Confirmatory Factor Analysis of an Instrument to Assess Quality in Pharmacy Service of Highly-Active Antiretroviral Therapy Program

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ABSTRACT

The purpose of this study was to validate the instrument scale to measure patients' perception of quality in pharmacy service of the highly active antiretroviral therapy (HAART) program. The PSQ-HAART instrument which was developed, with an underpinning in the Gap Theory, in pharmacy context of the HAART program in community hospital in Chiang Rai province, was revised based on confirmatory factor analysis and replication of item analysis. Psychometric test was conducted during February 2005 among a random sample of 200 patients from HIV clinic at four community hospitals in Chiang Rai province. A total of 199 questionnaires were returned (99.5 % response rate). Of these, 183 questionnaires were used for data analysis. The results indicated that the instrument had high internal consistency reliability and construct alidity. A six-factor structure: tangible-reliability, assurance-empathy, empathy, responsiveness I, responsiveness-assurance and responsiveness II was confirmed. The results also indicated that the 33-item scale had better fit than the 36-item scale. The instrument may allow pharmacy administrators to assess quality in pharmacy service when necessary, develop methods to balance service quality with knowledge/skill prior to providing service. Further testing of the instrument would provide more comprehensive evidence for its construct validity when assessing quality in pharmacy context of the HAART program of the country.

Key words: Chiang Rai province, Community hospital, Confirmatory factor analysis, Gap Theory, Highly-active antiretroviral therapy, Pharmacy service, PSQ-HAART, Service quality, HAART

INTRODUCTION

To be an effective practitioner in health profession, many service quality instruments have been developed and used in the study of health, and in health professions (e.g., especially medicine and nursing) for their specific purposes,

populations and hypothesis testing. With the highly-active antiretroviral therapy (HAART) program becoming more widely available in Thailand and pharmacists are often considered the most accessible health professionals, frequently at the frontline in helping patients deal with medication related issues, it is necessary to have a better understanding of service quality related to the expansion of existing programs.

Research study has demonstrated that measurements of quality in pharmacy service has had a positive influence on and have been a predictor of patient satisfaction and then their behavioral intention to the service, including continuing antiretroviral therapy adherence, complying with pharmacist's advices, keeping pharmacist's appointments and communicating positive things about the pharmacy service to others (Chaitha et al., 2007). The more likely the patients to have positive behavioral intention to the service to increase likelihood of adherence, the better it would assist in the success of the program. Measurement of patients' perception of quality in pharmacy service may be a more efficient estimate of long-range outcomes than actually collecting longitudinal data of the outcomes. This is because one would know the level of patients' perception of their service quality in performing targeted tasks so that effective instructional strategies/ methods can be established and implemented earlier to balance patients' expectation and their perception of the service quality. These have supported the importance of assessing quality in pharmacy service.

In this context, for pharmacy administrators in the HAART program to prepare competent pharmacists, they must be able to properly assess patients' perception of service quality in addition to other areas of competence. Thus, an evaluative tool is needed in the pharmacy service environment that can accurately assess patients' perception. Chaitha et al., (2005) established instrument to measure pharmacy patients' perception of quality in pharmacy service of the HAART program in community hospital in Chiang Rai province, named 'PSQ-HAART', with an underpinning in the Gap Theory (Parasuraman et al., 1985). It had high internal consistency reliability (Cronbach's coefficient alpha = 0.94-0.95) and construct validity (factor loadings = 0.38 – 0.73). Internal consistency of the instrument's items was also strong. However, based on exploratory factor analysis (EFA) in Chaitha et al., (2005), a model can be shown only to have acceptable fit, but it cannot show that the model was the best fit or if there are other models which fit better or equally well.

Objectives of the Study

The objectives of this study were to validate the 'PSQ-HAAT' questionnaire (Chaitha et al., 2005) to measure quality in pharmacy service of the HAART program by testing and replicating item analysis on the 33-item and 36-item instrument and to determine which model had better fit of the six-subscale structure (tangibles-reliability, assurance-empathy, empathy, responsiveness I, responsiveness-assurance and responsiveness II) obtained from the previous psychometric test, using EFA in Chaitha et al., (2005) study.

Definitions of the Study

Expectation of service quality – The wished-for level of performance or the desired level of performance (Parasuraman et al., 1985).

HAART patients - HIV-infected patients who enrolled in the HAART program.

Perception of service quality – An individual's assessment of the overall excellence or superiority of the service provided (Parasuraman et al., 1985).

Pharmacy service – Pharmacy service of the HAART program.

Service quality – Service quality in this study was based on Parasuraman et al., (1985) which is a function of the magnitude and direction of the gap between the expected service and the perceived actual service.

