

# Validation of the Arabic Version of the PANSS scale among Lebanese schizophrenic patients

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## Summary

### Objectives

To use the Arabic version of the PANSS in Lebanese schizophrenic patients, to check its validity and reproducibility compared to other versions of the questionnaire and to assess risk factors affecting the total PANSS score.

### Methods

This case-control study, performed between April and August 2016, included 400 patients (200 patients, 200 controls).

### Results

The PANSS scale items converged over a solution of three factors, explaining a total of 64.81% of the variance. A high Cronbach's alpha was found for the full scale (0.961), the positive symptoms (0.877), negative symptoms (0.933) and general psychopathology (0.926). A stepwise linear regression, using the total PANSS score as continuous variable, showed that low socioeconomic level and male gender would significantly increase the total PANSS score (Beta = 13.139, CI 7.570-18.708,  $p < 0.001$  and Beta = -8.614, CI -13.884 – -3.345  $p = 0.001$ ).

### Conclusions

This study shows that the Arabic version of the PANSS has promising psychometric properties, and thus it is a good tool to use for the diagnosis of patients with schizophrenia. Based on this study, health care professionals and researchers can readily use the PANSS questionnaire to estimate the overall severity of schizophrenia among psychiatric patients in Lebanon.

### Key words

Schizophrenia • PANSS scale • Validation • Reliability

## Introduction

Schizophrenia is a multidimensional psychiatric diagnosis which has been observed in all cultures and socioeconomic groups throughout the world. It can profoundly affect the ability to lead a satisfying social and family life, causes serious occupational disability and acquires extensive health care costs <sup>1</sup>. Schizophrenia affects around 0.3-0.7% of people at some point in their life <sup>2</sup>. In a review of the epidemiology of schizophrenia and related disorders in the Arab world, the prevalence ranged between 0.7% and 5.6% <sup>3</sup>. The World Health Organization report on mental health system in Lebanon in 2010 showed a prevalence of around 47% <sup>4</sup>.

Decades ago, research on schizophrenia showed that this disorder consists of at least two separate symptom clusters: positive and negative symptoms and syndromes <sup>5 6</sup>. As a result, a variety of assessment scales were developed to identify these syndromes <sup>7-9</sup>.

In 1987, Kay and colleagues developed the Positive and Negative Syndrome scale (PANSS) <sup>10</sup> that is a widely used and valid instrument for the

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assessment of severity of schizophrenia symptoms<sup>10-12</sup>. The PANSS is currently one of the most widely used symptom measure in schizophrenia research; data are typically presented in the original three-dimensional form. It helps clinicians and researchers assess treatment outcomes by providing a psychopathology profile and by comparing the changes in PANSS scores throughout treatment<sup>13-15</sup>. The PANSS can also assist clinicians in providing personalized treatment for patients<sup>16</sup>.

It has been translated into many languages and validated in different populations, however the Arabic version was never validated in Lebanon. Thus, the objectives of the current study were to use the Arabic version of the PANSS in Lebanese schizophrenic patients, to check its validity and reproducibility compared to other versions of the questionnaire and to assess risk factors affecting the total PANSS score.

## Methods

### Study design

This case-control study was performed between April and August 2016 in the Psychiatric Hospital of the Cross (PHC), the biggest psychiatric hospital in Lebanon. This study included 400 patients, 200 schizophrenic patients recruited from the PHC and 200 controls subjects chosen randomly from the general population. The purpose and procedures of the study were explained to all participants, and a written informed consent was signed and obtained from each participant. No payment was made for participation. The patient had the right to accept or refuse to participate in the study.

### Ethical aspect

The Psychiatric Hospital of the Cross Ethics and Research Committee, in compliance with the Hospital's Regulatory Research Protocol, waived the need for an approval based on the facts that it was an observational study that respected participants' autonomy and confidentiality and induced minimal harm to them.

### Procedures and assessments measurement

The questionnaire used during the interviewed was in Arabic, the native language of Lebanon. It included two parts, the first one concerning the socio-demographic characteristics (age, gender, age of the first episode, number of episodes, family history of mental disorder) and another one that included the Positive and Negative Syndrome Scale (PANSS) questions. The PANSS was translated from English to Arabic through an initial translation and back translation process. The English version was translated into Arabic by a mental health specialist, then this translation was translated again into English by another specialist. Upon completion of this

process, the translators compared the English versions of PANSS to determine whether the variables had the same meaning. One trained person was responsible for the data collection, via a personal interview with each patient. This person was independent of this study. A pilot test was conducted on 15 patients to check if the questions were well understood. To note that these 15 answers were not entered in the final database.

