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Sociodemographic determinants of knowledge, attitude and practices of Ghanaian nurses towards persons living with HIV and AIDS in Kumasi

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ABSTRACT

Introduction: Despite increasing knowledge, and awareness on HIV/AIDS, Countries and health institutions are still struggling to deal with the issues of stigma and discrimination towards patients living with HIV and AIDS amongst its staff. An investigation into other potential determinants/influences of nurses' knowledge, attitudes, and practices towards HIV/AIDS such as sociodemographic factors is therefore necessary

Methods: The study used correlational cross- sectional design. A total of 247 participants from five selected health facilities were recruited through a simple random sampling. Chi-square analysis and Spearman's rank correlation were used to measure the level of association between the sociodemographic variables and knowledge, attitude and practices. Mean scores were calculated for knowledge, attitude and practices.

Results: The study reported a significant correlation between nurses' knowledge and professional rank, year of work experience, in-service training, age, and their practice [($r = 0.216$; $p = 0.002$), ($r = 0.278$; $p = 0.0001$), ($r = 0.174$; $p = 0.010$), ($r = 0.173$; $r = 0.011$), and ($r = 0.176$; $p = 0.011$)] respectively. Also, a significant correlation was observed between practice and age of the nurses ($r = 0.151$, $p = 0.030$). The attitude was positively associated with knowledge, professional rank, educational level, work experience, and age but negatively associated with practice and in-service training however there was no statistically significant correlation.

Conclusion and recommendation: Nurses' knowledge, attitude and practice was directly correlated with their sociodemographic characteristics which suggests that policies and interventions aimed at improving nurses' knowledge, attitudes and practices should take into account their sociodemographic characteristics.

1. Introduction

Since the beginning of the HIV epidemic, an estimated 78 million people have been infected with HIV, with nearly half of those people have died due to AIDS-related complications (UNAIDS, 2020).

In Ghana, the prevalence rate of HIV is estimated to be 1.47 % amongst ages 15–49 years (UNAIDS, 2018). Approximately, 250 000 of the population living with HIV and 10 000 deaths per annum makes it a public health problem in Ghana (Ghana AIDS Commission, 2014; UNAIDS, 2014).

Studies on human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) knowledge, attitudes and practices (KAP) among health care workers in developing countries have often revealed the lack of knowledge about HIV transmission and risk prevention, coupled with the existence of anxiety for contagion (Akgun Kostak et al., 2012; Marranzano et al., 2013). Nurses being the largest health professional group caring for patients living with HIV, have always been at the forefront of the HIV epidemic (Ishimaru et al., 2017). Investigations into nurses' attitudes towards patients with HIV have revealed negative and discriminatory behavior (Farotimi et al., 2015). However, other studies have revealed that few nurses show empathic attitudes towards patients living with HIV and AIDS (Gitachu, 2017; Hamama et al., 2014).

Nurses' knowledge may compromise the quality of care and attitudes towards patients living with HIV and AIDS. Special nursing knowledge and skills have been suggested as requisite for taking care of patients living with HIV by nurses (Gitachu, 2017; Hamama et al., 2014; Suominen et al., 2010). The general negative feelings and views about the

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care of HIV infected patients among some nurses could be attributed to misconceptions about HIV (Okpala et al., 2017). Gitachu (2017) has attributed HIV/AIDS stigma and discrimination in the health care setting to a lack of knowledge about HIV and AIDS and fear of contracting HIV among professional nurses (Boakye and Mavhandu-Mudzusi, 2019).

Despite the increasing knowledge on the mode of transmission and guidelines to ensure adequate protection, most nurses still react with fear, over-protectiveness and over-stringent infection control due to fear of possible contagion (Okpala et al., 2017). Studies exploring HIV/AIDS knowledge and attitude of nurses found a varying degree of HIV/AIDS knowledge among nurses (Farotimi et al, 2015; Hamama et al., 2014).

The Ghana government, in the past has made efforts to help UNAID's and WHO's agenda for "zero discrimination" against people living with HIV/AIDs (PLWHA) at the health centers. The Ghana AIDs Commission launched the "patients charter" which involved a web –based reporting system to help PLWHA to report directly to the commission of incidents of discrimination and stigma at the health center through a short message service (SMS) (Williamson et al., 2017). However, issues relating to nurses discriminatory and stigmatized attitude is multifactorial and requires multidimensional approach (Serwaa, 2018). In other studies, the sociodemographic characteristics such as age, level of education, years of work experience etc. of nurses have shown to predict nurses' knowledge, attitudes and practices towards PLWHA.

