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Caregiver burden and affecting factors for patients with schizophrenia

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Abstract

Caregiver burden is a complex concept that is influenced by many different factors. This study aimed to evaluate caregiving burden in caregivers of schizophrenia patients and to examine the effect of gender and other socio-demographic and clinical characteristics on caregiving burden. This study included 100 (50 female, 50 male) patients, who had been diagnosed with schizophrenia and their caregivers. The Zarit Caregiver Burden Scale (ZCBS), Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HAM-D), and Symptom Checklist-90-Revised (SCL-90-R) were administered to the caregivers. Insight Rating Scale (IRS), Calgary Depression Scale for Schizophrenia (CDSS), Positive and Negative Syndrome Scale (PANSS), Functional Recovery Scale in Schizophrenia (FRSS), Global Assessment Scale (GAS) were administered to the patients. The caregivers of male patients had significantly higher HAM-A, HAM-D, ZCBS total and all subscale, and SCL-90-R total and all subscale scores. The male patients had significantly higher PANSS general psychopathology subscale and CDSS and lower IRS scores. Multiple regression analysis revealed that male patient gender, living in urban areas and HAM-D scores of the caregivers were predictive of ZCBS total scores. This study found that schizophrenia has a significant burden. In addition, male patient and depression level of the caregivers were determined as the predictors of the caregiver burden.

Keywords: Schizophrenia, caregiver, burden, gender

Introduction

Schizophrenia is a chronic psychiatric disorder, affecting approximately 1% of the general population and affects individuals, family members and society [1]. The burden of schizophrenia affects many areas, especially in family and economic [2]. Today, most persons with schizophrenia are being cared for in the community by their families. While, 70% of persons with schizophrenia stay with their family in Eastern countries, 25%–50% of those live with their family in Western countries. This is associated with cultural and social factors [3,4].

Caregiver/family burden is ‘all-encompassing’ term that refers to experience of families caring for relative with chronic illness, as well as the capacity to cope with circumstances [5,6]. Zarit et al. have defined burden as the extent to which caregivers

perceive their emotional, physical health, social life, and financial status as a result of caring for their ill relative [7]. Some authors further distinguish between objective and subjective burden. Objective burden is related to the patient’s symptoms, and socio-demographic characteristics, and other factors such as changes in household routine, family or social relations, work and physical health. Subjective burden is related to mental health and subjective distress [4]. Although schizophrenia is one of the diseases that lead to burden for caregiver, it has not been given enough importance [3]. Studies can show inconsistencies especially in determining demographic and disease-related factors. While many studies have shown that disease severity increases caregiver burden, some studies have not demonstrated such effect. Some studies reporting that positive symptoms cause more burden, there are studies reporting that negative symptoms cause more burden. Besides studies reporting that caregivers of male patients exhibit more burden, there are studies reporting that caregivers of female patients exhibit more burden [4-6]. Many factors, such as performing studies in different cultures, using different measurement methods, and not homogenizing patient groups, may lead to different results.

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Gender differences affect disease severity, variety of symptoms, and treatment options. There is a higher prevalence of schizophrenia in male, with an earlier age of onset, present more negative symptoms, functioning impairment and substance use. In contrast, female suffer more from affective symptoms [8]. Recent research has shown that gender differences might arise from a complex interplay between biological and psychosocial factors. More studies that involve the exploration of the impact of estrogens on the central nervous system should be done to both understand and treat schizophrenia [9]. Personalized medicine approaches in the treatment of schizophrenia besides taking gender into account would be an important step forward.

There are many studies evaluating schizophrenia and caregiver burden. Considering the effects of gender ranging from the phenomenology of schizophrenia to prognosis, we think that it has important effects on the burden of caregivers. Many studies which examined the relationship between gender of patient and/or another many factors and caregiver burden have reported different results. Our study aimed to evaluate burden in caregivers of schizophrenia patients and to examine the effect of gender and other socio-demographic and clinical characteristics on caregiving burden.

