An assessment of health-related quality of life using generic and HIV-specific instruments among patients receiving antiretroviral therapy at a general hospital in central Thailand

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ABSTRACT

This cross-sectional study aimed to assess the health-related quality of life (HRQoL) among 210 HIV-positive patients receiving antiretroviral therapy (ART) at a general hospital in Central Thailand, and to analyze correlations between scores from HIV-specific and generic HRQoL instruments. A small majority of the participants were female (56.2%) with a mean (SD) age of 43.3 (7.9) years. An assessment using the World Health Organization Quality of Life-HIV Brief Version (WHOQOL-HIV BREF) demonstrated that most participants reported moderate levels for overall HRQoL (71.9%) and general health (40.5%). The mean scores of the six domains ranged from 12.64 to 16.20 out of a total score of 20, with the lowest and highest scores being reported for 'social relationships' and 'spiritual/personal beliefs/religion'. For the 5-level EuroQol-5 dimension (EQ-5D-5L), most participants reported 'no problems' in any of the five health dimensions, with mean (SD) EQ-5D-5L utility and EQ VAS scores of 0.93 (0.08) and 81.43 (15.75) respectively. All the general items and domain scores of the WHOQOL-HIV BREF significantly correlated with both the EQ-5D-5L utility and EQ VAS scores (p < 0.05), but the correlations were considered either weak or moderate. Our results provided a better understanding of the HRQoL of these patients and suggested certain important aspects concerning the patients' HRQoL that should be integrated into patient counseling and education.

1. INTRODUCTION

Human Immunodeficiency Virus (HIV) infection is a major public health problem, affecting approximately 36.7 million people worldwide in 2015 (World Health Organization, 2016). Untreated HIV infection leads to gradually diminishing immune defenses and can progress to the most advanced stage of the infection called AIDS, which stands for Acquired Immune Deficiency Syndrome (Moir and Fauci, 2009). HIV/AIDS is not only a major cause of significant morbidity and premature mortality, especially in developing countries, but it also negatively impacts multifaceted aspects of an individual's life. Furthermore, as HIV/AIDS is often perceived as a life-threatening and contagious disease, it tentatively leads to psychological and social distress such as stigma

and depression in many patients (Mahajan et al., 2008; Mavandadi et al., 1999; Oguntibeju, 2012).

Due to the above-mentioned burdens of HIV/AIDS, patient-reported outcomes (PROs), especially health-related quality of life (HRQoL), have emerged as an integral part of HIV/AIDS management in addition to CD4 cell count and viral load (Degroote et al., 2014; Wu and Rubin, 1992). Information on patients' HRQoL will enable healthcare providers to better understand the impacts of HIV/AIDS and its treatment on their patients (Basavaraj et al., 2010). Furthermore, it is potentially beneficial for the planning of strategies to enhance patient adherence to antiretroviral therapy (ART) which is a critical key to sustained HIV suppression, decreased risk of drug resistance, and improved survival among these individuals (Battaglioli-DeNero, 2007; Oguntibeju, 2012). Abundant studies have therefore focused on an assessment of HRQoL among HIV-positive patients using a variety of instruments, including both generic and HIV-specific ones. Examples of the generic instruments commonly used in previous HIV studies are the Medical Outcomes Study Short Form-36 (SF-36) Health Survey, EuroQol-5 dimension (EQ-5D), and World Health Organization Quality of Life Questionnaire-Brief Version (WHOQOL-BREF); examples of the HIV-specific instruments include the Medical Outcomes Study HIV (MOS-HIV) Health Survey, WHOQOL-HIV BREF, Functional Assessment of HIV Infection (FAHI), and Patient Reported Outcomes Quality of Life-HIV (PROQOL-HIV) (Degroote et al., 2014). Those studies demonstrated that HIV infection affected not only the physical health and well-being but also other HRQoL domains of an individual, e.g., psychological, spiritual, social, and environmental domains. Various associations between HRQoL and a number of determinants, especially sociodemographic and disease-related characteristics, were also reported (Briongos - Figuero et al., 2011; Imam et al., 2011; Oguntibeju, 2012).