### PANSS scale

The PANSS is a 30 item questionnaire, originally organized into separate scales for positive symptoms (seven items), negative symptoms (seven items) and general psychopathology (16 items) as designed by Kay and al.<sup>10</sup> to assess severity of psychopathology in adult patients with schizophrenia and other psychotic disorders. All individual items are scored with values from 1 to 7, with 1 reflecting absence of symptoms and 7 reflecting extremely severe symptoms.

The 30 items are arranged as follow:

- positive symptom subscale items (P1-P7) includes: delusions, conceptual disorganization, hallucinatory behavior, excitement, grandiosity, suspicious/persecution, and hostility;
- negative symptom subscale items (N1-N7) includes: blunted affect, emotional withdrawal, poor rapport, passive/apathetic social withdrawal, difficulty in abstract thinking, stereotyped thinking, and lack of spontaneity and flow of conversation;
- general psychopathology symptom items (G1-G16) includes: somatic concern, lack of judgment and insight, guilt feelings, tension, mannerisms and posturing, depression, motor retardation, uncooperativeness, unusual thought content, disorientation, poor attention, anxiety, disturbance of volition, poor impulse control, preoccupation, active social avoidance<sup>10</sup>.

The scores for these scales are calculated by summation of ratings across component items. Therefore, the potential ranges are 7 to 49 for the Positive and Negative Scales, and 16 to 112 for the General Psychopathology Scale. In addition to these measures, a Composite Scale is scored by subtracting the negative score from the positive score. This yields a bipolar index that ranges from -42 to +42, which is essentially a difference score reflecting the degree of predominance of one syndrome in relation to the other<sup>10</sup>.

### Statistical analyses

Data analysis was conducted using SPSS software version 23. The independent-sample t-test was used when comparing two groups. When two variables were correlated we used the paired sample t-test. For categorical variables, the chi-2 were used when applicable. A p-value less than 0.05 was considered as significant.

To confirm the PANSS questionnaire construct validity in the Lebanese population, a factor analysis was launched for the positive, negative and general psychopathology symptoms of the questionnaire respectively, using the principal component analysis technique, with a promax rotation since the extracted factors were found to be significantly correlated. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were ensured to be adequate. The retained number of factors corresponded to Eigenvalues higher than one. Moreover, Cronbach's alpha was recorded for reliability analysis for the total score and for subscale factors.

## Results

### Sociodemographic and socioeconomic characteristics of the participants

Details regarding sociodemographic and socioeconomic characteristics of the participants are shown in Table I. Overall 400 participants were enrolled (200 cases and 200 controls). The mean age of schizophrenic patients was  $43 \pm 13$  years compared to  $27 \pm 10$  years for the controls. Most of the participants were female in each group (70.5% in control group, 55.5% in cases group). The majority of cases were single (70.0%), having an intermediate and below level of education

**TABLE I.** Sociodemographic and socioeconomic characteristics of the participants.

		Patients with schizophrenia	Healthy control	
		Frequency (%)	Frequency (%)	p-value
Gender	Male	89 (44.5%)	59 (29.5%)	0.002
	Female	111 (55.5%)	141 (70.5%)	
Geographic region	Beirut	28 (14.0%)	20 (10.0%)	< 0.001
	Mont-Lebanon	71 (35.5%)	130 (65.0%)	
	North	52 (26.0%)	25 (12.5%)	
	South	26 (13.0%)	11 (5.5%)	
	Beqaa	19 (9.5%)	11 (5.5%)	
	Nabatieh	2 (1.0%)	3 (1.5%)	
	Foreign	2 (1.0%)	0 (0.0%)	
Marital status	Single	140 (70.0%)	166 (83.0%)	< 0.001
	Married	35 (17.5%)	33 (16.5%)	
	Divorced	23 (11.5%)	1 (0.5%)	
	Widowed	2 (1.0%)	0 (0.0%)	
Education level	Illiterate	8 (4.0%)	0 (0.0%)	< 0.001
	Primary	59 (29.5%)	0 (0.0%)	
	Complementary	62 (31.0%)	1 (0.5%)	
	Secondary	37 (18.5%)	3 (1.5%)	
	University	34 (17.0%)	195 (98.0%)	
Socioeconomic level*	Low	134 (67.0%)	132 (66.0%)	< 0.001
	Medium	61 (30.5%)	44 (22.0%)	
	High	5 (2.5%)	24 (12.0%)	
History of medical illness	Yes	110 (55.0%)	18 (9.0%)	< 0.001
	No	90 (45.0%)	182 (91.0%)	
Family history of psychiatric illness	Yes	86 (43.0%)	15 (7.5%)	< 0.001
	No	114 (57.0%)	185 (92.5%)	
		<b>Mean <math>\pm</math> SD</b>	<b>Mean <math>\pm</math> SD</b>	
Age		43 $\pm$ 13	27 $\pm$ 10	< 0.001