MATERIALS AND METHODS

The PSQ-HAART Instrument

This instrument was developed, with an underpinning in the Gap Theory (Parasuraman et al., 1985), through four major steps over the course of a one-year period (January – December 2004). Each step was dependent on the previous steps. These steps were: firstly, generated instrument items which were based on literature review, then informal interviews with HAART patients. Following content validation by expert panels, the 49- item instrument was pilot-tested with a sample of 320 HAART patients from four community hospitals in Chiang Rai province, viz., Mae Sai, Mae Chun, Chiang Saen and Mae Saui hospitals. The result derived a 36-item instrument in six-factor structure: tangibles-reliability (9 items), assurance-empathy (10 items), empathy (6 items), responsiveness I (4 items), responsiveness-assurance (5 items) and responsiveness II (2 items). Lastly, it was revised again based on results of EFA, using principal component analysis as the extraction method, with a sample of 216 HAART patients from four community hospitals in Chiang Rai province, viz., Phan, Somdejprayarnasungworn, Mae Lao and Wiang Pa Pao hospitals.

Three items were excluded from the 36-item instrument, including item 1: "The pharmacist has suitable guidelines, textbooks and/or documents in caring me"; item 14: "The pharmacist works collaboratively and systematically with pharmacy staff in servicing me" and item 19: "The pharmacist is consistently courteous with me." The results indicated that the instrument had 33-item instrument in six-factor structure: tangibles-reliability (8 items), assurance-empathy (8 items), empathy (6 items), responsiveness I (4 items), responsiveness-assurance (5 items) and responsiveness II (2 items), which had high internal consistency reliability (Cronbach's coefficient alpha = 0.94) and construct validity (factor loadings = 0.38 – 0.73).

Internal consistency of the 36-item and 33-item instruments were strongly supported by Cronbach's coefficient and corrected item-subscale correlation. Patients were asked to rate their desired service level (E) and the perception of actual service level (P) for each item regarding the pharmacy service, using a 5-point Likert scale. Gap score was then calculated. A gap score of P – E indicated the gap discrepancy between desired service expectation and perception of

actual service. Both instruments had six-subscale structure which were highly replicable and stable with a new independent sample, and both were fit to the pharmacy context of the HAART program in community hospital in Chiang Rai province (Chaitha et al., 2005). However, based on EFA, a model can be shown only to have acceptable fit, but it cannot show which model fits better or equally well.

Study Design: This study applied a descriptive cross-sectional design to validate the instrument scale named 'PSQ-HAART' to measure patients' perception of quality in pharmacy service of HAART program. A CFA using completing models strategy was conducted to compare the 33-item instrument (the proposed model) with the 36-item instrument (the alternative model) in an attempt to demonstrate that which one was better fitting model. As results of the item analyses in the process of questionnaire development in the study of Chaitha et al. (2005), the 36-item instrument was hypothesized in six factors: items 1 through 9 (tangibles-reliability), items 10 through 19 (assurance-empathy), items 20 through 25 (empathy), items 26 through 29 (responsiveness I), items 30 through 34 (responsiveness-assurance) and items 35 through 36 (responsiveness II). While the 33-item instrument was also hypothesized in six factors but three items were excluded. The 33-item instrument were: items 1 through 8 (tangibles-reliability), items 9 through 16 (assurance-empathy), items 17 through 22 (empathy), items 23 through 26 (responsiveness I), items 27 through 31 (responsiveness-assurance) and items 32 through 33 (responsiveness II).

Population: The population in this study included all patients who enrolled in the HAART program at all community hospitals (16 hospitals) in Chiang Rai province.

Sample size calculation: The recommended sample size for a CFA is 20 subjects per observed variable (Kline, 1998). However, more typical is minimum ratio of at least five subjects for each observed variable. The maximum number of observed variables used in service quality part was 33. Thus, a minimum sample size of 165 subjects was desirable for the CFA in this study. The response rate was expected to be 85 percent. This made the sample size 194. To account for missing data, this sample size of 194 was increased to 200. A decision was made that problematic items were: (1) those which had ten percent or more of the responsive items either missing or gave multiple answers (Hair et al., 1998) and/or (2) those which allocated the same responsive values of all items.

Selection of the subjects: The study subjects were randomly selected from the HAART program of four community hospitals in Chiang Rai province, viz., Mae Sai, Mae Chun, Chiang Saen and Mae Lao hospitals. The 'Access to Care' (ATC) number list of each hospital was used as the sampling frame. A systematic randomly-sampling procedure was used to draw 40 patients' ATC numbers from the list. The HAART patients who had participated in the development of the questionnaire (Chaitha et al., 2005) were excluded from this study.

Duration of the Study: This study was conducted during January 2005 to May 2006.

Data Collection: Data collection was conducted in February, 2005. A nurse from HIV clinic from each community hospital (viz., Mae Sai, Mae Chun, Chiang Saen and Mae Lao hospitals) acted as a research assistant and two people living with HIV/AIDS (PLHA), volunteered from each hospital, were the field-workers, underwent intensive training to administer the questionnaire to the patients. Participants had to sign an informed consent form to be included in the study. The method of responding to the questionnaire depended on the ability of each respondent to answer. In the case that the respondent was a child who could not write or answer the questionnaire by themselves, a parent or a guardian would respond on their behalf. For illiterate respondents and those with poor eyesight, or any other limitations that prevented them from completing the survey alone, the fieldworkers read out the questions and wrote down their answers. Each manner of survey administration was noted. The fieldworkers ensured that patients filled out the survey in private, which protected patients' confidentiality. The protocol of this study followed ethical standards of the Ethical Conduct for Research Involving Humans (ICH Steering Committee, 2000; FERCIT, 2002) and was approved by the Ethical Review Committee of the Faculty of Pharmacy, Chiang Mai University.