Although a number of HRQoL studies in HIV-positive individuals have been conducted in Thailand, the majority of them utilized only generic HRQoL instruments, with the WHOQOL-BREF and SF-36 being the most commonly reported ones. Only a limited number of studies reported the assessment using HIV-specific HRQoL instruments, including the MOS-HIV and WHOQOL-HIV BREF (Bunjoungmanee et al., 2014; Ichikawa and Natpratan, 2004; Lertwilairatanapong and Kaewpan, 2007). However, in order to provide a comprehensive overview of the patients' HRQoL, utilization of both generic and disease-specific measures in combination is recommended by most researchers (De Vries, 2001). Basically, disease-specific instruments provide a more clinically sensitive assessment of the HRQoL relating to a specific disease, but their use is restricted to patients with that disease. On the other hand, although generic instruments may be less focused (or even fail to focus) on the issues of interest in a particular disease, they enable cross-comparison of the HRQoL across diseases and population groups. In addition, preference-based generic instruments such as the EQ-5D can generate utility scores for the calculation of quality-adjusted life years (QALYs) in economic analyses (Fayer and Machin, 2007; McSweeny and Creer, 1995). This study thus aimed to assess HRQoL of HIV-positive patients receiving ART with the use of both generic and HIV-specific instruments, and also to analyze correlations between them. The results of this study should provide an insight into the impact of HIV and its treatment on the patients' lives. They may also lead to an improved care plan for HIV-positive patients in the future, at least in the context of a general hospital.

2. MATERIALS AND METHODS
2.1 Study design and participants

This cross-sectional study was conducted at the antiretroviral (ARV) clinic of a general hospital

in the Health Region 5 in Central Thailand in 2016. Consenting patients with the following inclusion criteria were recruited by accidental sampling: aged 20 to 60 years, having HIV-positive status, having received ART continuously for at least six months, and having no record of any memory or mental deficit. The sample size was estimated from a formula for a cross-sectional study: $n = Z^2\sigma^2/d^2$ (Daniel, 1999), where $z = 1.96$, $\sigma = 217$ and $d = 30$, based on the study of Lertwilairatanapong and Kaewpan (2007), and the calculated value was 200. With an additional 5% of patients added to account for potential data missing or incompletion, the final sample size in this study was 210.

After their written informed consent was obtained, the participants were asked to self-complete the study questionnaires while they were waiting for the doctor's visit. An individual interview was allowed to be used instead of self-completion only in the cases of those with difficulties in doing so. The participants' disease- and treatment-related data were collected from their medical records.

2.1.1 Study instruments

The three questionnaires utilized in this study included a self-developed patient information questionnaire, the Thai version of the WHOQOL-HIV BREF, and the Thai version of the EQ-5D-5L.

2.1.1.1 WHOQOL-HIV BREF

The WHOQOL-HIV BREF is an HIV-specific HRQoL questionnaire developed by the World Health Organization (WHO) based on the 26 items from the WHOQOL-BREF (World Health Organization, 2002). The Thai version of the WHOQOL-HIV BREF used in this current study was developed by Lertwilairatanapong and Kaewpan (2007). This questionnaire comprises 6 domains, i.e., physical (4 items), psychological (5 items), level of independence (4 items), social relationships (4 items), environmental (8 items), and spirituality/personal beliefs/religion (4 items), and two independent items examining general QoL, i.e., overall QoL and general health (World Health Organization, 2002). As each of the items in the 6 domains presents each facet, there are a total of 31 items, representing 30 facets. The respondents are asked to rate how they feel about these aspects of life over the past two weeks on a 5-point Likert scale, ranging from 1 (not at all) to 5 (an extreme amount). After recoding the negatively phrased items, the score of each domain can be calculated from averaging the score of all items within the domain and then multiplying by 4. The possible range of each domain score is therefore 4 to 20, with a higher score denoting a better HRQoL (World Health Organization, 2002). The Thai WHOQOL-HIV BREF was validated for its content, and demonstrated high internal consistency reliability with a Cronbach's alpha coefficient of 0.87 (Lertwilairatanapong and Kaewpan, 2007).