Previous literature has shown that the strongest predictors of nurses' knowledge is level of education and years of working experiences. Years of working experience is negatively correlated with nurses' level of knowledge (Suominen et al., 2010). Watkins et al. (2006) also found that age was significantly associated with nurses' knowledge. Older nurses had the lowest level of knowledge. In another study a planned in-service training programme organized for nurses improved their knowledge and to a lesser extent their attitudes (Eman & Rahab, 2011). A study by Vorasane et al. (2017) showed that stigmatizing attitudes, such as prejudice, discrimination at work, and fear of AIDS are less likely among nurses with longer years of experience in treating PLWHA. On the contrary, a study by Ledda et al. (2017) revealed that health workers with more than 11 years of service showed greater discriminatory attitudes, poor tolerance towards HIV/AIDS and more fear. Again, while Ishimaru et al. (2017) showed middle-aged nurses between 40 and 49 years expressed an increased willingness to care for HIV-infected patients, Wada et al. (2017) found that younger nurses tend to have less discriminatory attitudes.

In Ghana, though the issue of stigma, discrimination, nurses' knowledge, attitudes and practices towards PLWHA have been extensively studied, there is currently no study dedicated to the investigation of the potential determinants of nurses' knowledge, attitudes and practices towards patients living with HIV and AIDS. We believe that information on the nexus between sociodemographic factors such as age, gender, level of education etc. and nurses' knowledge, attitudes and practices is needed to assist the Ghana Health service devise a multidimensional approach to address the issue of knowledge, discriminatory and stigmatized attitude, unwillingness to care for PLWHA and compliance to standard precaution practices.

2. Materials and methods

2.1. Study design and setting

The study is quantitative, cross-sectional in nature and employed a correlational design to study the relationship between the sociodemographics of participants and their knowledge, attitude and practices towards patients with HIV/AIDS. This study was conducted in two private health facilities (Clinic [Facility A] and Medical Centre [facility B]), two public health facilities (University Hospital [facility C] and District Hospital [facility D]), and a Teaching Hospital (KATH [facility E]) in the Kumasi metropolis. These five facilities were chosen because they all have HIV clinics that provide HIV counselling, testing services, use the current national guidelines issued by the National AIDS/STI Control Programme for their HIV patient treatment and have the longest history of HIV/AIDS management services in the metropolis.

2.2. Study population and sample size estimation

The study recruited all registered nurses who were employed to work in the previously mentioned settings and satisfied the inclusion criteria. The inclusion criteria included: participants who are qualified nurses and registered with the Nurses' and Midwifery Council (NMC), Ghana, participants who have worked for not < 3 months in their respective units/wards, and participants who were between the ages 18 and 65 years. The participants selected for the study were proportional to the total number of registered nurses working in the HIV wards/units of the five selected health facilities. The study determined its estimated sample size using a formula developed by Yamane in 1967.

$$n = \frac{N}{1 + N(e^2)}$$

Using a confidence level of 95 %, level of precision of 5 %, and a population size (N) of 304, the estimated sample size (n) was purged at 247. The table below represents the various facilities, the population and the desired sample size obtained with the Yamane formula (see Table 1).

2.3. Sampling

A simple random sampling technique was used to draw equal samples from each ward to form the representative sample. For example, the required sample size for Facility A was 14. Therefore, seven (7) participants were selected from each ward. The attendance register for each day was used as the sampling frame; a manual lottery technique was used to select the representative sample at random. The procedure was used to selected two-thirds of the population on the duty roster. Participants were excluded from the study if they failed to report to work on that day. This method was continued for succeeding visits for several days until the expected sample size was obtained. The number of visits to each facility was determined by the sample size needed. To avoid the repeated selection of the same participants, any nurse who has had the opportunity to participate in the study was not recorded and allotted a number in the lottery on subsequent visits.

2.4. Data collection

The research instrument employed in this study was a self-administered HIV/AIDS KAP questionnaire consisting of 48-items. The instrument was adapted from Delobelle et al. (2009), an open-access study. The questionnaire was developed in English – a language understood and spoken by all the participants and it is also the accepted language for educational instructions in Ghana (Embassy, 2018). The questionnaire was made up of the demographic characteristics, training received on aspects of HIV, knowledge, attitudes, and practices related to the care of patients with HIV and AIDS.