Material and Methods

Participants and Procedure

This study was conducted between February 2018 and April 2018 at the Psychiatry Clinic of Konya Training and Research Hospital, and 79 female and 84 male patients who had received in-patient treatment were evaluated. This study included 50 male and 50 female patients between the ages of 18 and 65 years who had received in-patient treatment and diagnosed with schizophrenia for at least one year according to DSM-5 criteria by clinical examination, and 100 caregivers theirs (one caregiver per patient). Patients who had other psychiatric disorders, chronic diseases requiring continuous help and care, and substance use other than smoking were excluded from the study. A primary caregiver over 18 years of age was defined as person has been intimately involved in the care of the patient for at least six months, that is, looking after her/his daily needs, supervising the medications, and bringing patient to the hospital. Caregivers who had medical or psychiatric illnesses requiring continuous help and care, and family member with chronic illnesses within the scope of caregivers' responsibilities were excluded from the study, as this may affect the burden associated with schizophrenia. Written consents were obtained from the patients and their caregiver who agreed to participate in the study. The study was approved by the Non-Invasive Clinical Research Ethics Committee of Faculty of Medicine, Necmettin Erbakan University, Konya, Turkey (2017/976).

Scales

Scale evaluations were performed face-to-face by a single physician and, if necessary, information was obtained from family members. Sociodemographic and clinical data of patients were obtained from medical records and information provided by the caregiver. The Zarit Caregiver Burden Scale (ZCBS),

Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HAM-D), and SCL-90-R) were administered to the caregiver. The Insight Rating Scale (IRS), Calgary Depression Scale for Schizophrenia (CDSS), Positive and Negative Syndrome Scale (PANSS), Functional Recovery Scale in Schizophrenia (FRSS), Global Assessment Scale (GAS) were administered to the patients.

The ZCBS is developed by Zarit et al, and focused on the subjective burden and objective burden with an emotional component, physical health, social burden, and financial burden [7]. This instrument comprised of 22 questions with five-point scale. Higher scores indicate higher caregiver burden. The scale was tested for validity and reliability in Turkey by Ozlu et al. In this research, the Cronbach's alpha value was found to be 0.83 [10].

The HAM-A is developed by Hamilton, and 14 items scale designed to assess the individuals level of both psychic and somatic anxiety, measured on a 5-point Likert scale [11]. Yazici et al. conducted the validity and reliability of the Turkish version of HAM-A. In this research, the Cronbach's alpha value was found to be 0.83 [12].

The HAM-D is developed by Hamilton, and a scale containing 17 items used to measure the level and severity of depression symptoms in individuals [13]. The scale was tested for validity and reliability in Turkey by Akdemir et al. In this research, the Cronbach's alpha value was found to be 0.75 [14].

The SCL-90R developed by Derogatis is a self-report instrument containing 90 items, clinical symptom rating scale assessing nine dimensions: anxiety, depression, somatization, paranoid ideation, hostility, phobic anxiety, obsessive compulsive, interpersonal sensitivity, hostility, and psychoticism [15]. Its reliability and validity study has been conducted in Turkish by Dag [16].

The IRS developed by David consists of 4 sections that aim to evaluate the acceptance of disease, designation of the psychotic experiences as abnormal, and awareness of any past psychological disorders [17]. The scale was tested for validity and reliability in Turkey by Arslan et al [18].

The CDSS developed and validated by Addington et al. is a evaluate depression and the level and severity of the symptoms of depression in patients with schizophrenia [19]. Aydemir et al. conducted the validity and reliability of the Turkish version of CDSS. In this research, the Cronbach's alpha value was found to be 0.88 [20].

The PANSS developed by Kay et al. consists of 30 questions in three subscales, i.e. 'positive syndrome,' 'negative syndrome' and 'general psychopathology' [21]. Its reliability and validity study has been conducted in Turkish by Kostakoglu et al. The Cronbach's alpha value for each of the subscales were found to be 0.75, 0.77 and 0.71 [22].

The FRSS developed by Llorca et al is a five-point Likert-type scale consisting of 19 items. The scale consisted of the subscales of daily living skills, the social functionality and the health care

and treatment measures and the functional remission in three different areas [23]. The Turkish validity and reliability study of the scale was conducted by Emiroglu. In this research, the Cronbach's alpha value was found to be 0.91 [24].

