ORIGINAL RESEARCH   ORİJİNAL ARAŞTIRMA

# Stress and Anxiety Levels of Nurses Working in Surgical Clinics During the COVID-19 Pandemic: Cross Sectional Study

## COVID-19 Pandemisi Döneminde Cerrahi Kliniklerde Çalışan Hemşirelerin Stres ve Anksiyete Düzeyleri: Kesitsel Çalışma

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**ABSTRACT Objective:** The coronavirus disease-2019 (COVID-19) pandemic has created major threat to health care professionals. Factors such as the increased number of cases and excessive workload increase the stress and anxiety experienced by nurses. This study aimed to determine of stress and anxiety levels of surgical nurses working in COVID-19 pandemic in Türkiye. **Material and Methods:** This multicenter descriptive study included 341 nurses working in surgical clinics during the COVID-19 outbreak in hospitals affiliated to the Ministry of Health, which were located on the European Side of İstanbul, Türkiye. Stress and anxiety were measured by Perceived Stress Scale, Anxiety by Spielberger State and Trait Anxiety Inventory. **Results:** The perceived stress and anxiety levels of the surgical nurses were determined above the average value. It was found that working in a pandemic hospital increased the level of state trait anxiety of nurses (p=0.02), and the duration of working in the profession (ρ=0.17, p=0.00) and in the surgical clinic affected the perceived stress level (ρ=0.16, p=0.00). **Conclusion:** The study was found that surgical nurses experienced moderate to severe stress and anxiety, during the pandemic; it was determined that working hours, the working year in clinic and total work experience in the profession were associated with this situation.

**Keywords:** Anxiety; COVID-19;
nursing; job related stress

**ÖZET Amaç:** Koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] pandemisi, sağlık çalışanları için büyük bir tehdit oluşturmuştur. Artan vaka sayısı, aşırı iş yükü gibi faktörler hemşirelerin yaşadığı stres ve kaygı düzeyini artırmıştır. Bu çalışmada, Türkiye'de COVID-19 pandemisi sırasında çalışan cerrahi hemşirelerinin, stres ve kaygı düzeylerinin belirlenmesi amaçlanmıştır. **Gereç ve Yöntemler:** Çok merkezli tanımlayıcı tipteki bu çalışmaya, COVID-19 salgını sırasında Türkiye'nin İstanbul Avrupa Yakasında yer alan Sağlık Bakanlığına bağlı hastanelerin cerrahi kliniklerde çalışan 341 hemşire dâhil edilmiştir. Stres ve kaygı, Algılanan Stres Ölçeği, Anksiyete Spielberger Durumluk ve Sürekli Kaygı Envanteri ile ölçülmüştür. **Bulgular:** Cerrahi hemşirelerinin algıladıkları stres ve kaygı düzeyleri ortalama değerin üzerinde belirlendi. Pandemi hastanesinde çalışmanın hemşirelerin durumluk sürekli kaygı düzeyini artırdığı (p=0,02), meslekte ve cerrahi klinikte çalışma süresini (ρ=0,17, p=0,00) ve algılanan stres düzeyini etkilediği bulundu (ρ=0,16, p=0,00). **Sonuç:** Sonuç olarak cerrahi hemşirelerinin pandemi sırasında orta-şiddetli stres ve anksiyete yaşadıkları; çalışma saatleri, klinikte çalışma yılı ve meslekteki toplam iş deneyiminin bu durumla ilişkili olduğu belirlendi.

**Anahtar Kelimeler:** Anksiyete; COVID-19;
hemşirelik; mesleki stres

Coronavirus disease-2019 (COVID-19), which emerged in China, has affected the whole world in a short time. It is a pandemic disease transmitted from person to person, which is caused by severe acute respiratory coronavirus-2.[1] The World Health Organization held an emergency meeting on January 2020 and announced the emergence of the COVID-19 outbreak to the whole world. Many health care professionals (HCPs) around the world have been infected with the COVID-19 virus; however, nurses have been

