

## SYSTEMATIC REVIEW

# A Systematic Review of Knowledge, Attitudes and Practices (KAP) of People Living With HIV/AIDS (PLWHA)

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## ABSTRACT

**Aims:** The combination of knowledge, attitudes and practices is an important psycho-behavioural mechanism in the disease-management strategies of HIV patients. This study reviews the global evidence of knowledge, attitudes and practices (KAP) of HIV patients. **Design:** Systematic review. **Data sources:** Four databases- Pubmed, Scopus, Science Direct and Web of Science (WOS) were searched from January 10 to April 25, 2021. **Methods:** Databases were searched for the predefined keywords of “knowledge”, “attitudes”, “practices”, “people living with HIV/AIDS” and “HIV/AIDS”. The inclusion criteria were limited to time range, language and study types and nature. PRISMA was followed and JBI quality assessment tools for cross-sectional and qualitative studies were used. **Results:** A total of 18 papers have been selected for the extraction of 1964 articles. The KAP were assessed related to nutrition, infant feeding, disclosure of HIV/AIDS, WASH (or hygiene), oral health, cancer-related domains with HIV/AIDS and HA(ART). Relevant dimensional KAP were incorporated with the basic items about HIV/AIDS. Overall, a mixed level of knowledge, discriminatory attitudes and malpractices were observed throughout the study. Socio-economic, counselling, support and dimensions related factors were identified as associated risk factors. **Conclusion:** Variation in assessing KAP is a critical problem and unique, outcome-based KAP assessment tools integrated with qualitative assessments were suggested to examine the interrelationship of the KAP components and outcomes.

**Keywords:** Knowledge, Attitude, Practice, HIV/AIDS patients, Systematic review

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## INTRODUCTION

Globally, HIV/AIDS is the most widely spread lifetime chronic health issue that weakens the immune system over time (1). Statistics have shown an increasing trend of HIV prevalence, with the last report being 38 million people were infected HIV integrated with 1.9 million incidences at the end of 2019 (2). On the record, 26 million HIV/AIDS patients (PLWHA) were retrieving anti-retroviral treatment (ART) by June 2020 (3). The KAP model has been used as the primary educational strategy for disease management. Evidence suggested that KAP level was associated to HIV management, including medication, and wellbeing (4–6). Low levels of KAP are considered as the indicators of ill health, ineffective healthcare use, lower disease diagnosis rate and maladaptive behaviours (7–9).

Poor knowledge level about HIV/AIDS, transmission and treatment depends more on HIV-related attributes such

as adherence to medication regimes or willingness to engage in risky behaviors and attitudes (12). Delavende and Kohler argued that HIV transmission and treatment knowledge can increase risky behavior because it leads to an expectation of increased life expectancy, which relieves the psychological burden of living with the disease (13). In Malaysia, sexual and drug-related behaviors were reported more likely (14,15) because they are less aware in those transmissions (16). Therefore, knowledge may not be enough to change health behaviour. One study explained that positive attitudes towards the healthcare providers were more likely to attend the clinical schedules (17). The intention of drugged PLWHA who were in the detention centre, the sexual and intravenous transmission of HIV is high due to discriminatory attitudes among the drugged PLWHA (18). Studies have indicated increased discriminatory attitudes and stigma levels among PLWHA (17,19–21). Therefore, attitudes must be tapped and mobilized to aid the patients in setting and achieving personal health goals. All these factors increased the high-risk behaviours and practices of PLWHA, and serodiscordant couples increased the potential risk of transmission (22–25); abstaining from these practices is beneficial for them (26–29). Nutritional and dietary demand is necessary

for their immunological maturity (30), where infants and children can be infected directly from HIV affected mothers (31,32) and other risky behaviours (25,33) along with HIV/AIDS and ART.

Therefore, KAP together can create a determination of HIV/AIDS preventive measures. It is important to assess them together in a framework and analyse them to recognize the dimensional attributes that make up KAP overall. This paper tried to assess the reports on KAP about different dimensions of HIV/AIDS for PLWHA. The following specific objectives are assessed in the study: the dimensions, method of assessment, associated/risk factors and outcome of knowledge, attitude and practices. Search for reviews on KAP for HIV/AIDS yielded results related to the transgender population (34) and healthcare professionals (35), including trained nurses (36). For HIV/AIDS-affected people, this will be the first KAP assessment that considers a global level of evidence.

