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Experiences of Thai-Muslim patients regarding inconsistent antiretroviral therapy adherence: An exploratory descriptive qualitative study

Pajongsil Perngmark[1*], Oatcharaphon Sahawiriyasin[2], and Eleanor Holroyd[3]

[1] Faculty of Nursing, Prince of Songkla University, Thailand
[2] Kok Bhoe District Hospital, Pattani Province, Thailand
[3] Faculty of Health and Environmental Sciences, Auckland University of Technology, New Zealand

Abstract

Background: Antiretroviral therapy (ART) has played a crucial role in saving countless lives of patients with HIV/AIDS across the world. However, despite its effectiveness, ART adherence still falls short globally, and non-adherence remains the primary cause of treatment failure. In the rural areas of southern Thailand, where the population is predominantly conservative Muslims, there has been an observed increase in ART non-adherence.

Objective: This study aimed to explore experiences of inconsistent ART adherence among Thai-Muslim patients with HIV/AIDS (PWHAs) in southern Thailand. In addition, the perspectives of healthcare providers were also sought.

Methods: Data were collected by conducting semi-structured in-depth interviews with ten Thai-Muslim PWHAs and five healthcare providers at a Voluntary Counseling-and-Testing Clinic. A content analysis approach was utilized to analyze the data.

Results: Inconsistent ART adherence was reported. Religion/spiritual imperatives, forgetfulness, inadequate knowledge (of drug side effects and drug regime), misunderstandings (about being symptom-free and feeling well), boredom from long-term drug-taking regimes, as well as poor transportation and lack of family support (arising from non-disclosure of one's HIV-serostatus due to HIV stigma) were emergent themes derived from the interviews with Thai-Muslim PWHAs. The healthcare providers' interview data revealed their need for the integration of Islamic beliefs to provide better care.

Conclusion: It is essential for healthcare teams to work collaboratively with patients' religious beliefs to enhance ART adherence. Clinical nurses can contribute to the promotion of HIV-care services by integrating Islamic beliefs and Muslim culture into their practice, thus increasing patients' knowledge and motivation for ART adherence. This could entail utilizing Islamic prayer rituals as drug reminders, elaborating on Islamic moral beliefs concerning sickness and healing, and integrating the cultural imperatives of self-care in the Muslim community into ongoing care delivery. Cross-cultural nursing education and specialized training in HIV care should incorporate knowledge about Islamic and Muslim cultural beliefs.

Keywords

medication adherence; antiretroviral therapy; health personnel; HIV/AIDS; Islam

***Corresponding author:**
Pajongsil Perngmark, RN, MPH, Ph.D
Faculty of Nursing, Prince of Songkla University, Hat Yai, Songkhla 90110, Thailand
Email: activejo409@gmail.com

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Background

Antiretroviral therapy (ART) has saved the lives of patients with HIV/AIDS worldwide (Iacob et al., 2017) by suppressing viral loads, maintaining high CD4 cell counts, and prolonging survival rates (Afe et al., 2017; Centers for Disease Control (CDC), 2019). To achieve these optimal results, at least 95% of ART adherence is necessary (Afe et al., 2017; Iacob et al., 2017). ART non-adherence is the most common reason for treatment failure, with the potential risk of developing drug resistance through suboptimal viral suppression (Heestermans et al., 2016; Iacob et al., 2017).

Globally, ART adherence remains poor (Centers for Disease Control (CDC), 2019; UNAIDS, 2021). Determinants of adherence differ per region of the globe (Afe et al., 2017; Heestermans et al., 2016). In developing countries, drug side effects, cost of treatments, lack of family care, and social stigma were common predictors contributing to low adherence (Afe et al., 2017; Sianturi et al., 2020). In rural locations, transportation costs (for repeat/refill prescriptions) and medications running out were the most common reasons for non-adherence (Becker et al., 2020; Sianturi et al., 2020). Non-disclosure of HIV status, lack of knowledge, and negative perceptions towards ART also significantly affected non-adherence (Bukenya et al., 2019; Sianturi et al., 2020). In

Thailand, ART inconsistent adherence has been found to be increasingly prevalent in the rural regions of southern Thailand, where the majority of the population are Muslims.

Healthcare providers can positively impact medication-taking behaviors among patients with HIV/AIDS (Butler, 2019; Centers for Disease Control (CDC), 2019) through engaging in counseling, mutually identifying barriers to adherence, providing targeted cost-relevant education interventions - such as memory aids, offering adherence support services, and tracking clinical measures (i.e., viral load, CD4 cell counts) (Centers for Disease Control (CDC), 2019). Treatment success requires not only a sustainable clinical supply of ART but also lifelong adherence to treatment by patients (Centers for Disease Control (CDC), 2019; UNAIDS, 2021).