exposed to COVID-19 more while providing treatment and care to patients during this period.[2] The rapid transmission and spread of the virus and the high mortality rate increase anxiety and stress among individuals. Therefore, nurses delivering primary care to patients may experience psychological problems, such as being away from their family and relatives, loneliness, boredom, exhaustion, and anxiety, both in the work environment and during the quarantine. They are further stressed and unwilling to return to work after quarantine.[3,4] The COVID-19 pandemic disease has caused major changes in the healthcare system. Although COVID-19 is not a surgical condition, considering the number of individuals infected by the pandemic, it is inevitable that COVID-19 patients will also need surgical care.[5] In addition, COVID-19 cases were seen in many units in hospitals during the pandemic, allowing nurses working in surgical clinics to care for patients with COVID-19.[5] As a necessity of the pandemic, the frequency of shift work and workload has increased considerably in order to reduce the contact of nurses with patients and each other.[3,4] In addition, with the pandemic, nurses experience stress and anxiety due to relation with patients with COVID-19, uncertainty about the course of the pandemic, and an increase in patient and death rates.[6]

A study conducted in India stated that the rate of patients dying from the COVID-19 pandemic in emergency care, general surgery and orthopedic surgery clinics was 27%.[7] Similarly, studies conducted in different countries report that the majority of deaths due to COVID-19 occur in surgical units.[8-10] It is reported in the literature that stress and anxiety affect nurses' behaviors such as excessive panic, inability to think clearly and burnout, therefore it is important to evaluate the mental health status of healthcare professionals against COVID-19.[11-15]

A study emphasizes that attention should be paid to the mental health of healthcare personnel working in other medical departments during the pandemic shows that the working conditions of nurses have deteriorated during the pandemic, even in daily hospital units.[16] During this process, especially surgical nurses faced many problems and experienced stress and anxiety.[17,18]

Studies on the COVID-19 outbreak affecting the whole world have indicated that HCPs delivering care to COVID-19 positive patients are often concerned about (i) the fear of transmitting infection to their families, (ii) the high incidence of infection among HCPs, and (iii) the thought of resuming to provide care to COVID-19 positive patients after their quarantine is over, and that stress and anxiety levels of HCPs are high.[4,11] Therefore, it is important to examine the psychological effects of the pandemic on nurses. When we look at the literature, there is limited study evaluating the effect of working conditions of surgical nurses on the level of stress and anxiety in the COVID-19 pandemic.[5] This study was carried out to determine the stress and trait anxiety levels of nurses working in surgical clinics during the COVID-19 pandemic.

## ■ MATERIAL AND METHODS

### DESIGN

It is a descriptive multi-center study.

### SETTING

This research was conducted by using online questionnaire method to assessment the perceived stress and trait anxiety levels of nurses working in surgical clinics during the COVID-19 pandemic between November 2020 and January 2021. Population consisted of nurses, who were actively working in surgical clinics during the COVID-19 outbreak in hospitals affiliated to the Ministry of Health, which were located on the European Side of İstanbul, Türkiye.

### SAMPLE

The study sample consisted of patients who agreed to participate in the study and met the research criteria after being informed about the purpose of the study. Power analysis was performed using the G*Power version 3.1.9.2 (Kiel University, Kiel, Germany) software to determine the number of samples. The appropriate sample size was obtained with the help of the single sample test. In line with the results obtained by Eskin et al., the sample size required to determine whether there were any changes in the perceived stress and anxiety levels of nurses during the pandemic was

calculated to be 341 individuals at a 95% confidence level (=0.05 and two-way), test power of 0.80 (1-), and Cohen's *d* effect size of 0.1522.[19]

## INCLUSION AND EXCLUSION CRITERIA

Surgical nurses, who agreed to participate in the research after being informed about the research online, were not interns, were working actively in surgical clinics, and were delivering care to patients diagnosed with COVID-19, were included in the study. Nurses who did not agree to participate in the study and who did not work in the surgical clinics were excluded from the study.

## DATA COLLECTION TOOLS

*Perceived Stress Scale (PSS)*: It was developed by Cohen et al.[20] It is designed to measure how stressful the situations experienced by the individual are perceived. It is a five-point Likert-type scale consisting of 14 items. The lowest and highest scores that can be obtained from the scale are 0 and 56, respectively. Higher scores on the scale indicate higher perceived stress. The scale was adapted to Turkish by Eskin et al. found the Cronbach alpha internal consistency coefficient of the scale as 0.84 and the test-retest reliability as 0.87.[19] They reported a positive correlation between PSS and depression, and negative correlations between life satisfaction, self-esteem, and perceived social support. In this study, the Cronbach alpha internal consistency coefficient was found to be 0.792.

