ORIGINAL ARTICLE

VALIDATION OF PEAPS-Q-14 (MALAY VERSION) AMONG WOMEN WITH ABNORMAL PAP SMEAR RESULTS: A RELIABILITY AND EXPLORATORY FACTOR ANALYSIS

Mardiana Mansor[1], Aniza Abd Aziz[2], Shabbir Ahmad Sheikh[3], Suriawati Ghazali[1], Kamal Akhtar[4]

[1] School of Nursing Sciences,Faculty of Medicine, UniSZA, Gong Badak Campus, 21300 Gong Badak, Kuala Nerus, Terengganu
[2] Community Medicine Unit,[3] Obstetrics & Gynaecology Unit, [4] Family Medicine Unit, Faculty of Medicine, UniSZA, Medical Campus , 20400, Kuala Terengganu, Malaysia

ABSTRACT

Women with an abnormal Pap smear results are susceptible to distress. The objective of this study was to measure the reliability and validity of the Malay version of Psychosocial Effects with an Abnormal Pap Smear Questionnaire 14 Items (PEAPS-Q-14). A cross sectional study was conducted among 70 women with abnormal Pap smear results who were referred to three tertiary hospitals in East Coast Malaysia and completed colposcopy investigation. The self-administered PEAPS-Q-14 comprises of four domains and a total of 14 items. Descriptive analyses, Chronbach's alpha and exploratory factor analysis were performed to measure the reliability and validity of the Malay version of PEAPS-Q-14. The final model of exploratory factor analysis on the Malay version of PEAPS-Q-14 indicated Bartlett's Test of Sphericity was significant (Chi-square = 404.640, p value < 0.001) and the Kaiser-Meyer-Olkin (KMO) was 0.561. The items were reduced to four factors based on Eigenvalue exceeding 1 after removing an item. The retained 13 items fit the original PEAPS-Q-14 subdomains well. The model with full items demonstrated acceptable overall internal consistency of 0.724 respectively. The Chronbach's alpha of each domain in PEAPS-Q-14 range from 0.666 to 0.917 and only an item (Item 7) under the second factor revealed corrected total item correlation of 0.183. Removal of Item 7 has resulted in better reliability of Factor 2 in which its Chronbach's alpha increased to 0.752. Therefore, the problematic item (Item 7) will be revised and replaced before further confirmatory factor analysis.This study showed the Malay version for PEAPS-Q-14 were reliable and valid to assess the psychosocial burden among women with abnormal Pap smear results based on exploratory factor analysis.

***Key words**: validity, reliability, exploratory factor analysis, abnormal Pap smear result*

INTRODUCTION

A questionnaire on psychosocial effects of having an abnormal Pap smear (PEAPS-Q) was developed by Bennetts et al, in 1995 to measure the distress experienced by women undergoing follow-up after being diagnosed with an abnormal Pap smear results[1]. It is also widely used internationally[2,3] and in Asian [4,5] to measure the psychosocial burden among women diagnosed with abnormal Pap smear results.

PEAPS-Q comprises of 14 questions which are divided into four domains, Domain 1; 'Experience of colposcopy procedure', Domain 2; 'Beliefs/feelings and changes in perception of self', Domain 3; 'Worry about Human Papilloma Virus (HPV) infectivity', and Domain 4; 'Effect on sexual relationship'. Each item is accompanied by five responses, typically being 'not at all', 'a little', 'a fair bit', 'quite a lot' and 'very much' [1].

In general, based on findings from studies conducted worldwide, PEAPS-Q-14 revealed good to excellent reliability. The original study done by Bennetts et al, in year 1995 [1] used PEAPS-Q-14 to measure depression among women with an abnormal Pap smear results and demonstrated that the overall Cronbach's alpha was 0.84 for the 14 items.

The attempt to explore the psychosocial burden among women with abnormal Pap smear results is crucial because the number of women in Malaysia with an abnormal Pap smear result has increased in the recent decades due to lifestyle changes [6]. Women with abnormal Pap smear results were distressed at the early stage of the disease and this condition progressed into psychological trauma in the form of fear, guilt, shame, anxiety [7] and other psychosocial stress [8]. An abnormal Pap smear result highly influences the quality of life of the patients themselves, family and community [9]. Moreover, psychosocial burden among the women leads to failure to undergo further diagnostic test and subsequently proper treatment [10].
Although the number of cervical cancer is increasing every year [6], there is still a lack of assessment on psychological impact among women diagnosed with abnormal Pap smear results particularly using PEAPS-Q-14 being reported in Malaysia. Hence, the purpose of this study is to determine the reliability

and validityof the PEAPS-Q-14 Malay version among women with abnormal Pap smear results.