Data Analysis: Descriptive statistics of patients' characteristics were computed, using SPSS for Windows Version 11.0 (SPSS Inc., Chicago. ILL). To assess the goodness-of-fit of the data to the service quality model, several goodness-of-fit indices were assessed using LISREL Program version 8.7 (Jöreskog and Sörbom, 1993). The Maximum Likelihood Method was used to estimate the CFA measurement model. Goodness-of-fit was predicted by the estimated model to measure the correspondence of the actual or observed input matrix (covariance or correlations). The variances of the factors were fixed at one. Multiple criteria were used to assess the goodness-of-fit of the factor model. The chi-square (x^2) statistic is a measure of overall fit. The x^2 statistic is very sensitive to large sample sizes (> 200). To reduce the sensitivity of the x^2statistic to ideal sample size, its value was divided by the degrees of freedom (df). A x^2/df ratio less than 3 is generally considered favorable (Kline, 1998). The Root Mean Square Error of Approximation (RMSEA) is a standardized summary of the average co-variance residuals, which is the difference between the observed and model-implied co-variance. If a model fit is perfect, the RMSEA equals zero. An RMSEA value less than 0.05 is considered a good fit and a value between 0.05 and 0.10 is considered acceptable. The Comparative Fit Index (CFI) indicates the proportion in the improvement of the overall fit of the model relative to a null model, in which all of the observed variables are assumed to be uncorrelated. Values of the CFI greater than 0.90 are considered to indicate a good fit. When the goodness-of-fit was poor, the modification indices (i.e., the Wald test and the Lagrange Multiplier test) were used to identify improvements in model fit. These indices provide detailed assessments of model fit by indicating the expected decrease in x^2 if a zero-factor loading on an observed variable is relaxed. The modification index with the highest value results in the greatest decrease in x^2. A competing models strategy was conducted in order to compare the 33-item instrument (proposed model) with the 36-item

instrument (alternative model) in an attempt to demonstrate that which model was a better-fit model. Data analyses were conducted four times for expectation and perception items of both models.

RESULTS

Description of the Study Samples

Two-hundred questionnaires were distributed to patients receiving pharmacy service at five community hospitals in Chiang Rai province (40 patients per hospital). A total of 199 questionnaires were returned (99.5 % response rate). Of the returned questionnaires, sixteen were not used for data analysis because all items in the questionnaire were allocated the same responsive values of all items. Therefore, 183 usable questionnaires (92.0%) were used for data analysis. The average age of the respondents from the studied sample was 35.01±7.86 [range 9-55] years. Their average income per month was 1,059.12±694.41 [0 - 7,000] Baht. The average duration receiving pharmacy service was 22.34±13.54 [1 - 96] months. The respondents reported taking an average of 2.13±1.03 [1 - 6] prescription medications per day (excluding antiretroviral regimen). The majority of the respondents was female (57.4%), completed high school (59.3%), and worked as laborers (50.0%). Most of them were married (43.6%), had universal coverage health assurances (90.1%), reported their health status as good (47.0%), and received the GPO vir antiretroviral formula (75.1%). A total of 81.9 % of the questionnaires were self-administered. For the remaining 18.1%, fieldworkers read out the questionnaires to them (11.6% were hindered by poor eyesight and 6.5% were illiterate).

Expectation items: Several goodness-of-fit indices for the 36-item instrument were examined. Initially, the chi-square-to-degrees of freedom ratio (x^2/df = 1617.42/579 = 2.79) and the Comparative Fit Index (CFI = 0.97) was at the level that indicated favorable fit of the proposed model. The Root Mean Square Error of Estimation (RMSEA) of 0.080 (Figure 1) indicated an acceptable fit of the 36-item instrument. All of these indicated a good fit of the data to the proposed model. After item refinement II, the service quality items number 1, 14 and 19 were excluded from the36-item instrument, the x^2/df ratio decreased to 2.33 (1119.04/480), the CFI increased to 0.98 and the RMSEA decreased to 0.068 (Figure 3). The modification indices for the unestimated relationship indicated the improvement in overall model fit (the reduction in the chi-square statistic). However, these modification indices were used only as a guideline for model improvements of those relationships that can theoretically be justified as possible modifications.