*Spielberger State and Trait Anxiety Inventory (STAI)*: This widely used and valid scale was developed by Spielberger et al.[21] The reliability and validity study of its Turkish version was conducted by Oner and Le Compte.[22] It consists of two subscales containing 20 statements that measure state and trait anxiety.

Emotions and behaviors expressed in the trait anxiety sub-scale (STAI-2) are answered as "(1) almost never, (2) sometimes, (3) often, and (4) almost always" according to their frequency. The minimum and maximum scores that can be obtained from the scale are 20 and 80, respectively. Higher scores represent increased anxiety levels. Test-retest and Kuder-Richardson reliability ratios of the original form of STAI-2 were found to be "0.73-0.86 and 0.86-0.92",

respectively.[22] In this study, the Cronbach alpha internal consistency coefficient was found to be 0.921.

## IMPLEMENTATION OF THE STUDY

Data were collected by using data collection form on demographic characteristics, which was prepared in line with the literature, PSS and Spielberger STAI Form TX-2.[3] Research data was collected using online Google Surveys (Google LLC, Mountain View, California/USA) as it was the hardest times of the pandemic in Türkiye. The nurses who met the inclusion criteria were sent a Google Surveys research link and asked to answer the questions.

## ETHICAL ASPECT OF RESEARCH

Before starting the study, permission from the Ministry of Health (date: January 10, 2019; no: 7470) and Haliç University Ethics Committee permissions (date: October 22, 2020; no: 131) were obtained. Before answering the research questions, informed consent was obtained from the participants in accordance with the Helsinki Declaration and permission was obtained from those who accepted to participate in the study with the confirmation button.

## STATISTICAL ANALYSIS

All data were analyzed by using IBM SPSS Statistics, Version 22.0 (IBM SPSS, Statistical Package for the Social Sciences, Türkiye) software. For descriptive analysis, frequency, percentage distribution, mean, and minimum-maximum values were analyzed. Chi-square tests were used for comparative analysis and independent samples t-test was used for quantitative comparisons. Results were evaluated at a 95% confidence interval and a p value of <0.05 was considered statistically significant.

# RESULTS

A total of 465 nurses completed the research questions. However, 124 of them were excluded from the analysis. A total of 341 nurses were included in the study (Figure 1). The mean age of the surgical nurses was 28.536.49 years and 83% (n=283) were female, 35.8% (n=122) were married, 77.1% (n=263) were university graduates, 28.2% (n=96) were working in the general surgery service and 80.4% (n=284) were
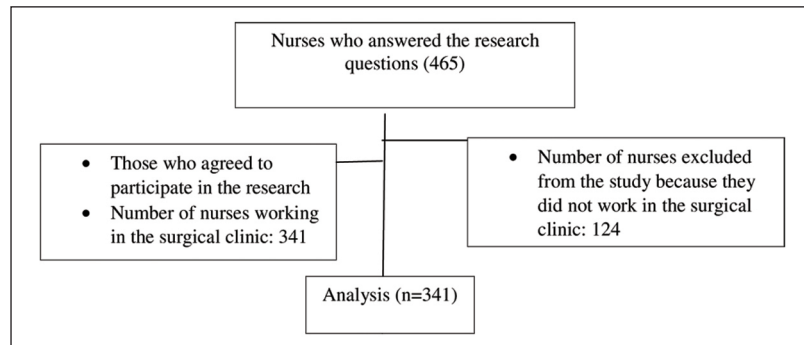
**FIGURE 1:** Flow diagram.

working in the pandemic hospital. The mean work experience in the profession was 6.126.78 years, the mean working time in the surgical clinic was 4.535.89 years, and the mean weekly working time was 46.328.98 hours (Table 1).

The mean PSS and STAI-2 scores of the nurses working in the surgical clinic during the COVID-19 pandemic process were 33.577.07 and 52.0611.35, respectively (Table 1).

There was no statistical significance between the PSS and STAI-2 scores of the surgical nurses during the COVID-19 pandemic period, and their mean age, marital status, educational background, and chronic disease (p>0.05). A statistically significant difference was observed between the gender of the participants and their PSS scores (p<0.05). Stress levels of women (34.106.60) were found to be higher than that of men (30.968.63) (Table 2).