**METHOD**

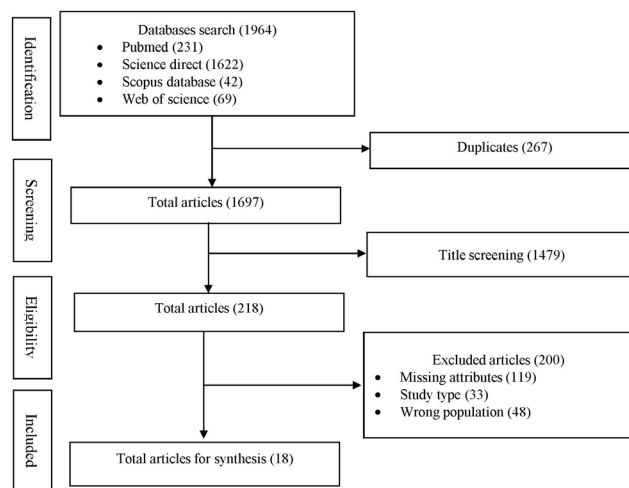
This review was underpinned by Arksey and O’Malley’s (2005) structure (37) which adopts a rigorous process of summarizing evidence and findings (38). Later, the framework was extended and redefined and Joanna Briggs represents the extended and redefined version of scoping review guidelines (39). Methodologically, this review conducted the following procedures: objective identification, search strategy development, searching, sorting, quality assessment, charting and result synthesis (40).

**Database search**

A total of 1964 studies were identified by using the key search terms in the advanced search option of four databases, i.e., Pubmed, Science Direct, Scopus and Web of Science. Medical subject heading (MeSH) terms and text word (tw) were applied in Pubmed to investigate search terms to create a search strategy. MeSH terms were related to HIV or AIDS and tw terms were related to “Knowledge”, “Attitude\*”, “Practice\*” and “HIV positive people”. The basic structure of key search terms was {“Knowledge”) and (“Attitude\*”) and (“Practice\*”)} and {“HIV” or “AIDS” or “HIV/AIDS” or “Human Immunodeficiency Virus” or “Acquired Immunodeficiency Syndrome”) and {“PLWHA” or “PLHIV” or “people living with HIV/AIDS” or “HIV/AIDS affected people”)}. The time period of 2010 to 2020 was defined during the search of the online databases. The study followed the Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) (Figure 1).

**Inclusion and exclusion criteria**

In this study, both qualitative and quantitative cross-sectional studies that focused on social perspectives rather than bio-medical and clinical perspectives were



**Figure 1: PRISMA chart for screening, article selection and evaluation**

included. Survey respondents had to be HIV positive and the studies had to report on the attributes of KAP descriptively. All the papers from the databases were imported into Mendeley® and duplicates were removed (267 studies). Initially, title/abstract screening was done during primary sorting. Later, SA and MAB screened all the studies using the following criteria (Table I).

**Table I: Criteria for sorting and inclusion of the studies**

Criterion	Inclusion	Exclusion
Time period	2010-2020	Outside of those years
Language	English	Non-English
Article type	Original (qualitative and quantitative)	Other than original (Any review, letter and editorial, RCTs)
Study focus	KAP on HIV/AIDS	Other than inclusion criteria
Population criteria	PLWHA	Non-PLWHA
Perspective	Health-related social science	Medical and experimental

**Quality assessment and result synthesis**

The class of the involved studies were evaluated using the Joanna Briggs Institute (JBI) critical appraisal tool for the cross-sectional and qualitative researches (41,42). Two authors (MAB, SA) evaluated the quality of the selected studies and MMH reduced any conflict that arose during the quality assessment. All the studies were included, as the quality of all the studies was found to be more than the median score.

Selected studies were critically organized into three consecutive spreadsheets for knowledge, attitudes and practices, and the spreadsheets were summarized in a table. The summary table was created based on the study details, settings-design, population, methods and tools, evaluation, estimated score and risk factors. Then the sheet was summarized and pooled for the systematic analysis. All the attributes of KAP were synthesized by the dimension(s) of HIV/AIDS and relevant factors narratively (Table II).