The GAS is developed by the American Psychiatric Association, was used to assess psychological, social and occupational functioning in case of schizophrenia or another psychotic disorder. It is a single-item questionnaire rated from 0 to 100 [25]. The results of GAS were categorized as follows by Köhler et al. : Scores between 61-100 indicated good functionality, scores between 31-60 were moderate, scores <30 were poor [26].

Statistical Analysis

Statistical analyzes were performed using SPSS version 15.0 (IBM® Inc, Chicago, USA). The compliance of variables with the normal distribution was examined using graphical and analytical methods. While the independent sample t-test was used to compare normally distributed variables, the Mann-Whitney U test was used to compare non-normally distributed variables. The Chi-square test was used to compare categorical data. The determinacy of caregiving burden-related factors on burden was determined by multiple linear regression analysis. The factors associated with burden at a significance level of $p < 0.01$ were included in the statistical analysis. ZCBS total scores were used as a dependent variable. When correlations were observed between dependent variables, the variable with lower p-value was included in the regression model. Bivariate linear regression analysis was performed for each independent variable versus the dependent variable, and statistically significant variables were considered candidates for multiple linear regression. A p-value less than 0.05 was considered statistically significant.

Results

The mean age of the patients was 40.8 ± 11.9 years. The mean educational duration was 6.7 ± 3.7 years. 59% lived in the city center, 49% were single, 50% could not work due to their disease, 55% had low socioeconomic level (Table 1). Of the caregivers, 67% were female and 33% were male. The mean age of the caregivers was 49.6 ± 11.6 years. The mean educational duration was 6.4 ± 4.0 years. 71% were married, 55% were housewives. (Table 2).

Socio-demographic and clinical characteristics of patients and comparison of these characteristics by patient gender

The male patients had higher singleness rate (66%), longer educational duration (8.2 ± 3.4 years), and higher rate of work disability (60%), higher number of hospitalizations (5.5 ± 3.2), higher number of criminal events (38%), and higher smoking rate (78%) ($p = 0.003$, $p < 0.001$, $p = 0.046$, $p = 0.023$, $p = 0.003$, and $p < 0.001$, respectively) (Table 1). They had higher PANSS total, general psychopathology subscale, and CDSS scores ($p = 0.032$, $p = 0.028$, and $p < 0.001$, respectively). The female had higher IRS scores. ($p = 0.012$) (Table 1).

Table 1. Sociodemographic Characteristics and Scale Scores of Patients and Comparison of These Characteristics and Scores by Patient Gender

	Patients (n=100) Mean ± SD, n(%)	Male patients (n=50) Mean ± SD, n(%)	Female patients (n=50) Mean ± SD, n(%)	p
Age	40.8 ± 11.9	39.1 ± 11.8	42.5 ± 11.9	0.167
Marital status				0.003
Single	49 (49)	33 (66)	16 (32)	
Married	28 (28)	12 (24)	16 (32)	
Divorced	6 (6)	1 (2)	5 (10)	
Widowed	17 (17)	4 (8)	13 (26)	
Place of residence				0.002
Urban area	92 (92)	50 (100)	42 (84)	
Others	8 (8)	0	8 (16)	
Total educational duration	6.7 ± 3.7	8.2 ± 3.4	5.3 ± 3.3	<0.001
Socioeconomic leve				0.678
Low	55 (55)	28 (56)	27 (54)	
Medium-High	45 (45)	24 (44)	23 (46)	
Mean disease duration (year)	15.2±9.4	14.1 ± 9.5	16.3 ± 9.3	0.185
Mean number of hospitalizations	4.9 ± 3.2	5.5 ± 3.2	4.3 ± 3.1	0.023
Criminal event	25 (25)	19 (38)	6 (12)	0.003
Work disability	50 (50)	30 (60)	20 (40)	0.046
Smoking	56 (56)	39 (78)	17 (34)	<0.001
Additional health problem	26 (26)	12 (24)	14 (28)	0.648
Family history of psychiatric illness	46 (46)	26 (52)	20 (40)	0.229
Family history of psychosis	24 (24)	13 (26)	11 (22)	0.640
PANSS Positive	21.5 ± 3.9	22.2 ± 3.7	20.7 ± 4.1	0.068
Negative	23.1 ± 5.4	23.7 ± 5.8	22.4 ± 5.0	0.443
General psychopathology	47.1 ± 6.4	48.6 ± 6.2	45.6 ± 6.3	0.032
Total score	91.7 ± 13.0	94.6 ± 13.2	88.9 ± 12.4	0.028
CDSS	8.5 ± 3.2	10.3 ± 2.6	6.7 ± 2.8	<0.001
GAS Good n (%)	0 (0)	0	0	0.092
Medium n (%)	94 (94)	45 (90)	49 (98)	
Poor n (%)	6 (6)	5 (10)	1 (2)	
IRS	6.7 ± 2.5	6.1 ± 2.6	7.4 ± 2.1	0.012