2.1.1.2 EQ-5D-5L

EQ-5D-5L is a new version of the EQ-5D, which is a widely used, standardized measure of health status developed by the EuroQol Group (van Reenen and Janssen, 2015). A Thai version of the EQ-5D-5L was developed by Pattanaphesaj (2014). This instrument consists of two parts: the EQ-5D-5L descriptive system comprising five dimensions (mobility, self care, usual activities, pain/discomfort, and anxiety/depression) and the EQ Visual Analogue Scale (EQ VAS) which ranges from 0 (worst imaginable health) to 100 (best imaginable health). Each dimension in the EQ-5D-5L is graded into five levels, i.e., no problems, slight problems, moderate problems, severe problems, and extreme problems. The health state derived from the 5 dimensions can be further converted to a single index value, ranging from -0.283 to 1.000, based on a Thai value set proposed by Pattanaphesaj (2014). Measurement properties of

the Thai EQ-5D-5L have been previously well documented (Pattanaphesaj and Thavorncharoensap, 2015).

Ethical approval for this study was obtained from the Research Ethics Committee of the Faculty of Pharmacy, Silpakorn University and the study hospital. The patients were fully informed of the study objectives, as well as the confidentiality and anonymity of their data. Approvals for use of the two questionnaires were derived from the questionnaires' developers.

2.1.2 Statistical analyses

Data were analyzed using Microsoft Excel and PSPP software. Descriptive statistics were used to describe the patients' characteristics along with their HRQoL scores. These variables were expressed using n (%), mean (SD) or median (interquartile range, IQR) as appropriate. Correlation tests were performed between the six domain scores and scores from the two general items of the WHOQOL-HIV BREF and the two scores from the EQ-5D, i.e., the EQ-5D-5L utility score and EQ VAS score. Correlations between the scores from both questionnaires were evaluated using Pearson's product moment correlation, with the significance level being set at 0.05 for all analyses.

3. RESULTS

A total of 210 patients were included in the study and only nine of them required the interview mode. A small majority of them were female (56.2%), aged from 40 to 49 (50.5%) with a mean (SD) age of 43.3 (7.9) years, and married (48.1%). Among the participants, 67.6% were of primary education or lower, 59.0% worked as employees, and 53.8% were of normal body mass index (18.50-22.90 kg/m^2). For their healthcare schemes, the majority of them were under the Universal Health Care Scheme (UC) (83.3%) and some were under the Social Security

Scheme (SSS) (12.9%), with the remainder being under other schemes (3.8%). Their duration of ART ranged from six months to approximately 19 years, with a median (IQR) of 5.6 (2.8-9.1) years. The pill counts showed that almost 97% of the patients had acceptable adherence to their ART (used 95% or more of the prescribed ART regimen). Based on the information retrieved from the patient information questionnaire, most patients perceived that their overall physical health was moderate (30.0%) or good (54.8%). Their demographic and disease-related characteristics are shown in Table 1.

Table 1 Demographic and disease-related characteristics of the participants (N = 210)

Characteristics	n (%)
Age (years)	
20-29	10 (4.8)
30-39	50 (23.8)
40-49	106 (50.5)
50-60	44 (21.0)
Education	
Primary or lower	142 (67.6)
Secondary	63 (30.0)
Tertiary or higher	5 (2.4)
Marital status	
Single	67 (31.9)
Married	101 (48.1)
Divorced/separated	42 (20.0)
Income per month (THB*)	
≤10,000	142 (67.6)
10,001-20,000	58 (27.6)
>20,000	10 (4.8)
Comorbid disease	
Yes	85 (40.5)
No	125 (59.5)

Table 1 Continued.