METHODOLOGY

A cross-sectional study was conducted in February to May 2015 involving women who were referred for further investigation of cervical cancer in three general hospital in East Coast Malaysia namely Raja Perempuan Zainab II Hospital (HRPZ II) in Kelantan, Tengku Ampuan Afzan Hospital (HTAA) in Pahang and Sultanah Nur Zahirah Hospital (HSNZ), in Terengganu. All women with an abnormal Pap smear results and had undergone colposcopy procedure who fulfilled the inclusion criteria was included in the study due to limited number of sample. The inclusion criteria were Malaysian, no psychiatric problem, able to read in the Malay language, willingness to give informed consent and participate in the study. Calculation of sample size was based on 14 items to subject ratio of 5 which corresponds to 70 respondents [11,12]. Thus, a total of 70 respondents were selected from the obstetric and gynecology clinics of the three general hospitals.

Development of the Malay version PEAPS-Q-14

A forward Malay translation of the original PEAPS-Q-14 followed by backward English translation were performed by two experts in English language to ensure the consistency of meaning of the items in bahasa Melayu and to maintain the standard of quality. The items were translated into local word which is simple and easy to comprehend because the target population is women in community with various background.

Expert evaluation of the items and contents

The content validity of the translated Malay version was reviewed by two Obstetric & Gygencology specialists, a statistician and public health physician, a psychologist, two nursing lecturers and a servicing head nurse. Based on the discussion, the original four factors for PEAPS-Q-14 were found to be suitable and decided to be maintained. The agreed subheadings in Malay for each domain were; Domain 1; five items about experience of colposcopy procedure (*PengalamandenganpemeriksaanKolposkopi)*, Domain 2; four items about beliefs/ feelings and changes in perception of self/ (*Kepercayaan / Perasaan dan perubahan terhadap persepsi diri)*, Domain 3; two items on worry about Human Papilloma Virus (HPV) infectivity/ (*Kebimbangan terhadap jangkitan Human Papilloma Virus (HPV:sejenis virus yang menjangkiti pangkal rahim)*, and Domain 4, three items about an effect on sexual relationship/ (*Kesan terhadap hubungan seksual)*. Almost all items were revised into simplified terms and sentences to provide appropriate meaning and better understanding among respondents. The responses for each item also followed the original 5 point Likert scales; score 1: Not at all (*tidak sama sekali*), score 2: A little (*sangat sedikit*), score 3: A fair bit (*sedikit*), score 4: Quite a lot (*banyak*) and score 5: Very much (*sangat banyak*). The minimum PEAPS-Q-14 total score was 1 and the maximum total score was 70.

Face validation

Face validation was done to assess the questionnaire clarity and representativeness. Five health staff (nurses and nursing tutor) from Universiti Sultan Zainal Abidin (UniSZA) and five patients that had undergone colposcopy procedure in Obstetric and Gynecology clinic from Tengku Ampuan Afzan Hospital and Sultanah Nur Zahirah Hospital were interviewed. Modification of questionnaires and structures of point Likert scales were done based on experiences of participants. Then, the term 'psychosocial' was changed to '*masalah emosi dan hubungan sosial'* in Malay version.

Collection of data

A self-administered approach was applied and patients took aproximately 15 minutes to complete the questionnaire. The questionnaire consists of two sections namely sociodemoghraphic profile and PEAPS-Q-14 in Malay language.

Ethical consideration

The study protocol was approved by Medical Research & Ethics Committe (NMRR-14-938-21672) and Human Ethic Commitee of Faculty of Medicine, UniSZA. The PEAPS-Q -14 was used with permission from the original author.

Statistical analysis

SPSS version 22 was used to analyze the results for sociodemographic of respondents using descriptive statistics. The reliability of the items was performed using Cronbach's alpha[13,14 ,15]. A good items is Cronbach's alpha of 0.6 or higher [13].

The exploratory factor analysis procedure extracted distinct components based on rotation process. The Varimax Rotation was chosen and performed [16] and the eigenvalue greater than 1.0 was the reference on number of factors extracted [13].Kaiser-Meyer-Olkin (KMO) ranges between 0.5 to 1 and significant Bartlett's test of Sphericity (p<0.05) indicates the model adequacy [12]. Item communalities of more than 0.3 indicate acceptable percent of variance explained by the item. Factor loading were used to to identify items with low correlation to its individual rotated factor for further re-specification

[17]. Items factor loading of greater than 0.4 under one component was considered acceptable.

