Psychometric properties of the Assessment of Positive Occupation 15 final version in individuals with mental disabilities

Purpose: To verify the reliability and validity of the Assessment of Positive Occupation 15 (APO-15) in individuals with mental disabilities living in communities or admitted in hospitals. **Methods:** A sample of 408 individuals with mental disabilities completed APO-15, the Japanese version of the Recovery Assessment Scale (RAS), the Japanese version of the Self-identified Stage of Recovery Part-B (SISR-B), and the General Health Questionnaire 12 (GHQ-12). We analyzed the psychometric properties of APO-15, including confirmatory factor analysis, entropy, polyserial correlation coefficient, average variance extracted, Cronbach's α coefficient, Pearson's product–moment correlation coefficient, item response theory, and cut-off point. **Results:** This study indicated the validity and reliability of APO-15 in a group of individuals with mental disabilities. The result of this study supported a four-factor model constructing of 15 items; includes a positive relationship, achievement, meaning, and engagement. Validity was supported by various results, i.e. the polyserial correlation and entropy were good, confirmatory factor analysis was a good estimate of the model fit, hypothesis testing was good convergent and discriminant validity, and concurrent validity also good. In addition, reliability was established by various analyses, i.e. the internal consistency reliability was good, and all items of APO-15 demonstrated satisfactory item response. The cut-off point became a 42-point sensitivity (0.770) and demonstrated good results with 1-specificity (0.441). That is, APO-15 can be used to appropriately measure the participation in occupation to promote the well-being of clients. **Conclusion:** APO-15 demonstrated good psychometric properties in measuring positive occupation in individuals with mental disabilities. APO-15 is an important tool to enable participation in activities that increase well-being in daily living.

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Abstract

Purpose: The purpose of this study is to verify the reliability and validity of the Assessment of Positive Occupation 15 (APO-15) in individuals with mental disabilities.

Methods: A sample of 408 individuals with mental disabilities is living in communities or admitted in hospitals. A sample was completed APO-15, the Japanese version of the Recovery Assessment Scale (RAS), the Japanese version of the Self-identified Stage of Recovery Part-B (SISR-B), and the General Health Questionnaire 12 (GHQ-12).

We analyzed the psychometric properties of APO-15, including confirmatory factor analysis (CFA), entropy, polyserial correlation coefficient, average variance extracted, Cronbach's α coefficient, Pearson's product–moment correlation coefficient, item response theory (IRT), and cut-off point.

Results: This study indicated the validity and reliability of APO-15 in a group of individuals with mental disabilities. The result of this study supported a four-factor model constructing of 15 items; includes a positive relationship, achievement, meaning, and engagement. Validity was supported by various results, i.e. the polyserial correlation and entropy were good, confirmatory factor analysis was a good estimate of the model fit, hypothesis testing was good convergent and discriminant validity, and concurrent validity also good. In addition, reliability was established by various analyses, i.e. the internal consistency reliability was good, and all items of APO-15 demonstrated satisfactory item response. The cut-off point became a 42-point sensitivity (0.770) and demonstrated good results with 1-specificity (0.441). That is, APO-15 can be used to appropriately measure the participation in occupation to promote the well-being of clients.

Conclusion: APO-15 demonstrated good psychometric properties in measuring positive occupation in individuals with mental disabilities. APO-15 is an important tool to enable participation in activities that increase well-being in daily living.

Authors:

Takuya Noguchi[1,2] and Makoto Kyougoku[3]

Affiliation:

1) Doctor Course, Graduate School of Health Sciences, Kibi International University, Okayama, Japan

2) Zikei Hospital, Okayama, Japan

3) Department of Occupational Therapy, School of Health Sciences, Kibi International University, Okayama, Japan

Corresponding author:

Takuya Noguchi

Address: 8, Iga-machi, Takahashi city, Okayama, Japan

Phone number: 090-1680-3121

E-mail address: n.takuya19780822@gmail.com.

Introduction

Psychosocial occupational therapy is a client-centered practice concerned with promoting the well-being of individuals through occupation (Giroux Bruce & Borg, 2002). Occupation is defined as a central of the human experience; it includes work, play, routine, and rest (Wilcock, 2006). Well-being is defined as the perceived state of harmony in all aspects of one's life (Low et al., 1998). Occupational well-being is defined as perceived state of satisfaction and pleasure from everyday experience (Charles & Townsend, 2013; Schultz, 2015). The core of occupational therapy is a belief about the engagement between occupation and well-being (Wilcock, 2006; Canadian Association of Occupational Therapists, 1997). Therefore, psychosocial occupational therapy need be able to assess occupation to promote well-being.