The questionnaire was divided into four major sections. The first

Table 1
Facilities, the population of nurses and desired sample size based on Yamane formula.

Name of facility	Total population of nurses (N)	Study sample/Sample size (n)
Facility A	15	14.47 = 14
Facility B	36	33
Facility C	55	48
Facility D	52	46
Facility E	146	106
TOTAL	304	247

section was comprised of demographic characteristics and variables relating to HIV/AIDS training and care, the second section was a 28-item HIV/AIDS knowledge scale with statements about disease's clinical presentation, mode of transmission, precaution, and prevention. The third section was a 10-item attitude scale and comprised of items examining empathic and preventive behavior. The final section was a 10-item practices scale. This was comprised of questions relating to adherence to universal precaution measures, the demand for and availability of post-exposure prophylaxis (PEP), and behavior about HIV testing and referral.

The reliability of the research instrument was measured using Cronbach's alpha coefficient. A coefficient for the knowledge and attitude were 0.78 and 0.66 respectively, confirming the reliability and acceptability of the instrument. The reliability coefficient obtained for the instrument in this study was comparable to that obtained in the Delobelle et al. (2009) study (0.77 and 0.63). However, slight changes were made to the questions. Furthermore, the researcher ensured that care was taken over the well-defined phrasing of each question to avoid vagueness. The instrument was piloted on 15 nurses from the medical wards of the Kumasi South Government before undertaking the study.

The questionnaires were delivered to the participants and all answered questionnaires were then collected by the first author. Privacy was ensured while participants were completing the questionnaires. Participants who did not have the time to finish the questionnaires were permitted to keep them; these were collected at the participants' given time by the first author. To avoid fatigue among the participants, the allocated time to complete the questionnaires ranged from 15 to 20 min. Data were collected for a period of 2 months (April to June 2018).

2.5. Data analysis

The data was analyzed using Graph Pad Prism 6 and IBM SPSS version 23. Descriptive statistics (frequency, percentage, mean and standard deviation) were used to present the findings. Also, a chi-square analysis was used to measure the level of association between the variables and analysis of variance (ANOVA) was used to compare the means of the subgroups. A P-value of ≤ 0.05 was considered statistically significant. A Spearman's correlation rank co-efficient was calculated among the dependent variables (KAP scores) and the independent variable (sociodemographic characteristics). The Spearman's co-efficient tests the strength of correlation between the two variables. The coefficient (R) ranges from -1 to $+1$, with $+1$ being a perfect positive correlation and -1 being a perfect negative correlation (Zhang et al., 2016). The mean scores were generated by the summation of all the items under knowledge, attitude and practices. Mean scores of 1.35–1.8, 2.3–3.4 and 1.81–2.0 were considered high knowledge, good attitude and good practices respectively while mean scores of 0.6–1.3, 1.6–2.2 and 1.2–1.8 were considered low knowledge, poor attitude and poor practices. The results were presented in tables.

2.6. Ethical consideration

Ethical clearance to conduct the study was sought from the Higher Degrees Committee Department of Health Studies, University of South Africa Research and Ethics, and Committee of Human Publication and Research Ethics (CHPRE)-KNUST. Also, permission was obtained from the management and authorities of the five selected healthcare facilities used in the study. Prior to the administration of the research instruments, an informed consent was sought from the participants. The ethical principles of Declaration of Helsinki (2013) were fully observed. Participants' completion of the questionnaire constituted informed consent as per the University of South Africa Ethics committee. The researcher also left her contact number with each participant to reach her where the need might arise.

3. Results

3.1. Sociodemographic characteristics of study participants

The majority (68.5 %) of the participants were females. The minimum and maximum age of the respondents were 20 and 60 years respectively. Also, 41.4 % of the participants were between the ages of 20–29 years. Staff nurses formed a majority (43.19 %) of the participants and most (58.14 %) of the participants had either a diploma or certificate qualification. Work experience ranged from 2 to 15 years with 2–5 years being the common range. The majority (71.15 %) of the participants worked in public hospitals. A majority (31.2 %) reported caring for HIV and AIDS patients very often (See Table 2).