Characteristics	n (%)
Complications/opportunistic infections	
Yes	30 (14.3)
No	180 (85.7)
CD4 (cells/mm^3)	
<200	34 (16.2)
200-500	93 (44.3)
>500	83 (39.5)
Duration of ART (years)	
< 1	13 (6.2)
1-5	93 (44.3)
6-10	74 (35.2)
>10	29 (13.8)
Missing	1 (0.5)

THB=Thai baht (34 THB is approximately equal to 1 USD); ART = antiretroviral therapy

The ART regimens of the participants varied, with GPO-VIR Z250$^®$ (nevirapine 200/lamivudine 150/zidovudine 250 mg) and lamivudine 150/zidovudine 100/efavirenz 600 mg being the most commonly prescribed (30.5% and 25.7% respectively). Among those with a history of adverse drug reactions (ADR) (21.0%), the most commonly reported were lipodystrophy (37.5%), peripheral neuropathy (16.7%), and insomnia (12.5%).

3.1 HRQoL scores

3.1.1 WHOQOL-HIV BREF

A majority of the participants reported moderate levels in the general health (40.5%) and overall QoL (71.9%) items, with mean (SD) scores of 3.58 (0.90) and 3.22 (0.66) respectively from a highest possible score of 5.

Regarding the 29 items in the six domains, most responses were in a positive direction. The highest score, reflecting a higher QoL, was reported for 'forgiveness and blame' (mean score: 4.33 from a maximum possible score of 5) followed by 'mobility' (mean score: 4.23), and 'death and dying' (mean score: 4.20). On the contrary, the lowest score, reflecting a lower QoL, was reported for 'sexual activity' (mean score: 2.57) followed by 'dependence on medications or treatments' (mean score: 2.79), and 'financial resources' (mean score: 2.99), as demonstrated in Table 2.

Table 3 shows the mean scores of all the six domains which were considered to be at moderate to good levels. From a maximum possible score of 20, the mean scores ranged from the highest to the lowest in the following order: 'spiritual/personal beliefs/religion' (16.20), 'physical health' (15.03), 'psychological health' (14.99), 'level of independence' (14.77), 'environment' (13.89), and 'social relationships' (12.64).

3.1.2 EQ-5D-5L

According to an assessment of the HRQoL using the EQ-5D-5L, as many as 31.4% of the participants reported 'no problems' on any of the five dimensions (health state 11111), and none of them reported 'extreme problems' in all dimensions (health state 33333). The highest percentage of responses in each dimension was also for 'no problems' (ranging from 50.0 to 95.7%) whereas the lowest percentage was for the response 'unable to do/extreme problems' (0% in every dimension). Among the five dimensions, the proportion of participants reporting slight to severe problems was highest in the 'pain/discomfort' dimension (50.0%) and lowest in the 'self-care' dimension (4.3%) (Table 4). Their means (SD) of the EQ-5D-5L utility and EQ VAS scores were 0.93 (0.08), ranging from 0.54 to 1.00 and 81.43(15.75), ranging from 45 to 100 respectively.

Table 2 Participants' responses to each item of the WHOQOL-HIV BREF (N = 210)