PANSS: Positive and Negative Syndrome Scale, CDSS: Calgary Depression Scale for Schizophrenia, GAS: Global Assessment Scale, IRS: Insight Rating Scale, Chi-square test was used to compare categorical ones, and Student t and Mann Whitney U tests were used to compare non-categorical data.

Clinical and caregiving-related characteristics of caregivers and comparison of these characteristics by patient gender

The sample consisted of 100 caregivers: 39 mothers, 20 spouses, 17 siblings, 11 fathers, 10 children, and 3 others. The mean duration of caregiving was 11.2±8.1 years. 22 had mental health problems, 19 received psychotropic drugs, 34 smoked cigarettes, and 60 had additional health problems (Table 2).

Table 2. Sociodemographic Characteristics of Caregivers and Comparison of These Characteristics by Patient Gender

	Caregiver (n=100) Mean ± SD, n(%)	Caregiver of male patient (n=50) Mean ± SD, n(%)	Caregiver of female patient (n=50) Mean ± SD, n(%)	P
Caregivers Mother	39 (39)	21 (42)	18 (36)	
Father	11 (11)	5 (10)	6 (12)	0.334
Spouse	20 (20)	10 (20)	10 (20)	
Sibling	17 (17)	11 (22)	6 (12)	
Child	10 (10)	2 (4)	8 (16)	
Others	3 (3)	1 (2)	2 (4)	
Gender Male	33 (33)	20 (40)	13 (26)	0.085
Female	67 (67)	30 (52)	37 (74)	
Age	49.6 ± 11.6	49.3 ± 11.3	50.0 ± 12.0	0.746
Marital status Single	6 (6)	3 (6)	3 (6)	0.758
Married	71 (71)	34 (68)	37 (74)	
Divorced	4 (4)	3 (6)	1 (2)	
Widowed	19 (19)	10 (20)	9 (18)	
Total educational duration	6.4 ± 4.0	6.6 ± 3.9	6.2 ± 4.1	0.658
Failure to work due to caregiving	23 (23)	7 (21.2)	16 (23.9)	0.766
Socioeconomic level Low	48 (48)	26 (52)	22 (44)	0.581
Medium	46 (46)	22(44)	24 (48)	
High	6 (6)	2 (4)	4 (8)	
Total caregiving duration (Years)	11.2 ± 8.1	10.5 ± 7.7	12.0 ± 8.4	0.345
Psychiatric disease	22 (20)	10 (20)	10 (20)	0.629
Psychiatric disease	20 (20)	10 (20)	10 (20)	0.629
Smoking	34 (34)	15 (30)	19 (38)	0.398
Additional health problem	60 (60)	28 (56)	32 (64)	0.414

OCD: Obsessive compulsive disorder, Chi-square test was used to compare categorical ones, and Student t and were used to Mann Whitney U tests compare non-categorical data.

