

## Reliability and Validity of Adapted KCAASS Using Exploratory Factor Analysis

<sup>1</sup>Padma A. Rahman, <sup>2</sup>Siti Balkis Budin, <sup>2</sup>Sazlina Kamaralzaman,

<sup>3</sup>Matthew Yau Kwain-Sang and <sup>2</sup>Ismarulyusda Ishak

<sup>1</sup>Faculty of Health Sciences, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia

<sup>2</sup>Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kampung, Bangi, Malaysia

<sup>3</sup>School of Public Health, Tropical Medicine and Rehabilitation Sciences,  
James Cook University, Queensland, Australia

---

**Abstract:** This study reports the result of reliability and validity of adapted version of Knowledge, Comfort, Approach and Attitudes towards Sexuality Scale (KCAASS) among Malaysian health care professionals. Face and content validity was first obtained by involving 10 professionals in the pilot study. A total of 544 respondents from three government hospitals within Klang valley, Malaysia consist of medical doctors, occupational therapists, physiotherapist and nurses participated in this study. Exploratory factor analysis concludes that only four factors need to be extracted from the instrument. Forty two out of forty four items were exceed the threshold 0.40 of factor loading for indicating a practically significant and valid. The communalities value for these items range from 0.316-0.843 (above 0.30) indicating the acceptable share variance among the items. In conclusion, the instrument was valid and reliable, especially the comfort, knowledge and attitude grouped items. Further improvements, particularly on the approach grouped items are needed in order for this instrument to be used effectively in health care settings.

**Key words:** Reliability, validity, exploratory factor analysis, instrument, approach

---

### INTRODUCTION

Malaysia is a multi-ethnic and multicultural nation that consists three major ethnic groups; Malay, Chinese and Indian. In a conservative country like Malaysia, sexual issues were seldom discussed and still considered as taboo. Various literature from other countries highlighted that rehabilitation professionals have been blamed for avoiding issues of sexuality in rehabilitation (Milligan and Neufeldt, 2001). Among the reasons for such neglect are ranging from being ignorance, avoidance and leaving such matters to family members and/or other professionals, inadequate knowledge and training in dealing with such issues and worrying about their professional and personal image (Neufeld *et al.*, 2002). Other than that, personal beliefs, embarrassment and fear of offending the patient are also identified as barriers in initiating sexual problems discussion with patients (Stein *et al.*, 2013).

Earlier findings by Low *et al.* (2002) in local context indicated that overall general practitioner's attitudes towards sexual problems encountered by their patients are positive. However, their survey with 381 Gps also found

that religiosity was significantly related to sexual attitudes. This survey incorporated revised version of Sex Knowledge and Attitude Test (SKAT-II) and deal with five areas of sexuality which includes sexual activity outside marriage; sexual activity within marriage; sexual activity before marriage; sexual variance; and autoerotism. With limited understanding and information regarding health care providers on their knowledge, attitudes and comfort level toward sexuality of their patients in Malaysia, there is an urgent need to explore further in this area by using the reliable and valid instrument. Early understanding on this issue will be able to inform educational efforts designed to improve health care services.

The KCAASS has specifically designed to measure staff training needs in the area of sexuality rehabilitation following spinal cord injury (Kendall *et al.*, 2003). KCAASS has also been adapted to be used in other settings such as amputation patients (Verschuren *et al.*, 2013) and general physical rehabilitation which includes stroke, traumatic brain injury, cerebral palsy, spinal cord injury, spina bifida, multiple sclerosis, neuromuscular diseases, chronic pain syndrome and lower limb amputation patients (Gianotten *et al.*, 2006).

---

**Corresponding Author:** Padma A. Rahman, Department of Occupational Theory, Faculty of Health Sciences, UiTM Kampus Puncak Alam, 42300 Bandar Puncak Alam, Kuala Selangor, Selangor Darul Ehsan, Malaysia

This study aims to explore the acceptable subscales of adapted KCAASS instruments into meaningful distinct factors based on Malaysian healthcare professionals. Following that, the authors hope to identify the level of comfort, knowledge, attitude and approach of these professionals towards sexuality of their patients.