At present, the relevant assessments used include the Canadian Occupational Performance Measure (COPM), the Occupational Self-Assessment (OSA), the Classification and Assessment of Occupational Dysfunction (CAOD), the Model of Human Occupation Screening Tool (MOHOST), the Occupational Performance History Interview-II (OPHI-II), the interest checklist, the role checklist, the VIA Survey of Character Strengths test, the Intensity and Time Affect Survey (ITAS), the Brief Mood Introspection Scale (BMIS), and the Positive and Negative Affect Schedule (PANAS). These assessments mainly focus on the relationship between occupation and well-being. However, these assessments do not measure participation in occupation to promote well-being in psychosocial occupational therapy.

Therefore, we developed a measurement tool called the Assessment of Positive Occupation 15 (APO-15). The assessment properties of APO-15 were studied in 110 individuals with mental disabilities living in the community. The assessment properties of APO-15 were suggested on the basis of statistical evidence, such as exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and item response theory (IRT). Overall, the assessment properties of APO-15 were very good. Therefore, we believe that APO-15 can reveal participation in occupation to promote the well-being of individuals with mental health disabilities living in the community.

APO-15 was developed for the mentally ill individuals who lived in the community. (Noguchi et al., 2015)To date, no study regarding its use in hospitalized patients has been reported. Psychosocial occupational therapy supports individuals with mental disabilities living in the community and those admitted to hospitals.

Therefore, the purpose of this study was to verify the reliability and validity of APO-15 in the aforementioned individuals.

Methods

Ethics statement

The research protocol was approved by the Ethics Committee of Kibi International University (No. 14-32) and the Research Ethics Committee of Zikei Hospital (No. 103(27-2)). All participants provided both written and verbal informed consents prior to participation. Participation was voluntary, and participants had the right to withdraw from the research at any time without providing any reason. This study was conducted according to the Declaration of Helsinki.

Participants

Data were obtained from individuals with DSM-5-based diagnosis of mental disabilities in psychiatric hospitals and group homes. We examined age, gender, diagnosis, and sense of happiness. Happiness was scored on a five-point Likert scale, ranging from 1 (very happy) to 5 (not at all happy).

Measures

Recent years, increase in suicides that continue to increase year after year in mental health problems, has been warning the social issues, such as economic loss (Mental Health Action Plan 2013-2020, 2013). In addition, trends to promote the recovery of individuals with mental disabilities have been observed in the field of mental health (Mental Health Action Plan 2013-2020, 2013; Slade, 2009; Corrigan et al., 1999; Corrigan & Phelan, 2004). From these trends, we believe that the recovery of rehabilitation clients with mental disabilities in this study also needs to be investigated using recovery measures.

1. APO-15

We developed APO-15 for measuring well-being through meaningful occupation in individuals with mental disabilities. APO-15 measures positive occupation based on four factors: positive relationship (5 items), achievement (4 items), meaning (3 items), and engagement (3

items). Positive relationship is defined as derive happiness and satisfaction from human relationships. Achievement is defined as the attempt to complete a target in life. Meaning is defined as significance found in activities and life. Engagement is defined as the flow experienced and the process leading to it. APO-15 evaluates 15 items on a 4-point Likert scale (1 = disagree, 4 = agree). High total scores are related to a higher degree of well-being through meaningful occupation.

2. The Japanese version of the Recovery Assessment Scale (RAS)

We selected RAS, which is comprised of 24 items, to measure the perceptions of recovery in five factors: personal confidence and hope (9 items), willingness to ask for help (3 items), goals and success orientation (5 items), reliance on others (4 items), and no domination by the symptoms (3 items). RAS is evaluated using a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). A high RAS total score indicates a higher recovery level (Chiba et al., 2010).

3. The Japanese version of the Self-identified Stage of Recovery Part-B (SISR-B)

SISR measures the process of recovery based on four factors: hope (1 item), identity (1 item), meaning (1 item), and responsibility (1 item). SISR is assessed using a 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree). Higher total scores of SISR indicate a higher recovery level (Chiba et al., 2010).

