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Questionnaire Development and Psychometric Testing of Adaptive Behavior Questionnaire among people living with HIV

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This descriptive cross–sectional research aimed to develop and test adaptive behavior questionnaire (ABQ) among people living with HIV who received antiretroviral therapy in Thailand's Universal Coverage Scheme Project. The study involved two phases. Phase I, questionnaire development, consisted of 6 steps: (1) defining the concept; (2) generating an item pool; (3) defining the choices of response to items; (4) reviewing items; (5) conducting a pilot study; and (6) selecting items for analysis. Inter–rater agreement and item-level content validity index for the first draft of the questionnaire (45 items) were 0.92 and 0.8082, relatively. Phase II involved the final draft of instrument (21 items), using psychometric property evaluation, Pearson's correlation coefficient to analyze the concurrent validity, predictive validity, internal consistency reliability, and test–retest reliability. Psychometric testing was systematically employed to evaluate the principle component factors which were named "adaptive behavior factors". Generally, the consistency of this questionnaire was found highly reliable. Additionally, concurrent criterion–related validity was examined by investigation of the correlations of the nine-adaptive behavior factor structure to physical function mode, self–concept mode, role-function mode and interdependence adjustment. The 7 days and twice within 30 days test-retest reliability coefficient of the ABQ indicated good reliability and provided sufficient empirical evidence to support the validity and reliability of the questionnaire.

Keywords: PLHIV, antiretroviral therapy, adaptive behavior, questionnaire development and psychometric testing

Acquired Immunodeficiency Syndrome (AIDS) remains primarily the most serious problem that has affected the social and medical realms of nearly every nation on earth. It is a lifelong infectious disease with no cure and can spread from one individual to another at an alarming speed. The worldwide numbers of people living with Human Immunodeficiency Virus HIV/AIDS (PHAs) climbed from approximately 31.6 to 35.2 million (Chokevivatana, 1998; World Health Organization [WHO], 2011). In 2012, there were 35.3 million [32.2 million–38.8 million] people living with HIV (WHO, 2013). This reflects the continued large number of new HIV infections and a significant expansion of access to antiretroviral (anti-HIV) therapy, which has helped reduce AIDS-related deaths, especially in more recent years.

In Thailand, the ministry of public health has established a monitoring system on the AIDS situation since finding the first AIDS case in Thailand in 1984. The number of HIV infections and AIDS patients has been increasing steadily. According to statistics reported by the Bureau of Epidemiology, Department of Disease Control, there were 530,000 AIDS

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patients that divided to numbers of adult above fifteen years old as 520,000 aids patients (Ministry of Public Health, 2010). In 2013, there were 570,800 people living with HIV (Ministry of Public Health, 2013).

At present, the best treatment option patients have is the antiretroviral treatment because of its effectiveness in controlling infections. The treatment reduces viral loading in the body as much as possible and for the longest period of time in order to delay the onset of severe immunodeficiency or full - blown AIDS and to provide the quality of life among patients. Therefore the administration of the antiretroviral treatment is quite important. The increasing number of people living with HIV /AIDS joining in Thailand's universal coverage scheme project reflects patients' needs for antiretroviral treatment. The benefit of joining the Thailand's universal coverage scheme project is that participants are provided with the medications and lab tests free of charge (Ministry of Public Health, 2007). The review of the literature revealed only a few studies about adaptive behavior among chronic illness, especially for people living with HIV/AIDS who received antiretroviral therapy. As for overseas studies, only a few reported and these had limitations regarding sample size. Most of all HIV/AIDS patients present adaptive behavior with negative attitude such as antisocial behavior, stigmatization, suffering, anger for other people around themselves, guilty, depression, low self-esteem, role function disorder and lack of self-care (Nil-iyaka, 2007). The study of a causal model of role adaptation in HIV-infected/AIDS patients present the factors directly affecting role adaptation positively are hardiness personality, sex, economic status and education. The stigma perception is only variable that has a directly negative effect on role adaptation. It was found that research result support Roy's theoretical proposition (Roy, 1991) on role adaptation (Ounprasertpong, 2001). To date, no one has inductively designed and psychometrically tested a scale, measuring adaptive behavior among people living with HIV who received antiretroviral therapy. A comprehensive measure of adaptive behavior is required to precisely evaluate the different facets of adaptive behavior among people living with HIV who received antiretroviral therapy in Thailand's Universal Coverage Scheme Project and identify which aspects can be modified to decrease morbidity and mortality. Without such a measure, it will be impossible to accurately assess the effects of new adaptive behavior interventions in this vulnerable population (Roy, 1991). Therefore, our objective is to report on the development and validation of a new measure of adaptive behavior among people living with HIV who received antiretroviral therapy in Thailand's Universal Coverage Scheme Project.