## MATERIALS AND METHODS

**Respondents and settings:** Respondents in this survey were the medical doctors, nurses, occupational therapists and physiotherapists in Malaysia. These professionals were recruited from General Hospital of Kuala Lumpur, Sungai Buloh Hospital and Universiti Kebangsaan Malaysia Medical Center. Questionnaires were distributed in rehabilitation units, department of orthopedics and traumatology, department of neurology, department of occupational therapy and department of physiotherapy. There were no exclusion criteria based on gender, age, experience or qualifications. Information sheet was given together with the questionnaires and respondents were informed they were free to withdraw at any time.

**Instrument:** The questionnaires consist of two different parts; part one required respondents to fill up their demographic characteristics that consist of age, gender, religion, marital status, professional qualifications and working experiences. Part two incorporated adapted version of KCAASS. The original KCAASS is an instrument developed by Kendall *et al.* (2003). This tool demonstrated a high level of internal consistency across the four conceptual domains of knowledge, attitudes, comfort and approach. This instrument intends to measure the knowledge and attitudes about sexuality as well as the professionals comfort with and approach toward sexual issues in their patients with spinal cord injuries (Kendall *et al.*, 2003).

With the written permission from the original researchers this instrument was adapted by changing six of the statements in the questionnaire consisting the word "spinal cord injuries" to "physical disability". This is done as the author will be using the adapted version of KCAASS in the next part of the study which focusing on patients with physical disabilities. No changes were made on the scoring of the questionnaire.

The knowledge scale measures current level of knowledge related to 14 topics on a scale from 1-4 (1: no knowledge and 4: excellent knowledge, maximum score is 56). The comfort scale measures level of comfort when dealing with 21 different sexual scenarios on a scale from 1-4 (1: nil discomfort and 4: high discomfort, maximum score is 80). The approach scale measures feelings

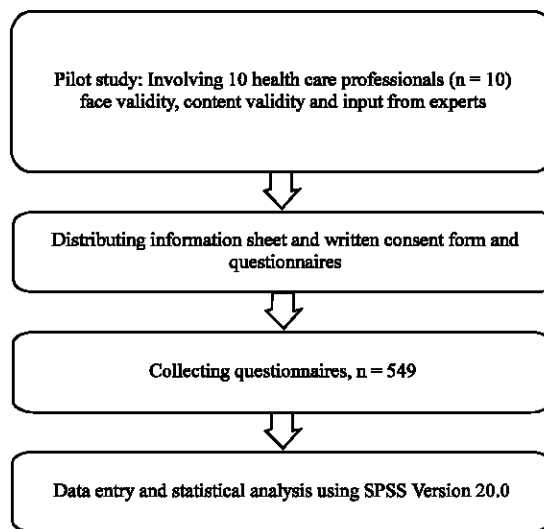


Fig. 1: Study flow chart

regarding five sexuality-related scenarios that health care professionals might be confronted when dealing with patients on a scale from 1-4 (1: nil discomfort and 4: high discomfort, maximum score is 20). The attitude scale measures agreement on five statements about disabilities and sexuality on a scale from 1-4 (disagree strongly and 4 agree strongly, maximum score is 20). The subscales in comfort, approach and attitude are reversed coded before being summed up (Fronek *et al.*, 2005). Higher scores in KCAASS represent better knowledge and better skills.

**Procedure:** The study procedures are shown in Fig. 1. Ten health care professionals consisting gynecologist, medical doctors, nurses, occupational therapist and physiotherapist examined the face and content validity of the adapted instrument. The purpose of this process is to detect any ambiguous statements or wording in the questionnaires.

