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Review Article

The Effect of Coronavirus (COVID-19) on Job Satisfaction, Work Stress and Burnout of Healthcare Workers: A Systematic Review and Meta-Analysis

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Abstract

Background: We aimed to examine the job satisfaction (JS), work stress (WS) and burnout (B) levels of healthcare workers (HCWs), who are at the forefront of the fight against the coronavirus (COVID-19) epidemic process, which negatively affects the whole world, by meta-analysis.

Methods: Articles, theses and papers in the literature before the COVID-19 (2014-2019) and during COVID-19 (2020-2022) were systematically reviewed. The sample size of 54 studies conducted from 13 countries was 49.139. Data analysis was performed with the Comprehensive Meta-analysis (CMA) 3.0 Version program.

Results: According to the random effect model analysis result, a negative, significant and low-level relationship was found between WS and JS, before and during COVID-19. There was a negative, significant and medium level relationship between JS and B. It was found positive, significant and high-level relationship between WS and B. Human development level (HDL) has a moderating effect on WS and B. In addition, sample size has moderating effect on WS and JS.

Conclusion: During the prolonged COVID-19 pandemic, HCWs have experienced more burnout due to strict isolation, working conditions requiring overtime, fatigue, insomnia and concerns about virus transmission. Intense work tempo, inadequate health equipment, patient deaths, and low wages are the factors that decrease JS and increase WS and B. It is recommended to improve working conditions globally and provide financial support and mental health protection for HCWs.

Keywords: Healthcare workers; Job satisfaction; Work stress; Burnout; Meta-analysis

Introduction

COVID-19 emerged in Dec 2019 in Wuhan, China, and spread worldwide in a short time. Various restrictions have been implemented in different countries at different times to deal with this virus (1). The COVID-19 outbreak has spread to more than 210 countries and has become a global threat to humanity (2). In addition, people have been negatively affected mentally due to social restrictions and radical changes in

working life, and millions of people lost their jobs during this pandemic (3, 4).

By June 27, 2020, nearly 9.6 million people had contracted this deadly disease, besides; it took the form of a global epidemic with the death of approximately 5 million people worldwide (2). According to the lowest scenario, "approximately 15 million people" will die globally due to the COVID-19 outbreak (5). In addition, people were negatively affected mentally due to social restrictions and radical changes in working life, and millions of people lost their jobs during this pandemic (3, 4). In this period, while healthcare workers (HCWs) were intensively dealing with patients, due to the severity of working conditions, they were the most negatively affected by the Coronavirus process (6-9). HCWs are expected to fulfill their duties to care for patients as a requirement of their job despite the risk of a coronavirus outbreak. According to Malesza (10), this task of healthcare professionals has become much more prominent and important due to the increasing burden of COVID-19 health services, a global crisis with fatal, destructive, and long-term effects.

The high risk of transmission of the virus in hospital environments, reports on the effect of virus-related infections on hospital employees have revealed psychological problems such as depression, anxiety, fear, stress, and burnout (11-14). In addition, the quarantine required to work in high-risk hospital wards has also been another source of mental disorders for HCWs (15). HCWs are the most effective weapons of humanity in the fight against the COVID-19 outbreak, which has caused the deaths of millions of people worldwide. With the rapid increase in the number of patients during the COVID-19, HCWs had to work in more isolated conditions in hospitals. It is vital to examine thoroughly how HCWs are psychologically affected by these epidemic conditions. Therefore, this research is conducted with a systematic review method to determine the effect of the COVID-19 outbreak process on job satisfaction (JS), work stress (WS) and burnout (B) and HCWs.

Burnout is a psychological response that is generally considered a delayed response to chronic emotion and interpersonal stress at work (16). Burnout is conceptualized as chronic workplace stress that cannot be successfully managed. WS is a broad phenomenon that includes interpersonal relationships, and interactions between environment and time (17, 18). WS is quite common in modern working environments. WS, which causes physical and psychological diseases, puts a significant burden on organizations and economies of countries. Increased absenteeism, high turnover rates, and low JS lead to production losses caused by long-term psychological and physical health problems (19). JS is associated with job security, wages, compensation received, colleagues, supervisor-manager support, development, and growth opportunities at work (20). JS refers to the feelings of work satisfaction that motivate one to work in general (21, 22). JS is about how the working environment and conditions meet the needs of the employee and how the employee can meet the requirements of the job. Human development level (HDL) determines countries significantly impact to the fight against epidemics. Human Development Index (HDI) is divided into four levels: (0.8-1.0) very high human development, (0.7-0.79) high human development, (0.55-0.70) middle human development, and (below 0.55) low human development (23). While there are studies in the literature on JS, WS and burnout levels of HCWs, this research was conducted because there is no comprehensive systematic synthesis of these studies revealing the effect of HDL and before COVID-19 and during COVID-19. Accordingly, the research questions were formed as follows.