In Muslim communities, HIV/AIDS is considered an immoral-religious disease (Badahdah, 2010). It has been perceived as a punishment from God (Allah) for those Muslims who violate the religious prohibition, such as having extramarital sex or injecting drugs users (Maulana et al., 2012; Pantelic et al., 2018). In the early HIV/ADS era, HIV stigma was one of the main problems faced by Muslim patients with HIV/AIDS (PWHAs) in southern Thai-Muslim communities (Jamplakay, 1997; Songwathana & Manderson, 2001). To date, no further work has been published among southern Thai-Muslim PWHAs, especially those residing in conservative, rural Muslim communities.

A recent Thai-based national survey study has confirmed that stigmatized and negative attitudes toward people living with HIV/AIDS still exist in general Thai society (Srithanaviboonchai et al., 2017). This can negatively impact ART adherence and low uptake of healthcare services provision among general Thai PWHAs, in particular for Thai-Muslim PWHAs, as indicated in the studies of Thai-Muslim community members and religion leaders and among Thai-youth living with HIV/AIDS in northern Thailand (Chamroonsawasdi et al., 2014; Fongkaew et al., 2014). In addition, HIV-related social stigma and discrimination against people living with HIV/AIDS within Thai society were also shown to decrease ART adherence significantly (Chamroonsawasdi et al., 2014; Fongkaew et al., 2014; Srithanaviboonchai et al., 2017).

Religious beliefs have been highlighted to play a significant role as supportive factors towards ART adherence (Fongkaew et al., 2014; Kisenyi et al., 2013) or as risk factors (Tocco, 2017). To date, a limited number of research studies have revealed that regular adherence to religious prayer was found to be significantly associated with high ART adherence among Muslim patients (Mbuagbaw et al., 2012; Nuraidah et al., 2022). In addition, Islamic tenets have been documented to affect ART compliance, particularly during the holy month of Ramadan (Tocco, 2017). To date, scarce research explores how Islamic religious belief systems may be utilized for ART adherence among Muslim patients in the community in their everyday lives (Fongkaew et al., 2014; Mbuagbaw et al., 2012; Nuraidah et al., 2022). Up until the present, the experiences of Muslim patients and their religious beliefs regarding ART adherence have been scarcely explored (Fongkaew et al., 2014; Mbuagbaw et al., 2012; Nuraidah et al., 2022). Perspectives of both patients and healthcare providers, including clinical nurses, regarding this issue, are poorly understood (Sianturi et al., 2020). Nevertheless, a couple of recent studies revealed that understanding the effects of Islamic religious beliefs and Muslim cultural backgrounds could improve clinical outcomes in nursing practice (Agnes et al., 2020; Perngmark et al., 2022a).

After the early HIV/ADS era, no further work has been published among conservative, rural southern Thai-Muslim PWHAs. Furthermore, to our knowledge, no research has explored ART adherence among southern Thai-Muslim patients up-to-date. Therefore, this study aimed to explore the experiences of Muslim patients with HIV/AIDS (PWHAs) residing in the southern region regarding inconsistent ART adherence in their daily living.

Methods

Study Design

An exploratory descriptive qualitative (EDQ) study was conducted. Our research study aimed to explore the experiences of Thai Muslim PWHAs regarding inconsistent ART adherence. EDQ is an appropriate method of choice because it can identify a deficit of knowledge of a particular issue of interest (Hunter et al., 2019). In addition, because ART non-adherence remains a major concern in rural southern Thai-Muslim communities, attention to descriptive elements of this phenomenon can also be used to gain insight and to inform optimally targeted community nursing care for rural-dwelling Muslim PWHAs (Hunter et al., 2019; Sandelowski, 2000).

Participants

This qualitative study took place at one of the Voluntary Counseling-and-Testing (VCT) clinics, in a community-based hospital in one District of Pattani Province, in the lower rural region of southern Thailand, where the majority of conservative Thai Muslims reside. About 12% of the total Thai population are Muslims. The majority of Thai Muslims live in the five southernmost provinces of Thailand, namely Songkhla, Satun, Pattani, Yala, and Narathiwas. Most are of Malay ethnicity and hold strong Islamic beliefs, integrated into all aspects of their daily lives (Mustafa et al., 2020).

To recruit Muslim participants (PWHAs), the patients' VCT health record data (of the year 2017) was assessed in keeping with ethical requirements, revealing that 52% of the PWHAs' current patients were Thai Muslims. One-fifth of these Muslim patients had low educational literacy (elementary school level), were unemployed, or receiving low incomes. In addition, approximately 5 % were reported to have frequently missed their doctors' appointments within the past six months (prior to data collection) and were noted to be unable to maintain consistent ART adherence.