Table 2
Sociodemographic characteristics.

Variable	Frequency	Percentage
Age (n = 215)		
<20 years	8	3.72
20–29 years	89	41.40
30–39 years	83	38.60
40–49 years	20	9.30
50–59 years	9	4.19
>60 years	6	2.79
Gender (n = 200)		
Male	63	31.5
Female	137	68.5
Professional rank (n = 213)		
Enrolled Nurse	17	7.98
Senior enrolled nurse	3	1.41
Staff Nurse	92	43.19
Nursing Officer	41	19.25
Senior Nursing Officer	27	12.68
Principal Nursing Officer	30	14.08
Chief Nursing Officer	3	1.41
Level of Education (n = 215)		
Certificate	34	15.81
Diploma	91	42.33
Bachelor's Degree	64	29.77
Masters	15	6.98
Others	11	5.12
Work environment (n = 208)		
Public	148	71.15
Private	60	28.85
Work Experience (n = 215)		
<2 years	49	22.79
2–5 years	69	32.09
6–8 years	54	25.12
11–15 years	19	8.84
>15 years	24	11.16
Frequency of care of HIV/AIDS patients (n = 213)		
Never	9	4.1
Rarely (once per month)	45	20.6
Sometimes (>once per month)	44	20.2
Often (>once per week)	37	17.0
Very Often (>5 times per week)	68	31.2
Don't know	10	4.6
HIV/Training (n = 218)		
Yes	89	40.83
No	129	59.17

3.2. Participants score on knowledge, attitude, and practices

Table 3 shows the knowledge, attitude and practice of participants: A majority of the participants recorded high score for knowledge (51.9 %), attitude (54.7 %) and practices (56 %).

3.3. Spearman's rank correlation of knowledge, attitude and practice with selected demographic characteristics of study participant

Table 4 shows the Spearman correlation of knowledge, attitude and practice with selected demographic characteristics of study participants. There was significant direct correlation between knowledge and professional rank ($r = 0.216$; $p = 0.002$), year of work experience ($r = 0.278$; $p = 0.0001$), training of HIV management ($r = 0.174$; $p = 0.010$), age ($r = 0.173$; $r = 0.011$), and practice ($r = 0.176$; $p = 0.011$). There was a significant positive correlation between practice and age ($r = 0.151$; $p = 0.030$).

The attitude was positively associated with knowledge, professional rank, educational level, work experience, and age, but negatively associated with practice and training, although the association was not statistically significant. Again, there was no significant association between knowledge and educational level; and between practice and attitude, professional rank, educational level, work experience, and training (p-value > 0.05).

3.4. Association of mean scores of knowledge, attitude, practice and socio-demographic characteristics of participants

Table 5 shows the mean scores of knowledge, attitude and practices and their association with socio-demographic characteristics.

The professional rank of participants was significantly associated (0.0089, 2.942) with their knowledge of HIV/AIDS-related issues. Specifically, the significant difference was between those ranked as SN (1.26 ± 0.24) and PNO (1.40 ± 0.11). Also, work experience was significantly associated with knowledge of HIV/AIDS (0.0083, 3.521). Participants with 11–15 years' work experience scored high for knowledge and practice. The mean knowledge of participants increased as participants increased in age from 20 to 29 years (1.23 ± 0.26) to about 50–59 years (1.41 ± 0.09). However, participants who are more than 60 years (1.35 ± 0.08) did not have a corresponding increase in their knowledge. Those in the public hospitals had mean knowledge values of (1.33 ± 0.21) and those in private hospitals had a mean of (1.29 ± 0.23).

The mean attitude scores of the participants between the ages of 20–29 years (2.22 ± 0.58) and 30–39 years (2.15 ± 0.45) were higher than those who were < 20 years (2.05 ± 0.17), but was lesser than those who were between the ages of 40–49 years (2.40 ± 0.42), 50–59 years (2.30 ± 0.48) and 60 years (2.43 ± 0.58). The mean attitude values of the participants increased from those who hold a certificate (2.17 ± 0.47), diploma (2.19 ± 0.57), bachelor's degree (2.21 ± 0.44) and master's (2.24 ± 0.48).