Q1. Is there a significant relationship between WS-JS levels of HCWs according to the COVID-19 process?

Q2. Is there a significant relationship between WS-B levels of HCWs according to the COVID-19 process?

Q3. Is there a significant relationship between B-JS levels of HCWs according to the COVID-19 process?

Q4. Do the period of studies, HDL, and sample size have a moderator effect on the levels of WS, B and JS of HCWs?

According to Spector and Thompson (24), combining the results of comparable studies can reduce random sampling errors that may be dominant in any individual study. When the sample size is the more in meta-analysis research, the estimation of effect is the more accurate. Therefore, the sample size of the research in this study was also analyzed as a moderator factor.

Methods

This research was conducted using the systematic review method. This method is the synthesis of the studies that found after the screening process according to the selection and elimination criteria determined by the appropriate method. Studies in which quantitative analyzes were applied to the data collected by the survey method were included in the research. In order to reach the studies within the scope of the research, screening was carried out in the databases containing the field of health and social sciences within the specified time interval. Accordingly, 54 studies were determined as 45 research articles, 9 theses (7 master's, 2 doctoral theses) in accordance with the research criteria because of the screening. Overall, 36 studies of them were conducted before COVID-19 and the sample size was 43.497. During the COVID-19 period, 18 studies were conducted, and the sample size was 5.642. The research sample were collected in 13 countries which entered to 4 different HDL from 49.139 HCWs. Pearson correlation coefficient (r) was calculated for all three variables (WS, JS, B) in 9 studies that included in the research. Therefore, these studies were repeatedly included in the analysis in the form of binary combinations. Besides, 72 studies are seen in the analyzes although the research data consist of 54 studies.

Ethical Approval

Ethical approval was obtained from Akdeniz University Scientific Research and Ethics Committee with the decision dated 31.08.2021 and numbered 293.

Search Strategy and Data Sources

Health and social sciences fields are searched in the determined databases. The studies were reached by entering the keywords as "work stress",“job stress”,“occupational stress”,“work satisfaction”,“job satisfaction”,“burnout”,“job burnout”,“work burnout”,“occupational burnout”,“healthcare professionals”, “doctor”,“healthcare workers”,“health workers”,“medical staff”,“care workers”, “nurse”,“doctors",“COVID”,“COVID-19” with conjunctions “and”,“or” in both Turkish and English languages into the databases between Dec 2019-Aug 2022.

Eligibility Criteria

In line with the following inclusion and exclusion criteria, it was examined whether the studies met the research criteria: 1) The publication time and data collection dates were considered while determining the scope of the research. Before COVID-19 period includes the dates between 2015-2019 and the COVID-19 period includes the studies in which data were collected and published between Dec 01, 2019, and Aug 26, 2022. 2) The studies published in English and Turkish and the studies in which abstract was written in English were included. 3) The studies have been conducted on JS, WS and B on HCWs. 4) Electronic and printed articles, master's and doctoral theses, studies presented in the paper were selected for working resource. Review, qualitative research, published and unpublished conference summary, letters and comments were excluded. Conference abstracts were not included in the study because of statistics and analyses were not specified in the conference abstracts. Similarly, the other unpublished studies were excluded, as this would be a problem. 5) In order to include the studies in the research, the study data must be collected by quantitative method and also Pearson’s correlation analysis must be applied to the total scores of JS, WS and B. Pearson’s r, one of the correlation types, was determined as the anal-

ysis in the studies since it is parametric. 6) The studies conducted with the survey method were included in the research.