**Table II: Summary of the included studies and findings**

Sl	Author(s) (Year); Study design	Study population	Dimension(s)	Data collection method	Knowledge assessment	Knowledge score	Risk factors	Attitude assessment	Attitude score	Risk factors	Practice assessment	Practice score	Risk factors
1	Dlamini et al. (2019), South-Africa; Cross-sectional (CS)	PLWHA breast-feeding mothers	PMTCT	Self-reported questionnaire	77.8% - High, 22.2% - Low	100% positive attitude					90.0% Positive, 10.0% Negative		
2	Olorunfemi et al. (2018), Lesotho; CS	PLWHA mothers with infants <6months	PMTCT (Infant feeding)	Structured questionnaire-based survey method (SQBSM)	80%- aware of IFOs, 94% know the risk of transmission and 26% recognised HIV transmission methods via breastfeeding.	52% positive to EBF, 97% discriminated infant feeding option	NSF	Mothers cannot adhere to their choice, 78% introduced feed other than breastfeeding in 5-6, 14% in 6+ and 8% in <5 months.		NSF	Family pressure, insufficient milk for baby, received IFO information, education, counselling.		
3	Beyene & Hailu (2013), Ethiopia; CS	PLWHA	water, sanitation and hygiene	SQBSM and observation of WSH facilities	Know types of water-borne disease (58.1%), the way of transmission (33.4%), way of water contamination (86.7%), Excreta-borne disease (94.7%), know the way of transmission (42%), times of handwashing (79.4%)	Essentiality of WSH disease (71.2%), poor hygiene increases transmission risk (86%), preventable excreta borne disease (83.3%), diarrhea is preventable (33.3%)	NSF	59% stored water for one day, 22.1% for >2 days. 31%- have poor latrine cleaning practice, 72% wash hand after latrine, low water consumption		NSF	Gender, education, income and employment status		
4	Khan et al. (2012), Malaysia; CS	PLWHA	HIV associated oral lesions	SQBSM	37% knowledgeable	64% have positive attitude	NSF	66%- seek professional care		NSF			
5	Jedy-Agba & Adenibamowo (2012), Nigeria; Qualitative	PLWHA	HIV associated cancer/malignancies	FGDs and KII	Poor knowledge of the cause of HIV associated misconceptions	Feared to diagnose for cancer, have disbelief of risk of cancer, fatalistic to treatment deny having cancer		Feared and seek alternative care for cost and low prevalence of screening					
6	Olowokere et al. (2012), Nigeria; CS	PLWHA	HIV/AIDS, ART	SQBSM	77.7% knowledgeable to HIV/AIDS and 75.2% to ART	78.9% positive attitude for HIV/AIDS and 73.9% for ART	ART Adherence	62.9% have >95% and 37.1% have <95% ART adherence level			Knowledge of HIV/AIDS and ART, Attitude of HIV/AIDS and ART		
7	Kasumu & Balogun (2014), Nigeria; CS	PLWHA	ART	SQBSM	83.1% good, 6.9% fair and 9.9% poor knowledge	98.1% positive and 1.9% negative attitudes	Education	78.4% have adherence level >95%, 86.7% adhere to clinical schedule			Reminder device (i.e., cellular phone, alarm), waiting time on the clinic, and age		
8	Ekubagewargies et al. (2019), Ethiopia; CS	PLWHA mothers with infants 6-12 months	Infant feeding	SQBSM	68.9% good knowledge	75.9% favourable attitude		23.7% good practice					
9	Anand & Puri (2018), India; CS	PLWHA	Nutrition	SQBSM			Place of residence		Rural: 34.1(3.7) < Urban: 34.4(3.7)	NSF		Rural: 8.1(2.1)~ Urban: 8.1(2.3)	NSF
10	Fuster-Ruiz de Apodaca et al. (2020), Spain; Qualitative	PLWHA	Interaction of illicit drug use and ART	Face to face interview	16/21 ignored ART-drug interactions and unaware due to having a wrong perception of interactive toxicity	11/21 have perceived threat, 8/21 have a risk of health for DDIs	Psychosocial attributes, ignorance and no negative experiences on DDIs.	Drugs > 5 taken illicitly heterogeneously, inhaled drugs used most.			Mean 5.33 (1.95)		Toxicity belief and illicit drug use
11	Guiron et al. (2011), Burkina Faso; CS	PLWHA	HIV/AIDS, HAART	SQBSM	60% know route of transmission, stage of progression, traditional medication, and necessity of disclosure	Positive attitude in all items >95% PLWHA except, HAART impact daily activities, disclosure and worry of loss support		95% never forget to medicate in time, 94% unadhered to medication for >3days.					Travelling, unavailability, distance, psychological and economic scantily, complications of HAART