Theoretical Framework

The goal of the Roy adaptation model is to enhance a person's life processes through adaptation. The Roy adaptation model was used in the situation of nursing, as individuals, families, and communities. In this study, the researcher applied the concept of Roy's adaptation to be the conceptual framework of the study to find out the factors which influence the adaptation of the people living with HIV. Roy explained the human adaptation system as a process influenced by a stimulus. A stimulus has been defined as that which provokes a response. It is the point of interaction of the human system and environment. Stimuli can come externally from the environment (external stimuli) or may originate in the internal environment (internal stimuli). Certain stimuli pool to makeup a specific internal impact, the adaptation level (Andrews & Roy, 1991; Lee & Park, 2007) (see Figure 1).

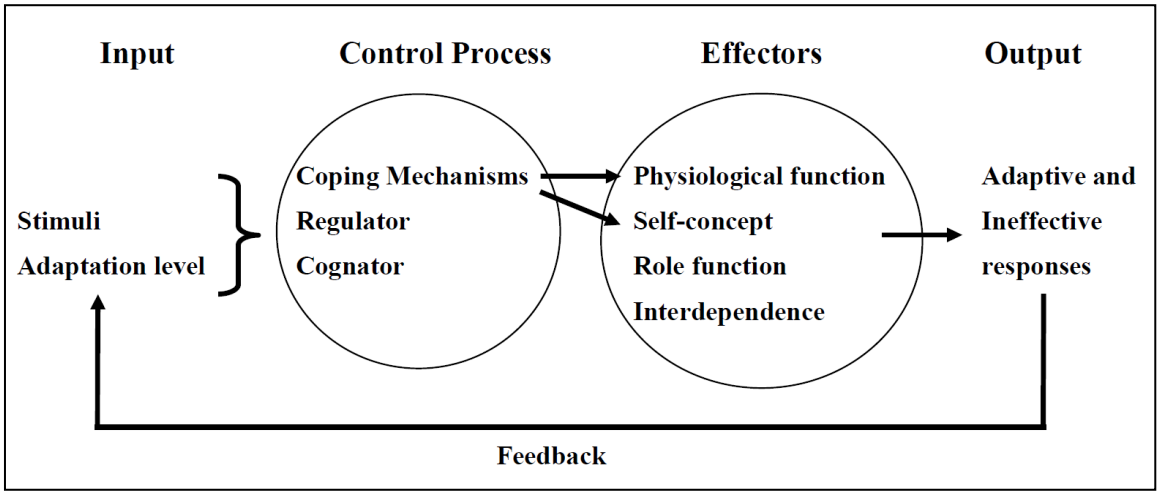

Figure 1. Person as an Adaptive System **(**Roy & Andrews, 1984)

Purposes of the Study

The purposes of this study were twofold: 1) to develop the Adaptive Behavior Questionnaire (ABQ) people living with HIV who received antiretroviral therapy in Thailand's Universal Coverage Scheme Project; and 2) evaluate the psychometric properties of the Adaptive Behavior Questionnaire (ABQ).

Method

Research design

This study as a descriptive cross-sectional design in which was organized in two phases.

The first phase was questionnaire development, involved six steps: 1) defining the concept; 2) generating an item pool by specific experts as this step was very important of developing questionnaire that composed of 5 HIV experts such as social workers, community advocate, doctor, and researcher. Five Adaptive behavior experts such as clinicians and researcher, and adult people living with HIV who received antiretroviral therapy more than 10 years in first stage of HIV infection who were recruited to evaluate the scale format and each item. To be included in this phase of the study, participants had to be adult and either be people living with HIV in first stage or someone deemed to have expertise in the area of HIV adaptive behavior. In accordance with established standards, participants were purposively selected for their clinical or scientific expertise because they were believed to have knowledge related to the practical or theoretical underpinnings of HIV adaptive behavior. The mean age of the experts was 45 years ($\pm$8.3 years), and 80% (8 of 10) were female. All participants signed an informed consent document before reviewing the scale format and item pool. Participants were then given a list of each of the 45 items and asked to read, evaluate, and then rate each item on its relevance to HIV adaptive behavior in first stage, its clarity, and its uniqueness on a 10-point Likert scale (1= not relevant, clear or unique; 10 = totally

relevant, clear, or unique). Participants also provided written comments about each of the items. The researcher team met and evaluated each of these responses and arrived at consensus about which items to include in the psychometric evaluation of Adaptive behavior questionnaire (Myles et al., 2007); 3) defining the choices of response to items; 4) reviewing items; 5) conducting a pilot study; and 6) selecting items for analysis. Using these methods we discarded 15 items and reducing the scale to 30 total items in 4 domains (see Figure 2).

Additionally, the researcher team modified the responses to included a 4 point Likert scale to enhance the consistency of scoring by people living with HIV. For this scaling, 1 meant the individual item occurred none of time, 2 meant the items occurred some of the time, 3 meant the items occurred often of the time, 4 meant the items occurred always of the time. With this score method, higher score suggest more adaptive behavior among people living with HIV.