Selection Process and Coding Variables

The screening criteria of the research were initially determined by three researchers. The researchers independently screened the studies according to the inclusion and exclusion criteria. The first of the three researchers was worked on 65 studies, the second one was worked on 74 studies and the third one was worked on 55 studies. By comparing the studies of all three researchers, the duplicated studies, were determined and excluded. While screening the data, disagreements were resolved by adhering to the eligibility criteria. In addition, a fourth expert researcher was consulted to resolve disagreements. Three researchers performed both data screening and coding. The coding process was performed by the researchers by using the Microsoft Office Excel program. Each researcher created a coding form in this program. After all, the data were collected from each researcher and then created a single data set.

Data Analysis

The data were analyzed by using the CMA 3.0 program. In this research, the correlation (r) coefficient was used to calculate the effect size for ease of interpretation (25). Fisher's Z is recommended in the combined effect size studies calculated with correlation coefficients. This is because it makes sensitive predictions and assumes that the difference between effect sizes is due to population diversity. In studies involving correlation data, the correlation coefficient is first translated into Fisher's Z, the overall effect size is calculated according to Fisher's Z, and then converted back into a general correlation (26). Funnel plots were analyzed for publication bias. Researchers disagree about the Funnel plots between WS and JS. Classic fail-safe N and Kendall statistical analyzes results were also analyzed to resolve this disagreement. According to the results of these analyses, the researchers agreed that there was no publication bias at a level that would affect the results of the research.

Results

Effect Sizes Measures and Heterogeneity Test Result

Table 1 shows the effect size and heterogeneity test results of B, WS, JS, according to the random effects model.

Table 1: Heterogeneity test result and effect size

				95%					Heterogeneity Test			
*Variables**	*Model*	*n*	*Total Sample*	Effect Size (Fisher's Z)	Sd	LL	UL	p	Q	df	p	I^2
B-WS	Random	23	25098	0.56	0.031	0.502	0.623	0.00	374.433	22	0.00	94.124
B-JS	Random	30	22451	-0.39	0.054	-0.498	-0.284	0.00	1690.457	29	0.00	98.284
WS-JS	Random	19	23204	-0.23	0.046	-0.330	-0.148	0.00	639.430	18	0.00	97.185

**B:Burnout, WS:Work stress, JS:Job satisfaction*

As a result of calculating the heterogeneity values of the studies in Table 1, the B-WS values were found to be Q=374.433, df=22, B-JS values were found to be Q=1690.457, df=29, WS-JS values were found to be Q=639.430, df=18. The studies included in the meta-analysis were heterogeneously distributed since the Q values were higher than the limit value of the chi-square distributions for the degrees of freedom 22, 29, 18. According to the I^2 value, high heterogeneity values of 94.124%, 98.284%, 97.185% were found in the variables of the study, respectively. For heterogeneity, a calculation of over 75% I^2 indicates high heterogeneity (26). The use of a wide variety of measurement tools may influence the heterogeneity of the studies. Random effects model was used to calculate the average effect sizes due to the heterogeneous distribution of the studies within the scope of the research. This model assumes acceptance of the possibility that studies come from multiple population rather than a single population. The Fisher's Z is considered low level between 0.10-0.29, medium level between 0.30-0.49, high level between 0.50 and above (27). Figures 1, 2, 3 below shows the forest plots of the studies because of the meta-analysis. It can be seen each study to what extent affects the overall effect. The effect size values, standard deviations and 95% confidence interval L-UL of HCWs' scores for B, JS, WS according to (r) are presented in Fig. 1. In accordance with the model of random effects between JS-WS, the effect size ($r_{(18)}$=-0.23, P<.05) was interpreted at a low level, significant and negative relationship was found. In accordance with the model of random effects between WS-B, the effect size ($r_{(22)}$=0.56, P<.05) was interpreted at a high level, significant and positive relationship was found. Between JS-B, the effect size ($r_{(29)}$=-0.39, P<.05) was interpreted at a medium level, significant and negative relationship was found.

Study Selection

Search Strategy and Data Sources (PRISMA flow diagram) are presented in Fig. 4.

