ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1655051

The Relationship Between Neurocognitive and Psychosocial Functioning in Major Depressive Disorder: A Multicenter Retrospective Study

Deniz ALCI[1], Serra YUZEREN[2], Fikret Poyraz COKMUS[3], Didem SUCULLUOGLU DIKICI[4], Kadir ASCIBASI[5], Erkan KURU[4], Neslihan ALTUNSOY[4], Hüseyin Murat ÖZKAN[6], Ömer AYDEMIR[7]

[1]Balikesir University, Faculty of Medicine, Department of Psychiatry
[2]Menemen State Hospital, Department of Psychiatry
[3]İzmir Tinaztepe University, Faculty of Medicine, Department of Psychiatry
[4]Freelance Psychiatrist
[5]University of Health Sciences, İzmir Tepecik Training and Research Hospital, Department of Psychiatry
[6]İstanbul Rumeli University, Department of Psychology
[7]Manisa Celal Bayar University, Faculty of Medicine, Department of Psychiatry

Geliş Tarihi / Received: *11.03.2025,* ***Kabul Tarihi / Accepted:*** *22.03.2025*

ABSTRACT

Objective: This study provides a holistic perspective of the effects of Major Depressive Disorder (MDD) and related factors on functioning and examines the relationship between neurocognitive and psychosocial impairments. **Materials and Methods:** This retrospective archive study was conducted by analyzing data obtained from eight different clinics in Turkey. The study included 98 patients diagnosed with MDD (DSM-5 criteria) and 68 matched healthy controls. Retrospective evaluations included the Montgomery-Asberg Depression Scale (MADRS), Sheehan Disability Scale (SDS), Perceived Deficit Questionnaire (PDQ-D), Digital Symbol Substitution Test (DSST), and SF-36 Health Survey. **Results:** Neurocognitive and psychosocial functioning levels were found to be low in MDD patients. Patients with MDD scored significantly lower on all domains of SF-36 and PDQ-D scores. While severity of depression and age of onset had a statistically significant impact on PDQ-D scores, educational level had a statistically significant impact on DSST scores. A negative correlation was observed between the PDQ-D and domains of the SF-36 other than the social functioning domain. **Conclusion:** The present study's findings related to the Turkish population emphasize the burden of MDD on functioning. Furthermore, the two-way relationship between impairments in cognitive and psychosocial functioning indicates a different aspect of depression symptomatology.

Keywords: Depressive Disorder, Quality of Life, Psychosocial Functioning, Neurocognitive Disorders,

Majör Depresif Bozuklukta Nörobilişsel ve Psikososyal İşlevsellik İlişkisi: Çok Merkezli Retrospektif Bir Çalışma

ÖZ

Amaç: Bu çalışma, Majör Depresif Bozukluk (MDD) ve ilgili faktörlerin işlevsellik üzerindeki etkilerine dair bütünsel bir bakış açısı sunmakta ve nörobilişsel ve psikososyal bozukluklar arasındaki ilişkiyi incelemektir. **Gereç ve Yöntem:** Çalışma retrospektif tipte olup, Türkiye'deki sekiz farklı klinikten elde edilen verilerin analiz edilmesiyle yürütülmüştür. Çalışmaya DSM-5 kriterlerine göre MDD tanısı almış 98 hasta ile yaş, cinsiyet ve eğitim düzeyi açısından eşleştirilmiş 68 sağlıklı kontrol dahil edilmiştir. Veriler, Montgomery-Asberg Depresyon Ölçeği (MADRS), Sheehan Yetiyitimi Ölçeği (SYYÖ), Algılanan Bilişsel Kusurlar Anketi (ABKA), Sayı-Sembol Eşleme Testi (SSET) ve SF-36 Sağlık Anketi kullanılarak retrospektif olarak değerlendirilmiştir. **Bulgular**: MDD hastaları, SF-36'nın tüm alt alanlarında ve ABKA skorlarında anlamlı derecede daha düşük puan almıştır. Depresyon şiddeti ve başlangıç yaşı, ABKA skorlarını istatistiksel olarak anlamlı şekilde etkilerken, eğitim düzeyi SSET skorları üzerinde belirleyici bulunmuştur. ABKA ile SF-36'nın sosyal işlevsellik dışındaki tüm alt ölçekleri arasında negatif bir ilişki gözlenmiştir. **Sonuç:** MDD hastalarında nörobilişsel ve psikososyal işlevsellik düzeyleri düşük bulunmuştur. Depresyon şiddeti ve başlangıç yaşının bilişsel işlevsellik üzerindeki etkisi belirgin olup, eğitim düzeyinin yürütücü işlevlerle ilişkili olduğu saptanmıştır. Bulgular, MDD'nin işlevsellik üzerindeki etkisini vurgulamakta ve depresyon semptomlarının bilişsel ve psikososyal yönleri arasındaki karşılıklı ilişkiye dikkat çekmektedir.