**TABLE II.** Mean scores on the different scales.

	Patients with schizophrenia	Healthy control	p-value
	Mean ± SD	Mean ± SD	
Positive symptoms	17.00 ± 7.43	4.42 ± 5.29	< 0.001
Negative symptoms	19.07 ± 7.54	4.29 ± 6.15	< 0.001
General psychopathology	35.07 ± 10.12	11.65 ± 13.92	< 0.001
Total PANSS score	71.13 ± 18.99	20.35 ± 23.75	< 0.001

(64.5%), and a low socioeconomic level (67%). On the other hand, 83% of the control group were single, 98% had a high level of education and 66% had low socioeconomic level. Almost all the control group didn't have a history of medical illness and family history of mental disorders (91% and 92.5% respectively), while 45% of cases didn't have a history of medical illness and 57% of them didn't have a family history of mental disorders. A significant difference was found between the two groups for all the sociodemographic and socioeconomic characteristics ( $p < 0.05$ ).

#### Mean scores on the different scales

Table II displays the PANSS scores between patients and control group. The results showed that PANSS score was significantly higher for patients with schizophrenia when compared to controls ( $71.13 \pm 18.99$  vs  $20.35 \pm 23.75$ ,  $p < 0.001$ ). It was also significantly higher on the three subscales of PANSS ( $p < 0.001$ ).

#### Correlation factor

Table III displays the correlation factors between each item of the PANSS scale and the whole scale. The correlation factors ranged from 0.27 to 0.806 for an individual item. In addition, the three subscales had a high correlation with the total PANSS score. For the positive symptom  $r = 0.864$ , for the negative symptoms  $r = 0.907$ , for the General psychopathology  $r = 0.968$ . To note that all factors were highly significantly correlated with the whole scale with  $p < 0.001$  for all of them.

#### Factor analysis

Out of all the items of PANSS scale, all variables could be extracted from the list, with no items that over-correlated to each other ( $r > 0.9$ ), having a low loading on factors ( $< 0.3$ ) or because of a low communality ( $< 0.3$ ). The factor analysis for the PANSS scale was run over the sample of healthy individuals and schizophrenic patients (Total  $n = 400$ ). The PANSS scale items converged over a solution of three factors that had an Eigenvalue over 1, explaining a total of 64.81% of the variance. A Kaiser-Meyer-Olkin measure of sampling adequacy of 0.951 was found, with a significant Bart-

lett's test of sphericity ( $p < 0.001$ ). According to the promax rotated matrix the three components could be summarized as follows: factor 1 included 15 items, factor 2 incorporated 8 items, while factor 3, seven items were retained (Table IV). Moreover, a high Cronbach's alpha was found for the full scale (0.961). The internal consistency for the subscales score was also high; Cronbach's alphas for the positive symptoms, negative symptoms and general psychopathology were 0.877, 0.933 and 0.926 respectively.

#### Validity measures

The ROC curves of PANSS scale, comparing schizophrenic patients with control individuals were shown in Figure 1. The optimal score that was a cutoff between healthy controls and patients with schizophrenia was 35.50 according to the ROC curve analysis. The sensitivity and specificity were good at this cutoff (99.5% and 81.5%, respectively). The area under the curve was high: 0.937 [0.910-0.964];  $p < 0.001$ .

#### Multivariate analysis

A stepwise linear regression, using the total PANSS score as a continuous variable, showed that low socioeconomic level would significantly increase the total PANSS score by 13.1 points (Beta = 13.139, CI 7.570-18.708,  $p < 0.001$ ). Male gender was significantly more associated with increasing the total PANSS score level by 8.6 points (Beta = -8.614, CI -13.884--3.345  $p = 0.001$ ) (Table V).

## Discussion

#### Validation of the scale

In the current study, we were able to validate the Arabic version of the PANSS scale, intended specifically for use among the Lebanese population. Results provided initial evidence supporting the reliability and validity of the scale as a screening instrument for Lebanese schizophrenics. The three factors identified in the PANSS scale demonstrated good psychometric properties, with excellent internal consistency for the scale. Thus, it can be used in the Lebanese population.