The questionnaire was then distributed to interdisciplinary staffs of selected departments and wards in three hospitals over a 1 month period. This time frame was necessary to reach staff on all shifts. The researcher spends 4 months to distribute and collect the questionnaires to ensure higher return rates. The researchers approached health care professionals and inform, gain consent and distribute questionnaire to consenting respondents. The completed questionnaires were returned by respondents in a sealed envelope. Strict confidentiality in the collection and handling of questionnaires was maintained at all times.

**Ethical approval:** Permission from the original author to adapt the original KCAASS were gained through email in

June 2013. Ethical approval was obtained from the ethics committee of the National University of Malaysia and followed by National Medical Research Register, Malaysia (reference number: NMRR-12-546-11385) to gain access into selected government hospitals.

**Data analysis:** A total of 549 of health care professionals returned the questionnaires. Data were examined for the presence of univariate and multivariate outliers (Tabachnick and Fidell, 2007) which might attenuate the results. The former was analyzed through standardized scores ( $|z| = 4.00$ ) and the latter through Mahalanobis Distance ( $p < 0.001$ ) and Studentized Deleted Residual ( $> \pm 4.00$ ). It was found that 5 outliers were identified and were discarded from analysis ( $n = 544$ ).

## RESULTS AND DISCUSSION

**Face validity:** All respondents ( $n = 10$ ) participated in the pilot study agreed that the statements in adapted KCASS was easy to be understood and appropriate.

**Content validity:** All panel in the pilot study also agreed that the statements used in the questionnaires cover the aspects of knowledge, comfort, approach and attitudes within sexuality issues.

**Respondent characteristics:** The questionnaires were received from 48 medical doctors, 278 nurses, 109 occupational therapist and 109 physiotherapists respectively. The respondents were female in majority consists of 438 respondents (80.5%) compare to male respondents which are 106 respondents (19.5%). About 65.3% of the respondents were from 21-30 years old category, 25.9% between 31-40 years old, 7.2% from 41-50 years old and 1.7% of the respondents were <50 years old. The majority of the respondents were Muslim (81.8%), followed by Buddhist (7.0%) and Christian (4.8%). From the total of 544 respondents, 21 respondents were Hindu where the remaining of 4 respondents were categories as others. In terms of marital status, the majority of the respondents were married (57.7%) and 41.7% of the respondents were single. The remaining 0.6% or 3 respondents were divorced status.

In terms of the working experience with physically disabled patients, the majority of the respondents in this study having experience 5 years and less (70.6%), followed by 18.4% of the respondents have experience 6-10 years with physically disabled patients. In spite of this fact, 9.9% of the respondents or 54 respondents were

Table 1: Respondents characteristics

Respondents profile	n	%
<b>Gender</b>		
Male	106	19.5
Female	438	80.5
<b>Occupation</b>		
Doctor	48	8.8
Nurse	278	51.1
Occupational therapist	109	20.0
Physiotherapist	109	20.0
<b>Age category (years old)</b>		
21-30	355	65.3
31-40	141	25.9
41-50	39	7.2
>50	9	1.7
<b>Religion</b>		
Muslim	455	83.6
Buddha	38	7.0
Hindu	21	3.9
Christian	26	4.8
Others	4	0.7
<b>Marital status</b>		
Single	227	41.7
Married	314	57.7
Divorced	3	0.6
<b>Working with physically disabled patients experience</b>		
5 years and less	384	70.6
6-10 years	100	18.4
11-20 years	54	9.9
21 years and more	6	1.1
<b>Qualification</b>		
Diploma	402	73.9
Degree	128	23.5
Master	10	1.8
PhD	4	0.7

having experience 11-20 years working with the disabled physical patient and the balance of 6 respondents in this study having 21 years and more working experience with the disabled physical patient. In terms of highest professional qualifications respondents have, the majority of the respondents are diploma holder (73.9%), followed by degree holder (23.5%) and only 10 respondents (1.8%) were found to have master qualifications. Four respondents or 0.7% earned PhD as their highest qualification.