At 95% confidence level, there was no difference between the nurses working in the pandemic hospital and those who did not work in the pandemic hospital in terms of perceived stress and anxiety (p>0.05). On the other hand, it was concluded that there was a difference between the 2 groups' averages in terms of perceived anxiety (p=0.02<0.05). There was no statistically significant correlation between the nurses' total work experience in the profession and their mean anxiety scores (p=0.30; p>0.05); however, a low positive correlation was observed between mean perceived stress (p=0.00; p<0.05) (Table 3).

During the COVID-19 pandemic, there was a low positive correlation between the mean working

**TABLE 1:** Descriptive characteristics, data related to their working conditions, and total scale scores (n=341).

| Characteristics | $\bar{X}\pm SD$ | n | % |
|---|---|---|---|
| Age | 28.53±6.49 | 341 | 100 |
| Gender | | | |
|   Female | | 283 | 83 |
|   Male | | 58 | 17 |
| Marital status | | | |
|   Married | | 122 | 35.8 |
|   Single | | 219 | 64.2 |
| Educational background | | | |
|   High school | | 15 | 4.4 |
|   University | | 263 | 77.1 |
|   Postgraduate | | 63 | 18.5 |
| Surgical clinic | | | |
|   General surgery | | 96 | 28.2 |
|   Cardiovascular surgery | | 50 | 14.7 |
|   Thoracic surgery | | 15 | 4.4 |
|   Orthopedics | | 19 | 5.6 |
|   Urology | | 16 | 4.7 |
|   Emergency surgery | | 2 | 0.6 |
|   Neurosurgery | | 8 | 2.3 |
|   Surgical intensive care | | 41 | 12 |
|   Operating room | | 31 | 9.1 |
|   Other* | | 63 | 18.5 |
| Hospital type | | | |
|   Pandemic hospital | | 274 | 80.4 |
|   Not a pandemic hospital | | 67 | 19.6 |
| Total work experience | 6.12±6.78 | 341 | 100 |
| Working time in the surgical clinic | 4.53±5.89 | 341 | 100 |
| Weekly working hours | 46.32±8.98 | 341 | 100 |
| PSS | 33.57±7.07 | 341 | 100 |
| STAI-2 | 52.06±11.35 | 341 | 100 |

*Endoscopy (26), endocrine surgery (15), plastic surgery (10), ear/nose/throat surgery (12); SD: Standard deviation; PSS: Perceived Stress Scale; STAI-2: Trait anxiety subscale.

**TABLE 2:** Comparison of the demographic characteristics of the participants and their mean PSS and STAI-2 scores (n=341).

| Characteristics | n | % | PSS X̄±SD | PSS Test | STAI-2 X̄±SD | STAI-2 Test |
|---|---|---|---|---|---|---|
| Age | 314 | 100 | 28.53±6.49 | ρ=0.08 | | ρ=0.05 |
| | | | | p=0.10 | | p=0.34 |
| Gender | | | | | | |
| Female | 283 | 83 | 34.10±6.60 | **Z=-2.33** | 51.9±10.94 | Z=-0.65 |
| Male | 58 | 17 | 30.96±8.63 | **p=0.01** | 52.84±13.26 | p=0.51 |
| Marital status | | | | | | |
| Married | 122 | 35.8 | 33.83±7.63 | Z=-1.00 | 52.02±11.65 | Z=-0.05 |
| Single | 219 | 64.2 | 33.42±6.76 | p=0.31 | 52.08±11.20 | p=0.95 |
| Educational a background | | | | | | |
| High school | 15 | 4.4 | 33.33±6.26 | $\chi^2$=1.39 | 49.2±11.98 | $\chi^2$=2.34 |
| Bachelor's degree | 263 | 77.1 | 33.59±6.83 | p=0.49 | 52.02±11.38 | p=0.31 |
| Postgraduate | 63 | 18.5 | 33.52±8.27 | | 52.92±11.21 | |
| Current chronic disease | | | | | | |
| Yes | 57 | 16.7 | 35.08±7.10 | Z=-1.63 | 50.4±9.92 | Z=-1.79 |
| No | 284 | 83.3 | 33.26±7.04 | p=0.10 | 52.39±11.6 | p=0.07 |

ρ: Spearman's correlation test; $\chi^2$: Kruskal-Wallis test; Z: Mann-Whitney U test; PSS: Perceived Stress Scale; STAI-2: Trait anxiety sub-scale; SD: Standard deviation.