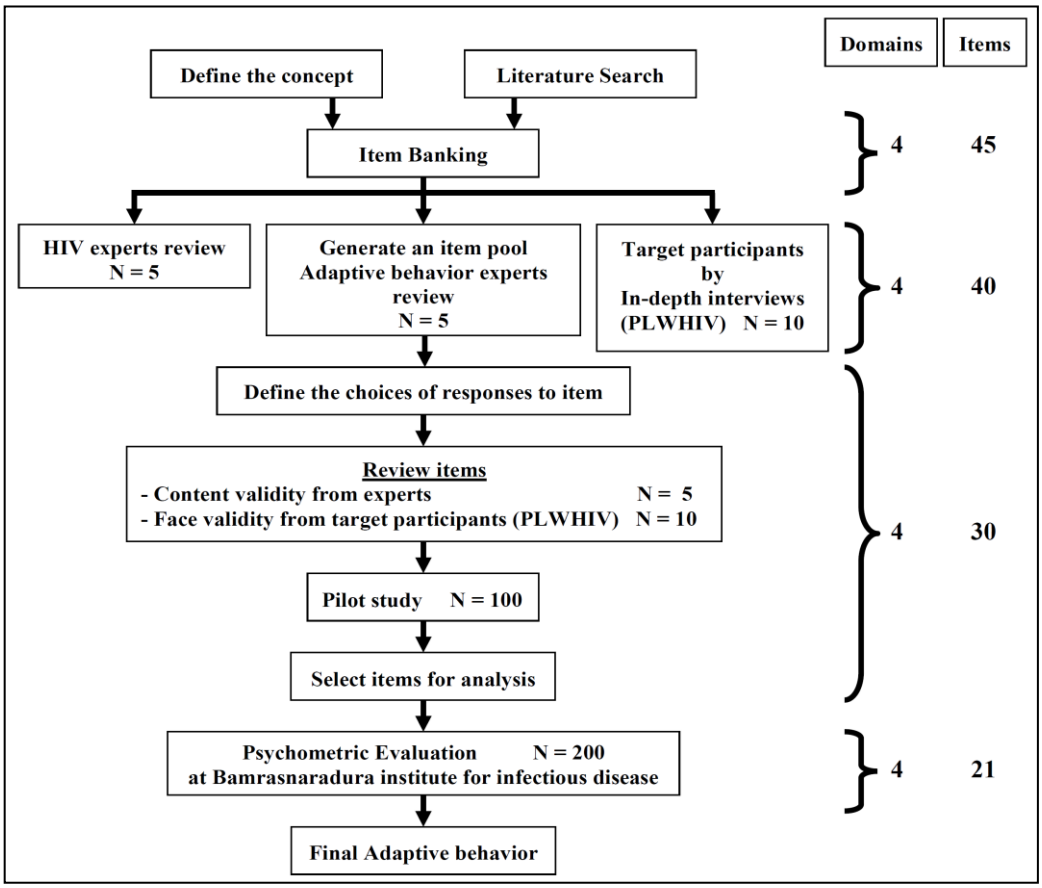

*Figure 2. D*evelopment of the Adaptive Behavior Questionnaire for people living with HIV

Second phase was psychometric property evaluation, required determination of the instrument's concurrent validity, predictive validity and reliability. The concurrent validity coefficient was obtained by examining the relationship between physical function mode, self-concept mode, role function mode, interdependence adjustment and the Adaptive Behavior Questionnaire (ABQ). The 7 days and 30 days test-retest reliability coefficient was used to test instrument stability.

Participants

The sample consisted of four groups: 1) 10 key informants for in-depth interviews, to generate the pool of questionnaire items; 2) 10 key informants to examine the face validity of questionnaire; 3) 100 participants for pilot testing the questionnaire; and 4) 200 participants to examine the questionnaire's psychometric properties. The total sample was purposively recruited from Bamrasnaradura Institute for Infectious Diseases, a specialized hospital in AIDS care under the Department of Disease Control, Ministry of Public Health, Nonthaburi, Thailand. For the in-depth interview and face validity testing, 10 key informants were recruited, for each group, from the name list, via purposive sampling. For the pilot study, 100 participants were recruited by purposive sampling, from the list of name of follow up in day at research clinic at Bamrasnaradura Institute for Infectious Diseases. For the psychometric property testing, 200 participants also were recruited by purposive sampling, from the list of name of follow up in day at AB-Care Unite at Bamrasnaradura Institute for Infectious Diseases, who were not part of the pilot study. A number of sampling selected for each of this group met the statistical recommendations for instrument development and construction (Hair, Anderson, Tatham, & Black, 1998).

Specific inclusion and exclusion criteria were set to provide guideline for choosing the population of interest. In this study, the inclusion criteria demanded that the subjects: 1) were both male and female first stage people living with HIV in Thailand's Universal coverage scheme project; 2) aged 18 years and over; 3) were able to understand and read Thai; 4) had mental alertness; 5) has been treated with any regimen of highly active antiretroviral therapy for at least 3 months of time period and voluntarily consenting to participant in focus group discussions in this study; 6) after being appropriately counseled process in first register of HIV protocol; 7) disclose HIV infection status to the researcher; 8) has good mental status: patients who are 60 years old and older were screened for cognitive impairment using Chula Mental Test.; and 9) willingness to participate. The HIV patients were excluded if any negative sign such as distraction or giving an answer that was not relevant to the question. However, there was no cognitive impairment of HIV patients found in this investigation.