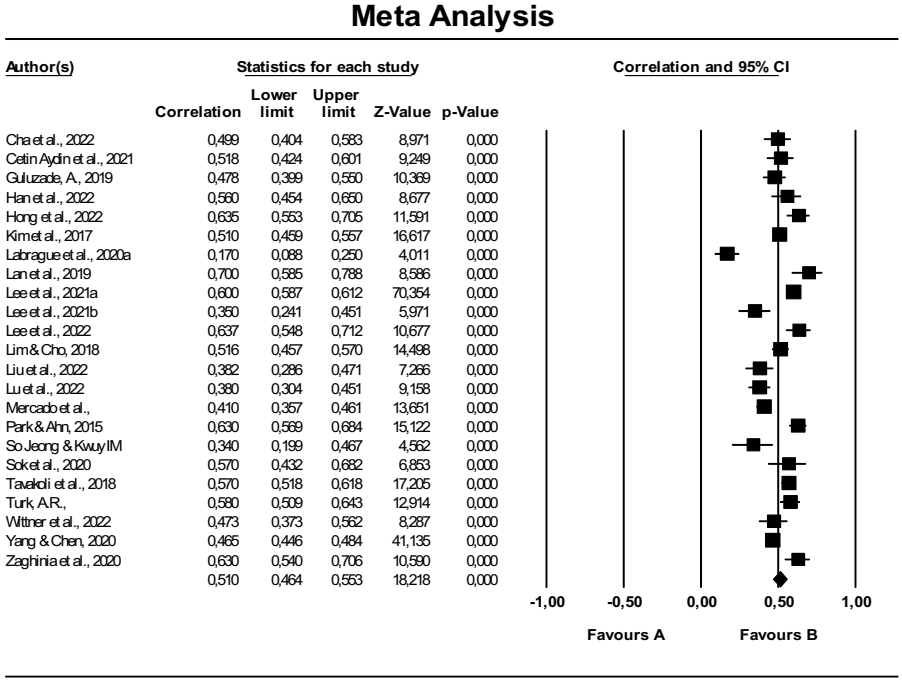

Fig. 1: The effect sizes and the forest plot in the studies conducted between WS-B

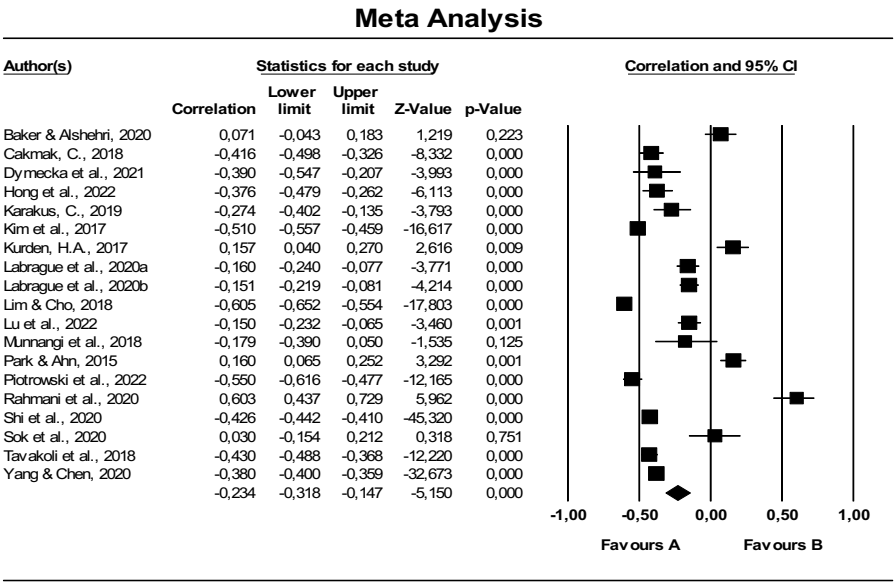

Fig. 2: The effect sizes and the forest plot in the studies conducted between WS-JS