**Multiple criteria for factors to be extracted:** The initial analysis was conducted to ensure the data suitable or not for EFA analysis for items in the KCAASS instrument. A KMO value index was 0.930 which is above the acceptable limit of 0.50. The individual KMO values were range 0.722-0.982 which is also above 0.50. Bartlett's test for sphericity for this analysis was sufficiently large ( $\chi^2 (946) = 18272.699, p < 0.001$ ) indicating that the correlation matrices contractor related factors items were not identity matrices. Since the initial analysis for these items was appropriate to conduct EFA analysis, Table 1 shows the results of the multiple criteria's for the number of factors need to extract. Referring to Table 2, it can conclude that, only four factors need to be extracted from

Table 2: Multiple criteria for factors to be extracted from KCAASS

Component number	Initial eigenvalue (Kaiser's criteria)	Parallel analysis simulation eigenvalue	Cumulative % (variance explained)	Decision
1	13.430	1.592	29.83	Accept
2	6.560	1.592	43.73	Accept
3	2.895	1.478	49.57	Accept
4	2.715	1.439	54.96	Accept
5	1.387	1.404	-	Reject
6	1.259	1.367	-	Reject
7	1.073	1.336	-	Reject

Table 3: Factor loading and communalities value for items KCAASS

Factors/Items	Factor loading	Communalities
"Partner asks "Will I hurt him/ her during sex?"	0.850	0.741
"Patient says "I want to have sex but my partner has lost interest what should I do?"	0.849	0.750
"Patient asks, "Will my partner still be turned on?"	0.835	0.750
Female patient asks, "Why am I so dry during sex?"	0.833	0.746
"Patient says, "How do I please my partner when I can't touch him/ her?"	0.823	0.722
"Female patient asks, "What will I do with my catheter during sex?"	0.822	0.654
"Male patient with tetraplegia asks, "Can I still have sex?"	0.821	0.671
"Male patient asks, "Will I ever able to have children?"	0.814	0.652
"Patient asks, "What if I have a bowel accident during sex?"	0.813	0.686
"Patient says "I can't feel anything anymore, so what's the point?"	0.810	0.719
"Male patient with tetraplegia says "I tried sex but I feel like a lump of meat"	0.791	0.716
"Patient says "None of my friends would ever go out with someone in a wheelchair"	0.777	0.609
Patient asks, "Do you think anyone will ever go out with me?"	0.775	0.632
"Male patient asks, "Will I ever be able to have an erection?"	0.732	0.581
"Patient asks for information about gay men and physical disability	0.705	0.536
"Patient asks, "When do I get to see the dirty movies?"	0.705	0.536
"A patient bursts into tears in the shower and says "I am not a man anymore."	0.704	0.472
"Female patient says "I like to be on top but my legs don't hold me?"	0.653	0.418
"Female patient asks, "Will I ever be able to have an orgasm again?"	0.607	0.351
"When you are changing a catheter, the patients get an erection	0.560	0.338
Dealing with people of another sexual preference different from your own	0.737	0.585
Male and female contraception	0.732	0.530
Fertility procedures	0.725	0.523
Changes in people's perception of their sexual identity following disability (self-esteem, body image and sexuality)	0.723	0.571
Teenage sexuality issues	0.720	0.523
Assistive devices and medications for achieving erections	0.712	0.534
Managing inappropriate behaviors	0.666	0.476
Professional issues in dealing with sexuality rehabilitation	0.649	0.520
Courtship and dating	0.633	0.386
Sexual positioning	0.632	0.428
Sexual anatomy and physiology	0.611	0.385
Care of bladder and bowel during sexual activity	0.606	0.387
Methods of sexuality counseling	0.468	0.353
"Patient says "Let's do it, I've got the double bed"	0.933	0.843
"Patient grabs your breasts or other private parts	0.909	0.790
"Patient asks you for a date	0.465	0.331
"You walk into a room and find a patient masturbating	0.443	0.337
"People with physical disability cannot be sexually aroused	0.850	0.784
"People with a physical disability are not sexually attractive to others	0.798	0.637
"People with physical disability shouldn't expect to have children	0.783	0.672
"People with physical disability would find it hard to get a partner	0.551	0.316

