Relationship of Neurocognitive Function with Psychological Well-Being and Activities of Daily Living among Patients Diagnosed with Schizophrenia in Jordan

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Research Article

ABSTRACT

Background: It remains unclear how the neurocognitive impairments associated with schizophrenia may influence the psychological well-being and activities of daily living among patients with schizophrenia.

Aims: The purpose of this study was to explore the relationship of neurocognitive function with psychological well-being and activities of daily living among patients diagnosed with schizophrenia in Jordan.

Method: Correlational design was utilized to recruit 140 patients with schizophrenia from governmental outpatient. A structured interview was utilized to collect data on patients' socio-demographic characteristics, neurocognitive function, psychological well-being, and activities of daily living.

Results: The majority of participants (88.6%) had neurocognitive function impairments, high level of psychological well-being, and ability to perform activities of daily living independently. Neurocognitive function correlated positively with participants' psychological well-being but not with their ability to perform activities of daily living independently. Psychological well-being was significantly related to participants' neurocognitive functioning (p < 0.05).

Conclusion: The study has implications for mental health providers and policymakers could use this study results to improve the treatment plans related to the activity of daily living and psychological well-being.

INTRODUCTION

The neurocognitive function is considered a significant component to examine the impact of schizophrenia on activities of daily living and psychological well-being [1]. Dysfunction in attention, perception, memory, and executive function are observed among patients with schizophrenia, however; vary in intensity [2]. Major dimensions of neurocognitive dysfunction among patients with schizophrenia include speed of processing, verbal learning, attention, working memory, visual learning, reasoning, social cognition, and problem-solving [2,3]. According to Gopalakrishnan and colleagues [4], neurocognitive dysfunction is often associated with below average well-being, and may also affect the psychological and physical health of patients diagnosed with schizophrenia. A study conducted on patients with schizophrenia found that

patients are suffering low self-concept, a lower sense of growth and openness to new experiences, and a lower capacity to manage complications in the environment and feel uncomfortable with self-control [5].

A longitudinal study found that cognitive dysfunction was associated with significant reduction in functional domains, including activities of daily living among patients with schizophrenia [2]. Patients with schizophrenia are often capable of initiating the appropriate behavioral sequences but incapable of maintaining them and/or switching appropriately between actions [6]. This appears as a difficulty to keep attention on the proper sequence of actions rather than a disability to initiate it. Although neurocognitive function seems important to mental health professional and researchers, yet, the topic has not been addressed adequately in the literature. In particular, the association between neurocognitive functions, psychological well-being and activities of daily living among patients with schizophrenia had little attention. Understanding factors, which can impact physical functioning and psychological well-being, may have an important clinical relation in improving outcomes for patients with schizophrenia.

The neurocognitive function is assessed among patients with schizophrenia, however; its impact on their physical and psychological health is not delineated [7]. Most of the patients with schizophrenia are indeed unable to undertake responsibilities such as maintain interpersonal relationships, finding a job, or living independently. Thus, negative effects on patients' ability to perform activities of daily living and psychological well-being is expected [8,9]. The purpose of the study is to examine the relationship of neurocognitive function with psychological well-being and activities of daily living among patients diagnosed with schizophrenia in Jordan.

The specific aims were

- To describe the neurocognitive function, psychological well-being, and activities of daily living among patients diagnosed with schizophrenia in Jordan.
- To examine the relationship of neurocognitive function with psychological well-being, and activities of daily living among patients diagnosed with schizophrenia in Jordan.
- To identify the differences in neurocognitive function, psychological well-being, and activities of daily living related to demographic factors among patients diagnosed with schizophrenia in Jordan.

METHOD

Design

A correlational, cross-sectional design was used. Data were collected using a structured interview with patients diagnosed with schizophrenia in Jordan.

Sample and settings

A convenience sampling technique was used to recruit the participants from health institutions representing the main governmental mental health care sector in Jordan. The governmental sector was represented by the National Center for Mental Health which is the largest psychiatric hospital in Jordan that provides treatment for acute and chronic psychiatric disorders with a capacity of 265 beds and from outpatient psychiatric clinics in Al-Bashir governmental hospital. Inclusion criteria were 1) participants aged 18 years or above, 2) Diagnosed with schizophrenia confirmed by psychiatrists' diagnosis in the medical records. Exclusion criteria were 1) Presence of serious psychotic symptoms or physical or neurological illnesses. Psychiatric medical information confirmed by mental health professionals (attending psychiatrist) and from participants' medical record to verify the information. In this study, we reach 140 participants.