Research Instrument

The instrument were employed to explore adaptive behavior among people living with HIV who received antiretroviral therapy that composed of: 1) guidelines of in-depth interviews, an investigator and a tape recorder; 2) Chula Mental Test (CMT) (Jitapunkul, Lialert, & Worakul, 1996); 3) personal background characteristic; 4) psychometric property evaluate in adaptive behavior questionnaire was employed to test the evidence for concurrent criterion-validity.

1) Guidelines of in-depth interviews: The researcher developed guidelines for in-depth interviews consisted of four unstructured questions used to explore adaptive behavior. The questions were based on the domain of ROY adaptive model as nursing theory for adaptation that composed of 4 domains such as physical function mode, self-concept mode, role function mode, interdependence adjustment.

2) The Chula Mental Test (CMT) is a 13 items cognitive impairment screening assessment of cognitive function of illiterate, older people living with HIV who were reading and writing difficulties. Responses to the items are code on a dichotomous scale (0=incorrect

and 1=correct). The summation score of the CMT, representing each subject's cognitive function, ranged from 1 to 19. Total CMT score of: 0-4 indicates severe cognitive impairment; 5-9 represents moderate cognitive impairment; 10-19 are indicative of normal cognitive function.

3) The personal background characteristic questionnaire: This questionnaire was developed by investigator and consisted of two parts. The first part included demographic and socioeconomic characteristics of the participants. The second part contained the information of HIV infection such as duration of HIV infection, bio-maker as a number of CD4 cell count and a number of viral load, duration of antiretroviral therapy.

4) Psychometric property evaluate in adaptive behavior questionnaire: The ABQ was developed by investigator. This instrument consisted of 30 items that derived from the concept of ROY Adaptive Model (RAM), including 10 items for physical function domain, 8 items for self-concept mode, 8 items for role function mode and 4 items of interdependence adjustment included a 4 point Likert scale to enhance the consistency of scoring by people living with HIV. For this scaling, 1 meant the individual item occurred none of time, 2 meant the items occurred some of the time, 3 meant the items occurred often of the time, 4 meant the items occurred always of the time. Total adaptive behavior score of: 30-60 indicates low adaptive behavior; 61-90 represents moderate adaptive behavior; 91-120 are higher score suggest more adaptive behavior among people living with HIV.

Data Collection and Data Analysis

Phase I: Development of the Adaptive Behavior Questionnaire

The data collection procedure in this phase was conducted and present in 6 steps, including: defining the concept; generating an item pool; defining the choices of response to items; reviewing items; conducting a pilot study; and selecting items for analysis. The first step consisted of selection of concept base on nursing theory as Roy Adaptive Model that related to adaptive behavior among people living with HIV who received antiretroviral therapy. According to this selection was based upon review of literature and exiting instrument which measured adaptive behavior. As a result, the concept was divided into four adaptive behavior domains such as physical function mode, self-concept mode, role function mode and interdependence adjustment in which people living with HIV who received antiretroviral therapy in Thailand's universal coverage scheme project.

Phase II: Psychometric testing on the Adaptive Behavior Questionnaire (ABQ)

To evaluate the psychometric properties for Adaptive behavior Questionnaire, Researcher recruited 200 participants from HIV Clinic in Bamrasnaradura Institute for Infectious Diseases. To be included in this sample, participants had to have a confirmed HIV diagnosis, be adult (over 18 years to older), identify as female and male, and speak fluent Thai language. Individual were excluded if they were unable to give written informed consent or complete the survey. Exploratory factor analysis was used to analyze the third draft of the adaptive behavior questionnaire. However, findings revealed the data did not meet the statistical assumptions; therefore, exploratory factor analysis was not used again. To obtain the final draft of the instrument, content categorization of adaptive behavior was conducted with the third draft, which was based on the literature's descriptions of the dimensions of adaptive behavior and deletion of some items participants, in the pilot study, did not perform, making a total of 21 items in the final draft of The Adaptive Behavior Questionnaire.

Protection of human subjects

The proposal of this study and consent form were approved by Committee on Human Rights Related to Human Experimentation-Mahidol University, and The Human Research Committees of Bamrasnaradura Institute for Infectious Diseases, a specialized hospital in AIDS care under the Department of Disease Control, Ministry of Public Health, Nonthaburi, Thailand. In the qualitative study, all participants were informed about details of the study. They had opportunities to raise questionnaire to assure the protection of their rights and safety. Then written consent was obtained once the individual agreed to participant in this study. In the quantitative study, consent forms and questionnaires were kept separately in envelops after each participant completed these papers by interview. All paper work and tapes containing data were destroyed when the study was completed.