4. The General Health Questionnaire-12 (GHQ-12)

We used GHQ-12, which is comprised of 12 items, to evaluate the experience of a participant with mental health disabilities in the past few weeks. GHQ-12 had two factors; it includes previous studies on depressive anxiety (6 items) and disability (6 items). Each item is assessed on a 4-point Likert scale from 1 (can have) to 4 (could not have at all). We used a standard 0-0-1-1 scoring system of the GHQ (0 = codes 1 and 2, 1 = codes 3 and 4) (Lesage et al., 2011).

Statistical Analysis

SPSS Statistics (http://www.spss.com) was used for the descriptive statistics, internal consistency reliability, and concurrent validity. HAD (http://norimune.net/had) was used for normality test. Exametrika (http://antlers.rd.dnc.ac.jp/~shojima/exmk/index.htm) was used for considering the validity of the items. Mplus 7.3 (http://www.statmodel.com) was used for CFA, hypothesis testing (convergence and discriminant validity), and IRT analysis.

1） Sample characteristics

The demographic data were summarized using descriptive statistics, and the normality test used was the Jarque–Bera test ($p < 0.05$).

2） Item validity

We assessed the item validity using polyserial correlation coefficients with critical values above 0.2 and entropy with critical values above 0.5.

3） Structural validity

The factor structure of APO-15 was determined by performing CFA using a weighted least squares estimation with mean and variance (WLSMV), with missing data. WLSMV is suitable for the analysis of categorical data. We used three indices to assess the model fits of CFA based on APO-15 factor structures. The first index was the root mean square error of approximation (RMSEA), with critical values of 0.08–0.10, indicating a mediocre fit, and those of <0.08 indicated a good fit. The second and third indices were the comparative fit index (CFI) and the Tucker–Lewis index (TLI), with critical values above 0.95.

4） Hypothesis testing (convergent and discriminant validity)

Hypothesis testing was evaluated using the square of the correlation between the factors and average variance extracted (AVE) based on the factor structure of APO-15 supported by CFA. Discriminant validity was assessed by the comparison of the squared correlation between each pair of constructs against the average of AVE. Convergent validity was assessed to investigate whether the square root of each AVE value belonging to each latent construct was >0.5.

5） Internal consistency reliability

Internal consistency reliability was evaluated using Cronbach's α coefficient.

6） Concurrent validity

Concurrent validity was determined using Spearman's nonparametric correlation to measure the association between each item of APO-15, sensation of happiness, RAS, and SISR-B.

7） Item response

Item response was assessed by performing graded IRT using maximum likelihood robust (MLR). The IRT estimated the item slope parameters and item difficulty parameters, total information curve (TIC), and the item response category characteristic curve (IRCCC) in APO-15. The critical values are 0.5 and 2.5 for item discrimination, and the absolute values are −4.0 and 4.0 for item difficulty. The IRT was employed to estimate Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

8） Cut-off point

Cut-off point for APO-15 was assessed against GHQ-12 as the gold standard by calculating the receiver operating characteristic (ROC) curves. ROC curve is a graph of sensitivity and 1-specificity. The area under the ROC curve of >0.70 was chosen as the critical value to identify good prediction.

Results

1） Sample Characteristics

Table 1 shows that there were a total of 408 participants (mean age was 52.4 ± 13.05 years): 273 (67%) were males and 135 (33%) were females. The participant details are presented in Table 1. The Kolmogorov–Smirnov test showed that not all scores had a normal distribution.

2） Item validity

Table 2 shows the values of the Jarque–Bera test, protpolyserial correlation coefficient, and entropy for each item of APO-15. Normal distribution was shown in item 14.

Protpolyserial correlation coefficients indicated values ranging from 0.550 to 0.747, and entropy indicated values ranging from 1.661 to 1.837.

3） Structural validity

Figure 1 shows the results of CFA. CFA of APO-15 was a good estimate of the model fit (RMSEA = 0.087; CFI = 0.946; TLI = 0.932).

4） Hypothesis testing (convergent and discriminant validity)

Table 3 shows the results of hypothesis testing. APO-15 demonstrated good convergent and discriminant validity.

5） Internal consistency reliability

Figure 1 shows the results related to internal consistency. The internal consistency of APO-15 (total score and all subscales) had a good and acceptable range between 0.741 and 0.893.