Perception items: Several goodness-of-fit indices for the 36-item instrument were examined. Initially, the chi-square-to-degrees of freedom ratio (x^2/df = 1654.53/579 = 2.86) and the Comparative Fit Index (CFI = 0.93) was at the level that indicated favorable fit of the proposed model. The Root Mean Square Error of Estimation (RMSEA) of 0.085 (Figure 2) indicated an acceptable fit of the 36-item instrument. All of these indicated a good fit of the data to the

proposed model. After item refinement II, the service quality items number 1, 14 and 19 were excluded from the 36-item instrument, the x^2/df ratio decreased to 2.53 (1214.13/480), the CFI increased to 0.97 and the RMSEA decreased to 0.064 (Figure 4). The modification indices for the unestimated relationship indicated the improvement in overall model fit (the reduction in the chi-square statistic). However, these modification indices were used only as a guideline for model improvements of those relationships that can theoretically be justified as possible modifications.

The results suggested that both 33-item and 36-item instrument had good fit, but 33-item had better fit than the 36-item. Therefore, these results confirmed the results of EFA in the study of Chaitha et al., (2005).

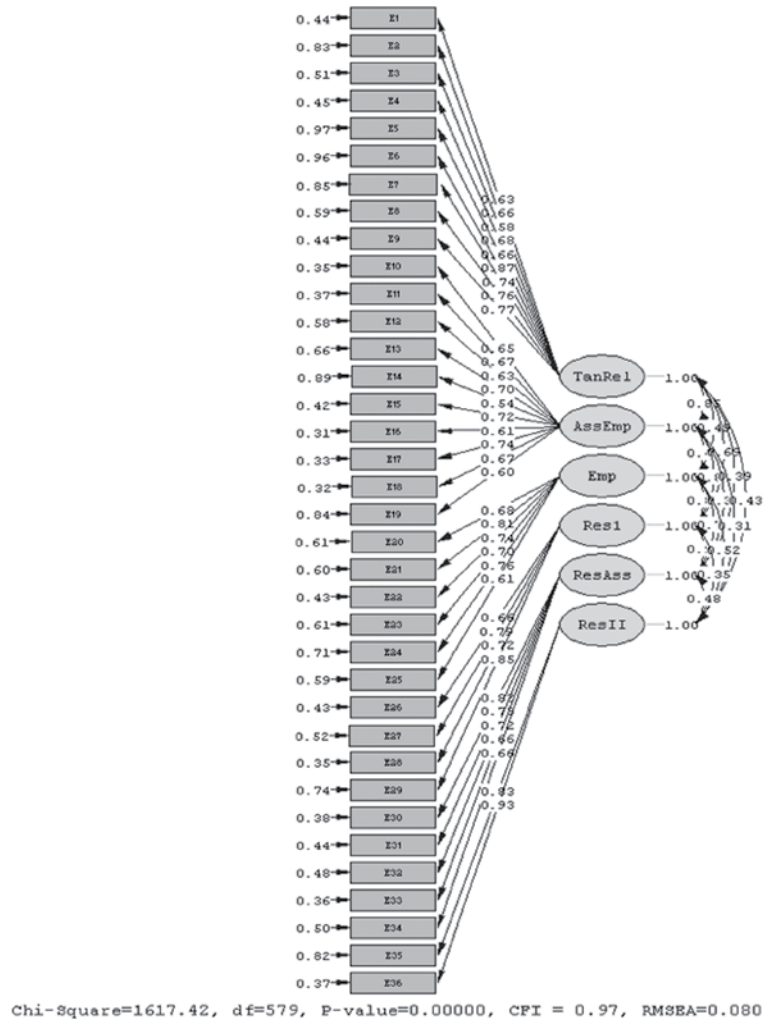

Figure 1. Measurement Model for Expectation Part of 36-item of the PSQ-HAART Instrument.