Instruments

The survey introduced in the Arabic language. The interview questions were translated into the Arabic language according to World Health Organization translation guidelines for [10] which includes forward translation: One translator (a health professional) familiar with the terminology of the area covered by the instrument and with interview skills was given this task. The translator is knowledgeable of the English-speaking culture but his/her mother tongue is the primary language of the target culture. Instructions were given to the translator to emphasize conceptual rather than literal translation and to use natural and acceptable language for the target population. Expert panel: A bilingual (in English and Arabic for translation) and the expert panel were convened by a designated editor-in-chief. The goal of this step is to identify and resolve the inadequate expressions/concepts of the translation as well as any discrepancies between the forward translation and the existing or comparable previous versions of the questions. Back translation: Using the same approach as that outlined in the first step using the instrument then translated back to English by an independent translator whose mother tongue is English and who has no knowledge of the questionnaire. The emphasis in the back-translation was on conceptual and cultural equivalence and not linguistic equivalence [10]. The measures were:

- The Addenbrooke's Cognitive Examination Revised (ACER) rating scale: Arabic version [11], was used to measure neurocognitive function. ACER is a brief cognitive test that incorporates five sub-domains scores, each one representing one cognitive domain, namely attention/orientation (18 points), memory (26 points), fluency (14 points), language (26 points) and visuospatial (16 points). The total score is 100 composed by the addition of all domains; higher scores indicate better cognitive functioning. This scale has good internal consistency with Cronbach's alpha of 0.80. The cutoff Test score 88 has 94% sensitivity and 89% specificity in which patients who score>88 consider has no dysfunction and who score<88 has dysfunction.

- Flourishing Scale [12]: Arabic version (available from original authors) was used to measure psychological well-being. The Flourishing Scale is a brief 8-item summary measure of the respondent's self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism. The scale provides a single psychological well-being score and can be used to provide useful feedback on how to improve one's life and provides useful stimulus for self-reflection. Each item was answered on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Sample items include: "I am competent and capable in the activities that are important to me" and "I lead a purposeful and meaningful life". Scores are summed across all items to yield a total FS score. Diener et al.'s [12] validation of the measure was described above (e.g., positive relationships with other well-being measures). They reported a coefficient 0.87 and a test-retest correlation over 1 month of 0.71.

- The Lawton IADL Scale [13] was used to measure Activity of daily living. The Lawton IADL Scale is consists of 8 items (Using the telephone, Shopping, Preparing food, Housekeeping, Doing laundry, Using transportation, Handling medications, Handling finances). Aim to assess independent living skills. Responses to each of the eight items in the scale are coded as 0 (unable or partially able) or 1 (able), and then the responses were summed. The summary score ranges from 0 (low function, dependent) to 8 (high function, independent). The Lawton IADL Scale has good internal consistency with Inter-item consistency Cronbach's alpha 0.85.

- In addition, an author-developed profile was used to obtain demographic and personal information identified by the reviewed literature than probably related (which included data on gender, education, marital status, employment status, monthly household income and age of duration of diagnosis).

Reliability

Minor statistical analysis was applied to test the reliability and validity of the translated tools. In this study, Cronbach's alpha reliability coefficients were calculated and showed at least 0.80 for all scales and subscales in the questionnaires. Validity was maintained through the approaches of translation where the translation and back-translation complied with the cultural appropriateness as well as language and grammar issues.

Data collection procedure

Prior to data collection, ethical approval was obtained from the scientific research committee at the School of Nursing, the University of Jordan and the targeted health agency. Data were collected; using a structured interview format from participants diagnosed with schizophrenia, who visited outpatient's clinics and receiving mental health care at psychiatric hospitals. A facilitator assigned to invited patients to participate. Those who express interest in participation were approached by the principal researcher who explained the purpose of the study, its significance and assuring the participants that the study will be anonymous and that they have the right to accept or refuse participation in the study without any direct or indirect influence on their quality of care received. Participants had the right to answer all their questions and concern's addressed. Consent forms are obtained from those expressed interest of participation. Data were collected from patients using a structured interview format and through a self-administered questionnaire for nurses working at the inpatient psychiatric units. Structure format has been used in structured interview format conducted by the principal researcher for those participants who might have visual or reading impairments or who simply preferred to have the standardized questionnaire read to them. The participants were asked about the appropriate time to participate in the study. Each participant was given written and oral information about the study. The setting for interviewing patients to maintain the privacy and comfort was discussed with the head department.