6） Concurrent validity

Table 4 shows the results related to concurrent validity. The concurrent validity was confirmed by the correlations between APO-15, sensation of happiness, RAS, SISR-B, and GHQ-12. APO-15 showed a negative correlation with participant's happiness for each factor score ($r = -0.128$ to -0.317, $p < 0.01$). APO-15 showed a positive correlation with RAS and SISR-B for each factor score ($r = 0.256$ to 0.660, $p < 0.01$). Moreover, APO-15 showed a negative correlation with the 2-factor score of GHQ-12 ($r = -0.206$ to -0.476, $p < 0.01$).

7） Item response

Table 5 and Figures 2-3 show the results of item slope parameters (α) and item difficulty parameters (β). Overall, items on APO-15 demonstrated satisfactory item response, with item slopes ranging from 0.769 to 1.300. The item difficulty parameter range from APO-15 demonstrated satisfactory item response in providing the appropriate discrimination and difficulty indices.

8） Cut-off point

Figure 4 shows the cut-off point of APO-15. The cut-off point became a 42-point sensitivity (0.770) and demonstrated generally good results with 1-specificity (0.441).

Discussion

Psychometric properties of APO-15

We validated the APO-15 self-administered measure for evaluating individuals with mental disabilities living in communities and those admitted to hospitals. To the best of our knowledge, this is the first study on the development of the assessment of occupation participation to promote well-being. Overall, APO-15 had a good model fit. The structural validity of APO-15 was assessed by CFA; it indicated a good model fit (Figure 1). For each item score of polyserial correlation coefficient and entropy of APO-15, the reference value was confirmed as being higher (Table 2). The hypothesis testing of this study demonstrated a good value for convergent and discriminant validity of APO-15 (Table 3). However, positive relation may need to be re-examined in the future because we obtained a rather small value. As assessed by Cronbach's α coefficient, internal consistency was acceptable (Figure 1).

A modest negative correlation among APO-15, happiness, and GHQ-12 was observed. In particular, the disability of GHQ-12 showed moderate correlation (Table 4). This indicates that it is consistent with the purpose of measuring occupation participation to promote well-being with APO-15. In addition, APO-15 had strong correlations with RAS and SISR-B. The results of this study indicate that the degree of occupation participation to promote well-being, measured by APO-15, is affected by the recovery of individuals with mental disabilities. This suggests that APO-15, RAS, and SISR-B represent subjective experience. IRT was used to assess the individual item characteristics of APO-15 (Table 5). APO-15 had modest item slope parameters in the range of 0.602–1.300. The difficulty parameter scores for APO-15 were very wide, ranging from −3.352 to 1.813. Moreover, these results indicate that the TIF of APO-15 was sufficient (Figures 2 and 3). Sufficient amount of information for APO-15 has been obtained. These results clearly demonstrate strong support for good item response in APO-15. In addition, APO-15 item design was based on a 4-point Likert scale. As mentioned above, there is now enough evidence to show that APO-15 has high validity and reliability. From this viewpoint, APO-15 Likert scale design is correct. The cut-off point of APO-15 became a 42-point sensitivity (0.770) and 1-specificity (0.441) with generally good results (Figure 4). Consequently,

it can provide useful information for therapists in the selection of clients to be supported through APO-15.

Clinical application of APO-15

With regard to clinical application, we can use APO-15 in psychosocial occupational therapy practice. APO-15 is its focus on the level of participation in the occupation to promote well-being. It is conceivable that the condition and changes in a patient's occupation-related well-being can be assessed during psychosocial occupational therapy process using APO-15. This assessment may be helpful in distinguishing between positive and negative occupation of individuals with mental disabilities and may serve as a means of promoting the outcomes of psychosocial occupational therapy.

Limitations

This study design has several limitations. First, we did not perform test–retest reliability to reduce the burden on participants. Second, the survey was conducted at only 20 hospitals and group homes. Despite these limitations, APO-15 as a measure for estimating occupation participation to promote well-being of the client is a valid and reliable tool. The validity and reliability of APO-15 in occupational therapy clients other than those with mental disabilities need to be verified.

Conclusion

Overall, the study findings suggest that APO-15 is a valid and reliable measure for evaluating clients with mental disabilities. APO-15 demonstrates valid psychological characteristics to measure the occupation participation that promotes well-being and can be utilized for effective occupational therapy.

Human Ethics

The following information was supplied relating to ethical approvals (i.e., approving body and any reference numbers):
This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of the Kibi International University (No. 14-32). In addition, we gained approval by the facility directors of the institutions that cooperated in this study. We explained to participants that they could freely decide whether to participate in the study and could refuse to

answer the questionnaire during this study. We completely protected the privacy of personal information. Furthermore, we obtained written informed consent from all participants.