Anahtar Kelimeler: Depresif Bozukluk, Yaşam Kalitesi, Psikososyal İşlevsellik, Nörobilişsel Bozukluklar, Bilişsel Disfonksiyon.

Sorumlu Yazar / Corresponding Author: Deniz ALCI, Balikesir University, Faculty of Medicine, Department of Psychiatry, Balikesir, Türkiye.
E-mail: dkabadayi@yahoo.com

Bu makaleye atıf yapmak için / Cite this article: Alcı, D., Yuzeren, S., Cokmus, F. P., Suculluoglu Dikici, D., Ascibasi, K., Kuru, E., Altunsoy, N., Ozkan, H. M., Aydemir, O (2025). The Relationship between Neurocognitive and Psychosocial Functioning in Major Depressive Disorder: A Multicenter Retrospective Study. *BAUN Health Sci J, 14*(1), 229-237. https://doi.org/10.53424/balikesirsbd.1655051

INTRODUCTION

Major depressive disorder (MDD) is one of the most prevalent lifetime psychiatric disorders (Gutiérrez-Rojas et al., 2020) and a prominent cause of disability in young adults around the world (Morey-Nase et al., 2019). MDD negatively impacts quality of life, causing physical and mental disability. It often emerges during adolescence and young adulthood, critical periods for neurocognitive and psychological development (Morey-Nase et al., 2019). Studies have shown impairment in cognitive and psychosocial functioning to be common in MDD (Cambridge et al., 2018), including cognitive impairments in verbal fluency, executive function, working memory and attention (Matthew J. Knight et al., 2018). Working memory, executive functions, and attention are most affected (Matthew J. Knight et al., 2018). Neurocognitive impairment can emerge before depression, persist alongside depressive symptoms, and continue even after clinical recovery. Many studies have reported the persistence of impairments in cognitive functioning despite symptomatic remission, preventing functional recovery (Matthew J. Knight et al., 2018; Schwert et al., 2018).

The functional impairment associated with MDD has social and economic consequences. The psychosocial functionality of those diagnosed with MDD is affected in such domains as working capacity, productivity, daily life activities and interpersonal relationships (Hammer-Helmich et al., 2018). In addition, the broad cognitive impairment associated with MDD affects many areas of psychosocial functioning (Matthew J. Knight & Baune, 2018). The cognitive domains affecting psychosocial functioning include executive function, memory, verbal learning, language and attention (Cambridge et al., 2018). Studies of the impacts on the domains of executive function, memory and verbal fluency have revealed them to be predictive of reduced levels of academic, professional and daily functioning (Lee et al., 2012). Furthermore, persistent cognitive impairment despite symptomatic remission may interact with existing emotional and social vulnerabilities and cause recurrent depressive episodes (Cha et al., 2017). Despite the above, the relationship between neurocognitive and psychosocial functioning in MDD is still an under-investigated issue.

The clinical features seen in the course of MDD may affect the development of neurocognitive impairment, including age of onset of the disease, education level, disease duration and severity of depression (Cambridge et al., 2018), although the effect of clinical features on the relationship between neurocognitive impairment and psychosocial functionality remains unknown.

The diagnosis and treatment of cognitive and psychosocial impairments are crucial for depressive people if they are to achieve the premorbid level of functioning. An MDD treatment that focuses solely on mood symptoms will fall short of making an adequate contribution to quality of life and functionality in patients, compelling researchers to focus increasingly on comorbid cognitive disorders with MDD and the decline in quality of life resulting in impairment in functioning. There have been many studies of comorbid cognitive disorders, MDD and the reduction of psychosocial functioning to date, although studies thoroughly analyzing the neurocognitive and psychosocial functioning of patients and quality of life are lacking in literature. Furthermore, which cognitive domains are predictors of psychosocial dysfunction is still currently unknown. This study provides a holistic perspective of the effects of MDD and related clinical factors on functioning and examines the relationship between neurocognitive and psychosocial impairments.

MATERIALS AND METHODS

Study type

The present retrospective archive study was conducted with data from eight clinics from in the cities of Ankara, Aydin, Balikesir, Izmir, Manisa, and Tekirdag in Turkey, which were analyzed retrospectively.