**TABLE III.** Correlation for each item and the subscales with the whole scale.

	Total PANSS	
	Correlation	p-value
P1 Delusions	0.769	< 0.001
P2 Conceptual disorganization	0.788	< 0.001
P3 Hallucinatory behavior	0.692	< 0.001
P4 Excitement	0.270	< 0.001
P5 Grandiosity	0.554	< 0.001
P6 Suspiciousness persecution	0.783	< 0.001
P7 Hostility	0.678	< 0.001
N1 Blunted affect	0.766	< 0.001
N2 Emotional withdrawal	0.793	< 0.001
N3 Poor rapport	0.789	< 0.001
N4 Passive apathetic social withdrawal	0.794	< 0.001
N5 Difficulty in abstract thinking	0.761	< 0.001
N6 Lack of spontaneity and flow of conversation	0.793	< 0.001
N7 Stereotyped thinking	0.675	< 0.001
G1 Somatic concerns psychopathology	0.510	< 0.001
G2 Anxiety	0.539	< 0.001
G3 Guilt feelings	0.475	< 0.001
G4 Tension	0.463	< 0.001
G5 Mannerisms and posturing	0.729	< 0.001
G6 Depression	0.635	< 0.001
G7 Motor retardation	0.749	< 0.001
G8 Uncooperativeness	0.746	< 0.001
G9 Unusual thought content	0.797	< 0.001
G10 Disorientation	0.728	< 0.001
G11 Poor attention psychopathology	0.723	< 0.001
G12 Lack of judgment and insight	0.806	< 0.001
G13 Disturbance of volition psychopathology	0.788	< 0.001
G14 Poor impulse control	0.690	< 0.001
G15 Preoccupation	0.539	< 0.001
G16 Active social avoidance	0.757	< 0.001
Positive symptoms	0.864	< 0.001
Negative symptoms	0.907	< 0.001
General psychopathology	0.968	< 0.001

**TABLE IV.** Promax rotated matrix of PANSS score\*

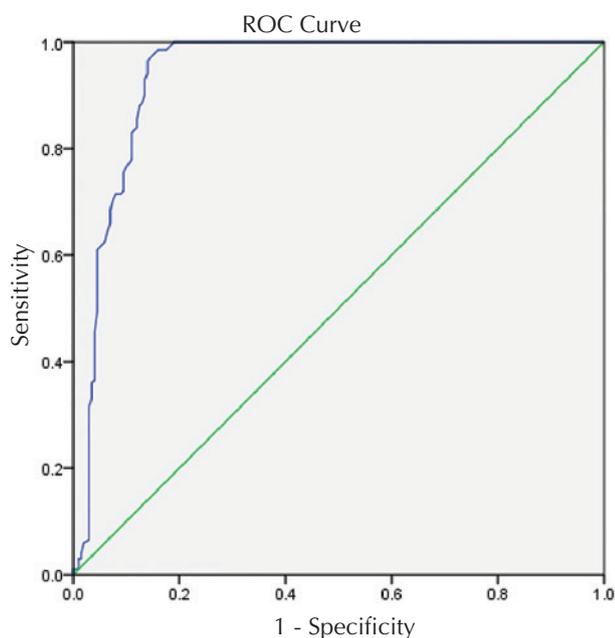
	Items	Loading factors
<b>Factor 1</b>		
Blunted affect	N1	0.802
Emotional withdrawal	N2	0.890
Poor rapport	N3	0.935
Passive apathetic social withdrawal	N4	0.950
Difficulty in abstract thinking	N5	0.800
Lack of spontaneity and flow of conversation	N6	0.812
Stereotyped thinking	N7	0.674
Mannerisms and posturing	G5	0.731
Motor retardation	G7	0.637
Uncooperativeness	G8	0.508
Disorientation	G10	0.874
Poor attention psychopathology	G11	0.717
Lack of judgment and insight	G12	0.651
Disturbance of volition psychopathology	G13	0.804
Active social avoidance	G16	0.544
<b>Factor 2</b>		
Delusions	P1	0.942
Conceptual disorganization	P2	0.733
Hallucinatory behavior	P3	0.787
Grandiosity	P5	0.866
Suspiciousness persecution	P6	0.704
Hostility	P7	0.458
Unusual thought content	G9	0.847
Poor impulse control	G14	0.500
<b>Factor 3</b>		
Excitement	P4	0.562
Somatic concerns psychopathology	G1	0.712
Anxiety	G2	0.841
Guilt feelings	G3	0.768
Tension	G4	0.848
Depression	G6	0.509
Preoccupation	G15	0.566

\* Cronbach's alpha: For positive symptoms = 0.877; For negative symptoms = 0.933; For general psychopathology = 0.926; Total PANSS = 0.961.