RESULTS

A total of 70 (100%) respondents who completed colposcopy procedure answered the questionnaire. They were 37 (52.9%) respondents with age more than 45 years and 33 (47.1%) less than 45 years old. Mean age of respondents was 44.79 years old. Majority of respondents were Malay (84.3%) and Muslim (88.6%). They were 39 (55.7%) from rural area and 44 (62.9%) with secondary education. Among respondents, 60 (85.7%) were married women, half of them (57.1%) were housewives with mean family income per month of RM 2209.24 and all respondents were non-smokers (100%).

Table 1 demonstrated that the exploratory factor analysis of the Malay version of PEAPS-Q-14 with full 14 items indicated Bartlett's Test of Sphericity was significant (Chi-square = 404.640, *p*-value<0.000) and the Kaiser-Meyer-Olkin (KMO) of 0.561. However, the items were reduced to five factors based on Eigenvalue of greater than 1. A total of 12 items in the first four factors fit the original PEAPS-Q-14 subdomains well but two items were loaded into a fifth factor.

Therefore, item 7 which was identified as one of the items loaded into the additional fifth factor and has poorer factor loading was removed and re-specified. The remaining 13 items loaded into four factors with excellent factor loadings (0.629 – 0.918), satisfactory item communalities and model adequacy. Thus, this model was considered as the final model (Table 2). The removed item was Item 7 "How worried are you that you would lose your chance to have a baby? *Sejauh mana anda bimbang tiada peluang mendapat zuriat?*".

Table 1: Exploratory Factor Analysis of Malay version PEAPS-Q-14 (Full Model)

Questions	Factor				
	1	2	3	4	5
Domain 1: Experience of colposcopy procedure					
Did you find the colposcopy procedures uncomfortable?	.703				
Did you find the colposcopy undignified?	.741				
Did you feel tense after colposcopy procedure?	.607				
Did you feel as though your body was invaded?	.549				
Did you feel in a helpless or vulnerable condition?	.749				
Domain 2: Beliefs/feelings and changes in perception of self					
How worried are you that cancer will appear in your body?			.934		
How worried are you that you would lose your chance to have a baby?					0.443
How worried are you that you might die?			.413		
Have you been worried that you may have cancer?			.893		
Domain 3: Worry about Human Papilloma Virus (HPV) infectivity		.853			
Have you been worried that you could give the HPV infection to a sexual partner?					
Have you been worried whether a sexual partner will think he can catch the HPV infection from you?		.895			
Domain 4: Effect on sexual relationship					
Have you been worried whether you should continue having sex?				.818	
Have you been worried whether having sex will make the problem worse?				.929	
Have you been worried whether others think you have had more sexual partners than you should?					0.678

Cumulative variance explained (five factors) = 72.1%, KMO = 0.573, Bartletts test: Chi-square = 420.927, p-value<0.000. Items communalities range from 0.424 to 0.888.

Table 2: Exploratory Factor Analysis of Malay version PEAPS-Q-14 (Final Model)

Questions	Factor 1	2	3	4
Domain 1: Experience of colposcopy procedure				
Did you find the colposcopy procedures uncomfortable?	.652			
Did you find the colposcopy undignified?	.718			
Did you feel tense after colposcopy procedure?	.698			
Did you feel as though your body was invaded?	.629			
Did you feel in a helpless or vulnerable condition?	.728			
Domain 2: Beliefs/feelings and changes in perception of self				
How worried are you that cancer will appear in your body?		.889		
How worried are you that you might die?		.618		
Have you been worried that you may have cancer?		.883		
Domain 3: Worry about Human Papilloma Virus (HPV) infectivity				
Have you been worried that you could give the HPV infection to a sexual partner?			.863	
Have you been worried whether a sexual partner will think he can catch the HPV infection from you?			.918	
Domain 4: Effect on sexual relationship				
Have you been worried whether you should continue having sex?				.843
Have you been worried whether having sex will make the problem worse?				.776
Have you been worried whether others think you have had more sexual partners than you should?				.657

Cumulative variance explained (four factors) = 67.8%, KMO = 0.561, Bartletts test: Chi-square = 404.640, p-value<0.000. Items communalities range from 0 .471 to 0.880.