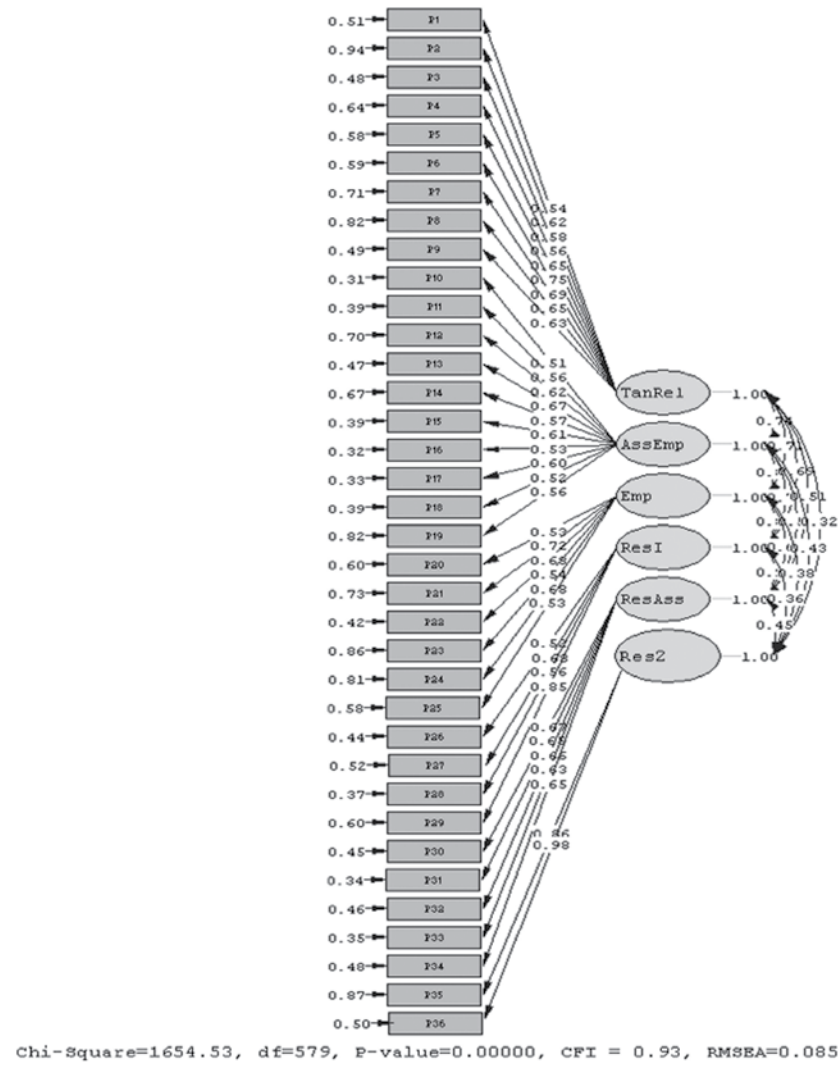

Figure 2. Measurement Model for Perception Part of 36-item of the PSQ-HAART Instrument.

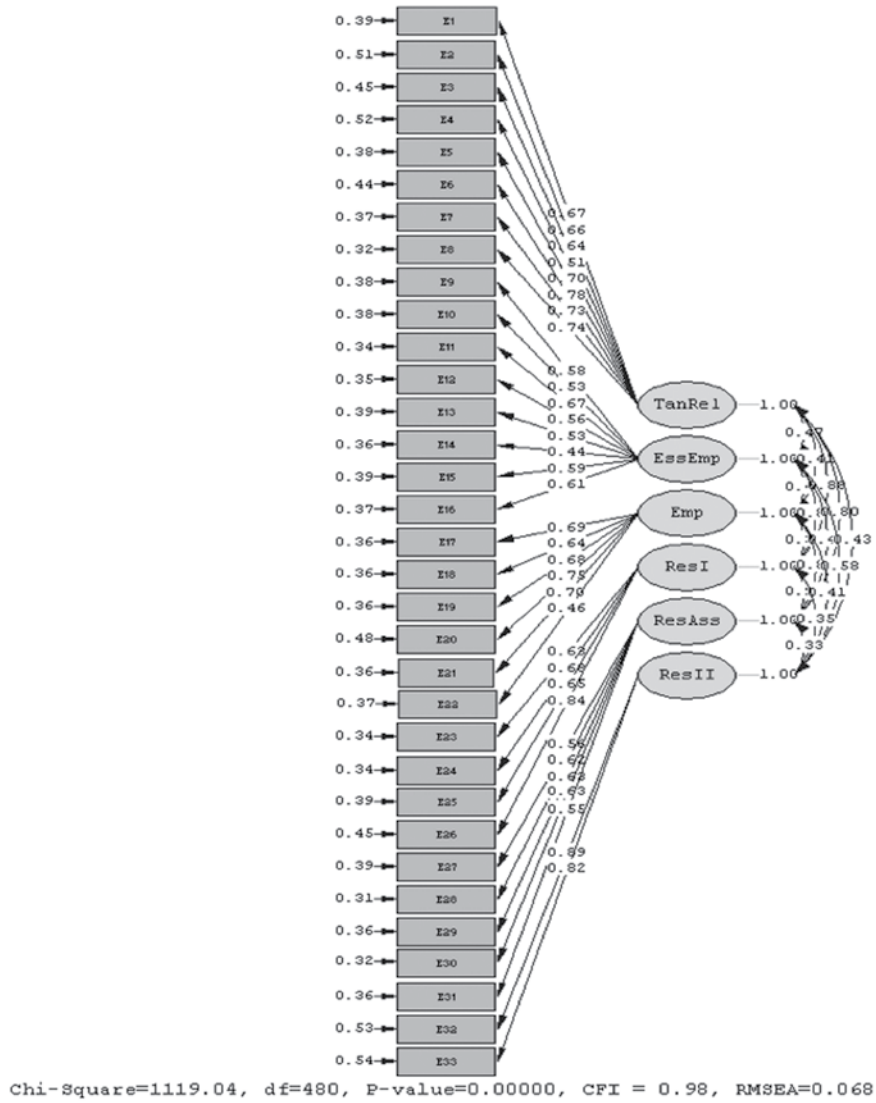

Figure 3. Measurement Model for Expectation Part of 33-item of the PSQ-HAART Instrument.

