diverse women's educational status did not positively impact their screening prevalence as the CCS rate was poor. It is possible that the majority of women in this study were living with their parents given that they were unemployed, never married, and made less than GHC 900 (about 58 USD) monthly. In a conservative country like Ghana coupled with poor CC knowledge and CCS awareness in the country [13, 14], women receiving parental support may not be inclined to undergo screening to prevent judgment from parents that they are engaged in premarital sex [59]. The poor screening rate despite women's high educational attainment observed in this study is consistent with similar studies in Benin [60] and Togo [61].

Reproductive and behavioral-related characteristics as shown in Table 2 showed a concerning outcome as ethnically diverse women could be at an increased risk of CC. Compared to reports in other studies across developing countries, the poor CCS rate of 7.2% obtained in this study is consistent with previous research reports in Africa. For example, a 9.4% screening rate was reported in Oyo State, Nigeria [62], and a 15% screening rate in Malawi with the heaviest CC burden in Africa [63]. A systematic analysis of population-based surveys from regional and country-level trends of CCS coverage in sub-Saharan Africa showed that CCS generally had remained constant at 14% from 2000 to 2020 [64]. The CCS rate was almost similar in Eastern and Western/Central Africa regions with 13% and 6% screening rates respectively. However, there were important country-level variations. Benin was reported to have had the lowest screening coverage in 2020, with 1% of women ever screened, whereas South Africa had the highest coverage at 56% [64]. The poor CCS habits coupled with women's early sexual initiation age of between 15 and 20 years is concerning as this increases women's risk of CC. A study conducted in Surakarta, Indonesia showed that women who had sexual intercourse before the age of 20 years had a 5.44-fold increased chance of developing CC [65]. Drawing on Arfailasufandi's et al. [65] argument, more than a quarter of ethnically diverse women sampled in this study could be almost six times the risk of developing CC due to women's early sexual exposure. The increased risk among women could be due to several reasons. First, several authors have attributed the low screening rates to poor public awareness or knowledge [7, 10, 66–68]. Quersin et al. [69] contend that in high-income countries women who abstained from screening did so either for cultural or economic reasons, low level of income, women who did not have children, did not have a partner, or were postmenopausal. Second, the poor knowledge was attributed to the absence of National Cervical Cancer screening programs in Ghana, Nigeria, and Cameroon [7, 10, 66–68]. The role of a national cervical and HPV vaccination policy cannot be overemphasized. Despite the poor CC knowledge and screening behavior among the study population, more than half of the respondents had undergone HIV testing. The relatively higher HIV/AIDS screening rate to lower CCS rates in the same population as shown in Table 3 has been attributed to Ghana's robust HIV screening policy [70–75]. In the absence of a national policy, the 7.2% screening rate in addition to the poor reproductive and behavioral risk reduction of women observed in this study is problematic. To realize the WHO Cervical Cancer Elimination Strategy targets for 2030 [8], there is an urgent need for a national screening program. However, Ghana like many other developing countries has several competing development priorities such as a high burden of infectious diseases, and maternal and child health issues coupled with limited health resources, shifting its limited resources from CC preventive screening to disease crisis management [36, 76–78].

Moreover, more than half of women engaged in intravaginal practices (IVPs) (douching), with less than half having histories of either emergency contraceptives or regular contraceptive use. Intravaginal douching has been linked to HPV genotypes that infected 1271 women aged 20–49 years in the United States of America (USA) in the National Health and Nutrition Examination Survey from 2003 to 2004 [79]. According to the National Health and Nutrition Examination Survey from 2003 to 2004, douching in the previous 6 months was substantially linked to all genital HPV types with a relative risk ratio of 1.26; and HPV high-risk types (1.40; 1.09–1.80) [79]. According to Museba et al. [80], IVPs are practices undertaken by women to promote hygiene and increase male sexual pleasure and sexual health in a variety of global contexts. Nonetheless, douching has been associated with HPV-16 DNA redetection at follow-up in longitudinal research in the United States who had confirmed or suspected HPV-16 infection [81]. Further, the practice was also linked to an elevated risk of high-grade precancerous lesions [82, 83] despite the inconsistent association between douching and HPV infection in the literature [79].