Data Analysis

Phase I: Development of the Adaptive Behavior Questionnaire

The transcribed text was analyzed using content analysis procedures described by Mayan (Mayan, 2001). The three steps consisted of coding process, categorizing of the data, and theme developing. The trustworthiness was established according to four criteria of credibility, auditability, transferability, and confirmability.

Phase II: Psychometric testing on the Adaptive Behavior Questionnaire (ABQ)

Descriptive statistics was used to analyze the participant's personal background characteristic and the information of HIV infection such as duration of HIV infection, Bio-Maker as a number of CD4 Cell Count and a number of viral load, duration of antiretroviral therapy.

Exploratory factor analysis performed separate factor analyses for 30 adaptive behavior questionnaire items as using SPSS, Version 18.0. Factor analysis was conducted, using the principle-components factor-extraction method, on the selected set of items to identify factors and factor loading (De Vellis, 1991). Rotated factor analyses were performed until a set of items discretely loading on one factor was achieved.

Test-retest reliability: test-retest reliability of the final scale was evaluated on 30 of 100 participants whom the adaptive behavior scale were administered in 7 days and twice within 30 days.

Results

Phase I: Development of the Adaptive Behavior Questionnaire

Four themes and nineteen categories emerged from qualitative studying Phase I. Consequently, item pools were developed from the interview data in each category. The resulting pools consisted of 45 items. The Adaptive Behavior Questionnaire is designed to measure frequency of adaptive behavior and identify type of adaptive behavior by using the

following four-point Likert scale (1= strongly disagree, 2= disagree, 3= agree, 4= strongly agree). Content expert judgment quantification was two fold. At the first round of reviewing, the content-validity experts agreed that most of the items represented the phenomena and relevance to their categories and themes. However, they suggested decreasing the items by approximately half of the first draft due to the fact that some items were similar in meaning and could be deleted or combined with others. Therefore, the third draft of adaptive behavior questionnaire contained only 30 items. The Content validity index (CVI) has acceptable, the relevant items were 0.95 and the clarity items were 0.94. To determine clarity and readability, ten people living with HIV who received antiretroviral therapy and 10 experts were asked to indicate their reactions to the statements after completing the Adaptive Behavior Questionnaire. Total items were finalized at 30 items.

Phase II: Psychometric testing on the Adaptive Behavior Questionnaire (ABQ)

Demographic and Medical Characteristics

A total of 200 people living with HIV who received antiretroviral therapy in Thailand's universal coverage scheme project completed the survey packet during the psychometric evaluation phase. The mean age was 36.79 (± 8.3) years. Most (82%) were Thai adult people living with HIV and single (46%). Most (85.9%) were employed, had bachelor degree (26.5%) and had meant annual income of 17,494 baht (±5,000). Medically, participants' mean years of HIV infection was 7.19 (± 2.3) years. Additional information about the demographics and medical characteristics of participants in the psychometric evaluation phase are listed in Table 1.

Internal Consistency

Reliability: Cronbach's coefficients alpha coefficient of internal consistency for the total scale revealed 0.8082 with the item-total correlation ranging from 0.42 to 0.71. Standardized alpha for subscales ranged from 0.55 to 0.88 that presented in Table 3. Seven of nine adaptive behavior patterns had sufficient item-subscale correlation.

Time Stability

Data available from the Bamrasnaradura Institute for Infectious Diseases, a specialized hospital in AIDS care under the Department of Disease Control, Ministry of Public Health, Nonthaburi, Thailand, and sample allowed researcher to examine time stability of the Adaptive Behavior Questionnaire. The test-retest correlation for 7 day interval was r=.79, p<.01, and 1-month interval the test –retest correlation was r=.88, p<.01.

Convergent and Divergent Validity

Pearson's correlation coefficients were calculated to compare individual scores on the newly developed adaptive behavior questionnaire and related validity scales. The correlation between four domain from Roy Adaptive Model such as physical function mode, self-concept mode, role function mode, interdependence adjustment and adaptive behavior among people

living with HIV that presented in Table 2. The result showed that the correlation among physical function mode and adaptive behavior (r=.602, p<.01), self-concept and adaptive behavior *(*r=.768, p<.01), role function mode and adaptive behavior *(*r=.760, p<.01) and interdependence adjustment (r=.230, p<.01).

Construct Validity

Construct-related evidence of validity by factor analysis: Before conducting factor analysis, item analysis was examined to evaluate univariate and multivariate characteristic of each item. As a result, five items were excluded. The Adaptive Behavior Questionnaire with 30 items was examined in the next step. When evaluating the assumption, most of the MSA values were meritorious; Bartlett test of sphericity was significant (χ^2=2849.612, p=.000) and KMO value in this study was 0.758; high value. The result revealed that data was appropriated to conduct factor analysis. By using principal components factor analysis with variamax rotation, eigenvalues of significant factors were greater than 1.0. A loading cutoff point was 0.40, meaningful interpretability underlined factors. The final draft of the Adaptive Behavior Questionnaire demonstrates nine factors with 21 items and explained 67.232% of the total variance. The resulting nine factors were labeled as adaptive behavior patterns. Factor loading on the items measuring in each dimension is shown in table 4.