Table II: Summary of the included studies and findings (continued)

SI	Author(s) (Year); Study design	Study population	Dimension(s)	Data collection method	Knowledge assessment	Knowledge score	Risk factors	Attitude assessment	Attitude score	Risk factors	Practice assessment	Practice score	Risk factors
13	Bukusuba et al. (2010), Uganda; CS	PLWHA women	Nutrition, diet and associated diseases	SQBSM	52% were knowledgeable about the terminology, drug-food interaction (28%), or trained in nutrition (90%)	Mean 8.3 (2.2)	Level of education, transport type, BMI	All voted on a balanced diet including fruits and vegetables. 63% consider the special diet for them and 45% feel increased meal frequency	Mean 34.4 (3.7)	The health facility, income, religion and emotional status	22% eat >2 meals/day, low grade food (60%), 20.3% have special diets and 7.5% have food related labours.	Mean 8.1 (2.3)	Diversified food consumption, meal frequency, knowledge of nutrition.
14	Anand & Puri (2013), India; CS	PLWHA	Nutrition	SQBSM	Good nutritional knowledge (80%)	Mean 8.0 (2.1)	Level of education, transport type, BMI	38% good, 60.8% average and 1.2% poor attitude	Mean 24.0 (3.8)	The health facility, income, religion and emotional status	Have good practices of medication and meals (95.3%), fruits and vegetables (80%), wash fruits and vegetables (89.5%)	Mean 21(6.5)	Education, income, religion, employment, transport facility & BMI
15	Masuku & Lan (2014), South-Africa; CS	PLWHA pregnant and lactating women	Nutrition	SQBSM		Mean 8.0 (2.1)	Level of education, transport type, BMI		Mean 24.0 (3.8)	The health facility, income, religion and emotional status		Mean 21(6.5)	Education, income, religion, employment, transport facility & BMI
16	Lolekha et al. (2015), Thailand; CS	Perinatal PLWHA=>12 yrs	Reproductive health, STIs & HIV, self-care and ART management	Audio computer-assisted self-interview	<50% unaware of pregnancy preventions, STIs, HIV transmission and ART management	Median 8 (IQR 5-10)	Gender, age, living in the orphanage, attitude score	Do not have sex with others (~50%), cannot marry HIV- person (40%). >90% felt easy to take ART on schedule, 66% say no to abusive drugs	Median 41 (IQR 36-46)	Gender, overall knowledge score and Tanner stage	Self-management is good (90%) but in the case of ART management 16% missed dosage, and 90% do not know their CD4 and viral condition. Drug use and sexual behaviour is significant		Education, gender and age
17	Ezechi et al (2016), Nigeria; CS	PLWHA women	Nutrition	SQBSM	23.5% good, 64.8% average, 11.7% poor knowledge	Mean 12.4 (3.5)	Age, marital status, education, occupation	16% good, 51.2% average and 32.8% poor attitude	Mean 10.1(3.5)		65.1% good, 33.0% average and 1.9% poor nutrition practice	Mean 15.2 (3.0)	Marital status, education, ethnicity
20	Raberahona et al (2019), Madagascar; CS	PLWHA	ART	SQBSM	87.6% good knowledge	Median 7 (IQR 6-8)	Age, education, job & marital status, gender, duration of infection and ART	75.6% a positive attitude	Median 5(IQR 5-6)	Job-status, duration of infection	64.5% missed their dosage, 7.9% did it frequently, and 48.3% skipped routinely missed dosages		
21	Mnyani et al (2017), South-Africa; CS	Pregnant and postpartum PLWHA women	Infant feeding	SQBSM	The mean score of general, HIV and infant feeding knowledge is higher among HIV infected pregnant and postpartum women	Pregnant: mean 12.5 (2.3); Postpartum: 12.1(2.5)	HIV status	65% positive to exclusively breastfeeding and 40.1% to formula feed		HIV status, knowledge score and socioeconomic status	63.9% HIV+ women exclusively breastfeed 16.7% exclusive formula feed		Infant feeding knowledge, job status, age of infants and health-care facilities