Participants consisted of Muslim patients (PWHAs) and healthcare providers (HCPs -three clinical nurses, a doctor, and a pharmacist) who were recruited from the same VCT clinic. *PWHAs recruitment:* Potential participants were identified based on the inclusion criteria- being Muslim, having received ART for at least one year with a history of ART inconsistent drugs-taking within the past six months (measured by an ART adherence score < 95%), without AIDS symptoms, and willing to engage in the study. A purposive sampling method was commenced initially, and then a snowball technique of recruitment was later adopted (Polit &

Beck, 2021) to recruit PWHA patients registered at the VCT clinic. Nurses at the VCT clinic assisted in recruiting the participants. *HCPs recruitment*: HCPs' inclusion criteria consisted of being employed full-time at the same VCT clinic and having completed formal training in HIV care for at least one year, and being willing to participate. All HCPs who met the inclusion criteria were purposively approached (in person) for their recruitment.

Data Collection

Data were collected from January 2017 to August 2017, using semi-structured in-depth interviews for both participant cohorts. Interviews ceased when data saturation was achieved (Polit & Beck, 2021). All eligible participants (i.e., ten Muslim PWHAs and five HCPs) agreed to participate, signed the consent forms, and remained with the study until the end of the study period. Field notes were used to document the reflections of interview sessions and to note observations of participants' interactions. Field notes were written immediately after each participant left the room while details were still fresh in the researcher's thoughts. Field notes included non-verbal information, such as a description of the participant's physical appearance and how they talked. The researchers reflected on the interview process, the provision of participants' information, and their responses to the researcher's questions (Lincoln & Guba, 1985).

The research team was female, non-Muslim, had a registered nursing qualification, and was independent of the VCT clinic. Both PP and EH held research expertise in qualitative studies for over ten years. The interviews were conducted by the field researcher (OS) and one research assistant (RA, a female Muslim nurse with working experience in chronic care for three years and independent of the VCT clinic). In addition, OS and RA were trained and supervised by PP throughout the interview process.

Trust and rapport were established with participants. Trust was built by using non-judgmental interactions, avoiding questions and expressions that suggest disapproval, using positive body language, expressing a genuine and respectful interest in what participants were saying, and attempting to understand all participant's perspectives (Green & Thorogood, 2014). The researchers also built rapport with all participants by providing a detailed description of the study and informing participants that they were free to stop participating at any time without any effects on their access to healthcare services and that they could refuse to answer questions that might make them feel uncomfortable. In addition, they were offered an opportunity to stop the interview if the distressed feelings occurred and were provided resources such as counseling if needed (Green & Thorogood, 2014).

Each participant was interviewed at least once or twice for about 30 minutes in a private room at the VCT clinic. Interviews were conducted in Thai, the national language of Thailand, and were audiotaped. Key topics covered in the interviews were the patient's experiences taking ART. For Muslim PWHAs patients, the interviews focused on their awareness, beliefs, and underlying causes/barriers to ART non-adherence, including perceptions of available resources to improve ART drug care. For example, 'Can you tell me about the non-adherence situations you encountered?' 'Please give an example.'

Further questions, such as 'How do you deal with drug side effects problems?' were asked. Each patient was further asked to describe their needs for ART drug adherence support and whether they had experiences utilizing Islamic beliefs to support their ART non-adherence problem. Reasons for loss of motivation on drug adherence were also explored

For HCPs: the clinical nurses were asked to describe routine healthcare services, perceived barriers and facilitators to ART treatments and care, perceptions of needs for ART adherence support, socio-cultural resources to improve ART adherence, and how best to support Muslim patients' drug care. These nurses were also asked about their understanding of Islamic beliefs and how these could be applied to ART service care provision to meet the needs of Muslim patients. The allied physician and the pharmacist were asked to outline their perceptions of medical treatments and drug counseling for Muslim patients' needs.

Data Analysis

Based on Sandelowski's recommendation, the content analysis approach was utilized to analyze the data (Hunter et al., 2019; Sandelowski, 2000). In keeping with content analysis (Polit & Beck, 2021), research team members listened to audio tapes, read, re-read, and verified, then coded and categorized transcript data. Words, phrases, and statements that described participant need, beliefs, and understandings were identified and highlighted to form deductive themes that reflected participants' responses. In this study, data were analyzed from both study groups' perspectives, i.e., the Muslim patients and healthcare providers/clinical nurses, to provide triangulation and help confirm patient information. To this effect, data analysis was taken part in two separate stages, and the two sets of themes were compared and contrasted to see convergent and(or) divergent themes between the two participant groups.

A constant comparison approach was used to develop and refine the content (Strauss & Corbin, 1990). The coding and content were developed manually by the research team. This initial phase was generally conducted and then followed by content validation. "Member checking" was performed using excerpts from the transcript of study participants to illustrate how their statements were coded and categorized. The first interview results served as the starting point for the subsequent interview. The interview data were then collected and analyzed using the same process. All of the following interviews were applied for the coding scheme, which was later refined to avoid lack of clarity, ambiguity, and overlap. Finally, content analysis of the memos and reflective field notes was reported in the logbook (Polit & Beck, 2021).