Discussion

This study was undertaken to develop and test psychometric properties of the Adaptive Behavior Questionnaire. Evidence of content validity was achieved based on qualitative study and expert reviews. The evidence of construct validity came from factor analysis. The factor loading cutoff point was 0.40, which is more conservative than that suggested by the minimal loading of Nunnally (Nunnally, 1978). Additionally, using eigenvalues of significant factors greater than 1.0 is a lower boundary for an underlying factor of any relevance (Knapp & Brown, 1995). Most of the loading items revealed adaptive behavior patterns from factor analysis that were relevant to the qualitative study in phase I.

The first factor included five items (item 21, 22, 24, 25 and 26). Of these five items, Factor 1 was named *"Adaptive behavior 1:The responsibility of job after HIV infection related to Role function mode".* Most of items revealed congruence with role function mode that was one of the important domains in Roy Adaptation Model. People living with HIV will affect the change of role function mode of the infected persons, especially in symptoms stage, because of sickness that made the persons unable to do any work or being excluded by the society and not allowed to work (Siriattakul, 2007). The HIV infected persons who could adapt would be able to work or live in the society and play their own roles.

The second factor included three items (item 14, 13, 16), represented adaptive behavior in the context of self-concept mode, thus it could be labeled as *"Adaptive behavior 2: Hopeless related to self-concept mode".* Most HIV infected persons felt guilty, isolation, depression and shame, because they realized that they are infected with HIV, an unacceptable disease in society (Mukkaew, 2007).

The third factor included 3 items (item 11, 12 and 20). Factor 3 was named *"Adaptive behavior 3: satisfaction of body image related to self-concept mode"*. Physiological self-concept mode was feelings of HIV infected persons about the change of their body conditions. Physiological self-concept mode affects adaptive behavior of HIV infected persons. Ineffective adaptation with self-concept mode can be seen in various behaviors such as weakness, short attention span, and neglect to take care of themselves, etc. If the HIV infected persons can adapt with self-concept mode, such problems will not occur, or occur very little (Sakuldee, 2007).

Table 1

Demographic characteristics of studied samples (n = 200)

Variables	Number	Percentage
Age		
Mean = 36.79, SD = 9.47, Range = 19 – 74 year	200	
Gender		
Male	99	49.5
Female	101	50.5
Education		
No Education	5	2.5
Elementary School	40	20.0
Lower Secondary School	33	16.5
High School	29	14.5
Diploma Degree	21	10.5
Bachelor Degree	53	26.5
Higher Degree	11	5.5
Other: (Developing bachelor Degree)	8	4.0
Mean = 4.32, SD = 1.85, Mode = 6.0		
Marital Status		
Single	92	46.0
Married	60	30.0
Divorced	12	6.0
Widowed	18	9.0
Cohabitation was not married	18	9.0
Mean = 2.05, SD = 1.30, Mode = 1.0		
Income (Baht/month)		
<10,000	104	52.0
10,000 – 25,000	68	34.0
25,001 – 40,000	17	8.5
40,001 – 55,000	5	2.5
>55,001	6	3.0
Mean = 17494.50, SD = 38327.94		
Mode = 10,000; 20,000, Range = 0.00 – 500,000		
Duration of HIV infection **(**year**)**	200	-
Mean = 7.19, SD = 4.89		
Mode = 10, Range = 1 – 21 year		
Duration of Antiretroviral therapy **(**year**)**	200	-
Mean = 14.10, SD = 4.66		
Mode = 10, Range = 3 month – 29 year		

Table 2

Correlation among Adaptive behavior Questionnaire scores and four Domain of Roy Adaptive Model

Variable	Physical Function Mode	Self-concept Mode	Role Function Mode	Interdependence Adjustment
Adaptive Behavior Score	0.602**	0.768**	0.760**	0.230**

*p<.05, **p<.01.

Table 3

Cronbach's Coefficient Alpha Internal Consistency Reliabilities for the 9 Adaptive behavior (subscales) and Adaptive behavior Instrument (N = 200)

Adaptive Behavior Pattern	No. of Item	Inter-item Correlation	Item-total Correlation	Standardized Alpha
Adaptive behavior 1: The responsibility of job after HIV infection related to Role function mode.	5	0.32-0.59	0.52-0.77	0.88
Adaptive behavior 2: Hopeless related to self-concept mode.	3	0.37-0.73	0.57-0.71	0.83
Adaptive behavior 3: satisfaction of body image related to self– concept mode.	3	0.25-0.57	0.44-0.66	0.74
Adaptive behavior 4: Self-esteem after HIV infection related to self– concept mode.	2	0.32-0.50	0.45-0.58	0.71
Adaptive behavior 5: The relationship with health providers in hospital affected to interdependence adjustment mode.	2	0.20-0.46	0.42-0.52	0.68
Adaptive behavior 6: Symptoms of HIV infection related with physical function mode.	2	0.38-0.73	0.42-0.64	0.65
Adaptive behavior 7: Activity in daily living related to Role function mode.	2	0.28-0.64	0.48-0.62	0.61
Adaptive behavior 8: Symptoms of low immune system level related with physical function mode.	2	0.35-0.72	0.42-0.68	0.59
Adaptive behavior 9: Symptoms of hyper viral load related with physical function mode.	2	0.33-0.65	0.46-0.69	0.55
Total	21	0.18-0.73	0.23-0.79	0.8082