Gender was significantly associated with HIV/AIDS-related practices (0.0325, 2.154). Females (1.82 ± 0.19) scored high for HIV/AIDS-related practices than males (1.75 ± 0.27). As participants' age from 20 to 29 years (1.75 ± 0.26) to 40–49 years (1.83 ± 0.21), their mean for HIV/AIDS-related practices increased. Participants who are more than 60 years of age recorded the highest average (1.90 ± 0.17) of HIV/AIDS-related practices.

Table 3
Participants score on knowledge, attitude and practices.

	Low	High
Variable	**Frequency (Percent)**	**Frequency (Percent)**
Knowledge	112 (48.1)	121 (61.9)
Attitude	105 (45.3)	127 (54.7)
Practice	100 (44.0)	128 (56.0)

4. Discussion

Consistent with Mao et al. (2012) that, the nursing profession is dominated by females, our study found that, the majority of the participants were females. The participants' age ranged from 20 to 60 years, with the most represented age group being 20–29 years. This was not surprising because a demographic survey in Ghana showed about 71–93 % of nurses and midwives in 2018 were 35 years or less (Asamani et al., 2019). A majority of the nurses were staff nurses, and most of them were trained at a level below the first degree. Their work experience ranged from 2 to 15 years; 2–5 years is the range with the highest frequency.

The study demonstrated a significant weak correlation between knowledge of the participants and their age. This finding is in agreement with other studies which also showed a significant correlation between age and knowledge of nurses towards the care of HIV/AIDS patients (Marranzano et al., 2013; Okpala et al., 2017). Though these two studies did not indicate the strength of association, it is worth comparing. The mean knowledge of participants increased as participants increased in age from 20 to 29 years to about 50–59 years. However, participants who are more than 60 years did not have a corresponding increase in their knowledge. It is usually believed that increasing age corresponds to a greater degree of knowledge which was not in the case of this study as the knowledge level declined in participants more than 60 years. This is consistent with Watkins et al. (2006). According to Salthouse (2004), there is an increase in knowledge from 18 years to 50 years but later on in adulthood, there is either a decline or stability in knowledge acquisition. Several hypotheses have been suggested to explain this occurrence of which some include generational confounds in educations, an asymptote on exposure to new information and increased specialization of one's knowledge (Salthouse, 2004).

There was also a weak significant correlation between professional ranks and the level of knowledge. Okpala et al. (2017) similarly found a significant association between professional rank and knowledge however, the strength of association was not indicated in their study. Specifically, the significant difference was between those ranked as staff nurses (SN) and principal nursing officers (PNO). Thus, those ranked as PNO had increased HIV related knowledge than those ranked as SN. This variance could be linked to the fact that knowledge and attitudes are gained through years of experience and caring for people (Ledda et al., 2017; Vorasane et al., 2017). Again, promotion of nurses to the next level/rank in Ghana largely depends on the number of years of practicing (Kamy, 2021) and so PNO's have more increased years of experience with caring for HIV infected patients than SN's. The findings also showed a significant positive correlation between knowledge and practice. Thus, an increased in knowledge of HIV/AIDS means an increased in compliance with universal precautions and HIV prevention practice. This finding was consistent with studies by Ibrahim et al. (2017). However, it was inconsistent with Magdi et al. (2013) study conducted in Egypt. In their study, they reported high knowledge among the nurses, however there was unsatisfying levels of practice among them. This variation in results could be attributed to the study settings – Islam being the predominant religion in Egypt. According to Magdi et al. (2013), most Muslims believe that Islamic faith shields them from contracting the virus. These beliefs directly or indirectly impact health care practices. Attitude and HIV related knowledge were positively correlated. Thus nurses with good attitudes had a corresponding satisfactory knowledge levels.

The results also showed that level of education was positively correlated with HIV related knowledge and attitude with nurses who have attained a master's degree. Suominen et al. (2010) also found a correlation between level of education and nurses' knowledge. The chi-square analysis saw nurses with master's degree getting higher mean scores for knowledge (1.43 ± 0.11) and attitude (2.24 ± 0.48). However,

Table 4
Correlation matrix between HIV/AIDS KAP and selected demographics.