Study group

The inclusion criteria for the study, which was granted ethics committee approval, included: aged 18–65 years, volunteering to take part, meeting the DSM 5 criteria supporting a diagnosis of MDD, not being on any psychotropic medication, and being sufficiently competent to follow the study's instructions and to comply with the study scales. The exclusion criteria were having substance use disorder, having had a (hypo)manic episode, presenting with psychotic characteristics, presence of any other psychiatric disease (except anxiety disorder in remission), presence of physical and/or neurologic diseases, having treatment-resistant depression (if relevant to the duration of the current disorder), being pregnant or breast-feeding, having undergone an ECT procedure within the past six months, and being on antipsychotics within the past two months or having been on depot antipsychotics within the past six months.

The study included 98 patients who fulfilled the specified criteria. The control group consisted of 68 healthy controls matched for age, sex and education level. The Sociodemographic Data Form, Montgomery-Asberg Depression Scale, Sheehan Disability Scale, Perceived Deficit Questionnaire (PDQ), Digital Symbol Substitution Test (DSST), and SF-36 Health Survey were retrospectively evaluated from patient records.

Dependent and independent variables

The dependent variables of this study are neurocognitive and psychosocial functioning. The independent variables include depression severity, disease duration, age of onset, and educational level.

Procedures

The data were collected using a sociodemographic characteristics form and validated psychometric scales. The Montgomery-Asberg Depression Scale (MADRS) assesses depression severity, with higher scores indicating more severe symptoms. The Sheehan Disability Scale (SDS) evaluates the impact of emotional symptoms on daily functioning. The Perceived Deficits Questionnaire (PDQ-D) is a 20-item self-report measure assessing subjective cognitive deficits, with higher scores reflecting greater impairment. The Digit Symbol Substitution Test (DSST) measures executive functions, attention, and psychomotor speed, while the SF-36 Health Survey assesses quality of life across multiple domains. Ethics approval was obtained for the study, and patient data were anonymized and retrospectively analyzed.

Statistical analysis

The statistical analysis was carried out in SPSS (Version 15.0. Chicago, SPSS Inc.). A Chi-square test was applied to categorical variables and a T-test to continuous variables. The correlation between the neurocognitive tests (PDQ-D and DSST) and psychosocial functioning scale scores (SF-36, Sheehan Disability Scale) was measured with a Pearson correlation coefficient analysis. A regression analysis was conducted for all functioning estimations to evaluate all reciprocal relationship in which the PDQ-D, DSST and SF-36 scales were taken as the dependent variables, and age, depression severity (MADRS), duration of the latest episode, duration of disease, age of disease onset, educational level and the number of episodes were taken as independent variables.

Ethical considerations

The study was approved by the institutional ethics committee, and all patient data were anonymized to ensure confidentiality. Written approval was obtained from the author's Balikesir University Ethics Committee (Date: 18.10.2022, Approval no: 2022/95).

RESULTS

Sociodemographic and clinical characteristics

The study included 98 patients and 68 healthy controls who met the specified criteria. The mean age of the patient and control groups were 34.92±10.6 years and 35.44±9.9 years, respectively. In addition, 68.7% of the sample group was female. No statistically significant difference was recorded between the patient and control groups in terms of age, sex and educational level (Table 1).

The age of disease onset was 30.68±10.2 years (min. 16, max. 65), and the average duration of disease was determined to be 4.1±5.2 years (ranging from 1–28 years). The number of past depressive episodes, ranging from 1 to 8, was on average 2.3±4.2, and the mean duration of the latest depressive episode was recorded as 5.85±6.1 months (ranging from 1 to 36 months). On average, the number of hospital admissions with a diagnosis of MDD was 0.61±0.2 (ranging from 0 to 2). The mean MADRS score in the patient group was determined as 31.06±6.4 (Table 2).

Table 1. Demographic Characteristics and Clinical Assessment Results of Participants

Variables		Mean*/%**
Age (year)	Patient	34.92±10.6*
	Control	35.44±9.9*
Gender	Female	68.7%**
	Male	31.3%**
Education level	Elementary	22.50%**
	Secondary	16.50%**
	High School	27.50%**
	College	33.50%**

This table presents the demographic characteristics and clinical data of participants, including age, gender, education level, age of onset, and disease duration. The comparison between major depressive disorder (MDD) patients and healthy controls ensures a balanced evaluation of neurocognitive and psychosocial functioning. n: Count, *: mean value **: Column percentage

Psychosocial functionality parameters

In the evaluation of the patients' psychosocial functionality parameters, the average score from the Sheehan Disability Scale was 18.61±5.5, while the mean score of the SF-36 for the physical functioning domain was recorded as 70.20±24.4, and 3943±22.9 for the social functioning domain, 45.66±41.7 for the physical role limitations domain, 11.89±22.6 for the emotional role limitations domain, 30.29±15.2 for the mental health domain, 25.40±15.02 for the vitality domain, 55.36±24.0 for bodily pain domain, and 34.13±20.2 for the general health perceptions domain. Patients scored lower in all SF-36 survey domains when compared to the general population, to a statistically significant degree ($p<0.05$) (Table 3).