Table 4

Rotated factor loading for Adaptive Behavior Questionnaire

Item Statement	Factor Loadings	Communalities h^2
Adaptive behavior 1: The responsibility of job after HIV infection related to Role function mode		
(5 Items, Eigenvalue = 4.117, Percent of Variance = 13.725)		
-After you had HIV, you act that based on social expect.	0.833	0.722
-You can act appropriate with your job description.	0.807	0794
-You obey social rule and law	0.790	0.653
-After you had HIV, you have feeling or opinion that appropriate with your role.	0.783	0.760
-After you had HIV, you act as your expect	0.725	0.650
Adaptive behavior 2: Hopeless related to self-concept mode.		
(3 Items, Eigenvalue = 3.585, Percent of Variance = 11.949)		
-You are frustrated when you have trouble eating, sore throat, and trouble swallowing.	0.928	0.910
-You are frustrated when you are weak and cannot do anything.	0.920	0.884
-You are frustrated when you have trouble breathing.	0.878	0.835
Adaptive behavior 3: satisfaction of body image related to self– concept mode.		
(3 Items, Eigenvalue = 2.461, Percent of Variance = 8.204)		
-You are satisfied with your appearance at the moment.	0.755	0.634
-You feel indifferent from everyone.	0.724	0.741
-When you have rash on the body or hair fall, you are embarrassed and do not want anyone to see you.	0.715	0.626
Adaptive behavior 4: Self esteem after HIV infection related to self– concept mode.		
(2 Items, Eigenvalue = 1.892, Percent of Variance = 6.307)		
-You feel you are worth when you help other people.	0.732	0.741
-You are feeling more discouraged.	0.579	0.569
Adaptive behavior 5: The relationship with health providers in hospital affected to interdependence adjustment mode.		
(2 Items, Eigenvalue = 1.804, Percent of Variance = 6.014)		
-You are good relationship with health providers.	0.890	0.838
-You are bound with health providers.	0.888	0.820
Adaptive behavior 6: Symptoms of HIV infection related with physical function mode.		
(2 Items, Eigenvalue = 1.753, Percent of Variance = 5.845)		
-You have nausea and vomiting or flatulence.	0.754	0.570
-Your mouth and your skin are dehydration	0.646	0.624
Adaptive behavior 7: Activity in daily living related to Role function mode.		
(2 Items, Eigenvalue = 1.649, Percent of Variance = 5.497)		
-You think you are a burden of the medical staff, family, and friends.	0.782	0.765
-You can do daily routines like eating, taking a shower by yourself.	0.656	0.607

Table 4

Rotated factor loading for Adaptive Behavior Questionnaire (Continued)

Item Statement	Factor Loadings	Communalities h^2
Adaptive behavior 8: Symptoms of low immune system level related with physical function mode. (2 Items, Eigenvalue = 1.607, Percent of Variance = 5.355)		
-You have blood in your stool or chronic diarrhea.	0.833	0.721
-You have trouble breathing.	0.655	0.652
Adaptive behavior 9: Symptoms of hyper viral load related with physical function mode. (2 Items, Eigenvalue = 1.301, Percent of Variance = 4.336)		
-You can not see clearly	0.842	0.748
-You have muscle pains all over the body.	0.59	0.550

The forth factor included 2 items (item 15 and 19). Factor 4 was named *"Adaptive behavior 4: Self-esteem after HIV infection related to self–concept mode"* If people living with HIV feel that they have lost their self-confidence and self-esteem because their body conditions have changed and been less effective, and then they cannot take care of themselves eventually. According to most people living with HIV will decrease their self-esteem, and they will think that their lives are failed. So, if HIV infected persons cannot adapt themselves, they will not see their values. On the other hand, if they see their values, they will be able to adapt with the disease (Sakuldee, 2007).

The fifth factor included 2 items (item 31 and 33). Factor 5 should be conceptualized as "*Adaptive behavior 5: The relationship with health providers in hospital affected to interdependence adjustment mode"*. People living with HIV who could adapt with their own conditions would take care of themselves well, live on their own, and need help from other people only when necessary. However, if they could not adapt with their own conditions, there might be inappropriate behavior (Siraprapasiri, 2002).