	Knowledge		Attitude		Practice	
Variables	Correlation coefficient	P-values	Correlation coefficient	P-values	Correlation coefficient	P-values
Knowledge			0.005	0.940	0.176	0.011
Attitude	0.005	0.940			−0.044	0.525
Practice	0.176	0.011	−0.044	0.525		
Professional Rank	0.216	0.002	0.032	0.646	−0.045	0.517
Education level	0.077	0.259	0.081	0.239	0.077	0.269
Work experience	0.278	0.0001	0.083	0.227	0.101	0.150
HIV/AIDS Training	0.174	0.010	−0.015	0.832	0.006	0.931
Age	0.173	0.011	0.103	0.135	0.151	0.030

Spearman's correlation; variables with p-value <0.005 signify a statistical significance.

Table 5
Association of socio-demographic data and the mean knowledge, attitude, and practices scores.

	Knowledge		Attitude		Practice	
Variables	Mean ± SD	p-value (t)	Mean ± SD	p-value (t)	Mean ± SD	p-value (t)
Age (years)		0.058 (2.18)		0.287 (1.25)		0.258 (1.32)
<20	1.31 ± 0.18		2.05 ± 0.17		1.77 ± 0.39	
20–29	1.23 ± 0.26		2.22 ± 0.58		1.75 ± 0.26	
30–39	1.35 ± 0.19		2.15 ± 0.45		1.83 ± 0.16	
40–49	1.36 ± 0.16		2.40 ± 0.42		1.83 ± 0.21	
50–59	1.41 ± 0.09		2.30 ± 0.48		1.82 ± 0.15	
≥60	1.35 ± 0.08		2.43 ± 0.58		1.90 ± 0.17	
Gender		0.633 (0.50)		0.376 (0.89)		0.032 (2.15)
Female	1.32 ± 0.20		2.20 ± 0.53		1.82 ± 0.19*	
Male	1.34 ± 0.23		2.27 ± 0.46		1.75 ± 0.27*	
Professional Rank		0.009 (2.94)		0.178 (1.51)		0.541 (0.84)
EN	1.37 ± 0.14		2.12 ± 0.46		1.70 ± 0.26	
SEN	1.47 ± 0.06		2.47 ± 0.32		1.73 ± 0.58	
SN	1.26 ± 0.24*		2.20 ± 0.56		1.79 ± 0.23	
NO	1.35 ± 0.22		2.07 ± 0.45		1.81 ± 0.25	
SNO	1.26 ± 0.20		2.32 ± 0.50		1.79 ± 0.20	
PNO	1.40 ± 0.11*		2.33 ± 0.48		1.84 ± 0.18	
CNO	1.43 ± 0.06		1.87 ± 0.23		1.77 ± 0.16	
Education level		0.100 (1.95)		0.751 (0.48)		0.617 (0.66)
Certificate	1.34 ± 0.14		2.17 ± 0.47		1.74 ± 0.30	
Diploma	1.28 ± 0.24		2.19 ± 0.57		1.83 ± 0.20	
Degree	1.32 ± 0.22		2.21 ± 0.44		1.81 ± 0.23	
Masters	1.43 ± 0.11		2.24 ± 0.48		1.80 ± 0.14	
Other	1.35 ± 0.14		2.40 ± 0.51		1.85 ± 0.15	
Work Environment		0.342 (1.08)		0.425 (0.86)		0.121 (2.13)
Public	1.33 ± 0.21		2.25 ± 0.48		1.75 ± 0.28	
Private	1.29 ± 0.23		1.90 ± 0.17		1.90 ± 0.17	
Other	1.23 ± 0.11					
Professional experience		0.008 (3.52)		0.309 (1.21)		0.151 (1.70)
<2 years	1.19 ± 0.24*		2.16 ± 0.42		1.73 ± 0.30	
2–5 years	1.34 ± 0.23		2.25 ± 0.59		1.83 ± 0.19	
6–10 years	1.33 ± 0.19		2.13 ± 0.46		1.78 ± 0.22	
11–15 years	1.43 ± 0.12		2.33 ± 0.52		1.84 ± 0.18	
>15 years	1.38 ± 0.12*		2.34 ± 0.47		1.83 ± 0.16	

* – signifies statistical significance, p-value <0.005, after Bonferroni correction; SD – standard deviation.