The caregivers of male patients had higher prevalence of depression and higher rate of living in urban areas, HAM-A, HAM-D, ZCBS total, ZCBS-1, ZCBS-2, ZCBS-3, ZCBS-4, and ZCBS-5 subscale scores ($p=0.046$, $p=0.007$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, and $p<0.001$, respectively). They had higher SCL-90-R total, somatization, obsessive compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism subscale scores. ($p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, $p<0.001$, and $p<0.001$, respectively) (Table 3).

Multiple Regression Analysis of factors affecting caregiver burden

ZCBS total scores were selected as dependent variable in multiple linear regression analysis. Besides gender, the socio-demographic and clinical variables of the patients or caregivers that were associated with ZCBS at significance level of $p<0.01$ or less were included in the statistical analysis as independent variables. PANSS positive and general psychopathology subscale, SCL-90-R total, and HAM-D scores and length of hospital stay were included in the statistical analysis due to the presence of multicollinearity. Accordingly, gender, educational duration, length of hospital stay, place of residence, smoking, PANSS positive and general psychopathology subscale, CDSS, GAS and IRS scores of the patients as well as gender, HAM-D and SCL-90-R total scores of the caregivers were included in the formed model. This model was predictive for ZCBS total scores at rate of 72% ($R^2=0.722$, $F=17.020$, $p<0.001$). Linear regression analysis revealed that male patients ($t=4.995$, $p<0.001$), living in urban areas ($t=2.929$, $p=0.004$) and HAM-D scores of the caregivers ($t=4.549$, $p<0.001$) were predictive of ZCBS total scores ($R^2=0.722$, $F=17.020$, $p<0.001$) (Table 4).

In 24 (22.2%) of the patients who only had diabetes mellitus (DM), 12 (11.11%) had hypertension (HT), and 16 (14.81%) had both DM and HT as comorbid diseases. Nine patients who had a history of BP were also pregnant (8.33%). Of them, six had BP attacks for the second time and three for the third time. Four patients with recurrent BP had HT and three had both HT and DM as comorbid diseases.

Antiviral agent (valaciclovir 3x1000mg, orally for seven days), proton pump inhibitor (PPI) (pantoprazole 40 mg IV, during steroid therapy) and intravenous (IV) steroid (by decreasing 15 mg every three days) (methylprednisolone 1 mg/kg/day) were used in the treatment.

The pregnant patients were not administered antiviral treatment. The patients were hospitalized for possible complications related to steroids and their daily biochemistry and hemogram values were tracked.

21 of 108 patients (19.44%) made partial improvement of motor functions at the end of the first month (13 patients had HB II, five HB III, two HB V and one HB VI), six patients had hemifacial spasm (5.55%) and 81 patients (75%) recovered fully. Surgical decompression was recommended to five patients with HB V and HB VI who had an over 90% drop in amplitude on electroneurography performed on the 14th day of onset. Surgical

Table 3. Scale Scores of Caregivers and Comparison of These Scores by Patient Gender