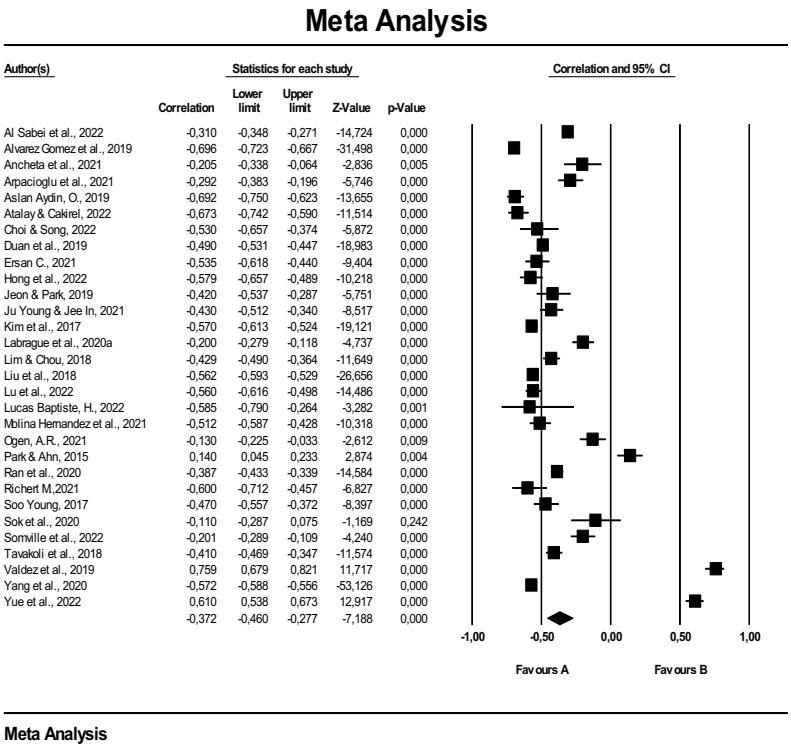

Fig. 3: The effect sizes and the forest plot in the studies conducted between JS-B