Almost half (41%) of women have used contraceptives with more than a quarter (33%) having used emergency contraceptives. Despite the precise cause of CC which remains unknown, the long-term use of oral contraceptives has been associated with women's increased risk of developing CC [84]. According to a World Health Organization's technical report (1992), using oral contraceptives carried a 1.19-fold increased relative risk than normal, and this risk would rise over time with use [85]. Women who had used contraceptives for 5 years or more had a 9-fold increased risk of CC due to the formation of cervical precancerous lesions with a grade of CIN 2/3 [84]. Thus, the increased prevalence of contraceptive use among ethnically diverse women with a poor CCS habit and increased CC risky behavior practice is worrisome. Many of the participants in this study could have precancerous cells but undetected due to their poor screening habits.

Knowledge of the cause and symptoms of CC among respondents in this study was poor as participants ranked within the low knowledge category (Table 4). This outcome is problematic as knowledge of the signs and symptoms was a crucial predictor of CCS in the Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu, Kenya [86]. Poor knowledge has been reported in several other studies in Ghana [15], India [87, 88], and Malawi [89]. Aweke et al. [44]; Ba et al. [45]; Berhe et al. [46]; Dickson et al. [47]; Menon et al. [49]; Tiruneh et al. [51] have attributed poor CC knowledge to a lack of information among women. Adanu [90] linked the lack of awareness about CC in

Ghana to the lack of a nationwide screening scheme with well-disseminated content to the public on key risk factors for CC. Over two decades since Adanu's [90] report, unfortunately, Ghana's lack of a national CCS and HPV vaccination program persists. Thus due to the opportunistic nature of screening for women of reproductive ages in Africa [68], regular contact with HCPs even among less educated women has been shown to positively influence CC knowledge [14, 44]. Stuart et al. [14] attributed the adequate CC knowledge among HIV seropositive women in Ghana despite their lower education attainment to their access to HCPs during antiretroviral medication counseling sessions. Age was a significant predictor of CC knowledge in this study. The increasing age of respondents corresponded with increasing CC knowledge, consistent with several other studies [45, 48, 53, 91]. Lemma et al. [34] justified the increasing CC knowledge among older women because Ethiopian women between the ages of 30-49 years are encouraged to get checked, while those over the age of 40 generally have good CC screening behavior [34]. As women age, they are more likely to give birth, have more gynecological exams including CCS, and receive more health information regarding sexual and reproductive health, including services for CC education and screening thus increasing their knowledge about signs and symptoms and mode of contraction [34]. History of STI was associated with women's knowledge of CC. Women who had tested positive for STIs in the past were more likely to be knowledgeable about CC than their counterparts with no known history. There could be several reasons for this outcome. According to Musa et al. [92] to establish a differential diagnosis of the cause of any STI including CC, there may be a propensity to recommend CCS, and education sessions about CC before screening commences. STIs such as HPV and chlamydia are linked to cervical carcinogenesis [35, 93–95] thus education is more likely to occur. As women undergo the process of STI treatments, they concurrently acquire knowledge about CC [92]. Comparatively, the CC knowledge disparity between women with a history of STI relative to those without a history has been attributed to increased healthcare interactions and awareness of related issues during STI sessions, potentially influencing women's knowledge levels. [96, 97]; and [98].

Strangely, women with histories of contraceptive use were less knowledgeable about CC than women with no history of contraceptive use. Several researchers have argued that the lack of CC knowledge among contraceptive users could be attributable to the decades of absence of Ghana's national screening and vaccination programs to promote active screening of women and prioritized CCS education by HCPS for contraceptive users [37, 99, 100]. Knowledge of CC is a vertical process where information is transmitted from the HCP to contraceptive users. The poor knowledge outcome among contraceptive users could be due to poor knowledge among Ghanaian contraceptive providers themselves [37, 101]. Aside from hospitals in Ghana, other outlets such as licensed chemical sellers and pharmacy shops provide contraceptive services. However, these different sources of contraceptives are manned by lower cadres of HCPs who may lack the requisite skills, knowledge, and training to undertake CC education. Thus, women who were contraceptive users in this study may have used these outlets instead of healthcare facilities as their contraceptive commodity sources. The lower CC knowledge among conceptive users in this study is consistent with previous studies in Central Ethiopia, USA, Kenya, Myanmar, and Japan [34, 102–105]. Further, in this study, there was a statistical difference between alcohol use and knowledge of CC, however only 19% stated that they consumed any alcohol.