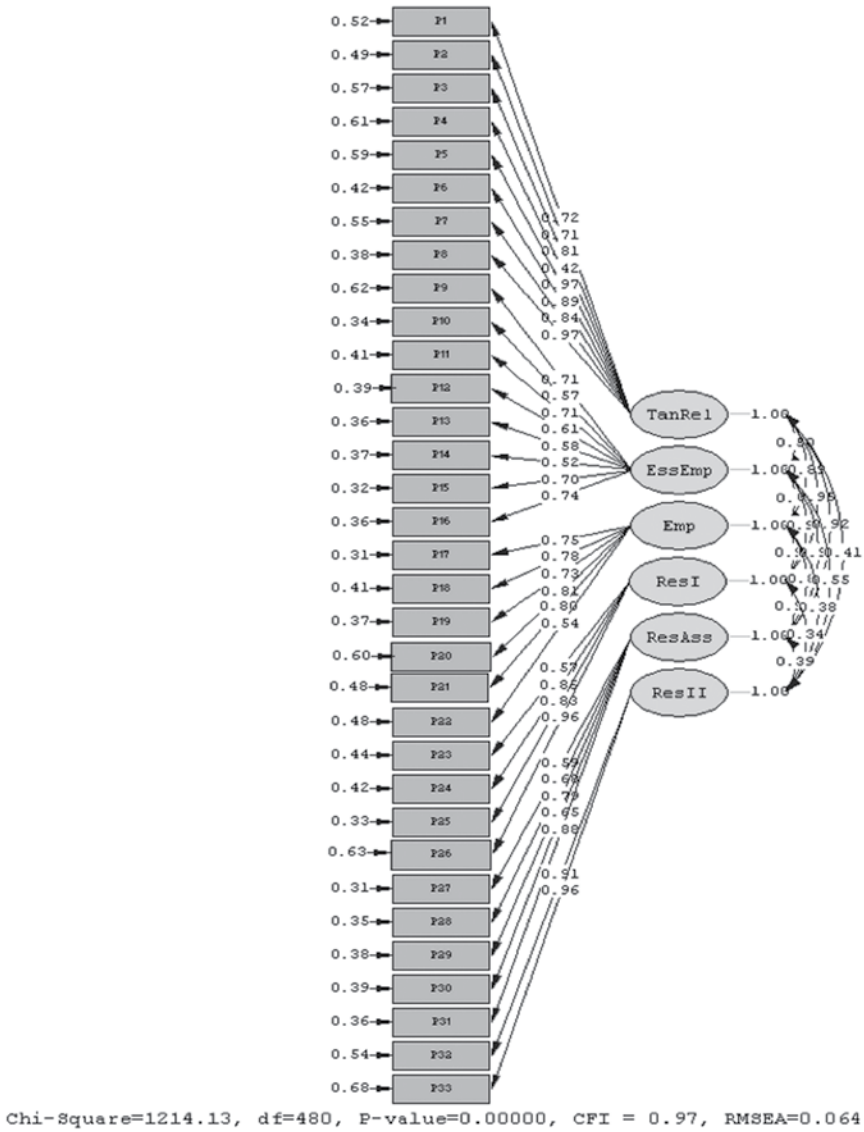

Figure 4. Measurement Model for Perception Part of 33-item of the PSQ-HAART Instrument.

DISCUSSION

Evidence based on the internal (subscale) structure and internal consistency reliability of the validated instrument were obtained for this step by replication of item analysis on the 33-item and the 36-item instrument, conducting CFA to test the adequacy of fit of the six-subscale structure on both models, and performing an item analysis on the items remaining after performing CFA, respectively. In general, the EFA techniques that were used to develop the instruments may result

in factors that are sample-specific and inclined toward high reliability (Hinkin, 1995). The use of a new, independent sample to replicate the item analysis of the instrument would enhance its generalizability and confirm that the results obtained were not a one-time chance occurrence (Devellis, 1991; Hinkin, 1995). In this study, replication of item analysis on the 36-item instrument was conducted. Using CFA in this manner (i.e., exploratory and confirmatory) could possibly capitalize on chance and sample-specific variance. Cole (1987) pointed out that CFA estimates was only as good as the underlying data. If the model was miss-specified even if it produced a good fit to the data, the parameter estimates (e.g., factor loadings) might be quite inaccurate. There might also be many alternative models that fit the data equally well. According to Cole (1987) and Kline (1998), CFA with model modification in this study is quite tentative. The CFA with model modification indices indicated that the 36-item instrument could be revised to 33-item and the six-factor structure provided a satisfactory fit to the data. This result confirmed the result of EFA in development process of the PSQ-HAART instrument (Chaitha et al., 2005) that the 33-item instrument had better fit than the 36-item instrument. The 33-item instrument (the proposed model) demonstrated high internal consistency reliability and each of six subscales demonstrated a good uni-dimensionality of subscale. The six-subscale model fit adjustments in CFA were conducted post hoc. These were based on model improvements suggested by model modification indices and because of these, one needs to be cautious when interpreting the CFA results in this study.