		Caregiver (n=100) Mean $\pm$ SD, n(%)	Caregiver of male patient (n=50) Mean $\pm$ SD, n(%)	Caregiver of female patient (n=50) Mean $\pm$ SD, n(%)	p
HAM-A		14.0 $\pm$ 5.5	16.3 $\pm$ 5.6	11.8 $\pm$ 4.5	<0.001
HAM-D		9.9 $\pm$ 4.7	12.7 $\pm$ 3.8	7.0 $\pm$ 3.6	<0.001
ZCBS	Total score	65.2 $\pm$ 11.2	73.9 $\pm$ 6.0	56.6 $\pm$ 8.1	<0.001
	ZCBS-1(Psychological tension and impaired private life)	23.2 $\pm$ 5.0	26.8 $\pm$ 2.9	19.7 $\pm$ 4.2	<0.001
	ZCBS-2 (Irritability and restrictedness)	10.2 $\pm$ 2.0	11.5 $\pm$ 1.3	8.8 $\pm$ 1.6	<0.001
	ZCBS-3 (Impaired social relations)	9.6 $\pm$ 2.0	10.6 $\pm$ 1.5	8.6 $\pm$ 1.9	<0.001
	ZCBS-4 (Economic burden)	14.5 $\pm$ 2.7	16.6 $\pm$ 1.7	12.4 $\pm$ 1.9	<0.001
	ZCBS-5 (Dependence)	7.6 $\pm$ 1.3	8.3 $\pm$ 1.0	6.9 $\pm$ 1.2	<0.001
SCL-90R	Total score	90.6 $\pm$ 40.9	116.8 $\pm$ 40.6	64.3 $\pm$ 18.4	<0.001
	Mean symptom score	1.0 $\pm$ 0.4	1.2 $\pm$ 0.4	0.7 $\pm$ 0.2	<0.001
	Somatization	1.4 $\pm$ 0.5	1.7 $\pm$ 0.4	1.0 $\pm$ 0.3	<0.001
	Obsessive compulsive disorder	1.0 $\pm$ 0.5	1.3 $\pm$ 0.5	0.7 $\pm$ 0.3	<0.001
	Interpersonal sensitivity	0.9 $\pm$ 0.5	1.2 $\pm$ 0.5	0.6 $\pm$ 0.3	<0.001
	Depression	1.4 $\pm$ 0.5	1.8 $\pm$ 0.4	1.1 $\pm$ 0.3	<0.001
	Anxiety	0.8 $\pm$ 0.5	1.1 $\pm$ 0.5	0.5 $\pm$ 0.2	<0.001
	Hostility	0.8 $\pm$ 0.5	1.0 $\pm$ 0.6	0.6 $\pm$ 0.4	<0.001
	Phobic anxiety	0.5 $\pm$ 0.4	0.7 $\pm$ 0.5	0.2 $\pm$ 0.1	<0.001
	Paranoid ideation	0.8 $\pm$ 0.5	1.0 $\pm$ 0.5	0.5 $\pm$ 0.3	<0.001
	Psychoticism	0.4 $\pm$ 0.4	0.5 $\pm$ 0.5	0.2 $\pm$ 0.2	<0.001
	Additional symptoms	1.1 $\pm$ 0.5	1.5 $\pm$ 0.4	0.8 $\pm$ 0.3	<0.001

HAM-A: Hamilton Anxiety Rating Scale , HAM-D: Hamilton Depression Rating Scale, ZCBS: Zarit Caregiver Burden Scale, SCL-90R: Symptom Checklist-90-Revised, Student t and Mann Whitney U tests were used to compare non-categorical data.

Table 4. Multiple Regression Analysis of Patient and Caregiver-Related Factors Affecting ZCBS Scores of Caregivers

Independent variables	B	Standart error	Beta	t	p
Patients					
Gender (male)	11.212	2.245	0.505	4.995	<0.001
Total educational duration	0.063	0.201	0.021	0.316	0.753
Length of hospital stay	0.005	0.003	0.098	1.592	0.115
Place of residence (city center-district)	7.740	2.643	0.190	2.929	0.004
Smoking	1.049	1.504	0.047	0.697	0.487
PANSS-Positive	0.111	0.216	0.039	0.513	0.609
PANSS- General psychopathology	-0.086	0.166	-0.050	-0.521	0.603
CDSS	0.169	0.265	0.049	0.637	0.526
GAS (Poor)	-2.734	3.474	-0.054	-0.787	0.433
IRS	-0.072	0.329	-0.016	-0.218	0.828
Caregivers					
Gender (female)	-1.580	1.460	-0.067	-1.082	0.282
HAM-D	0.866	0.190	0.357	4.549	<0.001
SCL-90-R-Total score	-0.027	0.025	-0.088	-1.055	0.294

PANSS: Positive and Negative Syndrome Scale, CDSS: Calgary Depression Scale for Schizophrenia, GAS: Global Assessment Scale, IRS: Insight Rating Scale, HAM-D: Hamilton Depression Rating Scale, SCL-90R: Symptom Checklist-90-Revised, Multiple linear regression analysis were used.

decompression was performed in two patients with HB VI who accepted the operation. The surgery was performed in one patient 32 days after the onset of paralysis and in the other patient 40 days after the onset of paralysis. There was no facial dehiscence and the facial nerve was completely freed between the geniculate ganglion and the stylomastoid foramen by the trans-mastoid approach in two patients. Following this, the decompression was performed by opening the fallopian canal. There were edema and congestion in the nerves of two patients. The graft taken from the temporal muscle fascia was laid on the nerve that was freed.