As revealed in the regression analyses (Table 4), among the variables affecting the social functioning domain, depression severity was found to be statistically significant ($p<0.05$) while age of onset was found to have just failed significance ($p= 0.057$). It was further shown that age of onset and depression severity affected the SF-36 emotional role limitations domain ($p<0.05$), and that depression severity, duration of disease and male gender were predictors of vulnerability to the SF-36's vitality domain ($p<0.05$). The number of episodes and educational level were both significant predictors of bodily pain ($p<0.05$).

As a result, a negative correlation was observed between the MADRS score and the SF-36's social functioning, physical role limitation, emotional role limitation, mental health and vitality domains in the effect of depression severity on psychosocial functionality ($p<0.05$).

Neurocognitive functioning parameters

PDQ-D and DSST were administered to measure the patients' neurocognitive functions. The mean PDQ-D

score was 25.87±18.6 and the mean DSST score was 38.93±13.5. A statistically significant difference was noted between the PDQ-D scores of the patient and control groups ($p<0.05$), and a positive correlation was observed between the PDQ-D and DSST scores ($p<0.05$).

A regression analysis revealed depression severity and age of onset significantly affected PDQ-D scores. Additionally, educational level had a notable impact on DSST scores. ($p<0.05$). Moreover, a later age of disease onset was observed to have just failed significance over DSST scores ($p= 0.057$) (Table 4).

The relationship between neurocognitive functioning parameters and psychosocial functionality parameters

A Pearson correlation coefficient analysis was carried out to measure the relationship between all neurocognitive functioning ratings and depression severity, and psychosocial functioning.

A positive correlation was observed between the SDS and PDQ-D scores ($p<0.05$), and a negative correlation was observed between the PDQ-D and all domains of the SF-36 other than the social functioning domain ($p<0.05$). No statistically significant association was noted between DSST scores and the other SF-36 domain scores or the Sheehan Disability Scale.

Figure 1 illustrates the correlation patterns between neurocognitive (PDQ-D, DSST) and psychosocial (SDS, SF-36) functioning parameters, demonstrating significant negative correlations between PDQ-D scores and all SF-36 domains except social functioning.

Table 2. Clinical characteristics of patients.

Variables	Mean
MADRS	31.1±6.5
The age of disease onset (year)	30.6±10.2
Duration of disease (year)	4.1±5.2
Duration of the latest depressive episode (month)	5.8±6.1
The number of past depressive episodes	2.3±4.2
The number of hospital admissions	0.6±0.3

This table provides clinical data of patients diagnosed with MDD, including the severity of depression (MADRS score), age of onset, duration of illness, number of past depressive episodes, duration of the most recent episode, and frequency of hospital admissions. **MADRS:** Montgomery-Asberg Depression Rating Scale

Table 3. Comparison of SF-36 Subdimensions Between Patients with Major Depressive Disorder and Healthy Controls

Variables	Depression Group (%)	General population's norm value (%)	p
Physical functioning	70.2±24.4	86.6±25.2	0.000
Social functioning	39.4±22.9	94.8±14.2	0.000
Physical role limitations	45.7±41.7	89.5±29.6	0.000
Emotional role limitations	11.9±22.6	94.7±20.9	0.000
Mental health	30.3±15.2	73.5±11.6	0.000
Vitality	25.4±15.0	67.0±13.8	0.000
Bodily pain	55.4±24.0	86.1±20.6	0.000
General health perceptions	34.1±20.2	73.9±17.5	0.000

This table presents the demographic characteristics and clinical data of participants, including age, gender, education level, age of onset, and disease duration. The comparison between major depressive disorder (MDD) patients and healthy controls ensures a balanced evaluation of neurocognitive and psychosocial functioning. **p:** p-value, **%:** Column percentage.

DISCUSSION

Psychosocial functionality of patients with major depressive disorder

The SF-36 scores of the patients in all domains were statistically significantly lower than those of the population norms. Furthermore, a negative correlation was recorded between depression severity and the social functioning, physical role limitation, emotional role limitation, mental health and vitality domains of the SF-36 survey and the SDS scores. Based on these results, MDD can be considered to have a negative impact on the general health perception of patients, to disrupt their functioning in all psychological, social and physical areas, and to lowers the quality of life. The greater the severity of depression, the greater the limitations in physical and

emotional areas, and the greater the interference in social functioning and health perceptions.