However, CFA necessitated a large sample. Thus, it was important to target a sample size that would be minimally adequate for the analysis. For this study, 199 of 200 questionnaires (99.5 % response rate) were completed and returned, and 183 questionnaires were used in CFA. This provided a sufficient number of samples to conduct a CFA (Hatcher, 1994; Hinkin, 1995; Kline, 1998).

Limitations: Instrument development is an ongoing, evolutionary process. Although this study has shown promising results, it does have several limitations that should be addressed. One such limitation involved the content domains of the instrument. The content domains did not include all possible areas of patients' perception in pharmacy service such as the patients' outcomes that they can evaluate, for example, CD4 level in HIV/AIDS patients. Thus, the instrument has limited generalizability for its use to only the six-content areas/subscales. A second limitation involved the representation of the study places in this study for the CFA steps which were volunteers, a nonrandom study place and not-entirely representative of national demographics. Non-responders were not contacted and assessed for nonresponse bias. Selection and non-responses biases could threaten the external validity of the results. Although this may limit the generalizability of the use of the instruments (i.e., 33-item and 36-item instrument) to the whole population of HAART patients, the author believed that it was not a major concern in this study. This was because the instruments demonstrated good external validity with high six-subscale replication in different, independent samples and different pharmacy service for the EFA and the CFA. A third limitation pertaining to the CFA, the CFA results with post hoc model modifications in this study,

were quite tentative, however, further research by replication or cross-validation with an independent or new sample in the future, is recommened.

It is important to note here that convergent validity and discriminant validity are usually associated with the use of the multitrait-multimethod (MTMM) approach to validation in which multiple constructs are each assessed using more than one assessment method (Campbell and Fiske, 1959). It has been argued that the MTMM approach provides a more rigorous test of convergent and discriminant validity than the CFA procedures, because the variance estimates can be partitioned into trait, method and random error factors. However, the MTMM approach was not possible in this study because a single method (i.e., self-administration written questionnaire of service quality) was used and there is no established instrument that measures the study construct in pharmacy service.

Implications: This study demonstrated a reliable and valid instrument that could be used to assess patients' perception of quality in pharmacy service of the HAART program. This instrument could be applied and used as a formative and/or a summative assessment of patients' perception within six-factor structure during the service. It could be utilized continually and regularly carried out, at least every six months. This would allow pharmacy administrators to identify deficits within the pharmacy service, develop interventions/strategies to address identified services' deficits throughout the program, and have programmatic assessment data within the subscale domains of the instrument prior to designing the service and ultimate practice. All combined subscales would be useful for a department of pharmacy. A department of pharmacy can focus on those subscales to design and/or adopt specific instructional methods. In addition to its application, the instrument could be a foundation for the advancement of research in the critical areas of pharmacy service of the HAART program.

Recommendations for future research: Future research could be directed towards instrument development, refinement, validation and hypothesis testing of the instrument. Cross-validation of the instruments with new, representative, independent samples could help determine whether this limitation would threaten the use of the instruments or enhance their generalizability. Future research would be to further establish other construct validities such as differentiation between groups (i.e., known-group validation), correlations between a measure of the construct and a designated construct/criteria/instrument and differentiation of each subscale item, using the item response theory. Using an instrument already developed, such as the PSQ-HAART questionnaire, would allow pharmacy services to eventually compare themselves to those of peer services in an effort to develop benchmarks and an understanding of best practices across the service. A process of benchmarking will allow a long-term view of how the services are performing, which will be far more valuable than one set of data. It would be valuable to develop and incorporate health scales that include the outcomes. Alternatively, researchers might consider further augmenting the proposed model by including additional patients' actual behaviors such as, percentage of antiretroviral medication adherence, service adherence and/or CD4 level. However, regarding outcome assessments of health care, it is difficult and costs the process.

With regard to hypothesis testing of the instrument, preliminary demographic variables (e.g., gender, ethnicity, experience) that significantly predict patients' perception of service quality within each subscale domain and all combined subscales should be investigated to build a multivariate logistic model in predicting patient perception levels. Next is the investigation of the instrument in terms of the measurement method used from the self-assessment reporting by the patients and its use with pharmacists as observation-based ratings. Self-reporting may reflect only vested interest by the patients (e.g., over- or underestimation of their perception) and would not reflect the preceptor assessment of the patients. Pharmacist evaluations would help identify those patients who overvalue or undervalue their perception. This would serve to help identify a "blind" spot that the patient possesses with respect to their perception. If both self-assessment and pharmacist-rating methods are used in evaluating patients' perceptions, future research should include the investigation of what patient factors help create an inaccurate self-assessment of perceptions, what are the likely outcomes/effects of such inaccuracies, and what interventions could be developed and used within or throughout the service to improve and calibrate quality of the service to make it correlate with one's perception. Finally, instruments could be used to examine the level of perception score and/or the gap score between patients' perception and their expectation subscales that best predict patient satisfaction, patient behavioral intention and / or patient outcome. Structural equation modeling or path analysis with growth curve modeling could achieve this.