**TABLE 3:** Comparison of participants' working characteristics and mean scores of PSS and STAI-2 (n=341).

| Characteristics | n | % | PSS X̄±SD | PSS Test | STAI-2 X̄±SD | STAI-2 Test |
|---|---|---|---|---|---|---|
| Clinic | | | | | | |
| General surgery | 96 | 28.2 | 33.28±7.64 | | 53.39±11.66 | |
| Cardiovascular urgery | 50 | 14.7 | 33.54±6.15 | | 53.62±11.67 | |
| Thoracic surgery | 15 | 4.4 | 34.40±4.91 | | 54.2±14.34 | |
| Orthopedics | 19 | 5.6 | 34.94±5.44 | | 51.32±10.43 | |
| Urology | 16 | 4.7 | 31.75±9.27 | $\chi^2$=2.15 | 50.63±6.81 | $\chi^2$=7.67 |
| Emergency surgery | 2 | 0.6 | 36.00±8.48 | p=0.98 | 58.50±13.43 | p=0.56 |
| Neurosurgery | 8 | 2.3 | 31.87±5.69 | | 51.5±11.89 | |
| Surgical intensive care | 41 | 12 | 34.17±7.96 | | 51.27±12.44 | |
| Operating room | 31 | 9.1 | 33.58±5.44 | | 50.94±9.03 | |
| Other | 63 | 18.5 | 33.63±7.60 | | 49.81±11.34 | |
| Hospital type | | | | | | |
| Pandemic hospital | 274 | 80.4 | 33.60±7.38 | Z=-0.64 | 52.72±11.25 | **Z=-2.21** |
| Not a pandemic hospital | 67 | 19.6 | 33.41±5.73 | p=0.52 | 49.36±11.44 | **p=0.02** |
| Total work experience | 341 | 100 | | ρ=0.17 | | ρ=0.05 |
| | | | | **p=0.00** | | p=0.30 |
| Working time in the surgical clinic | 341 | 100 | | ρ=0.16 | | ρ=0.07 |
| | | | | **p=0.00** | | p=0.18 |
| Weekly working hours | 341 | 100 | | ρ=0.00 | | **ρ=0.13** |
| | | | | p=0.90 | | **p=0.01** |
| PSS | | 341 | 100 | | | ρ=0.06 |
| | | | | | | p=0.21 |

$\chi^2$: Kruskal-Wallis test; Z: Mann-Whitney U test; ρ: Spearman correlation test; PSS: Perceived Stress Scale; STAI-2: Trait anxiety sub-scale; SD: Standard deviation.

**TABLE 4:** The results of the regression analysis in which the significance of the coefficients was tested for the models created.

| | | Coefficients | SE | t value | p value |
|---|---|---|---|---|---|
| Model | Constant | 45.58±0.15 | 3.33 | 13.67 | **0.00** |
| | The hospital she/he works in is a pandemic hospital | -2.69 | 1.56 | -1.72 | 0.08 |
| | Weekly working time | 0.15 | 0.06 | 2.18 | **0.03** |

SE: Standard error.

time in the surgical clinic and the mean perceived stress scores of the nurses (p=0.00; p<0.05); whereas it had no statistically significant correlation with anxiety levels (p=0.47; p>0.05). The change in the weekly working hours of the nurses was observed to have no effect on the perceived stress and trait anxiety levels; however, it was found that there was a weak positive correlation between the weekly working time and the level of anxiety (Table 3).

When Table 3 is examined, it can be said that the change in the perceived stress levels of the nurses during the COVID-19 pandemic did not have any positive or negative effect on their trait anxiety levels (p=0.21>0.05).

Since the variable affecting the anxiety levels of nurses during the COVID-19 pandemic process was p=0.03<0.05, it was found as weekly working time. When the variable found to be significant for the model is accepted as constant, the anxiety level in nurses will be 45.58 units. The effect of a one-unit (hourly) increase in the weekly working time on the level of anxiety will be 45.580.15=45.73 units (Table 4).