An international multicenter study revealed that people with MDD reported marked functional impairment with lower SDS total scores (Hammer-Helmich et al., 2018). Sumiyoshi et al. (2019) reported a positive correlation between depression severity and psychosocial function, as measured by the SDS, concurring with the findings of the present study. Furthermore, worse depressive symptoms were associated with lower work productivity in the domains of presenteeism, overall work impairment, general activity impairment and lower quality of life. Aydemir et al. (2009) found that MDD patients scored statistically significantly lower in all domains of the SF-36 than population norm, with the mental health quality parameters being observed to have a high level of correlation with depression severity, and the physical domain to have a moderate level of correlation (Aydemir et al., 2009).

Table 4. The impact of sociodemographic and clinical characteristics on psychosocial and cognitive functionality parameters.

Variables	Depression Group	General population's norm value
SF-36 social functioning domain		
Severity of depression	0.016	-0.814
The age of disease onset	0.057	0.418
Sf-36 emotional role limitations domain		
Severity of depression	0.016	-0.246
The age of disease onset	0.006	0.292
Sf-36 vitality domain		
Severity of depression	0.034	-0.510
Duration of disease	0.027	-0.851
Male gender	0.031	7.559
Sf-36 bodily pain domain		
The number of past depressive episodes	0.013	1.781
Education Level	0.046	4.940
PDQ-D		
Severity of depression	0.014	0.599
The age of disease onset	0.002	-0.496
DSST		
The age of disease onset	0.057	-0.248
Education Level	0.000	5.666

This table demonstrates the effects of sociodemographic and clinical characteristics such as depression severity, age of onset, duration of illness, number of depressive episodes, and education level on psychosocial and neurocognitive functioning in MDD patients. Statistically significant predictors for each domain are highlighted. **p**: p-value, **SF-36**: 36-Item Short Form Health Survey, **PDQ-D**: Perceived Deficit Questionnaire for Depression, **DSST:** Digit Symbol Substitution Test.

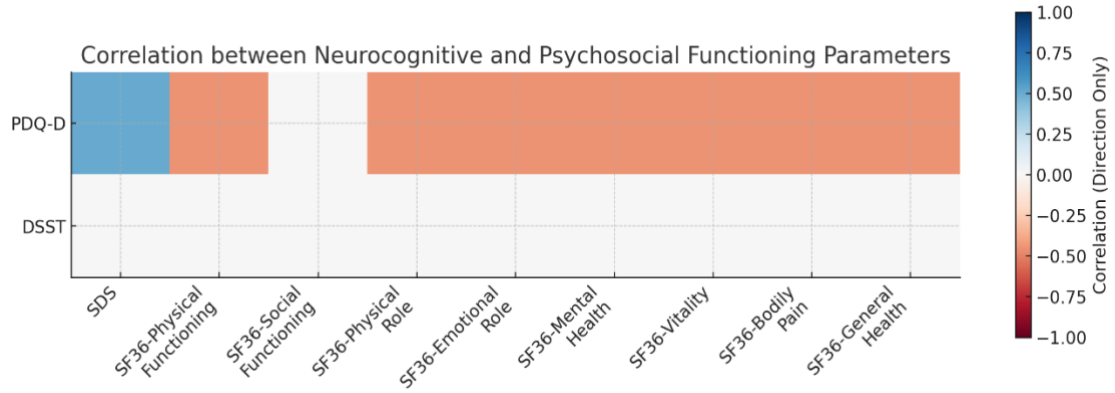

Figure 1. Correlation Between Neurocognitive and Psychosocial Functioning Parameters in MDD

The present study reveals the social functioning and emotional role limitation domains of SF-36 to be affected by depression severity and late onset of the disease. Furthermore, the vitality domain was affected by depression severity, duration of disease and male gender, while the bodily pain domain was affected by the total number of episodes and educational level. Reviews of literature reveals similar findings, with depression severity reported to have an impact on emotional functioning (Choenarom et al., 2005; Murray et al., 2006). A systematic review of 103 studies by Cabello et al. (2012) found the vitality domain to be negatively affected by depression severity and its chronicity but positively affected by the female gender. On the other hand, the bodily pain domain was negatively affected by the chronicity and female gender factors, while being positively affected by daily-life activities and self-care.

Neurocognitive functioning of patients with major depressive disorder

In the present study, MDD patients were found to score statistically significantly low in the scales measuring objective and subjective neurocognitive functioning. Cognitive dysfunction in MDD is related to the specific core symptoms of depression, and has a negative impact on the functioning of patients.