## RESULTS

A total of 18 observational studies had been included in this review (Table II). Among them, only two studies used qualitative methods (43,44) and the rest are cross-sectional observational studies. Maximum studies (n=11) were based on the PLWHA in a different African region. Among them, 4 studies were conducted in Nigeria (44–47), two in Ethiopia (48,49), and one study each in Uganda (50), Madagascar (51), Burkina Faso (12), and Lesotho (52), respectively. The rest of the studies were conducted in South Africa (53–55), India (56–58), Malaysia (59), Spain (43) and Thailand (60). In Thailand, perinatally-infected, under-aged children (age  $\geq$ 12 years) were the participants (60), and 4 studies were conducted based on HIV-positive breastfeeding mothers (53,54) and mothers with infants <6 months (52) and 6-12 months of age (49), as well as pregnant and postpartum mother (55). Only two studies specified the study population as HIV-positive women (45,50).

Most of the studies used a survey method based on a structured or semi-structured questionnaire. In addition, face-to-face interview (43), computer-assisted audio self-interview (CASI) (60), focus group discussions (FGDs) and key informant (KI) interviews (44) were also used for assessment. KAP had been assessed according to different dimensions along with HIV/AIDS and ART (12,46,51), nutrition (45,50,54,56,57), infant feeding (49,52,55), oral lesions (59) and HIV-associated cancer/malignancies (44), water, sanitation and hygiene (48) and prevention of mother-to-child transmission (PMTCT) (52,53). A Spanish research assessed KAP in the interaction of illicit drug use and ART (43), while reproductive health and self-care along with HIV prevention and ART management were evaluated in Thailand (60).

### Knowledge among the PLWHA

Most of the PLWHA had an adequate level of knowledge of HIV/AIDS and ART (12,46,47,51). Several misconceptions on transmission route and medium of transmission had been reported, including misconceptions about mosquito bites (12). The median score was estimated to be 7 with an inter-quartile range (IQR) of 5 to 8 for PLWHA in Madagascar (51). Along with socio-demographic factors, HIV/AIDS-related attributes—HIV progression, ART regimen and adherence, HIV/AIDS and ART duration and being a member of an HIV-related organization—were responsible for enhancing respondents' knowledge of disease and medication (46,47,51).

A study found that 72% of women had a good knowledge level about the PMTCT (53). Around 69% of women had higher knowledge score compared with mean score of infant feeding knowledge in Ethiopia (49). Though they had sufficient knowledge, barely 26% of mothers had complete knowledge of HIV transmission methods (52).

Compared with HIV-negative women, HIV-positive pregnant and postpartum women had a higher mean score of both general (12.5, SD 2.3) and HIV-associated (12.1, SD 2.5) infant feeding (55). Possible risk factors were the age of the mother and time of receiving the PMTCT information (52).

Studies that assessed nutrition and diet found sufficient knowledge level among the PLWHA (56,57), PLWHA pregnant women (45,50) and breastfeeding women (54). But 64.8% of Nigerian women were found to have average knowledge, followed by 23.5% with sufficient knowledge and 11.7% with insufficient knowledge level (45). Though 90% of Ugandan HIV-positive women had been trained in nutrition, diet and disease, only 52% had proper knowledge of food-related diseases. Among them, less than one-third had knowledge of drug-food interactions (50). The mean score on nutrition was reported as highest among Nigerian women (12.4, SD 3.5) followed by South African women (8.0, SD-2.1) (45,54). Expectedly, a significant mean difference in the knowledge of nutrition was observed between urban (8.3) and rural (7.4) populations in India (57). Possible factors reported in those studies were age, marital status, job type, education, place of dwelling, type of transport, and body mass index (45,54,57).

Besides, PLWHA had high levels of knowledge about WASH-borne diseases and when to wash hands, but many were unaware of the transmission routes of water (66.6%) or excreta (58%) for diseases. Their level of knowledge also depended on the prevalence and frequency of diarrhea-related episodes (48). Poor level of knowledge is also manifested in the dimension of HIV-related malignancy and cancer (44) and oral lesion (59). Spanish qualitative study indicated that around 80% of PLWHA were unaware of the interaction between illicit drug use and ART treatment. They were unaware of interactive toxicity and ignorant of the possibility of having negative experiences based on drug-medication interaction (43). Though the median score of 8 is high (5-10), perinatally-infected adults (age  $\geq$ 12 years) were likely to transmit the virus, given their high level of ignorance about STIs and HIV transmission and symptoms, as well as medication management. They also had low levels of knowledge about reproductive health. Being male, aged ten to adulthood and living in an orphanage were also found to be factors associated with level of knowledge (60).