RESULTS

Descriptive characteristics

A total of 140 patients participated in this study, of whom 52.9% were males (n=74) and 47.1% were females (n=66). The mean age of the participants was 42.4 years (SD=11.3), ranging from 18 to 66 years. The participants' mean score of the duration of diagnosis was 12.3 years (SD=8.2), the participants' duration of diagnosis ranged from 1 to 37 years. Regarding marital status, the majority of the participants were married 45% (n=63). In relation to participants' level of education, 34.3% (n=48) of the participants had secondary school education. Furthermore, 64.3% (n=90) of the participants were unemployed (Table 1).

Table 1: Demographic characteristics of the sample (n = 140).

Variable	n	%
Gender		
Male	74	52.9
Female	66	47.1
Marital Status		
Single	49	35.0
Married	63	45.0
Divorced	7	5.0
Widowed	21	15.0
Level of Education		
Elementary	16	11.4
Primary	36	25.7
Secondary	48	34.3
Diploma	13	9.3
Undergraduate	27	19.3
Working Status		
Unemployed	90	64.3
Full-time job	29	20.7
Part-time job	10	7.1
Retired	11	7.9

Neurocognitive function

The Addenbrooke's Cognitive Examination Revised (ACER) Rating Scale was used to collect data on patients' neurocognitive function. The results showed that 88.6% (n=124) of participants had scores of less than 88 (cognitive dysfunction), while 11.4 % (n=16) of the participants had a score equal or more than 88 (cognitively function). The analysis indicated that the vast majority of participants (88.6%) cognitively dysfunction **(Table 2)**.

Table 2: Description of Cognitive function of the participants (n= 140).

Cognitive function	Cutoff	Present of cognitive dysfunction	n (%)
Attention	17	Yes	74 (52.9)
		No	66 (47.1)
Memory	18	Yes	92 (65.7)
		No	48 (34.3)
Fluency	9	Yes	116 (82.9)
		No	24 (17.1)
Language	24	Yes	68 (48.6)
		No	72 (51.4)

Visuospatial	15	Yes	107 (76.4)
		No	33 (23.6)
Total Cognitive Function	88	Cognitively Disabled	124 (88.6)
		Cognitively Able	16 (11.4)

Psychological well-being

To describe psychological well-being, psychological well-being using Short Flourishing Scale was used. The results showed that participants' mean score of psychological well-being was 28.5 (SD=5.1) out of 40, the median was 30.0. In addition, 25% (n=40) of the participants had a score between 8-25 and 75% (n=52) were between 31-40 indicating that 50% (n=48) of the samples had a score between 26 and 30. The results indicate that most participants have a positive level of psychological well-being.

Activities of daily living

The results showed that male participants mean score was 4.2 (84%) (SD=0.9), and for female participants mean score was 6.2 (77%) (SD=2.2). The results indicate that participants have a high level of independence; for both females and males.

Relationship of neurocognitive function with psychological well-being and activities of daily living

Using the t-test to examine differences between cognitive function and cognitively dysfunction, regarding psychological well-being and activities of daily living, the results showed that there was a statically significant difference in psychological well-being (t=-6.28, p=0.014) with participants' cognitive function (Gates' delta=0.86). While there is no significant difference found between participants' cognitive function related to activities of daily living. The results showed that participants whom cognitively function had higher mean score than participants whom cognitively dysfunction in psychological well-being. While no significant difference found between cognitive function and cognitive dysfunction related to activities of daily living (Gates' delta=0.49) **(Table 3)**.

Table 3: Relationship of neurocognitive with psychological well-being and activities of daily living (n=140).

Variable		n	m (SD)	t- test			95% CI	
				t	df	P	Lower	Upper
Psychological Well-Being	cognitively dysfunction	124	27.86(5.04)					
	cognitively function	16	33.50(3.09)	-6.28	138	<0.001	-7.47	-3.79
Activities of Daily Living	cognitively dysfunction	124	5.03(1.95)					
	cognitively function	16	5.93(1.69)	-1.77	138	0.079	-1.91	0.1

Differences in neurocognitive in relation to participants' demographic characteristics

Pearson *r* was used to examine the relationship between participants' age and participants' duration of diagnosis with their neurocognitive function. The results showed that there were no statistical significance correlations between neurocognitive function participants' age and duration of diagnosis (p>0.05). Using the t-test to examine differences between males and females regarding neurocognitive function, the results showed that there was a statically significant difference between participants' gender related to neurocognitive function (t=3.1, p=0.002). In addition, the results showed that males 69.63 (SD=18.79) had higher mean score than females 59.50 (SD=19.70) in cognitive function.