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Figure 1(on next page)

Fig. 1 Structural validity and internal consistency reliability of APO.

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APO-15 Items α = 0.893	Estimate	S.E.	Est./S.E.	Two-Tail
Latent variables				
Factor 1; Positive relationship α = 0.741				
Item 4	0.731	0.032	22.533	0.000
Item 6	0.666	0.037	17.977	0.000
Item 10	0.568	0.039	14.734	0.000
Item 11	0.702	0.030	23.322	0.000
Item 14	0.664	0.033	20.127	0.000
Factor 2; Achievement α = 0.797				
Item 1	0.749	0.031	24.131	0.000
Item 2	0.753	0.027	27.787	0.000
Item 3	0.775	0.026	30.359	0.000
Item 5	0.809	0.025	32.634	0.000
Factor 3; Meaning α = 0.782				
Item 8	0.756	0.029	26.017	0.000
Item 9	0.856	0.021	40.386	0.000
Item 15	0.783	0.025	31.581	0.000
Factor 4; Engagement α = 0.787				
Item 7	0.825	0.028	29.652	0.000
Item 12	0.839	0.025	33.446	0.000
Item 13	0.735	0.028	26.153	0.000
Factor correlation				
Factor 2				
Factor 1	0.384	0.032	11.851	0.000
Factor 3				
Factor 1	0.422	0.033	12.903	0.000
Factor 2	0.436	0.032	13.601	0.000
Factor 4				
Factor 1	0.436	0.035	12.349	0.000
Factor 2	0.420	0.032	12.963	0.000
Factor 3	0.393	0.035	11.086	0.000
Model fit information				
RMSEA	0.087 [90% CI = 0.077–0.096]			
CFI	0.946			
TLI	0.932			

Note: CI = Confidence Interval, Factor 1 = Achievement, Factor 2 = Meaning, Factor 3 = Positive relationship, Factor 4 = Engagement, α = Cronbach's α coefficient

Figure 2(on next page)

Fig. 2 Test information function (TIF) of APO-15.

Fig. 2 Test information function (TIF) of APO-15.