Rigor

After analysis, writing descriptions, and identifying themes (by all of the research team), the field researcher (OS) validated and confirmed the themes to the study participants. Each participant was also offered the opportunity to review the descriptions, classifications, and themes identified. Three participants accepted the opportunity, while seven participants refused to do so, saying that they trusted how the researchers had worked with the data. All three participants agreed with the analysis results; no new data were added during validation.

Criteria outlined by Lincoln and Guba (1985) were used to establish the study's rigor. Credibility was achieved through triangulation of the two participant data groups and participant member checking. Dependability involved consistency in categorizing data, with dependability ensured by having another researcher check the emergent themes' accuracy for each participant group and then across groups. To achieve confirmability, the researchers reviewed the data and documents and created an inquiry audit throughout the study project. Finally, transferability was established by using detailed descriptions of the study context.

Ethical Considerations

This study was approved by the Ethics Committee of the Faculty of Nursing, Prince of Songkla University (certified MHESI 68105/2534). The ethical approval was also authorized by the Pattani Provincial Ministry of Public Health. Participants were informed about the study's purposes and ethical approval and signed informed consent documents prior to data collection. All participants were assured that data would be kept confidential and participants would have no disadvantage in receiving healthcare.

Results

A total sample of 15 participants: ten Muslim PWHAs patients and five healthcare providers (HCPs), participated in this study. Details of the sociodemographic data of participants are provided in **Table 1**.

Table 1 Sociodemographic data of Muslim PWHAs patients and VCT HCPs

PWHAs	**(*n* = 10)**	**HCPs**	**(*n* = 5)**
Age (year)	Range 19 (1), 23-45 (9) Mean = 33.2 (8.19)	**Age (year)**	Range 29-47 Mean = 34 (7.68)
Religion		**Religion**	
Islam	10 (all)	Buddhist	5 (all)
Sex		**Sex**	
Male	5	Female	5 **(**all)
Female	5		
Marital status		**Marital status**	
Married	4	Married	3
Single	4	Single	2
Widowed	2		
Occupation		**Position**	
Labor	3	Clinical nurse	3
Housewife	4	Physician	1
Unemployed	3	Pharmacist	1
Education		**Education**	
Primary level	7	Bachelor	2
Middle level	3	Master	1
		Post-master	2
Income		**HIV care work experience**	
Poor (under the poverty line)	10	5-10 year	3
		> 10 year	2
Diagnosed HIV-infected		**ART adherence**[¥]	ART adherence[¥]
5-10 (years)	7	Low adherence	(max = 100%)
> 10	3	[a] score (< 95%)	Range = 64-89.29 %
			Mean = 73.06 (4.99)
Caused of HIV-infected		**Drug-taking Behaviors**	Drug-taking score (max=20)
Unprotected sex (CSWs)	7	Low drug-taking behaviors [b]	Range = 11-18
Injecting drug used	2	scores (< 15)	Mean = 14.37 (1.97)
Mother-to-child	1		
Disclosed HIV status			
Yes (to spouse/family member)	6		
No	4		
Received VCT counseling	Yes = 10 (all)		
Prior to taking ART	Yes		
During on ART	Yes		
Had experiences with drug side effects			
No	3		
Yes	7		
Experiences of non-adherence problem	Yes = 10 (all)		
Skipped taking drugs			
Sometimes, occasionally	10 (all)		
Ever used drug reminders			
No	8		
Yes	1/1		
(TV news time/mobile phone)			

Note: VCT=Voluntary Counseling and Testing; CSWs = commercial sex workers; ART adherence score interpretation: ≥95% score means good adherence, < 95% means inconsistent drug taking (according to Thai Ministry of Public Health (2021)); Tools used: [a] ART adherence score[¥] [b] drug checklist report form; [¥]ART adherence formula: Adherence level (%) = (Doses Taken/Total Expected Doses) *100 Adherence ((Afe et al., 2017)

Ten Muslim PWHAs patients were purposively selected from each sex, were aged between 23 to 45 years old (*n* = 9), and one aged 19 (male, from mother-to-child transmission). Causes of HIV infection varied: either from unprotected sex (*n* = 7), injecting drug use (*n* = 2), or mother-to-child transmission (*n* = 1). Disclosure HIV-serostatus: six had disclosed to their spouse or other family members, and four had concealed their test results due to fear of stigma. All patients had received drug counseling prior to receiving ART services. All had experienced drug side effects and were inconsistent in their drug-taking regimes over the past six months.

All had ART adherence scores below 95%, ranging between 74.10-89.29 %. [Adherence Formula: Adherence Level (%) = (Doses Taken/Total Expected Doses) * 100 Adherence (as cited in Afe et al. (2017)). The formula has been measured and widely used throughout Thailand, according to the Thai Ministry of Public Health (2021). The length of ART taking time ranged between 3-17 years: five within three years, four within 4-5 years, and one about 17 years.