### Attitudes among PLWHA

Studies had reported that most of the PLWHA showed positive attitudes on HIV/AIDS and ART (12,46,47,51). Guiro and others reported that a significant number of PLWHA were worried about disease disclosure and losing support (12). In this case, certain factors, job status, duration of infection (51) and medication adherence level (47), were associated with the HIV/AIDS and ART attitudes among the PLWHA.



For PMTCT, mixed attitudes were observed over the study. Dlamini and associates reported all the HIV-positive mothers were positive about PMTCT in Swaziland, South Africa (53). In Lesotho, 97% of the mothers with a child under age 6 months discriminate between child-feeding options and only 52% agreed that exclusive breastfeeding (EBF) is sufficient for their child (52). Similarly, another study in South Africa reported that 65% of HIV+ mothers were positive on EBF while 40% prefer formula for their child (55). The percentage was higher in Ethiopian HIV-positive mothers with a child of 6-12 months (49). Compared with HIV-negative mothers, more positive attitudes had been reported among HIV-positive mothers along with the socioeconomic status and knowledge level of the risk factors for infant feeding (55).

But the attitudes on the nutrition and balanced diet were found to be average and poor among most of the Indian and Nigerian PLWHA (45,56). Whereas in Uganda, all PLWHA women felt that as they were infected with HIV, they needed to eat a balanced diet. Among them, 63% required a special diet and 45% agreed on the need for eating an increased number of meals (50). The mean attitude score was estimated to be highest for Indian PLWHA (34.4), followed by South African pregnant and lactating PLWHA (24.0) and Nigerian PLWHA women (10.1) (45,54,56,57). Religion, income, type of health facility and psychological status were associated with the pregnant and lactating PLWHA mothers in South Africa (54).

Positive attitudes were found among most of the PLWHA for WASH-associated diseases (71.2%), importance of poor hygiene (86%) and preventable excreta-borne diseases; however, in the case of diarrheal diseases, 67% did not think it preventable (48). In the case of opportunistic infections, 36% reported negative attitudes towards oral lesions in Malaysia (59) whereas fear, disbelief, denial and fatalistic dependency were found for the HIV-associated malignancy and cancer (44). Besides, perceived threat and health-related fear among toxicities of illicit drug use during ART medication remained among the PLWHA (43). On the other hand, perinatal PLWHA had an attitude of being unable to marry due to their disease while they had positive attitudes about taking ART medication on time and not abusing drugs. The median score of attitudes on reproductive health, HIV transmission and prevention and ART management was also estimated and varied by gender, knowledge level and Tanner stage (60).

### Practices among PLWHA

Sufficient practices of ART were generally determined by having an ART adherence level of more than 95%, which was highest in Nigeria (46,47), Thailand (60) and Burkina Faso (12). Raberahona et al. (2019) reported that almost 65% of PLWHA missed their ART dosages, and, among them, 8% did it frequently. More than 48% of PLWHA

who missed their ART medication also skipped missed dosages (51). These missed dosages occurred due to travelling, clinical distance, unavailability in clinics and medication complications (12). Sufficient practices of ART were high among those who have good knowledge and attitudes score (47). Besides that, sociodemographic factors and the use of reminder devices were found to be risk factors for ART adherence (12,46,51,60). For the perinatal PLWHA in Thailand, good self-management prevailed among 90% of perinatal PLWHA. Drug use and sexual practices were also significantly high among less educated, male perinatal PLWHA (60). Illicit drug use is also high (5.33 drugs taken on average) among Spanish PLWHA, which was associated with ART non-adherence related to the toxicity belief- impact of drug is neutralized due to ART or medication (43).