Authors have emphasized the direct link between the perceived benefits of CCS and knowledge of CC [106, 107]. In most studies, low perceived benefits of CS have resulted in low knowledge among respondents [67, 106, 108–113]. The low perceived benefits of CCS and women's poor knowledge about CC in this study were expected as the low perceived benefits of screening could be due to poor public awareness because of the lack of a national cervical screening program to increase education in Ghana.

In both the bivariate analysis found in Appendix A1 and Table 7, there was a statistical significance between vaginal symptom presentation and women's willingness to screen. Interestingly, more than half of the women in this study were likely to screen only with the presentation of two or fewer symptoms threshold as shown in Table 4. This hesitation about CCS could be due to the low public awareness and lack of information about the CC. This screening hesitation phenomenon is not only peculiar to respondents in this study but also consistent with a study conducted at Chittagong Medical College Hospital in Bangladesh where almost two-thirds of women who presented for screening presented with vaginal bleeding, bloody vaginal discharge, foul-smelling discharge, and post-coital bleeding within a year of the appearance of symptoms [114]. Another study in California, USA, reported that of more than 16,000 women with CC in the study cohort, a quarter presented symptomatically with late-stage CC with an increased risk of death [115]. Sadly, the appearance of vaginal symptoms signifies an advanced malignancy, either stage II or III where minimal medical interventions can be instituted to save lives [114]. The composite score for habits in Table 4 shows ethnically diverse women could be at increased risk of advanced cancers at either stage II or III due to their late screening habits. This outcome is alarming considering Ghana's lack of trained professionals for cervical cancer treatment coupled with the high cost of treatment for CC [13].

In the bivariate analysis, an increase in the availability of facilitating factors provided a 10% increase in the likelihood of screening. Table 3 demonstrates compositely that more than half of the respondents did not believe the available facilitating factors could influence their CCS intentions. Except for financial support, husbands'/partners' support, the proximity of screening centers, and religious and community support were not enough to impact ethnically diverse women's screening intentions. There could be various explanations for the lack of facilitating factors that would influence women's willingness to screen. First, due to the absence of a national cervical cancer policy, there is a lack of information in a population with strong cultural values that frown upon public discussions on sex-related topics including female bodily exposure. Researchers have shown that in many conservative East Asian cultures, female bodily exposure to CCS is a delicate and secretive topic making it rare to be discussed in private or even in small community contexts [116]. Second, due to the sensitive nature

of CCS and cultural stigma against sex-related discussion on CCS, husbands/partners, religious and community networks may have avoided discussing several cancer risk factors, signs, and symptoms, especially in the absence of community health investments. Third, due to decades of poor investments in community resources, religious networks in Ghana have avoided CC and CCS education due to their lack of understanding of the disease, risk exposures, and screening guidelines [117]. Although the availability of facilitating factors modestly increased women's chances of screening, screening intention was not statistically significant with facilitating factors as shown in both Appendix A1 and Table 7. From Table 3, screening centers were farther away from the residential locations of respondents. Given the high unemployment status of respondents in this study, it is possible that the high cost of screening coupled with the additional burden of transportation costs to distant facilities could have compounded women's poor CCS habits as recorded in this study. Consistent with several studies in Ghana, the high resultant cost of screening is one of the reasons why Ghanaian women avoid CCS [14, 117–123]. It is not surprising that women's ability to cover the cost of screening was the single most important CCS facilitating factor in this study.

More than half of the respondents in this study had affective concerns regarding CS. Expectedly, women with affective concerns about CCS outcomes were less likely to screen relative to their counterparts without any affective challenges as shown in the bivariate analysis in Appendix A1. Authors have given several explanations for this outcome. Abdulelah et al. [124] attributed the affective concerns of women about CCS to the absence of comprehensive awareness campaigns, essential for the elimination of women's affective screening concerns. Additionally, Petersen et al. [125] argued that women's affective concerns which negatively influence screening uptake were due to ineffective messaging about CC, CCS, myths, and misconceptions about the cause of the disease which negatively influence screening uptake. Petersen et al. [125] further contended that women's affective concerns were due to weak health systems as a result of the lack of resources, and the lack of national and ambiguous health facility policies that fail to effectively enforce current CCS intervention policies. Neither adequate knowledge about CC nor the availability of facilitating factors predicted screening as shown in the multiple logistic regression in Table 7. However, the mutually reinforcing sum of adequate knowledge and supporting factors resulted in women being more than 5-fold likely to screen.