To examine the differences in study variables in relation to participants' marital status, one-way ANOVA was conducted. The results showed that there were significant differences in cognitive function ($F_{3, 139}$=8.55, p<0.001) related to marital status. Using post hoc comparison (Scheffe), the results showed that participants' who are single were significantly different (had a higher mean score) (M=72.63, SD=14.34) from widowed (M=41.85, SD=19.63) and divorced (M =55.09, SD=19.19). Also married were significantly different (had a higher mean score) (M=64.61, SD=20.63), from widowed (M=41.85, SD=19.63). While no significant difference found in participants' marital status related to activities of daily living and psychological well-being (p>0.05) **(Table 4)**.

Table 4: Differences in study variables in relation to Participants' marital status (n=140).

Variable		n	M	SD	F	p-value	Post hoc test (Scheffe)
Cognitive function	Single	49	72.63	14.34			Single X Widowed X Divorced Married X Widowed
	Married	63	64.61	20.63			
	Divorced	21	55.09	19.19	8.55	< .001	
	Widowed	7	41.85	19.63			
Activities of Daily Living	Single	49	5.38	1.66			
	Married	63	4.9	1.88			
	Divorced	21	5.09	2.42	0.69	0.55	
	Widowed	7	5.57	2.69			
Psychological well-being	Single	49	29.51	4.92			
	Married	63	28.68	5.31			
	Divorced	21	26.19	5.28	2.34	0.076	
	Widowed	7	26.85	3.33			

Regarding participants' level of education, one-way ANOVA was conducted. The results showed that there were significant differences in cognitive function ($F_{4, 139}=25.99$, p<0.001) and psychological well-being ($F_{4, 139}=5.52$, p<0.001) related to the level of education. Using post hoc comparison (Scheffe), the results showed that participants' who are had university education were significantly different (had a higher mean score) (M=83.33, SD=12.17) from all other participants; elementary (M=39.06, SD=18.34), primary (M =56.25, SD=15.16), secondary (M=69.87, SD=15.98), and diploma (M =63.53, SD=12.56). Also elementary were significantly different (had a higher mean score) from primary, secondary and diploma. Moreover primary were significantly different (had a higher mean score) from secondary. Also, related to the level of education with psychological well-being. Using post hoc comparison (Scheffe), the results showed that participants' who are had university education were significantly different (had a higher mean score) (M=31.29, SD=4.33) from elementary (M=25.12, SD=5.13) and primary (M =26.80, SD=4.59). Also elementary were significantly different (had a higher mean score) from primary. While no significant difference found in participants' level of education related to activities of daily living (p>0.05) **(Table 5)**.

Table 5: Differences in study variables in relation to Participants' level of education (n=140).

Variable		n	M	SD	F	p-value	Post hoc test (Scheffe)
Cognitive function	Elementary	16	39.06	18.34			Elementary X Primary X Secondary X Diploma Primary X Secondary University X Elementary X Primary X Secondary X Diploma
	Primary	36	56.25	15.16			
	Secondary	48	69.87	15.98	25.99	<0.001	
	Diploma	13	63.53	12.56			
	University	27	83.33	12.17			
Activities of Daily Living	Elementary	16	3.34	2.15			
	Primary	36	4.97	2.04			
	Secondary	48	5.85	1.79	5.6	0.98	
	Diploma	13	5.46	2.1			
	University	27	4.92	0.99			

	Elementary	16	25.12	5.13			
	Primary	36	26.8	4.59			
	Secondary	48	29.14	5.07	5.52	<0.001	
	Diploma	13	29.23	5.52			
Psychological well-being	University	27	31.29	4.33			Elementary X Primary University X Elementary X Primary

DISCUSSION

The results of this study regarding neurocognitive function showed that participants were mainly cognitively disabled. Results showed that participants have neurocognitive impairments in various areas of functioning including attention, memory, fluency and visuospatial, while no impairment found in language domain. The results are consistent with previous international studies concerned with neurocognitive functions among patients with schizophrenia. For example, Sharma and Antonova [14] reported that neurocognitive impairments have observed in most cognitive functions tested including memory, attention, and fluency and visuospatial in patients with schizophrenia. A recent study compared the neurocognitive function of patients diagnosed with schizophrenia to control normal individual, researchers found that patients diagnosed with schizophrenia had worse performance in all cognitive functions tested involving executive function, attention, and memory [15]. Moreover, Mesholam- Gately et al. [16] revealed in their meta-analysis study that individual with schizophrenia had lower scores when compared to scores for ordinary patients. These reports and the current study support the general theme that patients with schizophrenia have neurocognitive impairments in various aspects of functioning. In this context, cognitive impairments are linked to negative symptoms, such as impoverishment of thoughts and speech, social withdrawal, flattening of affect, and loss of sense of pleasure in patients with schizophrenia. These negative symptoms may have effect patients' performances. This has been emphasized previously by Milev's [17] who reported that neurocognitive impairments have been combined with negative symptoms in patients with schizophrenia.