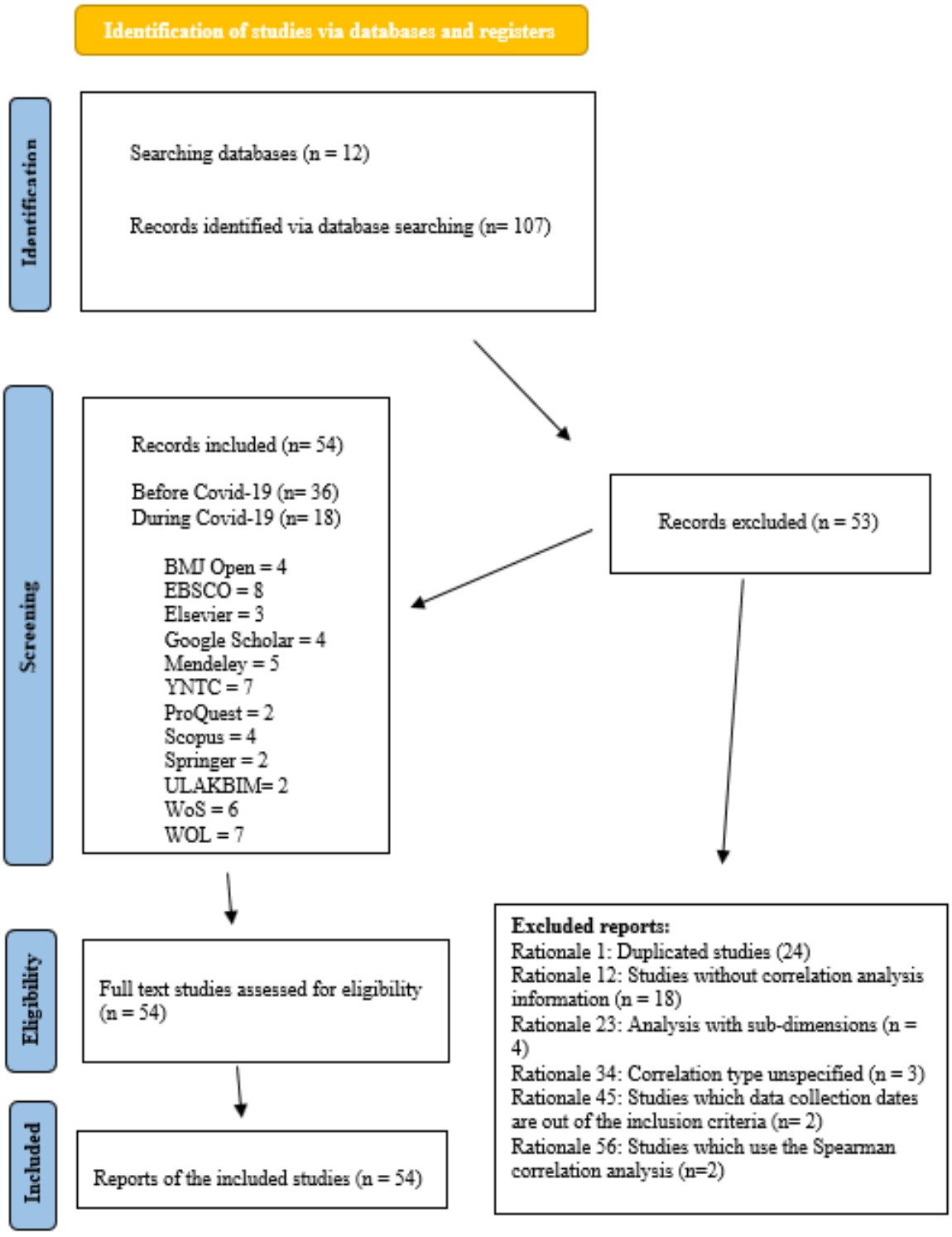

Fig. 4: PRISMA flow diagram (28)

Moderator Analysis

The variables within the scope of the research (process, sample size, HDL) are analyzed separately by moderator according to WS, JS, B (Table 2).

Table 2: Moderator analysis results

WS-JS (n=19)								
Variables		n	Effect Size	Sd	df	0.05 (Conf. Level) X^2	Q	p
Process	Before COVID-19	15	-0.198	0.052	1	3.841	2.046	0.153
	COVID-19 Process	4	-0.393	0.125				
Sample Size	0-500	11	-0.114	0.107				
	501-1000	6	-0.365	0.098	2	5.991	8.186	0.017**
	1001+	2	-0.428	0.027				
HDL	Very High	12	-0.266	0.099				
	High	5	-0.243	0.058				
	Medium	2	-0.156	0.028	2	5.991	2.716	0.257
	Developing	0	-	-				
WS-B (n=23)								
Process	Before COVID-19	14	0.564	0.040	1	3.841	0.006	0.936
	COVID-19 Process	9	0.559	0.048				
Sample Size	0-500	15	0.600	0.038				
	501-1000	6	0.466	0.065	2	5.991	3.328	0.189
	1001+	2	0.599	0.095				
HDL	Very High	17	0.592	0.031				
	High	4	0.494	0.048	3			
	Medium	1	0.172	0.043		7.815	79.748	0.000*
	Developing	1	0.867	0.101				
B-JS (n=30)								
Process	Before COVID-19	22	-0.353	0.064	1	3.841	1.549	0.213
	COVID-19 Process	*8*	*-0.499*	*0.098*				
Sample Size	0-500	19	-0.311	0.106				
	501-1000	5	-0.476	0.078	2	5.991	4.021	0.134
	1001+	6	-0.568	0.072				
HDL	Very High	20	-0.392	0.070				
	High	7	-0.374	0.105	2	5.991	0.042	0.979
	Medium	3	-0.426	0.255				
	Developing	0	-	-				

The studies covered by the HDL in the relationship between WS-B (n=23, X^2=7.815, Q=79.748, *P*<.05) and the studies covered by the sample size in the relationship between WS-JS (n=19, X^2 =5.991, Q=8.186, *P*<.05) were found to be moderator for the calculated effect size. The process did not have a moderator effect on the relationship with any variable. Moderator effect is not significant in analyses other than those specified.

Discussion

COVID-19 is a worldwide vital public health issue. Scientific studies are needed for understanding the psychological, social and physiological effects of this problem on humans. Although hospitals are safe for HCWs due to strict hygiene measures, they have a stressor effect in terms of working conditions. However, the COVID-19 epidemic has also been a separate stressor for HCWs. This study aimed to examine the relationship between WS, JS, B levels either in before COVID-19 or during COVID-19 period of HCWs by systematic review method. When the obtained results are examined in the context of research questions, the stressors caused by COVID-19 reduce HCWs' JS, thus negating the attitude towards their work. In this research, the JS of HCWs decreased as they were exposed to more stress during the COVID-19 period. In the COVID-19 period, the insufficient number of HCWs and inadequate hospital capacities in response to the increasing number of COVID cases has been an important stressor for all HCWs. Vaccine studies and the long and uncertain treatment process of the COVID virus, as well as intensive and long working hours are other stressor factors that increase stress and reduce JS in HCWs. While HCWs' JS levels decrease during the COVID-19, WS levels increase (29-36). HCWs are already exposed to WS under normal conditions due to both relationships with patients and difficult working conditions (long and on-call shifts, fatigue, insomnia, isolation from family and society, violence from patients). In addition to these, experiencing the intense stress caused by COVID-19 epidemic may cause burnout in the following process. During COVID-19 period, while HCWs were trying to avoid contacting the virus, they were also feared and worried about transmitting the disease to their close environment. Patient deaths and increasing demand on care from patients during the treatment process may lead to insensitivity, feelings of burnout and alienation towards themselves, patients and their occupations. Research which supports this results revealed that HCWs experience more stress and burnout during the COVID-19 period (2, 37-49). HCWs must cope with the physical, psychological, and social difficulties caused by the coronavirus. Be exposed to work for long periods due to COVID-19 period may lead to monotony at work. After a while this can also affect feelings of worthlessness, and meaningless towards to HCWs' jobs. This situation can lead to chronic burnout, which in turn can cause HCWs to become desensitized to patients, the people around them and feelings of personal inadequacy. Such negative experiences can lead to decrease in the satisfaction of employees for their professions, especially in works in the service sector that require intense interpersonal interaction. In this research, as HCWs' burnout feelings increased, JS decreased. Research results conducted in COVID-19 period is parallel to this result (11, 50-55). In line with the results obtained from this study, the COVID-19 pandemic period has emerged as an important factor that creates WS on HCWs and B in the following process. Difficulties and stressors in the working conditions of HCWs during the COVID-19 period increased B and decreased JS.