Items*	n (%) of participants for each response					Mean***	SD
	Not at all	A little	A moderate amount	Much	An extreme amount		
How satisfied are you with your health?	6 (2.9)	9 (4.3)	**85 (40.5)**	78 (37.1)	32 (15.2)	*3.58*	*0.90*
How would you rate your quality of life?	1 (0.5)	11 (5.2)	**151 (71.9)**	34 (16.2)	13 (6.2)	*3.22*	*0.66*
Domain 1: Physical health							
1. To what extent do you feel that physical pain prevents you from doing what you need to do?**	**80 (38.1)**	73 (34.8)	49 (23.3)	7 (3.3)	1 (0.5)	*4.07*	*0.89*
2. Do you have enough energy for everyday life?	15 (7.1)	14 (6.7)	67 (31.9)	**86 (41.0)**	28 (13.3)	*3.47*	*1.04*
3. How satisfied are you with your sleep?	5 (2.4)	11 (5.2)	64 (30.5)	**93 (44.3)**	37 (17.6)	*3.70*	*0.90*
4. How much are you bothered by any physical problems related to your HIV infection?**	**68 (32.4)**	57 (27.1)	65 (31.0)	15 (7.1)	5 (2.4)	*3.80*	*1.05*
Domain 2: Psychological health							
1. How much do you enjoy life?	4 (1.9)	14 (6.7)	68 (32.4)	**90 (42.9)**	34 (16.2)	*3.65*	*0.90*
2. How well are you able to concentrate?	1 (0.5)	6 (2.9)	63 (30.0)	**104 (49.5)**	36 (17.1)	*3.80*	*0.77*
3. How satisfied are you with yourself?	4 (1.9)	11 (5.2)	72 (34.3)	**91 (43.3)**	32 (15.2)	*3.65*	*0.87*
4. Are you able to accept your bodily appearance?	11(5.2)	16 (7.6)	**77 (36.7)**	65 (31.0)	41 (19.5)	*3.52*	*1.06*
5. How often do you have negative feelings such as blue mood, despair, anxiety, depression?**	**97 (46.2)**	58 (27.6)	40 (19.0)	13 (6.2)	2 (1.0)	*4.12*	*0.99*
Domain 3: Level of independence							
1. How well are you able to get around?	3 (1.4)	4 (1.9)	23 (11.0)	**92 (43.8)**	88 (41.9)	*4.23*	*0.83*
2. How satisfied are you with your ability to perform your daily living activities?	5 (2.4)	3 (1.4)	42 (20.0)	**104 (49.5)**	56 (26.7)	*3.97*	*0.86*
3. How much do you need any medical treatment to function in your daily life?**	45 (21.4)	18 (8.6)	40 (19.0)	**62 (29.5)**	45 (21.4)	*2.79*	*1.44*
4. How satisfied are you with your capacity for work?	0 (0)	9 (4.3)	57 (27.1)	**114 (54.3)**	30 (14.3)	*3.79*	*0.74*
Domain 4: Social relationships							
1. How satisfied are you with your personal relationships?	5 (2.4)	13 (6.2)	58 (27.6)	**99 (47.1)**	35 (16.7)	*3.70*	*0.90*
2. How satisfied are you with the support you get from your friends?	17 (8.1)	10 (4.8)	67 (31.9)	**87 (41.4)**	29 (13.8)	*3.48*	*1.05*

Table 2 Continued.