The five HCPs comprised three VCT clinical nurses, a physician, and a pharmacist. All HCPs were female Thai Buddhists working for drug treatment and counseling at the VCT clinic between 5 to 10 years. The VCT clinical nurses provided routine care clinic-based services, such as monitoring ART drug adherence, pill-counts assessment, health education, and counseling for ART services.

Regarding the study's main themes, the five main themes emerged consisting of religious and spiritual importance, cognitive relevance, socioeconomic and financial barriers, need for social respect, and psychological barriers (See also **Table 2**).

Table 2 Themes and sub-themes identified (as underlying barriers) by PWHAs Muslim Patients and HCPs

Themes by PWHAs and HCPs	Sub-themes (as underlying barriers of ART non-adherence)
From PWHAs' perspectives	
1: Religion/Spiritual Importance	• HIV as a punishment from God (mostly male) • HIV as Allah's will (mostly female) • Perceived making a bad sin (Zina) from immoral misconduct (mostly male) ○ Seldom use Islamic beliefs and Islamic praying to support their drug-taking/ART adherence

2: Cognitive Relevance [Experiences of non-adherence problem, all PWHAs]	• Forget to take drugs (infrequent)
	  ○ Too busy to do things
	  ○ Have poor memory
	• Barely used sound reminders to support ART adherence.
	  ○ Most never used any kind of drug reminders.
	  ○ Few used handy sound reminders (mobile phone alarm, TV news)
	• Misunderstandings (symptom-free, feeling well)
	  ○ Skipped taking drugs (occasionally)
	• Inadequate Knowledge (drug side effects & drug care management)
	  ○ Experiences drug side effects and skip drugs by themselves

3: Socioeconomic & Financial Barriers	• Have transportation problems • Have financial problems ○ Occurred among low -incomes patients (mostly)
4: Need for Social Respect	• Non-disclosure of HIV-serostatus to a family member • HIV stigma (fear of stigma) ○ Lack of family support (in drug care & transportation)

5: Psychological barriers	• Boredom with taking long time drugs
	  ○ Getting tired of taking drugs (longtime use, over three years)
	  ○ Loss of motivation to keep ART adherence consistently

From HCPs perspectives	

1: Religion/Spiritual Importance	• The need for better integration of Islamic beliefs into ART adherence
	  ○ Aware of Islamic & cultural care importance
	  ○ Expressed the need for integrating Islamic beliefs in ART adherence for better culturally HIV-care

Theme 2-5	• Similar to those reported by PWHAs

Note. PWHAs = patients with HIV/AIDS; HCPs = health care providers/clinical nurses

Theme 1: Religious/Spiritual Importance

1.1 From PWHAs' perspectives: All PWHAs participants were conservative Muslims residing in rural communities in Southern Thailand. Most of the male patients self-disclosed their past sexual risk-taking behaviors (*n* = 4, having extramarital sex with commercial sex workers) or having injecting illegal drugs (*n* = 2) that they termed as very bad 'sins' (termed 'Zina'). Theme 1 included two sub-themes: HIV as a punishment from God (Allah) and HIV as Allah's will.

HIV as a punishment from God (Allah)

All patients, regardless of gender, believed that their receiving a diagnosis of HIV was a punishment from God (Allah). Most male patients (*n* = 4) believed they got HIV due to their past sexual risk-taking behaviors against Allah's will.

> *"Uhm…, I used to make a big sin- having extramarital sex with commercial sex workers. I believed I got HIV because I did 'Zina' against Allah's teachings." (Pt 8, male, 39 years old)*

HIV as Allah's will

All female patients (*n* = 5, all got HIV from their husbands) and the other male patient (who contracted HIV from mother-to-child transmission) believed HIV was a test from Allah.

"I got HIV since I was a child from my mother (while in utero). Until now, I have to accept it's my destiny. I believed this thing happens like a 'test' from Allah, whether I could endure it or not" (Pt 9, male, 19-years-old)

1.2 From HCPs' perspectives: All the HCPs were aware of how Muslim cultural and religious beliefs could be incorporated into promoting engagement with HIV care services. In particular, the 'the need for better integration of Islamic beliefs into ART adherence' approach was a salient aspect of this sub-theme highlighted by all of the Thai-Buddhist clinical nurses.

The need for better integration of Islamic beliefs into ART adherence

"Islam leads Muslim's way of living that I've heard before. So, I think we may need to try better integrating Islamic beliefs into our HIV care approach. This might be helpful in mitigating the ART non-adherence problem among Muslim patients." (Nurse 2, Thai-Buddhist, 29 years old)

Field notes/Reflections: Strong negative beliefs of 'being punished by God (Allah) due to having done a bad sin' in the past and obediently accepting it as 'Allah's Will' were profoundly perceived by Muslim PWHAs. Comparatively, the Thai-Buddhist clinical nurses recognized the importance of Islamic religious beliefs to help lowering ART non-adherence. Besides, their positive thoughts that Islamic beliefs and practices could help strengthen Muslim patients' ART adherence were also expressed.