their level of knowledge did not reflect on their practice as their mean scores for practice was relatively lower when compared with nurses with relatively lower levels of education. Nurses with 'Diploma' rather had high mean scores on practice. This was however not surprising since the hierarchy of nursing requires nurses with advanced studies particularly, masters' degree to be in leadership positions or assume supervisory roles (Alvernia University, 2022). It is possible that participants with masters' degree in this study were leaders or supervisors and were not directly involved in the care of HIV and AIDS patients. In addition, to be able to adequately care for patients living with HIV/AIDS, it requires special knowledge and skills (Hamama et al., 2014; Suominen et al., 2010) through in-service training programs. This study demonstrated a significant association between in-service training and knowledge. Okpala et al. (2017) and Pal et al. (2016) also observed similar trends. An interventional study done in Delhi, reported a significant increase in the knowledge of nurses after a 48 h in-service training program (Pal et al., 2016). In line with this, researchers have suggested continuous in-service training for health workers in charge of HIV and AIDS care

(Famoroti et al., 2013; Ledda et al., 2017; Nyamathi et al., 2008). The finding that HIV training through seminars/ workshop is statistically associated with knowledge is inconsistent with Marranzano et al. (2013) who showed no correlation between knowledge and attendance to HIV/ AIDS seminars/lectures. Chalya et al. (2015) showed a negative correlation instead.

In our study, both the spearman's rank correlation coefficient and the chi-square analysis showed no significant correlation between age and attitude. However, Ishimaru et al. (2017), Ledda et al. (2017), and Wada et al. (2016) found a significant association between these two variables.

Work experience was positively correlated with knowledge, attitude and practice, with nurses who have 11–15 years of work experience getting higher mean scores for knowledge, attitude, and practice. Delobelle et al. (2009) on the other hand, reported no significant correlation between nurses' work experience and their knowledge except for nurses' attitude and work experience. Similarly, Vorasane et al. (2017) and Ledda et al. (2017) found a significant correlation between work experience and attitudes while Famoroti et al. (2013) found no correlation with regards to work experience and attitude. Generally, nurses with work experience over 15 years had better attitude. However, attitude was negatively correlated with practice, though not statistically significant. Thus, a more favorable attitude was associated with decreased compliance with universal precautions and HIV preventive practices which stresses the need for interventions that focus on improving nurses understanding of and attitude towards universal precautions.

Evidence from international reports seem to collaborate the fact that nurses who undergo HIV/AIDS-specific training tends to be more aware of universal precautions for preventing the risks of occupational HIV transmission (Delobelle et al., 2009; Ngaihte et al., 2016). However, our study found no association between attending HIV training workshops and level of practice. The study also reported a significant correlation between gender and practices with female nurses getting higher mean scores for practice (1.82 ± 0.19) than males (1.75 ± 0.27). This was congruent with Wu et al. (2016) which reported female health-workers are more likely to comply with the universal precautionary measures than their male counterparts.

5. Limitation and strength

The conclusion is based on data collected from a cross-section of registered nurses and at one point in time. We could not study or analyse the effect of sociodemographics on participants' knowledge, attitude and practices over a period of time. The modest sample size used may be considered important limitation. Larger samples are required for generalizable findings. This study was also a traditional research and so recommendation for in-service training was based on previous research (in other countries), conclusions and inferences from the study. A nation- wide interventional study could be conducted to fully understand and evaluate the impact of in-service training on nurses' knowledge, attitudes and practices. Nonetheless, this study seems to be the first of its kind to be conducted in Ghana. Furthermore, the use of correlational methods of analysis allowed the researchers to highlight the sociodemographic correlates of knowledge, attitude and practices to guide policy, intervention and future research.

6. Conclusion

The findings of our study demonstrated that the sociodemographic characteristics of nurses have a corresponding effect on their knowledge, attitude and practices (KAP) towards HIV and AIDS which suggests that policies and interventions for improving nurses' knowledge, attitude and practices should take into account their sociodemographic characteristics. The study also showed a correlation between knowledge, attitude and practice. This means these variables are interrelated. Therefore, improving knowledge through continuous in-service training will lead to noticeable impact on attitude and practice. Continuous in-service educational programme that addresses nurses' knowledge gaps in HIV preventive practices, management and transmission should be facilitated by the Ministry of Health and the Ghana Health Service.

Authors contribution

DSB was involved with the development of the concept, idea, methodology, data collection, manuscript drafting and editing. EK was involved with data processing and analysis, AH Mavhandu-Mudzusi was involved with project supervision and editing of the manuscript. All authors have approved the manuscript and agree with submission to International Journal of African Nursing Science.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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