### Reliability

The internal consistency as showed by Cronbach alphas were higher than the original scale <sup>10</sup> and that

of Qatar <sup>3</sup> and Brazil <sup>17</sup>. Another way to verify the reproducibility of the questionnaire was to use correlation coefficients, as the one proposed by Kirshner and



**FIGURE 1.** ROC curve of PANSS scale. Schizophrenic patients and healthy control were analyzed. Area under the curve = 0.937 [0.910-0.964] ( $p < 0.001$ ); at value = 35.50, Se = 99.5% and Sp = 81.5%.

Guyatt<sup>18</sup>. The correlation coefficients showed a high correlation between each item of the PANSS questionnaire and the disease. Moreover, all the items correlated well with the composite score supporting the good internal reliability of this version of the scale similar to the findings by Kay et al.<sup>10</sup>.

### Validity

The construct validity of the Arabic version of the PANSS was addressed by calculating the sensitivity and specificity of the scale. Our scale properties are also better than those of other researchers: we obtained in a case finding situation a sensitivity of 99.5% and a specificity of 81.5%, and an Area Under the Curve (AUC) of 0.937. These excellent results may be due to the fact that we compared individuals with schizophrenia versus others with no psychiatric disease.

In the first factor structure study of the PANSS, Kay & Sevy<sup>19</sup> found four factors (negative, positive, excited, and depressive) in an American population. Most recent studies found five to seven factors<sup>20-22</sup>. Our model accounted for almost 65% of the variance, higher than most of the conducted studies<sup>23-25</sup>. The factor analysis in our study converged over 3 factors versus 4 factors in the original version<sup>10</sup> and 5 factors in the Brazilian version<sup>23</sup>.

### Factors affecting the total PANSS score

Gender differences have been widely observed in the clinical presentation, psychosocial functioning and course of illness in people with first-episode and chronic schizophrenia<sup>26 27</sup>. Gender effects have been reported quite consistently in schizophrenia, with male patients having an earlier age of onset, poorer functional outcome, greater negative symptoms and cognitive impairment, and less severe positive symptoms<sup>28</sup>. Male gender was correlated with a higher total PANSS score. Our results consolidate the previous findings that also found that schizophrenic men show more negative symptoms such as social withdrawal, blunted affect, poverty of speech and anhedonia<sup>29 30</sup>. Previous research has consistently indicated that female patients have a later age of onset, fewer negative symptoms, better premorbid social functioning, less extensive cognitive impairment, and a better overall functional outcome than male patients<sup>28</sup>.

The relationship between socio-economic status and schizophrenia has been the subject of much research as well. Parental education and low familial socio-economic status may also be risk factors for poor outcome in schizophrenia<sup>31</sup>. As schizophrenia occurs more commonly in children of parents with less education, such as in immigrant and/or urban families<sup>32 33</sup>, it is also possible that patients with schizophrenia grow up in low socio-economic status environments only to end up even lower. Our results were in agreement with these previous findings.

### Limitations

The present study has few limitations. First, this preliminary study recruited a relatively small sample of Lebanese schizophrenics, but the sample size is compa-

**TABLE V.** Linear regression with the total PANSS score as the dependent variable in schizophrenic patients only.

	Unstandardized beta	Standardized beta	p-value	95% CI	
Low socio-economic level	13.139	0.326	< 0.001	7.570	18.708
Gender	-8.614	-0.226	0.001	-13.884	-3.345

Variables entered in the linear regression: age, gender, family history of mental disorders, history of medical illness, geographic region, marital status, education level, and socioeconomic level.

rable to previous pilot studies done in the original and the other translated versions. Further larger studies are needed to confirm our findings. Our study recruited patients from one hospital only and thus might cause a selection bias.

## Conclusions

This study shows that the Arabic version of the PANSS has promising psychometric properties, and thus it is a good tool to use for measuring symptom severity in pa-

tients with schizophrenia. Based on this study, health care professionals and researchers can readily use the PANSS questionnaire among psychiatric patients in Lebanon. It is recommended to be used as a routine screening test to identify schizophrenia in all Arabic-speaking populations, including the Gulf and most North African countries, and in all Arab immigrants around the world.

## Conflict of interest

None to declare.

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