Table 3: Reliability analysis PEAPS-Q-14 Malay version

Domain	Cronbach's Alpha			
	Full model (no of items = 14)		Final Model (no of items = 13)	
Domain 1 ***Experience of colposcopy procedure***	0.716	**0.724**	0.716	**0.701** [a]
Domain 2 ***Beliefs/feelings and changes in perception of self***	**0.666**		**0.752**[a]	
Domain 3 ***Worry about Human Papilloma Virus (HPV) infectivity***	0.917		0.917	
Domain 4 ***Effect on sexual relationship***	0.734		0.734	

[a]*without an item i.e Item 7*

Table 3 demonstrated that the Cronbach's alphas for overall Full model and Final Model were highly acceptable at 0.724 and 0.701 respectively. The initial analysis demonstrated that all factors in PEAPS-Q-14 were reliable with excellent individual factor internal consistency Cronbach's alpha of more than 0.7 except for Domain 2. An item under the Domain 2 which was Item 7 revealed corrected total item correlation of 0.183 which was less than 0.2. However, removal of this item has greatly improved the internal consistency of Domain 2. The findings in the reliability analysis further support the decision to remove Item 7 in the earlier exploratory factor analysis.

DISCUSSION

This study was specifically conducted to assess the reliability and factor analysis for the Malay version of PEAPS-Q-14 questionnaire among a specific target population which was women with an abnormal Pap smear results. A forward and backward translation process was initially performed by linguist to maintain the quality of the items followed by extensive revision and improvement of the content by a team of expert to fulfill the content validity of the instrument. Face validation was performed to assess the clarity of the questionnaire in order to improve understanding of respondents. The respondents generally understood the whole questionnaire except for a few items particularly related to medical terminologies. Thus, the term 'psychosocial' was changed to '*masalah emosi dan hubungan sosial*'. Subsequently, a few other medical terms were also changed into corresponding local words for better understanding. The results from exploratory factor analysis and reliability analyses indicated that Item 7 "*How worried are you that you would lose your chance to have a baby*" was identified as the most problematic item. Consequently, removal of this item resulted in improvement of the factors' extraction which fit into the four original factors and better Cronbach's alphas. The possible explanation for this observation is that Item 7 was irrelevant to more than half of the respondents who aged more than 45 years old. They were already menopoused and non-reproductive, who did not have to worry about the chance of getting a baby eventhough they have a cancer. Furthermore, a validation study done in American women reported similar problem. Their result of factor analysis showed that Item 7 presented with of a low communality and was omitted[2].

The current reliability results were compatible with findings of the original study[1]. The internal consistencies of Cronbach's alpha were 0.84, 0.84, 0.79 and 0.72 for each factor respectively. The four dimensions were good and acceptable to be used for women with abnormal Pap smears [1]. Another study which was conducted among American women with abnormal Pap smear results used PEAPS-Q-14 also reported excellent internal consistency (Cronbach's alpha=0.73–0.87) [2] . The findings supported the evidence that this questionnaire is a reliable instrument to assess distress parameters among women [2].

Factor analysis is a multivariate statistical analysis, which is used for examining the relationships within a domain of observed variables in measured items [18] and to identify latent constructs [19]. It establishes underlying dimensions between measured variables and provides construct validity evidence [12]. Factor analysis is a statistical cyclical process of continually refining and comparing solutions until the most meaningful solution is produced [20]. The advantage of reducing variables into smaller set in factor analysis is to save and facilitate easier interpretations [17,21,22]. As opposed to exploratory analysis which explore and identify latent constructs, confirmatory factor analysis test and specify on a priori specific model of factor structure [19]. Therefore, the problematic item (Item 7) will be revised and replaced followed by further confirmatory factor analysis. If the item still fail to produce good factor loading by confirmatory factor analysis, it will be removed from the instrument.

CONCLUSION

The present PEAPQ-S-14 had gone through the process of forward and backward translation, content validity, face validity and revision in Malay language. The PEAPS-Q-14 in Malay version was found to be valid and reliable to assess psychosocial burden in women with abnormal Pap smear results based on satisfactory exploratory factor analysis results and internal consistency. Therefore, it could be used to evaluate psychological effect of women with abnormal pap smear after further confirmatory factor analysis.

ACKNOWLEDGEMENT

We would like to thank the Ministry of Education Malaysia under RAGS grant (grant number RR101) for funding this study as well as the National Medical Research Register (NMRR-14-938-21672) and Universiti Sultan Zainal Abidin for the approval to conduct this study. A special thanks to Anna Bennette (the original author of PEAPS-Q-14) for giving the permission to use the questionnaire. A heartfelt appreciation for all staff from Obstetric and Gynecology clinic staff at HTAA, HSNZ, HRPZ II for their cooperation and collaboration.