Findings also showed that participants had a high level of psychological well-being, and it is associated positively with cognitive ability. Interestingly, the results counteract what has been reported by Strauss et al. [5] and Uzenoff et al. [18] that patients diagnosed with schizophrenia had a low level of psychological well-being. Strauss and colleagues [5] have also reported that patients with schizophrenia suffer from negative attitudes toward themselves, have lower ability to manage complexities in the external environment, not satisfied with relationships with others, and feel that life is uncomfortable and have purpose and meaning, and difficult to deal with new experiences. Our study infers that patients with schizophrenia who have knowledge and insight about their illness reported a lower level of psychological well-being probably due to their high level of awareness about the consequences of their mental illnesses. Another explanation is related to cultural diversity and religious resources. Among Islamic culture, religion provides people with a sense of self-ability, self-esteem, optimism, and acceptance of God's (Allah) destiny that may contribute to good acceptance of illnesses making them more satisfied even while feeling sick [19,20]. Also among Arabian culture, family roles, dynamics, life and social roles are also significant contributors to psychological aspects of members, and it is mandatory for family members to provide all aspect of socio-economic support for their sick family members [21,22].

This study also found that patients diagnosed with schizophrenia have a high level of independence in activities of daily living. This finding was surprising as the results differ from previous studies that reported a decline in everyday functions in the patients with schizophrenia. In a study conducted by Awad et al. [8] found that patients with schizophrenia experienced a decreased in functionality and decreasing ability to perform activities of daily living. In addition, Chambon et al. [23] found that deficits in executive functions and memory cause difficulties in planning for activities of daily living. In the same line, Oorschot et al. [24] found that patients with schizophrenia involved in less goal-directed activities. However, in spite of the development of psychological and pharmacological treatments, a large proportion of patients with schizophrenia continue to experience cognitive deficits, positive and negative symptoms, and chronic impairments cause social and occupational difficulties. These differences might be interpreted in terms of sociodemographic factors. For example, in this study, most of the participants were young, and have more capacity to perform activities of daily living which indicate that age of patients does have a significant role in managing and performing their activities of daily living. This concern has been emphasized previously by Freeman et al. [25] who reported that changes in daily functions were associated with age.

The present study found that participants' cognitive function, correlated positively with participants' psychological well-being, while there was no significant relationship found between participants' neurocognitive function and activities of daily living. The results, somehow, consistent with findings reported by Gopalakrishnan et al. [4] who found that poorer neurocognitive function was associated with below average well-being. Awad et al. [8] also found a similar positive association between better neurocognitive function and a high psychological well-being. On the other hand, contrast to

the literature, this study found that there is no relationship found between participants' neurocognitive function with activities of daily living, while previous studies found that neurocognitive impairments had a negative effect on performing daily activities [2,26]. In Jordan, patients with schizophrenia are referred to psychosocial rehabilitation where they receive psychosocial and occupational training that makes them more capable of management of their activities of daily living.

One limitation of this study is related using subjective methods to measure the variables, however; more objective ones such as observational would reveal more information and understanding for the relationship between the targeted variable.

CONCLUSIONS

Although most patients in this study have neurocognitive impairments, they still reported a high level of the psychological well-being and ability to perform activities of daily living. When exploring the relationships between neurocognitive function with psychological well-being and activities of daily living support there were relationships between neurocognitive function with psychological well-being, while there were no relationships between neurocognitive function with activities of daily living. Our study confirms the presence of a significant difference in neurocognitive function in relation to gender, marital status, and level of education. Moreover, confirmed the presence of a significant difference in psychological well-being in relation to the level of education. Also, this study will expand the knowledge, nationally and internationally, about the association between neurocognitive function, psychological well-being and activity of daily living among patients with schizophrenia. Moreover, this study will serve as a baseline data for further empirical studies that would investigate the relationship of neurocognitive function with a number of bio-psycho-social functions among patients with schizophrenia.

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