The EFA analysis was based on PAF extraction method with Oblique rotation method. Two items were removed due to the loading below 0.40. \*This items were reverse coding items. Comfort; eigenvalue = 13.832, variance explained = 30.99%, Cronbach's alpha = 0.966; Knowledge; eigenvalue = 6.405%, variance explained = 14.07%, Cronbach's alpha = 0.905; Attitude approach; eigenvalue = 2.861, % variance explained = 5.99%, Cronbach's alpha = 0.785, eigenvalue = 2.607%, % variance explained = 5.30%, Cronbach's alpha = 0.852

the KCAASS instrument. From the Kaiser's criteria, it should be seven factors need to extracted, however results of parallel analysis indicated that only four factors should be extracted due to the first four Kaiser's eigenvalue for the first four KCAASS measurement have exceeded the parallel analysis simulation eigenvalue. This is supported by the cumulative percentage of variance explained for the factors to be extracted were exceed 40.0% which is 54.96%, respectively. So, it confirms that, KCAASS measurement should have four factors under this measurement.

**Exploratory factor analysis (validity):** The EFA analyses were then rerun using the Principle Axis Factoring (PAF) extraction method combine with oblique rotation by constrained to the four factors solution. Factor loading <0.40 were suppressed in order to get the practically significant loading and the communalities value exceed 0.30 to get a practically significant loading also. The results of EFA for KCAASS measurement factors measurements are presented in Table 3.

After constrained to the four factors solution, the cumulative percentage variance extracted from these

measurements was 56.35%. The 42-42 items exceeded the threshold 0.40 of factor loading for indicating a practically significant and valid, whereas two items were removed from this analysis due to the factor loading <0.40. The communalities value for the items remains in this analysis also above 0.30 (Range: 0.316-0.843) indicating the acceptable share variance among the items. The Kaiser-Meyer-Okin (KMO) index for measure sampling statistics constrained analysis was 0.930 for this analyses and meet threshold value which is >0.50, to indicate that covariance matrix in the scale items was sufficient. The Bartlett test of sphericity was also highly statistical significance ( $\chi^2(861) = 18075.727, p < 0.001$ ) indicating the correlation matrix was not an identity matrix.

The four factors under KCAASS are named comfort, knowledge, approach and attitude. The internal consistency of the extracted variables was acceptable reliable. The Cronbach's alpha for attitude (0.852) was at the very good reliable of the set of grouped items, whereas for approach, it shows it has an acceptable reliable set of grouped items (0.785). In addition, comfort and knowledge were at the excellent reliable set of grouped items (0.966 and 0.905, respectively). KCAASS is a useful tool in identifying the range of knowledge, comfort and attitudinal need of health care providers (Kendall *et al.*, 2003). The aim of current study is to examine the validity of knowledge, comfort, approach and attitude items (14 knowledge, 21 comfort, 5 approach and 5 attitude) of adapted version of KCAASS among Malaysian healthcare professionals. Validity is defined as the extent to which an instrument measures what it is supposed to measure. EFA is commonly used by the researcher to develop, refine or evaluate an instrument. The purpose of running EFA in this study is to support initial work on face and content validity by the panel of experts. The KMO and Bartlett's test of sphericity are necessary measures to conclude the worthiness of factor analysis. Kaiser recommends KMO values <0.5 as acceptable. In this study, the KMO value is 0.930 which is considered to be superb (Hutcheson and Sofroniou, 1999). The Bartlett's test indicates the correlation matrix was not an identity matrix ( $p < 0.001$ ) thus rejecting the null hypothesis that there are some relationships between the variables we considered in the analysis. Seven factors need to be extracted based on the Kaiser criterion of factors that have eigenvalue of 1. Further analysis using parallel analysis eigenvalue confirm that only four factors namely knowledge, comfort, approach and attitude need to be in KCAASS.