# DISCUSSION

There are many studies investigating psychological stress and anxiety experienced by HCPs during the COVID-19 pandemic in the literature.[1,6,11,23,24] Cai et al. reported that 47% of nurses experienced moderate to severe anxiety, and in the study conducted by Huang et al., the mean stress and anxiety levels of healthcare workers were 42.92±17.88 and 42.91±10.89, respectively.[25,26] In this study, it was determined that the stress and trait anxiety levels experienced by nurses working in surgical clinics during the pandemic were similar to those in the literature.

This study has shown that the perceived stress and trait anxiety levels of nurses working in surgical clinics are moderate. The literature review has shown that COVID-19 pandemic increases the perceived stress and trait anxiety experienced on HCPs.[6,12,13,25-30] Hou et al. found that nurses who cared for patients who underwent elective surgery before being diagnosed with COVID-19 contracted COVID-19 pneumonia; similarly, it is stated that the surgical team working in emergency departments is fear of COVID-19.[31,32] This finding can be considered as an expected result since surgical nurses play a primary role in the care of COVID-19 positive patients, isolate and restricted life by the pandemic requires extraordinary responsibility, there is a lack of equipment, and the risk of transmission is high. The collection of research data in the second wave of the pandemic and gaining experience in the management of the disease may have an effect on the perceived stress and trait anxiety levels of nurses.

In the present study, female nurses have been observed to experience more perceived stress than men. Studies have shown that female nurses have higher psychological stress and anxiety levels during the COVID-19 pandemic than men.[13,23,33,34] Stress is a state of arousal manifested by physical, emotional and mental changes when an individual is exposed to a stimulus. Therefore, women experience these changes more as internal experiences and personal feelings. In addition, during the COVID-19 period, female nurses may experience stress and anxiety due to reasons such as family processes (having children, divorce etc.), having to continue working for economic reasons, and losing a close relative. Salopek-Žiha et al. found that there was a deterioration in the mental health of surgical nurses, especially those with young children, and similarly, stated that surgical

nurses who have children are more anxious than those who do not have children.[18,35] Shanafelt et al. reported that nurses working in surgical clinics are afraid of infecting their loved ones with the COVID-19 virus.[6] In this context, it can be said that women are more alert in evaluating the changing conditions in the pandemic and perceiving them as stress, which is the outcome of the current negative situation, within the context of their personal differences.

In this study, it was found that the stress experienced by nurses increased as the number of years worked in total and surgical clinics. Zhu et al. have reported that HCPs with work experience of more than a decade have higher stress levels.[34] Xiao et al. and Spoorthy et al. have found that stress levels of HCPs increase with the increasing work experience.[11,24] The disease course of COVID-19 worsens with age, which can be explained by the high stress level of nurses with a high total working year.

Studies have indicated that during the COVID-19 pandemic, nurses experience psychological stress due to long working hours and workload, leading to negative consequences on their general health condition.[26] Similar to the literature, working hours significantly correlate with the anxiety levels of surgical nurses included in the present study. This finding suggests that the increased working hours in an extraordinary situation such as a pandemic affect the trait anxiety levels of nurses by experiencing situations such as fear, inability to access resources and fatigue.

## LIMITATIONS OF THE STUDY

This research is limited to the fact that the majority of nurses are women and surgical nurses working with COVID-19 patients.

## CONCLUSION

In conclusion, the majority of primary care surgical nurses experienced moderate to severe stress and anxiety, during the pandemic; it was determined that working hours were associated with this situation. The working year in the clinic and the total work experience in the profession affect the perceived stress level, and the surgical clinics where the nurses work do not affect the perceived stress and trait anxiety. Since these are changeable factors, the working hours of nurses should be regulated during the pandemic, and psychological support should be given to reduce stress and anxiety levels, especially to surgical nurses working in the pandemic hospital.

*Authorship Contributions*

*Idea/Concept: Açelya Türkmen; Design: Açelya Türkmen; Control/Supervision: Açelya Türkmen; Data Collection and/or Processing: Açelya Türkmen, Yasemin Özhanlı; Analysis and/or Interpretation: Açelya Türkmen, Yasemin Özhanlı; Literature Review: Açelya Türkmen, Yasemin Özhanlı; Writing the Article: Açelya Türkmen, Yasemin Özhanlı; Critical Review: İkbal Çavdar.*

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