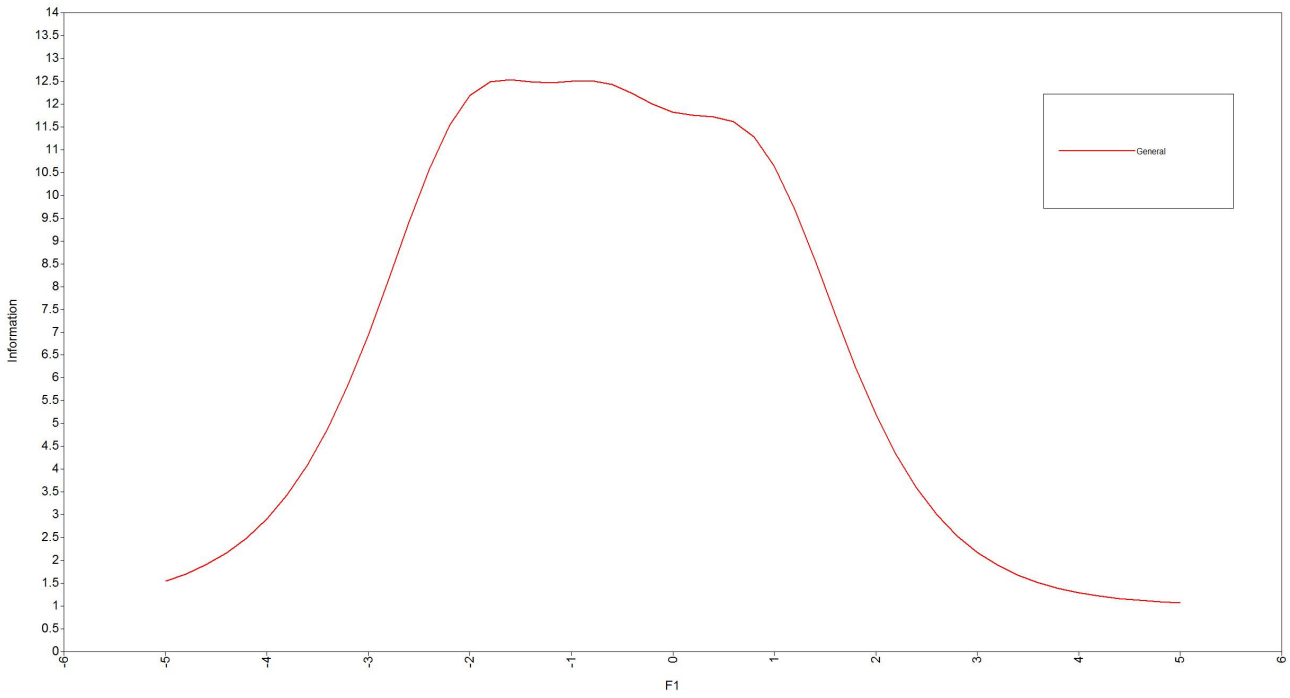

Figure 3(on next page)

Fig.3 Item response category characteristic curve of APO.

Fig 3. Item response category characteristic curve of APO.

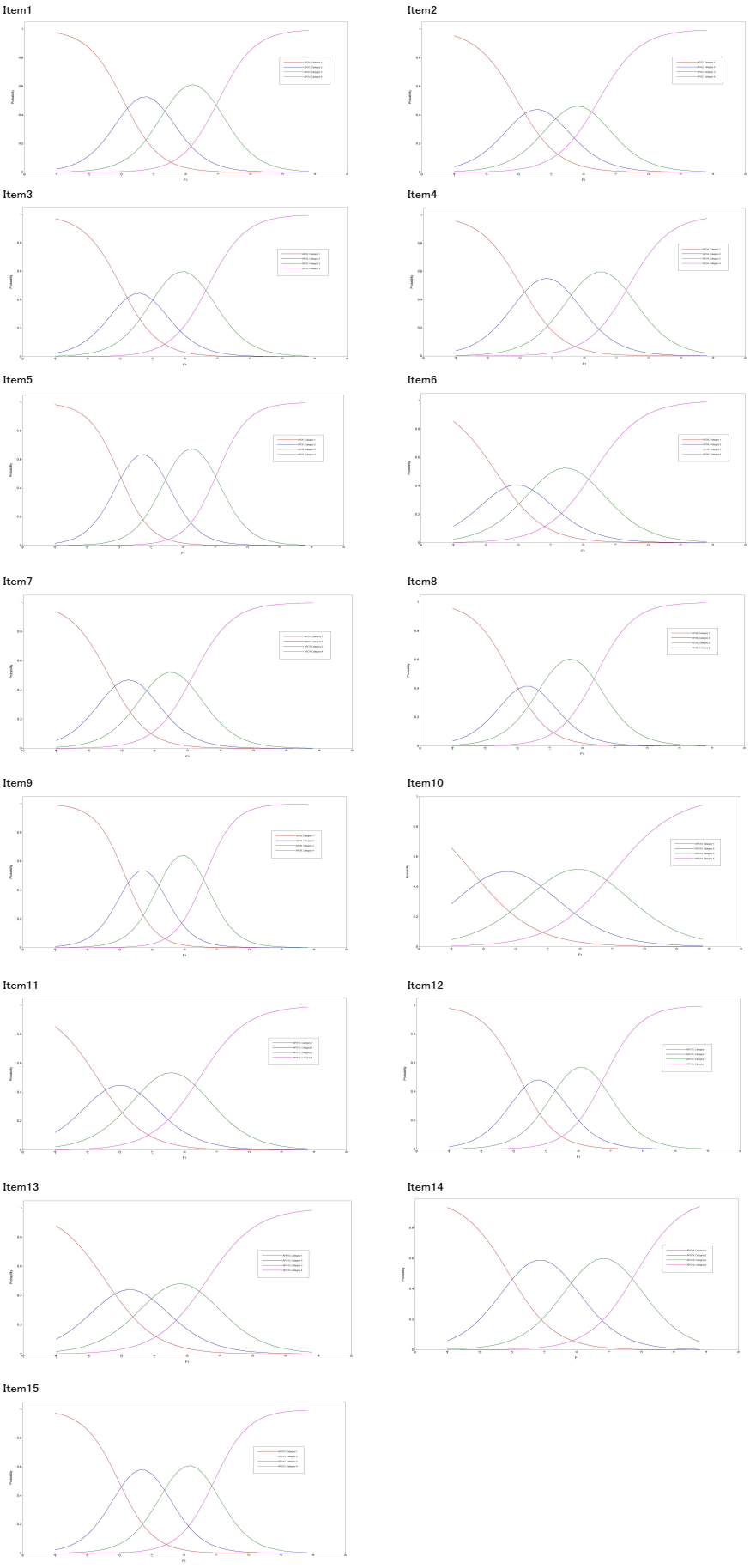

Figure 4(on next page)

Fig. 4 Cut-off point of APO-15.