One of the patients was found to have HB III and the other HB IV at the end of the first postoperative month. The first patient had HT as a comorbid disease. CT and MRI were performed on all patients included in the study. Two patients who were found to have cerebellopontine corner tumor were excluded from the study. CT revealed that 26 (24.07%) patients had facial canal dehiscence on the paralyzed side and five (4.62%) patients had bilateral facial canal dehiscence.

Discussion

This study evaluated the caregiver burden in schizophrenia. Significant differences were determined in sociodemographics and clinical characteristics and family burden between male and female patients. We found that male patient, depression level of the caregivers, and living in urban areas were predictive factors of burden. This study, male patients had higher number of hospitalizations, longer length of hospital stay, higher rate of work disability, higher rate of living in urban areas, higher PANSS general psychopathology subscale, CDSS and lower IRS scores. Our results support that male had higher disease severity, poorer disease prognosis, and higher caregiver burden.

The World Federation of Mental Health has issued a report supporting that caring for those with a chronic condition requires tireless effort, energy, and empathy and indisputably greatly impacts the daily lives of caregivers [27]. Additionally, the emotional, physical and economic impact, the concept of 'burden of care' involves subtle but distressing notions such as shame, embarrassment and feelings of guilt [28]. Although studies have made assessments about caregiver gender, there are few studies on the relationship between patient gender and burden. This study observed that most patients were cared for by female caregivers (mostly mothers), most of them were blood relatives. We determined that ZCBS total score was 65.2 ± 11.2 . The ZCBS scored between 19 and 95 and there are no cut-off point, and this result shows that the caregivers had considerable caregiver burden. Many studies have similar results, but there are also studies reporting lower ZCBS scores [2,3,29-31]. Since in-patients are included in this study, we found higher care burden.

Gender differences in schizophrenia have been described in the incidence and prevalence, age at onset, symptomatology and course, premorbid adjustment, cognitive functioning, and different of risk factors, such as familial, hormonal, and psychosocial influences [6]. The incidence of schizophrenia might be slightly higher in male. The age of onset of disease is higher in female. Gender differences are small with male tending to have more negative, female more affective symptoms. Furthermore, male exhibit more substance abuse. Regarding the long-term course,

female seem to perform better with lower levels of persisting symptoms, better social functioning, and recovery. However, the course might be worse in postmenopausal female [9,32].

This study, all scale scores applied to evaluate burden and psychiatric status were higher in the caregivers of male patients. We found that male had higher PANSS total and general psychopathology subscale and CDSS scores, lower IRS score and higher number of hospitalizations. Many studies have reported that male may have a more severe manifestation of the schizophrenia [7]. In this respect, our study is consistent with the literature. As we expected that male patient was predictive factor of burden. One major reason may be that male patients have higher disease severity, less insight and higher rate of work disability. Yu et al. reported that family members for male patients than for female patients is higher burden scores, and indicated that male patients were generally more involved in violence and other disturbing behaviors than females and thus caused more adverse effects on the physical and mental health of the family [33]. Amell et al. reported that caregivers of male tended to report higher burden and patient gender's influenced burden. They explained that male have more frequent unusual and disruptive behaviors, more social dysfunction, cognitive impairment and poor outcomes [7]. Mors et al. found that male patients caused more distress in their relatives, it was associated with odd behavior and disruption of others' lives [34]. Roick et al. reported that the male, high PANSS positive and negative symptom scores were linked to an increase in burden, and relatives of male had greater burden in the domains 'urging', 'tension' and 'supervision' [35]. It has often been reported that negative symptoms occur more frequently in male while affective symptoms occur more often in female [8]. In our study, although the male had higher levels of negative symptoms, there was no significant difference. We conducted study inpatients to form more homogeneous group, and there were relatively few participants. Also, gender differences might have been minimized because inpatient treatment is a more preferential option for patients with positive symptoms and behavioral problems.