7 | Limitations

One of the study's limitations was that it was conducted in only one of the various ethnically diverse communities in Kumasi and across Ghana, thus the results are not nationally generalizable. Furthermore, the cross-sectional study does not infer causal relationships.

The factors that influenced CCS behavior among ethnically diverse women between the two migrant communities were not compared in this study. Although the different ethnic compositions between the two communities may have identified additional or different results, a comparison of the factors that influence ethnically diverse women's CCS was not done. This is because the focus of the study was to measure the factors that influence CCS broadly in the two ethnically diverse communities in the Asokore Mampong Municipality.

8 | Recommendations

The research findings led to several recommendations. The Ministry of Health and Ghana Health Service should partner with the government to include cervical screening and cancer treatment costs on the National Health Insurance Scheme, and design and deploy a national cancer prevention and treatment program across Ghana. The agencies should establish CCS and management units in all districts, municipalities, and regional hospitals nationwide. This could make cervical cancer awareness and information sources more accessible to patients. To increase awareness of cervical screening among ethnically diverse women, hospitals, and community health workers should organize outreach initiatives in local communities under their respective catchment areas to educate residents about the disease and the necessity of routine screening.

It is recommended that the Ministry of Health and Ghana Health Service adopt a standardized and contextualized version of the United States of America's Center for Disease Control Screening and HPV vaccination guide for Ghana which presently lacks such existing screening and vaccination guidelines for women in Ghana.

Since Ghana has one of highest contraceptive uptake in Africa, it is recommended that the Ministry of Health incorporate cervical screening into Ghana's contraceptive service provision or HIV voluntary counseling and testing tied to HPV testing and CS for vulnerable women at no cost. An encounter with a contraceptive service provider will concurrently offer women opportunities for HPV and cervical screenings. Moreover, policymakers should consider opportunities for self-testing which would eliminate women's affective concerns with HCP screening to increase both access to tests and decentralize screening facilities.

9 | Conclusion

The study established that ethnically diverse women had poor habits, knowledge of CC, and low perceived benefits of screening. However, the majority of women believed support with the cost of screening for women including out-of-pocket cost of screening may facilitate screening. Despite women's increased risk of cervical cancer based on their reproductive and behavioral related factors, the prevalence of cervical screening among ethnically diverse women's in Ghana was low. The factors that influenced ethnically diverse women's CCS in the Asokore Mampong Municipality were knowledge, affective concerns, perceived benefits of screening, presentation of vaginal symptoms, and facilitating factors. The Theory of Care Seeking Behavior had adequate explanatory power for all the factors that influence cervical screening in the study population

consistent with the argument of Dsouza et al. [34] that the model provided the best explanation for screening behavior in resource-limited settings.

Author Contributions

Abdul-K. Abubakari: conceptualization, writing – original draft, methodology, validation, visualization, writing – review and editing, supervision. Janet Gross: conceptualization, writing – original draft, writing – review and editing. Ibrahim D. Kwaku: data curation, software, formal analysis. Isaac K. Boateng: data curation.

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Ethics Statement

This study was ethically approved by the Committee on Human Research Publication and Ethics at the School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology.

Conflicts of Interest

The authors declare no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Transparency Statement

The lead author Abdul-Karim Abubakari affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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Appendix A

Table A1

TABLE A1 | Relationship between intention to screen with each domain of TCSB.

Characteristic	OR[1]	95% CI[1]	*p*-value
Habit			
No	—	—	
Yes	0.46	0.23, 0.90	0.023
Perceived benefit			
No benefit	—	—	
Some benefit	2.34	0.89, 7.30	0.11
Beneficial	3.31	1.25, 10.4	0.024
Facilitating factors			
No	—	—	
Yes	1.02	0.51, 2.01	> 0.9
Affects			
No	—	—	
Yes	0.01	0.00, 0.05	< 0.001
Norms			
No	—	—	
Yes	0.00	0.00, 20,948,726,859,075	> 0.9
Knowledge categorization			
Low CC knowledge	—	—	
Adequate CC knowledge	1.27	0.61, 2.53	0.5

[1] $n = 445$. CI, confidence interval; OR, odds ratio.