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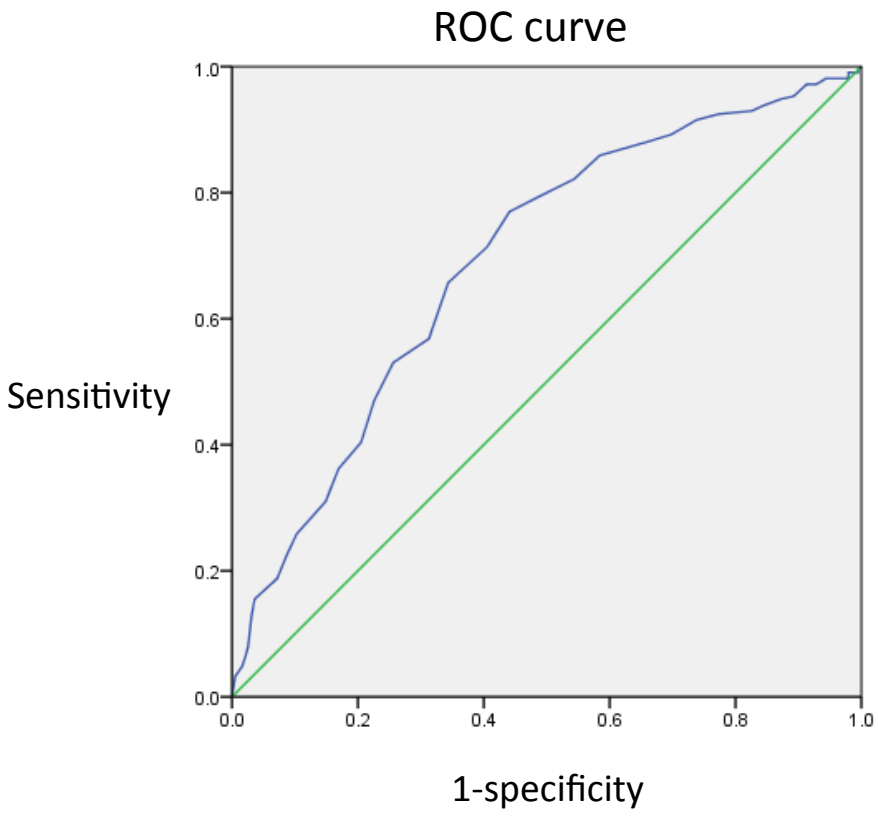

Table 1(on next page)

Table 1. Participant Characteristics.

Table 1. Participant Characteristics (n = 408).

	Characteristics	Mean (SD)	%
Age		52.4 (13.05)	
Gender	Male		273(66.1%)
	Female		135(33.1%)
Living environment	Hospital		132(32.4%)
	Community		276(67.6%)
Diagnosis	Schizophrenia		302(74%)
	Mood disorder		53(13%)
	Alcoholism		9(2.2%)
	Adjustment disorder		12(2.9%)
	Others		32(7.8%)
Sensation of happiness	Very good		37(9.1%)
	Good		97(23.8%)
	Average		150(36.8%)
	Fair		85(20.8%)
	Poor		38(9.3%)
	Unknown		1(0.2%)

Note: SD = Standard Deviation

Table 2(on next page)

Table 2. APO-15 item analysis.