Theme 2: Cognitive Relevance

Cognitive relevance consisted of a tendency to "forgetfulness" and the common misconceptions that 'feeling well' and 'having no symptoms meant recovery' coupled with insufficient knowledge about specific drug side effects, not having any active reminder systems and inadequate drug care management regimes for these patients. Forgetfulness was the most common obstacle to adherence.

Forgetfulness

"I forgot to take drugs (ART) sometimes; I was so busy working with my household chores. Many things to get done each day. … uhm…about drug reminders, no, I never used any drug reminders. I have no idea about it." (Pt 1, female, 29 years old)

Barely used sound reminders

Most patients (*n* = 8) never used any kind of drug reminders to support ART adherence. However, a few (*n* = 2) reported they had tried to time their medications with TV news-times (*n* = 1) or using a mobile phone alarm (*n* = 1) as a convenient sound reminder.

"HCPs (doctors and VCT nurses) told me that I have to take drugs (ART) every day for my good health. I'm willing to comply. But the big problem was my poor memory. So, I need to have something like a sound reminder to help remind me (about drug-taking time). Luckily, the TV news time works. I used it quite often" (Pt 5, female, 38 years old)

Field notes/Reflections: Drug reminding tools, either high- or low (simple) technology, were seen to be effective assistance against forgetfulness. Therefore, healthcare providers/clinical nurses should encourage Muslim PWHAs to use proper drug reminding tools that fit within their daily activity, including their Islamic ritual practice.

Misunderstandings ('feeling well' & 'no symptoms meant recovery')

Many of the patient participants (*n* = 7) admitted they often skipped their drugs, particularly whenever they felt they were 'getting well' and had 'no symptoms,' which they felt commonly occurred after taking drugs (ART) for an extended period. In addition, most participants perceived that 'no symptoms' meant HIV was well under control. In this regard, all HCPs participants confirmed the patients' testimonies.

"Some patients did skip drugs occasionally although they did (ART) adhere pretty well. I asked them why they were doing so (skip drugs), and they gave the reasons that they thought 'no symptoms' meant their health was okay, so they skipped drugs for such occasions." (Nurse 1, Thai-Buddhist, 32 years old)

Inadequate knowledge (of drug side effects & drug care management)

Inadequate knowledge about drug side effects and drug care management were also mentioned as key barriers for many participants (*n* = 6). Most PWHAs participants decided to stop taking their drugs when serious drug side effects occurred rather than asking for their HCPs' support. In this regard, VCT clinical nurses and a pharmacist agreed that making a phone call follow-up visit (since most participants were uncomfortable with home visits due to fear of public stigma) and providing informational support could be helpful.

"… yeah, I used to have experienced some serious drug side effects problems. I felt terrible …so tired and couldn't handle it, so I stopped taking drugs by myself, hoping to make me get better. Then I went to the VCT clinic, met a doctor, and got new drugs (replaced the previous ones) the other day. Nurse P explained that the side effects could happen to some patients, like me. I was advised that, in the future, if any drug side effects occur, I should make a phone call and let them (HCPs) know and help manage the problem properly." (Pt 4, male, 23 years old)

Field notes/Reflections: These were essential barriers against ART adherence at the individual level. Therefore, healthcare providers/clinical nurses should not only consider these barriers but also try to draw on integrated key Islamic beliefs to address the patient's misunderstandings of their health and improve their knowledge of drug compliance.

Theme 3: Socioeconomic and Financial Barriers

PWHA participants identified that they had problems with transportation to the VCT clinic, commonly linked to financial difficulties. They further stated that in response to this concern, the VCT clinic staff had offered to send drugs to their post offices for those patients who were in urgent need but unable to attend the clinic.

Financial and transportation problems

"Yes, we knew that some of these patients missed drugs because they had (financial and transportation) problems coming to refill ART drugs at the VCT clinic. We've discussed within our HIV care team to improve care services and came up with a small trial (as optional) of sending drugs via post-office to those patients who

inform us in advance about their next follow-up. It seemed good going." (Nurse 3, Thai-Buddhist, 35 years old)

Field notes/Reflections: Limited or lack of finances and transportation problems were other important barriers to ART compliance, particularly among those rural patients living in remote areas. Working in collaboration with the patient's family members (for transport and extra financial help) or with extra social support workers, such as village health volunteers, might be useful in this regard.