Because of the moderator analysis, there is a moderator effect between WS-B and HDL. Uncertainty and anxiety in the early days of the COVID-19 outbreak may have caused intense anxiety in HCWs. During COVID-19 period, many factors such as not being able to access adequate medical protective equipment, not being able to access drugs and vaccines, staff shortages, and working with a low salary may have led to an

increase in stress and burnout in HCWs (2, 52, 56-60). Despite the negative working conditions, the appreciation, esteem, praise, and respect of society to HCWs due to their effort can be a reason for increasing the HCWs' JS and motivation on work. COVID-19 has caused the deaths of millions of people and HCWs. Psychological help, psychological support and social support are useful in preventing HCWs from experiencing stress and burnout during the COVID-19 period and gaining a positive attitude towards their work (15, 19, 30, 31, 61, 620. The lack of sufficient number of studies in countries except the high and very high-level developed countries can have an effect on the results. Studies conducted in very high and high development leveled countries reveal a significant, positive and high-level relationship between HCWs' WS and B (63-67). On the other hand, the sample size has a moderator effect on the relationship between WS-JS. Studies with 0-500, 500-1000 and 1000 or more samples in the scope of this research reveal a significant, negative and high-level relationship between WS-JS. However, the same moderator effect was not found between WS-B also JS-B. This result is important in terms of showing the significant effect of WS on HCWs' JS in large sample sized studies (68-73). The results of this research can create insight and awareness to HCWs' negative feelings and attitudes towards their job in a possible future outbreak. In addition, with this research, HCWs' occupational difficulties, working conditions and concerns are emphasized. In future research, other factors that may affect the feelings, attitudes and behaviors of HCWs towards their jobs can be examined. As a result, HCWs are the first fighter to epidemics and to other diseases that pose a threat to humanity. Especially during the COVID-19 epidemic regardless of title, all HCWs have been faced with risking their own and relatives' lives.

Applied Implications

Health managers, health policy makers will be able to make objective evaluations about HCWs' working conditions and also will be able to make effective decisions in possible epidemic conditions. Especially since epidemic conditions affect the whole world, it becomes difficult for people to access health services and hospitals. HCWs have to deal with the treatment of more patients than usual during the COVID-19 period. Each country can already take measures to provide more economic and social support to health workers, while strengthening the health system against future epidemics.

Limitation

The limitations of this research were in line with the studies included in the research, the place where these studies are conducted, the measurement tools used, and the sample. If there were ongoing unpublished studies during the research, these may change the research results. Studies that were not included in the current study pose a potential risk to the validity of the findings of this research.

Conclusion

According to the random model, a low level, significant and negative relationship was found between JS-WS, while a medium level, significant and negative relationship was found between JS-B. In addition, a high level, significant and positive relationship was found between WS-B. The HDL has a moderating effect between WS-B. Sample size also has a moderating effect between WS-JS.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Access to summary of study characteristics are open to all. https://docs.google.com/document/d/1yvURSiF8Rx7U7TEyQmDoOkGrn0cWEYlv/edit

Conflict of interest

The author(s) declare that they have no conflict of interest.

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