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	15 items of APO	Mean	SD	JB			Entropy	PCC
				S	K	P-value		
Item 1	I am motivated to fulfill hope	2.809	0.880	−0.357	−0.555	.001	1.804	0.658
Item 2	I have a target that I want to achieve, there is a purpose	3.002	0.960	−0.591	−0.681	.000	1.829	0.660
Item 3	I am now making efforts to achieve the goal	2.956	0.891	−0.583	−0.354	.000	1.778	0.710
Item 4	I can work in collaboration through discussion with around people.	2.676	0.858	−0.195	−0.582	.016	1.791	0.713
Item 5	I can direct toward achieving the goal rather than immediate profit.	2.809	0.828	−0.283	−0.464	.011	1.739	0.721
Item 6	I feel that I am supported by the surrounding people	3.181	0.851	−0.861	0.106	.000	1.662	0.579
Item 7	I can tackle it by concentrating on my favorite activities	3.213	0.865	−0.884	−0.007	.000	1.661	0.703
Item 8	I am living my life to the fullest.	3.130	0.848	−0.809	0.111	.000	1.675	0.713
Item 9	I live on the basis of my beliefs	2.960	0.892	−0.540	−0.447	.000	1.787	0.744
Item10	When I encounter people who are in trouble, I want to help them immediately	2.980	0.832	−0.452	−0.417	.000	1.720	0.550
Item11	I feel fulfilled by helping each other and people around me	3.135	0.844	−0.753	−0.047	.000	1.679	0.676
Item12	I can do concentrate on my activity	2.870	0.922	−0.457	−0.614	.000	1.837	0.747
Item13	I can concentrate on my hobby	3.020	0.908	−0.606	−0.488	.000	1.784	0.624
Item14	I always consider the good side of things	2.566	0.824	−0.054	−0.524	.088	1.748	0.653
Item15	I have chosen my own way to live life proactively	2.841	0.868	−0.320	−0.597	.001	1.790	0.683

Note: SD = Standard Deviation, JB = Jarque–Bera test, S = Skewness, K = Kurtosis, PCC = Polyserial Correlation Coefficient

Table 3(on next page)

Table 3. Hypothesis Testing of APO-15.

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APO-15	AVE	SCC			
		Factor1	Factor2	Factor3	Factor4
Factor 1	0.446	1.000			
Factor 2	0.595	0.491	1.000		
Factor 3	0.638	0.583	0.591	1.000	
Factor 4	0.641	0.521	0.462	0.396	1.000

Note: AVE = Average Variance Extracted; SCC = squared correlation coefficient; Factor 1 = Positive relationship; Factor 2 = Achievement; Factor 3 = Meaning; Factor 4 = Engagement;

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Table 4(on next page)

Table 4. Concurrent validity of APO-15.

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APO-15 Factor		**RAS**					**SISR-B**				**GHQ-12**	
	Happiness	PC	Goal	Support	RO	SM	Hope	Identity	Meaning	Responsibility	AD	Disability
Factor 1	−.273**	.559**	.500**	.524**	.601**	.377**	.436**	.387**	.467**	.486**	−.226**	−.429**
Factor 2	−.317**	.576**	.660**	.380**	.388**	.308**	.581**	.480**	.507**	.509**	−.206**	−.476**
Factor 3	−.276**	.627**	.592**	.407**	.371**	.361**	.518**	.485**	.557**	.558**	−.245**	−.429**
Factor 4	−.128*	.479**	.444**	.448**	.366**	.256**	.389**	.349**	.414**	.327**	−.224**	−.388**
Factor Score Total	−.314**	.693**	.679**	.543**	.545**	.406**	.594**	.525**	.600**	.585**	−.273**	−.532**

Note: Factor 1 = Positive relationship, Factor 2 = Achievement, Factor 3 = Meaning, Factor 4 = Engagement, PC = Personal confidence, RO = Reliance on others, SM = Symptom management, AD = Anxiety·Depression

Table 5(on next page)

Table 5. Item Response on APO-15.

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Items of APO-15	α	β1	β2	β3
Factor1				
Item 4	0.920	−1.975	−0.385	1.383
Item 6	0.795	−2.695	−1.413	0.318
Item 10	0.602	−3.352	−1.198	1.036
Item 11	0.803	−2.700	−1.287	0.458
Item 14	0.824	−2.094	−0.163	1.813
Factor 2				
Item 1	1.042	−1.932	−0.603	1.004
Item 2	0.914	−2.050	−0.835	0.451
Item 3	1.021	−1.983	−0.876	0.716
Item 5	1.221	−1.991	−0.542	1.043
Factor 3				
Item 8	1.022	−2.212	−1.186	0.428
Item 9	1.300	−1.841	−0.751	1.588
Item 15	1.094	−2.027	−0.598	0.921
Factor 4				
Item 7	0.999	−2.401	−1.200	0.164
Item 12	1.055	−1.827	−0.651	0.795
Item 13	0.769	−2.482	−1.030	0.579
Information criteria				
AIC	12999.479			
BIC	13240.155			

Note:. α = Item slope parameters; β = Difficulty parameters; AIC = Akaike's Information Criterion; BIC = Bayesian information criterion; Factor 1 = Positive relationship; Factor 2 = Achievement; Factor 3 = Meaning; Factor 4 = Engagement;