The sixth factor included 2 items, (item 4 and 6). Factor 6 could be labeled as "*Adaptive behavior 6: Symptoms of HIV infection related with physical function mode".* Most of people living with HIV in the first stage of infection, the symptoms are not prominent and the only positive findings are antigens and antibodies. Each patient has different symptoms i.e. some of them have acute infections such as a common cold, rash fever, sore throat, headache and fatigue, which will last for a week. If patients do not take care of themselves in the right way, the disease will become aggravated (Mukkaew, 2007).

The seventh factor included 2 items (item 27 and 29). Factor 7 was labeled as "*Adaptive behavior 7: Activity in daily living related to Role function mode*". Most of people living with HIV in acute infection stage, no symptom stage, and symptom stage will be tired, more or less. It is a result of physiological causes such as chronic cough, chronic diarrhea, loss of weight, etc. They will sleep less because of insomnia and resting not enough which is a result of stress, and mental depression. If the HIV infected persons do not get enough rest, they will not be able to adapt with the condition that the important factor affected to self-care

themselves especially activity in daily living such as eating, cooking, dressing, cleaning body, personal health and hygiene (Sittipran, 2007).

The eighth factor included 2 items (item 1 and 2). Factor 8 could be labeled as "*Adaptive behavior 8: Symptoms of low immune system level related with physical function mode".* Protection of HIV infected person who has immune deficiency: Since their CD4+T – Lymphocyte was destroyed by HIV which is a main cause of other problems and opportunistic infection on the skin that affects adaptive behavior. The infection on the skin can be found among HIV infected persons. In addition, there are other individual factors such as age of the infected person that affects adaptive behavior on body protection, and hygiene or how the HIV infected person cleans the body after having the skin infection that will make the adaptive behavior on body protection better (Giddens & Tomaszewski, 2006).

The ninth factor included 2 items (item 7 and 8). Factor 9 could be labeled as "*Adaptive behavior 9: Symptoms of hyper viral load related with physical function mode".* Most of HIV infection affects physiological adaptation. The virus will destroy and decrease immune system in the body of HIV infected persons, so there will be a great chance to get complications easily. Problems that affect physiological adaptation of HIV infected persons will be more complicated, and might affect every system in the body or every small element of physiological adaptation (Walsh, Mandalia, & Gazzard, 2002).

The construct-related evidence of validity in the Adaptive Behavior Questionnaire revealed that most of adaptive behavior pattern scores were significantly different between physical function, self-concept mode, role function mode and interdependence adjustment among people living with HIV. This finding was congruent with many previous studies which revealed that the factors related good adaptive behavior and maladaptive behavior among people living with HIV who received antiretroviral therapy to deal with situations (Punyawantanee, 2008; Raychaudhuri & Kundu, 2004; Reif, Smith, & Golin, 2003; Renolds, et al., 2003). The concurrent criterion-related validity of the adaptive behavior questionnaire, correlations were found in the expected direction and could be considered as sufficient. In addition, the results supported many studies. Evidence of reliability of the Adaptive Behavior Questionnaire demonstrated sufficient reliability (r = 0.8082) for a new instrument. However, a high value may be affected from many factors; (1) more items were included in the ABQ and (2) higher value of the total test variance (mean = 48.89, variance = 735.28) in this study. Item-total correlation more than 0.20 was acceptable (Streiner & Norman, 2000). Seven of nine adaptive behavior patterns revealed sufficient item-subscale correlation. Adaptive behavior pattern 4, 5, 6, 7, 8, and 9 that consisted of 2 items revealed somewhat low Cronbach's alpha correlation coefficients. The above discussion demonstrated that the ABQ had adequate reliability and validity. As a result, the ABQ offers a promising way of measuring adaptive behavior pattern among people living with HIV/AIDS who received antiretroviral therapy in the future. According to reliability of the ABQ by the 7–days and 30 days test–retest reliability assessment, which was found to be somewhat higher that reliabilities found among other adaptive behavior scale for people living with HIV who received antiretroviral therapy? Evidence from the test–retest reliability assessment suggests good reliability for both the low- and moderate–adaptive behavior subscales. In addition, the literature indicates correlations of 0.70 are sufficient, in the early stages of development, for group studies (Nunnally & Bernstein, 1994). All of the correlations, in this study, were found to be at or above 0.70.

Limitation and Recommendations

Researchers acknowledge several limitations in this study. First, researchers choose to use methodology consistent with classical testing theory instead of the more recently developed item response theory. Second, participants in both the in-depth interview and expert review phase of this study were all from Central region of Thailand. This limited geographic area may represent a source of bias in researcher's scale development and may have led researcher to exclude pertinent items from the scale. This instrument is helpful for researchers who are interested in explaining, predicting, and improving effective adaptive behavior pattern among people living with HIV. Future researcher needs to provide evidence and strengthen support for the validity and reliability of the Adaptive Behavior Questionnaire. Confirmatory factor analysis should be employed to confirm the number of latent variables underlying the items corresponding to the expected number, and confirm an expected factor structure of the Adaptive Behavior Questionnaire.

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