CONCLUSION

This study validated the PSQ-HAART instrument for assessing patients' perception of quality in pharmacy service of the HAART program. The results indicated that both 33-item and 36-item of the PSQ-HAART instrument had good fit for pharmacy service, but the 33-item had better fit than the 36-item. The instrument may allow pharmacy administrators to assess quality in pharmacy service and then develop methods to balance service quality with knowledge/skills prior to providing the service.

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APPENDIX
The PSQ-HAART Questionnaire

Part I: Service Quality

When I received the pharmacy service…….	Expectation					Perception				
	Lowest				Highest	Lowest				Highest
1. *The pharmacist has suitable guidelines, textbooks and/ or document in caring for me.	1	2	3	4	5	1	2	3	4	5
2. Materials associated with pharmacy service are suitable-appealing; for example, antiretroviral or anti-opportunistic infection pamphlets.	1	2	3	4	5	1	2	3	4	5
3. I receive antiretroviral information completely before starting the drugs.	1	2	3	4	5	1	2	3	4	5
4. The pharmacist insists on my health care record.	1	2	3	4	5	1	2	3	4	5
5. The pharmacist helps me manage my antiretroviral schedule that accommodates for my life style.	1	2	3	4	5	1	2	3	4	5
6. The pharmacist provides memory table for my antiretroviral self-administration.	1	2	3	4	5	1	2	3	4	5
7. The pharmacist usually monitors my antiretroviral therapy outcome.	1	2	3	4	5	1	2	3	4	5
8. The pharmacist helps me care my health.	1	2	3	4	5	1	2	3	4	5
9. When I have a problem, the pharmacist shows a sincere interest in solving it.	1	2	3	4	5	1	2	3	4	5
10. The pharmacist does service by a certain time of HIV clinic.	1	2	3	4	5	1	2	3	4	5
11. The pharmacist has the knowledge to ensure my questions.	1	2	3	4	5	1	2	3	4	5
12. The pharmacist has appropriate interpersonal communication and counseling.	1	2	3	4	5	1	2	3	4	5
13. The pharmacist services me suitably according to professional role.	1	2	3	4	5	1	2	3	4	5
14. *The pharmacist works as a collaborative with pharmacy staff	1	2	3	4	5	1	2	3	4	5
15. I feel safe in the transaction of the pharmacist.	1	2	3	4	5	1	2	3	4	5
16. I receive service from the pharmacist equity to other patients.	1	2	3	4	5	1	2	3	4	5
17. The pharmacist gives me individual attention.	1	2	3	4	5	1	2	3	4	5
18. The pharmacist has me best interest at heart.	1	2	3	4	5	1	2	3	4	5
19. *The pharmacist is consistently courteous with me.	1	2	3	4	5	1	2	3	4	5

20. The pharmacist understands my specific needs.	1	2	3	4	5	1	2	3	4	5
21. The pharmacist responds to my needs.	1	2	3	4	5	1	2	3	4	5
22. The pharmacist responds to my feeling appropriately.	1	2	3	4	5	1	2	3	4	5
23. The pharmacist gives me personal attention.	1	2	3	4	5	1	2	3	4	5
24. The pharmacist respects my right to make my own choice.	1	2	3	4	5	1	2	3	4	5
25. The pharmacist holds my information provided secure.	1	2	3	4	5	1	2	3	4	5
26. The pharmacist tells me exactly when service will be performed.	1	2	3	4	5	1	2	3	4	5
27. The pharmacist helps physicians in caring me.	1	2	3	4	5	1	2	3	4	5
28. The pharmacist provides me continuous care with physicians and other health care providers.	1	2	3	4	5	1	2	3	4	5
29. The pharmacist sets system to contact me if I missed the appointment.	1	2	3	4	5	1	2	3	4	5
30. The pharmacist gives prompt service for me.	1	2	3	4	5	1	2	3	4	5
31. The pharmacist is always willing to help me.	1	2	3	4	5	1	2	3	4	5
32. The pharmacist establishes and maintains rapport with me to ensure my adherence to antiretroviral therapy.	1	2	3	4	5	1	2	3	4	5
33. The behavior of the pharmacist instill confidence in me.	1	2	3	4	5	1	2	3	4	5
34. The pharmacist empowers me.	1	2	3	4	5	1	2	3	4	5
35. I can consult the pharmacist about socioeconomic issues.	1	2	3	4	5	1	2	3	4	5
36. I can consult the pharmacist by phone if I need.	1	2	3	4	5	1	2	3	4	5

Remark: - tangibles-reliability (items 1 through 8) assurance-empathy (items 9 through 16); empathy (items 17 through 22); responsiveness I (items 23 through 26); responsiveness-assurance (items 27 through 31); responsiveness II (items 32 through 33).
- *Three items (items 1, 14 and 19) were excluded from the 36-item service quality scale after confirmatory factor analysis testing.