Items*	n (%) of participants for each response					Mean***	SD
	Not at all	A little	A moderate amount	Much	An extreme amount		
Domain 4: Social relationships (cont.)							
3. How satisfied are you with your sex life?	54 (25.7)	37 (17.6)	**76 (36.2)**	32 (15.2)	11 (5.2)	*2.57*	*1.18*
4. To what extent do you feel accepted by the people you know?	38 (18.1)	34 (16.2)	**65 (31.0)**	58 (27.6)	15 (7.1)	*2.90*	*1.20*
Domain 5: Environment							
1. How safe do you feel in your daily life?	6 (2.9)	10 (4.8)	76 (36.2)	**94 (44.8)**	24 (11.4)	*3.57*	*0.86*
2. How satisfied are you with the conditions of your living place?	2 (1.0)	13 (6.2)	**74 (35.2)**	72 (34.3)	49 (23.3)	*3.73*	*0.92*
3. Have you had enough money to meet your needs?	7 (3.3)	30 (14.3)	**139 (66.2)**	26 (12.4)	8 (3.8)	*2.99*	*0.75*
4. How satisfied are you with your access to health services?	11 (5.2)	17 (8.1)	62 (29.5)	**99 (47.1)**	21 (10.0)	*3.49*	*0.97*
5. How available to you is the information that you need in your day-to-day life?	4 (1.9)	23 (11.0)	**98 (46.7)**	71 (33.8)	14 (6.7)	*3.32*	*0.83*
6. To what extent do you have the opportunity for leisure activities?	6 (2.9)	20 (9.5)	**99 (47.1)**	66 (31.4)	19 (9.0)	*3.34*	*0.88*
7. How healthy is your physical environment?	3 (1.4)	16 (7.6)	**86 (41.0)**	73 (34.8)	32 (15.2)	*3.55*	*0.89*
8. How satisfied are you with your transport?	4 (1.9)	6 (2.9)	56 (26.7)	**108 (51.4)**	36 (17.1)	*3.79*	*0.83*
Domain 6: Spiritual/personal beliefs/religion							
1. To what extent do you feel your life to be meaningful?	5 (2.4)	9 (4.3)	43 (20.5)	**80 (38.1)**	73 (34.8)	*3.99*	*0.97*
2. To what extent are you bothered by people blaming you for your HIV status?**	**132 (62.9)**	9 (18.6)	22 (10.5)	10 (4.8)	7 (3.3)	*4.33*	*1.06*
3. How much do you fear the future?**	**82 (39.0)**	34 (16.2)	53 (25.2)	28 (13.3)	13 (6.2)	*3.69*	*1.28*
4. How much do you worry about death?**	**123 (58.6)**	38 (18.1)	26 (12.4)	13 (6.2)	10 (4.8)	*4.20*	*1.16*

*The items shown in the table are from the English version (Department of Mental Health and Substance Dependence, World Health Organization, 2002).,**Negatively phrased items,***Calculated after recoding the scores of the negatively phrased item*

Table 3 Participants' scores of the general QoL items and six domains in the WHOQOL-HIV BREF
(N = 210)

Item/Domain	Mean	SD	Range
General QoL items*			
Overall QoL	3.22	0.66	1 - 5
General health	3.58	0.90	1 - 5
Domains**			
Physical health	15.03	2.39	8 - 20
Psychological health	14.99	2.68	6.4 - 20
Level of independence	14.77	2.26	9 - 20
Social relationships	12.64	2.67	5 - 20
Environment	13.89	2.03	7.5 - 20
Spiritual/personal beliefs/religion	16.20	3.06	7 - 20

Possible score ranges: *1 – 5, **4 – 20

Table 4 Health profiles of the participants as assessed by the EQ-5D-5L (N = 210)

Dimension	Levels of perceived problems				
	No problems	Slight problems	Moderate problems	Severe Problems	Unable to do / Extreme problems
Mobility	176 (83.8)	23 (11.0)	10 (4.8)	1 (0.5)	0 (0)
Self-care	201 (95.7)	8 (3.8)	0 (0)	1 (0.5)	0 (0)
Usual activities	181 (86.2)	22 (10.5)	4 (1.9)	3 (1.4)	0 (0)
Pain/discomfort	105 (50.0)	86 (41.0)	18 (8.6)	1 (0.5)	0 (0)
Anxiety/depression	130 (61.9)	59 (28.1)	19 (9.0)	2 (1.0)	0 (0)

Data are shown as n (%).

Correlations between the scores from the WHOQOL-HIV BREF and EQ-5D-5L

The scores of the two general items and six domains of the WHOQOL-HIV BREF significantly correlated with the scores from the EQ-5D-5L, either weakly or moderately, as shown in Table 5. The EQ-5D-5L utility score correlated highest with the

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'spiritual/personal beliefs/religion' domain of the WHOQOL-HIV BREF (r = 0.45, p < 0.01) and correlated lowest with the 'social relationships' (r = 0.14, p < 0.05). For the EQ VAS score, the highest correlation was with the 'psychological health' domain (r = 0.38) and the lowest correlation was with the 'level of independence' domain (r = 0.18) (p < 0.01 for both).