A good level of practices was found among most of the breastfeeding mothers (90%) (53) while in another study, EBF and formula feeding practices were found among 64% and 16.7% of South African HIV-positive postpartum women respectively (55). Their PMTCT and infant feeding practices varied by infant-feeding knowledge, job status, child's age and healthcare facilities (55). In Lesotho, mothers cannot adhere to their choice of infant feeding: 86% practiced other feeds rather than breastfeeding before the age of six months (52). The choice of infant feeding option depended on family pressure, insufficient colostrum, infant feeding counselling covering the information gained from counselling and educational status (52). In Ethiopia, only 23.7% of women had good practices of infant feeding (49).

Good nutritional practices were followed most often by the PLWHA in India and Nigeria (45,56,57). In India, 80% consume fruits and vegetables and 89.5% wash the food before consuming it (56). But in Uganda, PLWHA women had poor diets, including >2 times meal (22%), low-grade food (60%), special diets (20.3%) and food-related misconceptions (7.5%) because of food availability and nutritional knowledge (50). In South Africa, the estimated mean of nutritional practices had been reported as 21.0 with a standard deviation of 6.5, whereas socioeconomic factors and transportation facilities were responsible for the nutritional practices of pregnant and lactating women (54).

In Ethiopia, PLWHA had bad practices regarding the duration of water storage, toilet cleaning, washing hands when necessary and using a low amount of water due to the scarcity of water during the dry season (48). These practices depended on the respondent's sex, education, income and job status (48). Related to HIV opportunistic infections, around 34% of Malaysian PLWHA did not seek professional care for oral problems (59). Besides, PLWHA had a low prevalence of screening, and they seek alternative care for HIV-related malignancies/cancer because of the huge cost associated with

mainstream treatments (44).

## DISCUSSION

The review assessed the KAP of PLWHA in different dimensions along with the associated or risk factors. Though most of the PLWHA have good KAP level, there is still a high risk of transmission and adverse health-related outcomes due to poor practices and attitudes. Several studies find possible factors of KAP attributes are interrelated. For example, knowledge and counselling is associated with practices regarding infant feeding (52,55). Knowledge level for nutrition and diet also increase the likelihood of having good dietary practices (50). Besides, illicit drug use is associated with unintentionally missed dosages of ART while their belief and perception of non-threatening drugs leads them to consume more illicit drugs (43). Olowookere et al. (2015) found both knowledge and attitudes toward HIV/AIDS and ART can influence the practice level (47). Besides, the knowledge score of the PLWHA, including perinatal PLWHA, is associated with their level of attitudes on the specific dimensions (55,60). But the KAP model indicated interrelated attributes and, in theory, working knowledge is a more important part that in the context of formulating attitudes (61) while the attitudes of the person can be inferred as the explicit behaviour or practice (62). Murra found a statistically positive relationship between knowledge of ART and adherence ( $R=.81$ ,  $p<0.001$ ) and attitude and adherence ( $R=.66$ ,  $p<0.001$ ). Privacy and confidentiality were maintained to ART adherence (63). Therefore, a rigid methodology is suggested to assess the interrelationship of KAP regarding the psychosocial literatures.

This review found several factors that were associated with the KAP attributes separately. Expectedly, socio-economic factors were found to be related to all the KAP attributes that support Nachegea's study regarding the ART (64). Besides, several factors related to both dimensions and participants were also associated with the KAP attributes. For example, transport facility and BMI were found to be potential risk factors for pregnant and lactating PLWHA women's knowledge and practices regarding nutrition (54). Similarly, for PMTCT, mother's age, informing time regarding the PMTCT, insufficient lustrum and concern for sufficient breastmilk and family pressure were found to be significant KAP attributes of PLWHA mothers with infants  $\leq 6$  months (52). Qualitative study of the DDIs identified the same factors amongst those who were using illicit drugs during their ART (43). Therefore, it is important to evaluate the KAP among the PLWHA based on the dimensions and targeted participants regarding the dimensions. In this review, survey methods were used mostly for KAP assessment studies whereas qualitative methods were used to explore the potential factors that were not reported in the cross-sectional studies (43,44).

## CONCLUSION

The review found an adequate knowledge level of PLWHA that varies worldwide in general with the gaps of nonviable routes of transmission. Level of attitudes and practices were questionable due to strong stigmatization towards high-risk groups for HIV infection. More well-established questionnaires should be developed and used to measure the universal precautions that should be taken towards HIV/AIDS patients. Further quality research should focus on qualitative methods with in-depth analysis, integrating with the model of KAP for comparisons of inter-relationships and interventional strategies.

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