This study, the male patients had higher rate of work disability due to the disease. Schizophrenia is disrupt work, interpersonal and family functioning's of individuals. In particular, financial losses affect healthcare utilization, psychosocial recovery, and other family members. In our society, male have higher employment rates and play dominant role in determining the family's income level. The fact that male fail to work brings substantial economic burden to their families. This finding is compatible with many studies from various countries [28,30,36]. In a study from Turkey, caregivers of male patient reported higher-level burden of care, and most of them were unemployed and couldn't contribute to their family's finances [36]. This would be effective in increasing caregiver burden for male patients.

Many studies have been reported that having lower levels of insight, being single, having longer length of hospital stay, involving in a criminal event, and failing to work, are related to worse functioning [5,18,30]. We found that the male patients had lower levels of insight, and higher singleness rate, number of hospitalizations and number of criminal events. The female patients have better premorbid functioning, social adjustment, treatment adherence, and insight. The low insight has been found to be predictive of higher relapse rates, worse functioning and

bad treatment adherence [8,9,30]. We consider that it having low insight may be important factor for male patients to cause more burden.

‘Burden of care’ is a complex construct. As caregivers struggle to balance work, family, and caregiving, their own physical and emotional health is often ignored, and many caregivers often experience tremendous stress, depression, and/or anxiety [4]. Studies show multiple consequences of burden, such as mental and physical health deterioration, family dysfunction and excessive use of health services [28]. We found that depression levels of caregivers predicted the burden. Lúcia et al. reported that there was an association between depression and burden, and emphasized that they affected reciprocally [37]. The high rates of depressive symptoms among caregivers suggested that interventions should include attention to the recovery of caregivers in addition to recovery of patients. Moreover, depressive symptoms correlated with patients’ male and symptoms and caregivers’ younger age and levels of education [30]. Gulseren et al. observed that there was relationship between burden and depression and anxiety of caregivers, and they predicted the burden. They asserted that long-term caring for patients might also be a chronic stress factor, resulting in vulnerability to depression and anxiety [36]. A recent study reported that 19.5% of caregivers of individuals with schizophrenia experienced depressive symptoms, and burden, coping strategies, and physical health were predictive of depression [38]. The results of this study are consistent with the literature.

This study determined that urban life was predicting burden. Many research have suggested links between schizophrenia and urban birth, upbringing and residence [39]. There are studies claiming that schizophrenia has better prognosis in rural areas. Moreover, rural dementia caregivers experienced negative impact on their financial status but reported more support from family members [40]. While negative factors such as difficulty in accessing health services are associated with rural life, it can be thought that burden can be reduced if they get informal social support by rural life and run away from many problems caused by urban life.

The present study has some important limitations. First, the cross-sectional nature of the data do not allow for causal inferences. Second, the samples consisted of volunteer participants who were responsive requests to participate by mental health service providers and the research teams who collaborated with the clinics. Third, sample size is relatively small. Another limitation is that there was no any difference in FRSS scores between the genders. Functional recovery can be difficult to assess, as patients have inpatient and moderate or severe disease severity. The more studies are needed in this area with larger samples especially with a need to incorporate a longitudinal study design.

Conclusion

As a result, the findings of this study were schizophrenia has a significant burden. Also, this study identified factors associated with burden in caregivers. The association of burden with the this factors were found: male patient and depression level of the caregivers. Our results emphasize that it is important not only to treat patients’ symptoms, but also to evaluate the mental health of caregivers, and gender-specific interventions can be taken to ease the caregiver burden. Longitudinal cohort studies should be

performed to further investigate the factors involved in the burden and their effects on caregivers.

Conflict of interests

The authors declare that they have no competing interest.

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Ethical approval

The study was approved by the Non-Invasive Clinical Research Ethics Committee of Faculty of Medicine, Necmettin Erbakan University, Konya, Turkey (2017/976).

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