Table 5 Correlations between the scores from the WHOQOL-HIV BREF and EQ-5D-5L

WHOQOL-HIV BREF scores	EQ-5D-5L utility score	EQ VAS score
General items		
Overall QoL	0.18*	0.29*
General health	0.23*	0.30**
Domains		
Physical health	0.31*	0.25*
Psychological health	0.39*	0.38*
Level of independence	0.32*	0.18*
Social relationships	0.14**	0.20*
Environment	0.20*	0.30*
Spiritual/personal beliefs/religion	0.45*	0.25*

The data shown in the table are Pearson's correlation coefficients. $* \ p < 0.01$, $** \ p < 0.05$

4. DISCUSSION

To our knowledge, this study was one of a small number of studies that attempted to assess HRQoL among Thai HIV-positive patients using both HIV-specific and generic instruments. Overall, our study revealed that a majority of the patients perceived their HRQoL as moderate to good. The assessment using the WHOQOL-HIV BREF demonstrated a moderate level of average scores for the overall perception of QoL and general health items which were close to the values derived from the studies among Thai HIV-positive patients of Kunawaradisai et al. (2016) and Meemon et al. (2016) in governmental hospitals, even though the studies were conducted in different regions of the country. These positive findings were likely attributed to the facts that our participants were those receiving ART and most of them had no complications/opportunistic infections, and they had CD4 cell counts of more than 200 cells/mm^3. Moreover, as many as 84.3% of them were found to have acceptable adherence to their ART. Previous studies indicated that ART and its adherence significantly improved the patients' HRQoL (Basavaraj et al., 2010; Degroote et al., 2014; Liping et al., 2015; Oguntibeju, 2012), whereas the presence of HIV complications and a low CD4 cell count level were associated with a lower HRQoL (Basavaraj et al., 2010; Campsmith et al., 2003; Degroote et al., 2014; Liping et al., 2015). However, it is worth noting that most studies using the WHOQOL-HIV BREF, both in Thailand and several other countries, also reported a moderate or good HRQoL among HIV-positive individuals (Belak et al., 2006; Kunawaradisai et al., 2016; Lertwilairatanapong and Kaewpan, 2007; Liping et al., 2015; Meemon et al., 2016). These findings were at least partly due to an improvement in HIV care, advances in antiretroviral therapy and HIV prevention approach, as well as improved public awareness of HIV (da Cunha et al., 2015; Mall et al., 2013; Oguntibeju, 2012).

Considering the six domains of the WHOQOL-HIV BREF in this study, their mean scores ranged from 12.64 to 16.20 out of a total score of 20. The finding of the greatest impact on the 'social relationships' domain is in line with some previous studies both in other regions of Thailand (Lertwilairatanapong and Kaewpan, 2007; Meemon et al., 2016) and other countries (Belak et al., 2006; Liping et al., 2015; Tran, 2012). Although this finding is unsurprising given the HIV-related stigma and discrimination that some HIV individuals may experience (Gilbert and Walker, 2010; Mahajan et al., 2008; Thomas et al., 2005), it reaffirms social relationships as the patients' main concern, thus emphasizing the need for more support from their families, the public, and healthcare providers. Moreover, healthcare providers should play a major role in planning approaches for strengthening the three essential relationships: patient-family, patient-healthcare provider, and patient-society (Qiao et al., 2015), educating the patients and their families