The Kaiser criterion was used to select those factors that have eigenvalue of >1 as shown in Table 2. In order to determine the internal consistency of the domains, the analysis for Cronbach alpha was performed. George and Mallery (2003) suggested that Cronbach

alpha values of  $\geq 0.90$  are excellent and values of  $\geq 0.70$  are acceptable. The internal consistency of adapted KCAASS was acceptable to excellent with Cronbach alpha values ranging from 0.785-0.966 for all domains. Highest Cronbach alpha value is comfort domain with a value of 0.966. Using different statistical methods to evaluate, the revised KCAASS appears to be reliable and valid measures to be used in Malaysian settings.

## CONCLUSION

This study makes significant contribution to the validity of the KCASS instruments in Malaysian setting. In addition, this study also can give an information about KCASS instruments to other researcher if want to use this revised instrument for Malaysian setting. Replication of this factor analysis through further research is significant to customize the research framework. Funding acknowledgement. The Fundamental Research Grant Scheme (FRGS/1/2011/SKK/UKM/03/7) under the Ministry of Higher Education, Malaysia, supported this work.

## REFERENCES

- Fronek, P., S. Booth, M. Kendall, D. Miller and T. Geraghty, 2005. The effectiveness of a sexuality training program for the interdisciplinary spinal cord injury rehabilitation team. *Sexuality Disability*, 23: 51-63.
- George, D. and P. Mallery, 2003. *SPSS for Windows Step by Step: A Simple Guide and Reference*. 4th Edn., Allyn and Bacon, Boston, MA., USA, Pages: 231.
- Gianotten, W.L., J.L. Bender, M.W. Post and M. Hoing, 2006. Training in sexology for medical and paramedical professionals: A model for the rehabilitation setting. *Sexual Relat. Therapy*, 21: 303-317.
- Hutcheson, G.D. and N. Sofroniou, 1999. *The Multivariate Social Scientist: Introductory Statistic Using Generalized Linear Models*. Sage Publication, London, ISBN: 9780761952015, Pages: 276.
- Kendall, M., S. Booth, P. Fronek, D. Miller and T. Geraghty, 2003. The development of a scale to assess the training needs of professionals in providing sexuality rehabilitation following spinal cord injury. *Sexuality Disability*, 21: 49-64.
- Low, W.Y., E.M. Khoo and H.M. Tan, 2002. *Sexual Health Problems: Attitudes and Practices of Malaysia General Practitioners*. Adis International Ltd., Auckland, New Zealand.
- Milligan, M.S. and A.H. Neufeldt, 2001. The myth of asexuality: A survey of social and empirical evidence. *Sexuality Disability*, 19: 91-109.

- Neufeld, J.A., F. Klingbeil, D.N. Bryen, B. Silverman and A. Thomas, 2002. Adolescent sexuality and disability. *Phys. Med. Rehab. Clin. North Am.*, 13: 857-873.
- Stein, J., M. Hillinger, C. Clancy and L. Bishop, 2013. Sexuality after stroke: patient counseling preferences. *Disability Rehab.*, 35: 1842-1847.
- Tabachnick, B.G. and L.S. Fidell, 2007. *Using Multivariate Statistics*. Allyn and Bacon, Boston, MA.
- Verschuren, J.E., J.H. Geertzen, P. Enzlin, P.U. Dijkstra and R. Dekker *et al.*, 2013. Addressing sexuality as standard care in people with an upper limb deficiency: Taboo or necessary topic?. *Sexuality Disability*, 31: 167-177.