Studies have revealed a high prevalence of objective cognitive impairment in MDD (Sumiyoshi et al., 2019). Davis et al. (2017) found that, compared to healthy controls, substantial deficits were observed in patients with depression in terms of such executive functions as verbal learning, memory, visual-spatial problem solving and visual attention. While no statistically significant difference was observed in psychomotor speed, substantial differences were observed in the reaction time and processing speed. A meta-analysis of 23 studies found attention, verbal memory, visual memory, verbal reasoning, processing speed/reaction time and verbal learning to be significantly poorer in the depressed samples (Goodall et al., 2018).

A bidirectional relationship exists between neurocognition and depression. For example, depressive symptoms such as comorbid anxiety, rumination, insomnia, negative thinking style, and lack of motivation negatively affect neurocognition, while poorer neurocognition causes amotivation, based on withdrawal from activities associated with neurocognitive functions (Morey-Nase et al., 2019). Depressive individuals reported experiencing negative affective responses to their experience of neurocognitive difficulties, and this reaction is associated with a lower awareness of the depression-neurocognition relationship (Morey-Nase et al., 2019).

The present study reveals that depression severity and early onset age have an impact on subjective cognitive dysfunction, that education level influences objective cognitive dysfunction, and that a later age of disease onset was observed to have just failed significance over DSST score. The identified correlation between depression severity and poor subjective cognition was consistent with the results of the "The Prospective Epidemiological Research on Functioning Outcomes Related to Major Depressive Disorder" (PERFORM) studies conducted in Europe and Japan (Hammer-Helmich et al., 2018; Sumiyoshi et al., 2019). Recent studies have also reported the age of onset to be related to cognitive impairment in MDD (Cambridge et al., 2018). Given the association between older age and more significant cognitive deficits, the negative effect of age of onset may be partly attributed to the contribution of the average age-related cognitive decline and the effect of MDD.

The lack of association between the DSST and MADRS scores indicates a lack of association between objective neurocognitive impairment and depressive symptoms, unlike subjective neurocognitive impairment. The DSST assesses cognitive performance by measuring the speed of psychomotor performance, which is relatively independent of depressive symptoms. The PDQ, on the other hand, is a self-report scale that measures subjective cognition, which tends to be affected by depressive symptoms. Mood disturbance due to MDD is a symptom that is defined subjectively by the patient, and so therefore, it is reasonable that the subjective cognition-depression relationship more

apparent. This result concurs also with the findings of the PERFORM J study (Sumiyoshi et al., 2019).

A study examining the relationship between the objective and subjective levels of neurocognitive impairment in MDD patients and healthy controls revealed that individuals reporting high subjective cognitive impairment were not necessarily those with high objective cognitive impairments in both groups (Schwert et al., 2018). Schwert et al. (2018) reported that a significant majority of depressed patients underestimate their memory-related cognitive abilities, whereas the majority of healthy individuals overestimate their memory functions. According to the cognitive model of depression, depressed patients have negatively biased perceptions of the self, others and the future, and as a result of negative perceptions of the self, patients with MDD may be pessimistic in their self-referent evaluations.

The impact of neurocognitive dysfunction on psychosocial functioning

Empirical evidence suggests that the cognitive dysfunction associated with MDD can lead to impairments in psychosocial functioning during both acute depressive episodes and remission.

The present study revealed a negative correlation between PDQ-D scores and SDS scores and all domains of SF-36, aside from the social functioning domain. As the PDQ-D addresses such domains as attention/concentration, retrospective memory, prospective memory, and planning/organization, the study demonstrates a correlation between these functions, including the core symptoms of depression and impairment in psychosocial functioning, identifying also a cause for the increase in disability.

This study identified no statistically significant association between the DSST and SF-36 scores, nor the Sheehan Disability Scale scores, indicating that psychomotor speed and visual learning have no effect on impairments in psychosocial functioning.

Cambridge et al. (2018) reported impairments in attention, memory and executive functions to be associated with longitudinal impairments in daily, social and occupational functioning in MDD. It was reported in the same study that depression severity increased the negative effects of cognitive deficits on psychosocial dysfunction, concurring with the findings of the present study. The results of the Perform J study revealed the objective cognitive impairments measured by the DSST, and disturbances of subjective cognition measured by the PDQ-D to be associated with a poor quality of life and impairment in neurocognitive functions. Significant decreases in DSST scores and increasing PDQ-D scores have been reported to be associated with higher SDS scores (Sumiyoshi et al., 2019). Consistent with the present study, Hammer-Helmich et al. (2018) reported subjective cognitive impairment to be associated with impairment in psychosocial functioning through SDS scores. Cha et al. (2017) also identified a positive correlation between the PDQ-5-D and SDS scores, as well as a strong relationship between subjective cognitive impairment and loss of functionality in work/school, family and home responsibilities, and lost economic days.

In the present study, while perceived subjective cognitive functioning is noted to have a significant effect on psychosocial functioning, objective cognitive functioning is mainly affected by age of onset and is unrelated to depression severity or psychosocial functioning.