regarding the disease, and improving the social perception of HIV/AIDS. Regarding the 29 domain-specific items of the WHOQOL-HIV BREF, the lowest score being demonstrated for the 'sexual activity' item was in accordance with previous literature that indicated a high prevalence of sexual problems among HIV-positive individuals (De Ryck et al., 2012; Lema, 2013; Siegel et al., 2006). This finding therefore underlines the importance of integrating the sexual aspect in patient counseling and education and implies that some HIV myths may still exist. Regarding the mean domain scores, the highest was reported for 'spiritual/personal beliefs/ religion' in this current study, whereas other studies yielded varied results, with the proposed areas being 'environment' (Tran, 2012), 'physical health' (De Ryck et al., 2012; Liping et al., 2015), 'psychological health' (Meemon et al., 2016), and 'level of independence' (Belak et al., 2006; Kunawaradisai et al., 2016). Nevertheless, our findings likely imply that addressing religious beliefs and practices in patient care may be beneficial for enhancing the patients' HRQoL.

From the assessment using the EQ-5D-5L, the scores demonstrated in this study were particularly promising given that they were comparable to or even higher than the scores of previous studies (derived from either the EQ-5D-3L or EQ-5D-5L) among Thai patients with other chronic diseases such as renal disease (Sakthong and Kasemsup, 2012), heart disease (Sakthong et al., 2015), and rheumatoid arthritis (Munchey and Pongmesa, 2016). It is worth noting that although our results were consistent with a recent study in Columbia (Keaei et al., 2016), they were noticeably higher than previous studies among HIV-positive patients in Thailand (Sakthong et al., 2009; Sakthong et al., 2014) and Vietnam (Tran et al., 2012). In addition, the highest and lowest proportions of the 'no problems' response in the 'self-care' and 'pain/discomfort' dimensions respectively

in this study were congruent with previous studies of other chronic diseases (Pattanaphesaj and Thavorncharoensap, 2015).

Regarding the correlations between the scores from the two instruments, the observed correlations were generally weak or moderate even though they were statistically significant. These findings may be attributed to the differences in dimensions being measured in the two instruments. Since the WHOQOL-HIV BREF is an HIV-specific instrument, it should be theoretically more sensitive and relevant to HIV-positive individuals. The high EQ-5D scores reported in this study therefore possibly implied an underestimation of the impact of HIV/AIDS on the patients' HRQoL and warranted further studies. Nevertheless, the inclusion of a generic instrument like the EQ-5D in the assessment will enable cross-comparisons of the HRQoL between different diseases and pave the way for further economic analyses.

We acknowledge some limitations of this present study. Firstly, due to the fact that our study was conducted only in a governmental hospital with the majority of the participants using the UC healthcare scheme, the results of this study cannot be generalized and assumed to relate to all HIV-positive patients. Secondly, considering the CD4 levels and the lack of opportunistic infections, most of our participants could be considered as stable HIV patients. The HRQoL level demonstrated in our study therefore does not adequately reflect the HRQoL of HIV-positive patients with greater disease severity. Furthermore, the small range and variation of the scores could at least partially contribute to the low correlations between the two instruments. Thirdly, to the best of our knowledge, validated cutoffs for the domain scores of the Thai WHOQOL-HIV BREF have not been established. The validity of the classification of these scores into HRQoL levels is therefore quite limited. Fourthly, due to the

unavailability of evidence on the sensitivity of the Thai WHOQOL-HIV BREF, its ability to discriminate between patients with different levels of HRQoL in our study could be questioned. Future research, therefore, should be conducted among patients with greater severity and in other types of healthcare setting.

5. CONCLUSION

The assessment of the HRQoL using the WHOQOL-HIV BREF and the EQ-5D-5L revealed a moderate to good HRQoL among the HIV-positive patients receiving ART at the study hospital. The WHOQOL-HIV BREF suggested that more attention should be paid to improving the patients' social relationships and also integrating all aspects concerning the patients' HRQoL with patient counseling and education. The correlations between the scores from the WHOQOL-HIV BREF and the EQ-5D-5L were considered to be weak to moderate but statistically significant.

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