Theme 4: Need for Social Respect (due to HIV Stigma)

This theme was mainly derived from perceptions of the HIV stigma carries (noticeably within conservative rural Muslim communities). Four participants actively concealed their HIV-serostatus from their family members. This non-disclosure led to an unintentionally negative impact, i.e., lack of family support in HIV care, including lack of transportation support. In this regard, all HCPs stated that more family counseling was necessary to reduce HIV stigma in families and communities. In addition, all the nurse participants believed that family support could help increase ART adherence.

Non-disclosure of HIV-serostatus and lack of family support (due to HIV stigma)

"My wife didn't know about my HIV status. I dared not tell her because I was afraid she might leave me. Actually, I wish she knew and helped support me whenever I had problems with drug taking (side effects) or to go get drugs when needed." (Pt 7, male, 34 years old)

Field notes/Reflections: HIV stigma was highly salient within this conservative, rural southern Thai- Muslim community. To help reduce the negative impacts of HIV social stigma, additional counseling provision for individual patients (if needed) and their family members was necessary.

Theme 5: Psychological Barriers

This theme consisted of boredom from taking ART for a long period, leading to a loss of motivation to keep up with ART adherence. Four participants, particularly those who took ART over three years, admitted that they used to feel bored with long-term medication adherence. Such boredom made them lose their motivation to keep up with consistent drug taking.

Boredom from taking 'long-term' drug taking

"Sometimes, I felt getting bored of takings drugs every day. So I used to skip drugs some of the time. I know these drugs (ART) help me be healthy, but you know what? I wish I could have a normal day off without taking drugs, to live like other ordinary people." (Pt 10, male, 36 years old)

Field notes/Reflections: Boredom arising from taking 'long term' drug regimes and losing motivation for ART adherence posed two important psychological barriers. Drawing on Islamic beliefs and Islamic ritual practices might be useful in supporting and strengthening Muslim patients' spirits.

Discussion

Our findings revealed that barriers to consistent ART adherence among Thai-Muslim patients were multi-faceted and complex. In our study, most patients believed that a diagnosis of HIV was an act of punishment from God (Allah), similar to findings of an earlier study by Badahdah (2010) with Muslim patients in Saudi Arabia and another recent study among adolescents living with HIV-positive in Indonesia (Nuraidah et al., 2022). Of note is that some patients felt they had "lost their spiritual strength" from 'boredom' ensuing from long-term ART drug-taking, which could have affected their ART non-adherence. Such negative beliefs might be essential in lessening ART adherence in this regard. Previous studies revealed that regular ritualized prayers positively impacted ART adherence (Dalmida et al., 2017; Mbuagbaw et al., 2012). However, these Muslim patients seldom utilized prayers to enhance and raise their 'spiritual strength.' Thus, we recommend that Islamic praying be advocated through health professional and religious support structures as a powerful culturally and community-based strategy to support Muslim patients' comprehension and motivation in consistent ART uptake (Perngmark et al., 2022a; Tocco, 2017).

In Islamic culture, Muslims believe that Allah (Subhanho Watala-SWT) is crucial to either healing or becoming sick; Allah (God) sends treatments together with the sickness. Such beliefs have been indicated to influence Muslims' health-seeking behaviors (Al Noumani et al., 2018; Fongkaew et al., 2014; Tocco, 2017). Therefore, linking these beliefs to healthcare service delivery is critical, as evidenced in previous studies with populations across the life span (Al Noumani et al., 2018; Nuraidah et al., 2022; Perngmark et al., 2022b; Tocco, 2017). For example, the verse of Hadith (verse 3/321) that emphasizes Muslim's duty to take medications when one becomes sick could be used to signify the importance of ART adherence among Muslim patients (Perngmark et al., 2022a). For instance, clinical nurses could assist individual Muslim patients in realizing that they must fulfill their obligation (i.e., taking drugs consistently) to serve Allah's wishes. Another verse of Hadith, "Use medicine (i.e., ART adherence), for Allah (God) does not send an illness (i.e., living with HIV/ADS) without sending a cure," should be brought up for further discussion. As a practical step to remain healthy, Muslim patients should be supported to comprehend that they need to maintain ART adherence. In addition, they should be encouraged to ask Allah (God) for assistance in their recovery by relying on prayer to support their spiritual strengths in consistent ART adherence.

In our study, forgetfulness was a common concern reported in the sub-themes of cognitive relevance. Nevertheless, most of these Muslim patients had never used any kind of sound reminders to support their ART adherence. According to Islamic practice, Muslims have to pray 5-times a day daily. 'Azan calling time' is a ritual announcement calling all Muslims to pray for Allah each round (Perngmark et al., 2022a). These ritualistic calling times could be used as effective medication reminders. Using 'Azan calling time' seems to be strategically and culturally understood and convenient for Muslim patients in this regard (Mbuagbaw et al., 2012; Perngmark et al., 2022a). Other devices, such as mobile phone sets/alarm time or TV news times, could also be used as simple yet effective sound reminders (Centers for Disease Control (CDC), 2019; Nuraidah et al., 2022).