Limitations and strengths of the study

Due to the cross-sectional design of the study, the temporal relationship of impairments in both neurocognitive and psychosocial functioning was not studied, and so there is a need to replicate the study using a similar methodology but with a longitudinal design.

The strengths of this study, on the other hand, are primarily its inclusion of eight different units and eight different types of institution, its simultaneous measurement of all parameters of functioning, its inclusion of a control group and its comparison of psychosocial functionality with the population norms.

CONCLUSION

The present study's findings related to the Turkish population emphasize the burden of MDD on functioning and contribute to the findings of previous studies conducted in different cultures. Furthermore, the two-way relationship between impairments in cognitive and psychosocial functioning indicates a different aspect of depression symptomatology with an effect on depression severity. Our findings highlight the significant impact of neurocognitive impairments on psychosocial functioning in MDD patients. Given the observed associations between perceived cognitive deficits and functional impairment, interventions targeting cognitive functioning -such as cognitive remediation therapy, psychoeducation programs, and structured neuropsychological interventions- should be integrated into standard treatment approaches. Addressing both affective symptoms and cognitive dysfunction could enhance patients' overall functional recovery and improve their quality of life. Our findings emphasize that major depressive disorder not only affects mood but also has a significant impact on cognitive and psychosocial functioning. The bidirectional relationship between neurocognitive impairments and psychosocial functioning highlights the complexity of depressive symptomatology, suggesting that a comprehensive treatment approach should address both cognitive and functional impairments. These findings suggest a need for therapeutics targeting the cognitive impairment of MDD, as well as further studies investigating the predictors of functioning in depression.

Acknowledgement
The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of interest
The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author contributions
Plan, design: ÖA; **Material, methods and data collection:** All authors; **Data analysis and comments:** DA, ÖA; **Writing and corrections:** DA, ÖA.

Funding
The is no funding throughout the process of conducting this research.

Ethical approval
Institution: Balikesir University Ethics Committee
Date: 18.10.2022
Approval no: 2022/95

REFERENCES

Aydemir, Ö., Çökmüş, F. P., Akdeniz, F., Dikici, D. S., & Balıkçı, K. (2017). Psychometric properties of the Turkish versions of perceived deficit questionnaire-depression and British Columbia cognitive complaints inventory. *Anatolian Journal of Psychiatry, 18(3), 224–230. http://dx.doi.org/10.5455/apd.228537*

Aydemir, Ö., Ergün, H., Soygür, H., Kesebir, S., & Tulunay, C. (2009). Major depresif bozuklukta yaşam kalitesi: kesitsel bir çalışma. *Turk Psikiyatri Dergisi, 20(3).*

Cabello, M., Mellor-Marsá, B., Sabariego, C., Cieza, A., Bickenbach, J., & Ayuso-Mateos, J. L. (2012). Psychosocial features of depression: a systematic literature review. *Journal of Affective Disorders, 141(1), 22–33.* https://doi.org/10.1016/j.jad.2011.12.009

Cambridge, O. R., Knight, M. J., Mills, N., & Baune, B. T. (2018). The clinical relationship between cognitive impairment and psychosocial functioning in major depressive disorder: a systematic review. *Psychiatry Research, 269, 157–171. https://doi.org/10.1016/j.psychres.2018.08.033*

Cha, D. S., Carmona, N. E., Subramaniapillai, M., Mansur, R. B., Lee, Y., Hon Lee, J., … McIntyre, R. S. (2017). Cognitive impairment as measured by the THINC-integrated tool (THINC-it): Association with psychosocial function in major depressive disorder. *Journal of Affective Disorders, 222(June), 14–20.* https://doi.org/10.1016/j.jad.2017.06.036

Choenarom, C., Williams, R. A., & Hagerty, B. M. (2005). The role of sense of belonging and social support on stress and depression in individuals with depression. *Archives of Psychiatric Nursing, 19(1), 18–29.* https://doi.org/10.1016/j.apnu.2004.11.003

Davis, M. T., DellaGioia, N., Matuskey, D., Harel, B., Maruff, P., Pietrzak, R. H., & Esterlis, I. (2017). Preliminary evidence concerning the pattern and magnitude of cognitive dysfunction in major depressive disorder using cogstate measures. *Journal of Affective Disorders, 218, 82–85.* https://doi.org/10.1016/j.jad.2017.04.064

Goodall, J., Fisher, C., Hetrick, S., Phillips, L., Parrish, E. M., & Allott, K. (2018). Neurocognitive functioning in depressed young people: A systematic review and meta-analysis. *Neuropsychology Review, 28(2), 216–231.* https://doi.org/10.1007/s11065-018-9373-9