REFERENCES

1 Bennett, A., Irwig, L., Oldenburg, B., Simpson, J.M., Mock, P., Boyes, A.,

Adams, K., Weisberg, E., Shelley, J. PEAPS-Q Questionnaire to measure the psychosocial effects of having an abnormal Pap Smear. *J Clin Epidemiol* 1995; **10**(48):1235-1243

2 Shinn, E., Basen-Engquist, K., Tao Le, Hansis-Diarte, A., Bostic, De'S., Martinez-Cross, J., Santos, A., Follen, M. Distress after an abnormal Pap Smear result: scale development and psychometric validation. *Preventive Medicine* 2004; **39**: 404-412

3 Valdini, A., Esielionis, P. Measurement of colposcopy-associated distress using the psychosocial effects of having an abnormal pap smear-questionnaire in a Latina population. *Journal of Lower Genital Tract Disease* 2004; **8** (1): 25-32

4 Phonrat, B., Ruengkris, T., Naksrisook, S., Intalapaporn, K., Jirakorbchaipong, P., Pitisuttithum, P. Psychosocial burden of women with abnormal Pap smears. *Southeast Asian J Trop Med Public Health* 2009; **40** (3): 593-601

5 Jayathunge, M. PH., Bowanwatanuwong, C., Maek-a-nantawat, W., Phonrat, B., and Pitisuttithum, P. Pscychosocial burden of abnormal Pap Smears among HIV-infected women at Chon Buri Hospital,Thailand. *Southeast Asian J Trop Med Public Health* 2010;**1:224**-234

6 Zainal Ariffin, O., & Nor Saleha, I.T. National Cancer Registry Report 2007, Ministry of Health, Malaysia. 2011

7 Drolet, M., Brisson, M., Maunsell, E., Eduardo L. F., Coutlee, F., Ferenczy, Alex., Fisher, William., Mansi, J. A. The psychosocial impact of an abnormal cervical smear result. *Psycho Oncology* 2012; **21** (10): 1071-1081

8 Tomás-Aragonés, L., Castillo-Amores, A.B., Rodríguez-Cerdeira, C., Marrón-Moya, S.E. Psychosocial aspects associated with the acquisition and development HPV infection and its repercussion on quality of life. *The Open Derma Journa* 2009; **3**:**133**-136

9 Baze, C., Monk, B.J., Herzog, T.J. The impact of cervical cancer on quality of life: A personal account. *Gynecologic Oncology* 2008; **109:12**-14

10 Hunt, L.M., De Voogd, K.B., Soucy, M.D., Longworth, J.C. Exploring Loss to Follow up: Abnormal Pap Screening in Hispanic Patients. *Cancer Pract* 2002; **3 :122**-129.

11 Costello, A.B., Osborne, J.W. Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. *Practical Assessment Research & Evaluation* 2005; **10** (7)

12 Williams, B., Brown, T., Onsman, A. Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine* 2010; **8** (3)

13 Awang, Z. Research methodology and data analysis. (2nd ed.). Malaysia: Visual Print Sdn Bhd, 2012

14 Gliem, J.A., Gliem, R.R. Calculating, interpreting and reporting Cronbach's alpha reliability coefficient for likert-types scale. Presented at Midwest research to practice conference in adult, continuing and community education, The Ohio State University, Columbus, OH. 2003; October 8-10

15 Panayides, P. Research reports: Coefficient Alpha, Interpret with caution. *Europe's Journal of Psychology* 2013;**9** (4): 687-696

16 Abeysena, C., Jayawardana, P., Peiris, U. Factor structure and reliability of the 12-item Sinhala version of General Health Questionnaire. *International journal of collaborative on Internal Medicine & Public Health* 2012; **4** (8)

17 Yong, A. G., Pearce, S. A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology* 2013; **9**(2): 79-94

18 Beavers, A.S., Lounsbury, J.W., Richards, J.K., Huck, S.W., Skolits, G.J., Esquivel, S.L. Practical considerations for using exploratory factor analysis in educational research, *Practical Assessment, Research & Evaluation* 2013; **18** (6): 1-13

19 Fabrigar, L.R., Wegener, D.T., MacCallum, R.C., Strahan, E.J. Evaluating the use of exploratory factor analysis in psychological research. *Psychological methods* 1999; **4**(3): 272-299

20 Plucker, J.A. Exploratory and confirmatory factor analysis in gifted education: examples with self-concept data. *Journal for the education of the gifted* 2003; **27** (1): 20-35

21 Reise, S.P., Waller, N.G., Comrey, A.L. Factor analysis and scale revision. *Psychological assessment* 2000; **12** (3): 287-297

22 Costello, A.B., Osborne, J.W. Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical assessment, research & evaluation* 2005; **10** (7): 1-9