The inadequate knowledge of drug necessity and drug side effects, including misunderstandings about being 'symptom-free' and 'feeling well,' and poor management skills of drug

care were additional barriers to consistent drug adherence reported similarly in previous studies (Afe et al., 2017; Heestermans et al., 2016; Nuraidah et al., 2022). For example, in this study, most patients held their misunderstanding that 'no symptoms meant recovery.' 'No symptoms' in this context could mean that either the HIV was well under control or their health was okay and they could get well soon. Consequently, some skipped their ART drugs occasionally, a finding that accords with previous studies (Afe et al., 2017; Heestermans et al., 2016; Perngmark et al., 2022a).

Transportation costs and lack of transportation were found as additional barriers to ART adherence among these low-income participants, leading to non-follow-up and omitted prescriptions that were congruent with the socio-economic barriers to healthcare access reported in developing countries (Afe et al., 2017; Becker et al., 2020; Perngmark et al., 2022a; Sianturi et al., 2020). Our findings revealed that financial and transportation problems were significant barriers to accessing health care among this cohort of rural Thai-Muslim patients living in remote areas. Healthcare providers and clinical nurses could utilize telehealth technology, such as sending drugs via post-office or providing drugs-consultation through a mobile phone or computer. Working in collaboration with the patient's family members or dealing with extra social support, such as village health volunteers, might be another useful strategy.

In the current study, stigmatization of HIV by family members and the community and non-disclosure of HIV status to family was also reported as subtle barriers to ART adherence resulting in a lack of family support similarly seen in previous studies (Afe et al., 2017; Bukenya et al., 2019; Heestermans et al., 2016; Sianturi et al., 2020). Therefore, we suggest that healthcare professionals should incorporate the application of specific religious and cultural beliefs into their clinical scoop of practice and both undergraduate and postgraduate allied health education to target better and support Muslim patients' and their family members' medication care needs (Dalmida et al., 2017; Perngmark et al., 2022a; Perngmark et al., 2022b).

Limitations

The findings should be viewed with a certain amount of caution. First, any attempt at generalizability was restricted due to the modest number of study participants. Second, the inherent social desirability biases might have been drawn from the nature of participant sampling. Third, the time of data collection was almost five years ago. However, despite these limitations, our results should at least provide rich, in-depth data on a specific rural minority Muslim population with HIV/AIDS cohorts about which little is known. The findings should also add novel data to fill the gap of knowledge that targets community nursing practice in this particular issue.

Implications to Nursing Practice

Our findings have important implications for cross-cultural nursing practice, especially for clinical nurses who work as healthcare providers establishing health education programs that address HIV stigma. Muslim cultural and religious practices should be integrated to help improve ART adherence for Muslim PWHAs in the community. This is based on the rationale and our findings that Muslim patients strongly believe in three core Islamic tenets-Islamic faith, Islamic practice, and Islamic moral beliefs. Healthcare teams working congruently alongside patients' religious beliefs are an important step toward improving any adherence regime. In addition, Islamic prayer rituals (as central to Islamic practice) and relevant Islamic moral beliefs around sickness, healing, and family responsibilities, such as the concept of Muslim's cultural imperatives to take care of oneself - applied in ART adherence should be incorporated into ongoing community care practice.

Furthermore, nursing undergraduate and postgraduate specialties in HIV care need to be provided on the nature of Islamic and Muslim cultural beliefs. These could be incorporated to support family members' and patients' health-seeking behaviors. Also, a regional health education campaign to address the stigma surrounding HIV in rural areas with a focus on evidence-based facts and demystifying dated or prejudging beliefs should be further conducted.

Conclusion

Our study provides novel findings into barriers against ART adherence among Muslim patients and healthcare providers in rural southern Thailand. Through further integrating Islamic beliefs and Muslim culture into nursing practice interventions, the findings could be used to promote HIV-care services and increase patients' comprehension and motivation for ART adherence in Muslim community contexts.

Declaration of Conflicting Interest

None.

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Authors' Contributions

PP and OS conceived the study and designed and analyzed the data. OS collected the data. PP directed study progress. EH assisted in data analysis and contributed to editing the manuscript. PP, OS, and EH wrote and reviewed the manuscript. All authors provided critical thoughts on the paper and read and approved the manuscript.

Authors' Biographies

Pajongsil Perngmark, RN, MPH, Ph.D, Associate Professor, Faculty of Nursing, Prince of Songkla University, Hat Yai, Songkhla 90110, Thailand.
Oatcharaphon Sahawiriyasin, RN, MN, Nurse Practitioner, Kok Bhoe District Hospital, Pattani Province 94120, Thailand.
Eleanor Holroyd, RN, Ph.D, Professor, School of Clinical Sciences, Faculty of Health and Environmental Sciences, Auckland University of Technology 0627, New Zealand.

Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing

Nothing to declare.

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