Gutiérrez-Rojas, L., Porras-Segovia, A., Dunne, H., Andrade-González, N., & Cervilla, J. A. (2020). Prevalence and correlates of major depressive disorder: A systematic review. *Brazilian Journal of Psychiatry, 42(6), 657–672.* https://doi.org/10.1590/1516-4446-2020-0650

Hammer-Helmich, L., Haro, J. M., Jönsson, B., Melac, A. T., Di Nicola, S., Chollet, J., … Saragoussi, D. (2018). Functional impairment in patients with major depressive disorder: The 2-year PERFORM study. *Neuropsychiatric Disease and Treatment, 14, 239–249.* https://doi.org/10.2147/NDT.S146098

Knight, Mattew J., Air, T., & Baune, B. T. (2018). The role of cognitive impairment in psychosocial functioning in remitted depression. *Journal of Affective Disorders, 235(March), 129–134.* https://doi.org/10.1016/j.jad.2018.04.051

Knight, Matthew J., Aboustate, N., & Baune, B. T. (2018). Cognitive dysfunction in major depressive disorder: Cause and effect. *Current Behavioral Neuroscience Reports, 5(4), 302–309.* https://doi.org/10.1007/s40473-018-0160-y

Knight, Matthew J., & Baune, B. T. (2018). Cognitive dysfunction in major depressive disorder. *Current Opinion in Psychiatry, 31(1), 26–31.* https://doi.org/10.1097/YCO.0000000000000378

Kocyigit, H., Aydemir, Ö., Fisek, G., & Memiş, A. (1999). Kisa form 36'nin Türkce versiyonunun güvenilirligi ve gecerliligi. *Ilaç ve Tedavi Dergisi, 12, 102–106.*

Lam, R. W., Saragoussi, D., Danchenko, N., Rive, B., Lamy, F. X., & Brevig, T. (2013). Psychometric validation of perceived deficits questionnaire–depression (PDQ-D) in patients with major depressive disorder (MDD). *Value in Health, 16(7), A330.* https://doi.org/10.1016/j.jval.2013.08.046

Lee, R. S. C., Hermens, D. F., Porter, M. A., & Redoblado-Hodge, M. A. (2012). A meta-analysis of cognitive deficits in first-episode major depressive disorder. *Journal of Affective Disorders.* https://doi.org/10.1016/j.jad.2011.10.023

Montgomery, S. A., & Åsberg, M. (1979). A new depression scale designed to be sensitive to change. *The British Journal of Psychiatry, 134(4), 382–389.* https://doi.org/10.1192/bjp.134.4.382

Morey-Nase, C., Phillips, L. J., Bryce, S., Hetrick, S., Wright, A. L., Caruana, E., & Allott, K. (2019). Subjective experiences of neurocognitive functioning in young people with major depression. *BMC Psychiatry, 19(1), 1–9.* https://doi.org/10.1186/s12888-019-2197-1

Murray, J., Banerjee, S., Byng, R., Tylee, A., Bhugra, D., & Macdonald, A. (2006). Primary care professionals' perceptions of depression in older people: a qualitative study. *Social Science & Medicine, 63(5), 1363–1373.* https://doi.org/10.1016/j.socscimed.2006.03.037

Özer, S. K., Demir, B., Tuğal, Ö., & KABAKÇI, E. (2001). Montgomery-Asberg depresyon değerlendirme

ölçeği: Değerlendiriciler arası güvenilirlik ve geçerlik çalışması. *Türk Psikiyatri Dergisi, 12(3), 185–194.*

Schwert, C., Stohrer, M., Aschenbrenner, S., Weisbrod, M., & Schröder, A. (2018). Biased neurocognitive self-perception in depressive and in healthy persons. *Journal of Affective Disorders, 232(February), 96–102.* https://doi.org/10.1016/j.jad.2018.02.031

Sheehan, D. V, Harnett-Sheehan, K., & Raj, B. A. (1996). The measurement of disability. *International Clinical Psychopharmacology, 11, 89–95.*

Sumiyoshi, T., Watanabe, K., Noto, S., Sakamoto, S., Moriguchi, Y., Tan, K. H. X., … Fernandez, J. (2019). Relationship of cognitive impairment with depressive symptoms and psychosocial function in patients with major depressive disorder: Cross–sectional analysis of baseline data from PERFORM-J. *Journal of Affective Disorders, 258(July), 172–178.* https://doi.org/10.1016/j.jad.2019.07.064

Ware Jr, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical Care, 473–483.*

Wechsler, D. (1958). The measurement and appraisal of adult intelligence. *Academic Medicine, 33(9), 706.*