Black Sea Journal of Health Science
doi: 10.19127/bshealthscience.1345380

Open Access Journal
e-ISSN: 2619 – 9041

Research Article
Volume 7 - Issue 1: 25-32 / January 2024

THE EFFECT OF MUSIC ON CARE BEHAVIORS AND BURNOUT LEVELS OF NURSES WORKING IN COVID-19 UNITS

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Abstract: Studies indicate that during the COVID-19 pandemic, most of the nurses have experienced burnout, affecting their caring behavior. It is important that nurses be provided with physical and mental health support. Therefore, music may be useful for these frontline nurses. The aim of this study was to assess the effect of music on care behaviors and burnout levels of nurses working in COVID-19 units. This was a self-controlled intervention study. The study included 38 daytime nurses in a public hospital in Ankara, Türkiye. Data were collected using the Caring Behaviors Inventory-24 (CBI-24), and the Maslach Burnout Inventory (MBI). Music was played for 30 minutes every day over eight weeks. After the music intervention, mean CBI-24 subscores significantly increased (P<0.001), and the mean MBI emotional exhaustion subscore decreased (P=0.010). We found a significantly negative correlation between the assurance subscale of the CBI-24 and the depersonalization subscale of the MBI (r=−0.418, P=0.009). The study showed that music decreased emotional exhaustion and improved their care behaviors of nurses working in COVID-19 units. Nursing leaders should develop strategies to reduce the burnout and enhance caring behaviors during the pandemic. These results may be a guide for policymakers to develop workplace policies during crises such as the COVID-19 pandemic.

Keywords: Burnout, Caring behaviors, COVID-19, Music, Nurse

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Received: August 19, 2023
Accepted: December 29, 2023
Published: January 01, 2024

Cite as: Akçay İ, Erek Kazan E. 2024. The effect of music on care behaviors and burnout levels of nurses working in COVID-19 units. BSJ Health Sci, 7(1): 25-32.

1. Introduction

Coronavirus disease-2019 (COVID-19) appeared in Wuhan, China, in December 2019 and spread worldwide. On March 11, 2020, the World Health Organization (WHO) reported that COVID-19 a global pandemic (WHO 2021), and the first case of COVID-19 was confirmed in Türkiye (T.R. Ministry of Health, 2021).

Nurses have been at the forefront of patient care during the pandemic. The International Council of Nurses (ICN) shared concerns that many nurses were experiencing mental health distress, and requested governments intervene to aid their overall health and wellbeing (ICN 2021). Furthermore, WHO called on health managers and team leaders to provide health care workers mental health and psychosocial support services (WHO, 2020).

Nursing care is an essential component of patient satisfaction and quality in healthcare. Therefore, it is vital that nurses' caring behaviors are properly administered. However, nurses working in COVID-19 units face many challenges, including a different care management approach, long hours working with personal protective equipment, risk of contracting disease, mental health problems, fatigue, and occupational burnout (Fernandez et al., 2020; ICN, 2021). The COVID-19 pandemic affected the quality of life (QOL) and caring behaviors of frontline nurses (Inocian et al., 2021). Minuye et al. (2021) evaluated nurses' intention caring for COVID-19 patients as low (59.5%). Some studies indicated that nurses display low caring behaviors when experiencing higher levels of stress or burnout (Sarafis et al., 2016; Shen et al., 2018).

Studies on frontline nurses in both Türkiye (Sayilan et al., 2020; Murat et al., 2021) and other countries (Hu et al., 2020; Duarte et al., 2020; Chen et al., 2021; Galanis et al., 2021; Kackin et al., 2021) reported burnout as common. Other studies (AlAteeq et al., 2020; Chen et al., 2020; Huang et al., 2020; Shanafelt et al., 2020; Inocian et al., 2021) indicate that the mental health problems brought on by the pandemic have become a serious obstacles for nurses, which negatively affects their patient care (AlAteeq et al., 2020; Kackin et al., 2021). To cope with these challenges, 36.3% of the nurses read mental health books, 50.4% resorted to social media, and 17.5% sought professional mental health support (Kang et al., 2020). Appropriate methods of dealing with difficult situations can help protect and improve mental health. Music therapy may be a viable option (Taets et al., 2013; Kacem et al., 2020).

Music is a noninvasive and nonpharmacological intervention. It is easy to apply, reliable, effective and requires little manpower and cost (Çifdalöz, 2019; Giordano et al., 2020; Kacem et al., 2020). Music

intervention studies (Repar and Patton, 2007; Lai and Li, 2011; Taets et al., 2013; Kacem et al., 2020) indicated that music reduced anxiety, depression, stress, and burnout levels, improved mental health and increased feelings of empowerment and happiness of health professionals. Nurses' emotional and physical states are reflected in patient care; so, a high QOL leads to improved patient care (Repar and Patton, 2007). The pandemic has increased burnout and decreased motivation among nurses. Therefore, nurses require more mental and physical support than ever before. Hospital managers should seek ways to manage these risks so that nurses remain resilient and healthy (Repar and Patton, 2007).

Since the onset of COVID-19, programs have been developed by the Turkish Ministry of Health. Public institutions and organizations, local governments, academic, professional, and non-governmental organizations have been providing remote mental health services to help alleviate mental distress and other problems of healthcare personnel and individuals affected by COVID-19 (T.R. Ministry of Health, 2020; Turkish Association of Public Health Society, 2021; Murat et al., 2021). However, it still could not fully provide a practical solution. A realistic option could certainly reduce the stress of health personnel and help reduce burnout.

Some studies have shown that music intervention has been effective at reducing stress levels of healthcare personnel during the pandemic (Giordano et al., 2020; Bittel et al., 2021; Pinho et al., 2021; Vajpeyee et al., 2021). However, few studies have analyzed the effects of music intervention on nurses' burnout while working in COVID-19 units, and none have investigated the effect of music intervention on caring behaviors, or the relationship between both. Therefore, the current study aimed to determine these effects.

1.1. Hypotheses

$H_0$1: Music intervention does not affect the perception of caring behaviors of nurses working in COVID-19 units.

$H_0$2: Music intervention does not affect burnout levels of nurses working in COVID-19 units.

$H_0$3: Music intervention does not affect the relationship between the perception of caring behaviors and burnout levels among nurses working in COVID-19 units.

$H_1$1: Music intervention affects the perception of caring behaviors of nurses working in COVID-19 units.

$H_1$2: Music intervention affects burnout levels of nurses working in COVID-19 units.

$H_1$3: Music intervention affects the relationship between the perception of caring behaviors and burnout levels among nurses working in COVID-19 units.

2. Materials and Methods

2.1. Design and Sample

This was a self-controlled intervention study. The research was carried out in a 510-bed public hospital in Ankara, Türkiye. The population of the study consisted of 236 staff nurses. The study was made in five COVID-19 clinics which agreed to participate in the study between September and December of 2020. These clinics were selected considering the technical possibilities that would allow musical intervention to affect the nurses' working conditions without blocking the nurses' routine work, and patients would not be affected by the music. The samples were selected through a purposive sampling method, and included 50 daytime nurses who had at least one year of work experience in these clinics. Intensive care units, psychiatric clinics, the emergency department, outpatient clinics, and the burn unit were excluded because of concerns around patient care.

The study only included nurses who worked on the day shift to allow a consistent music intervention and pre/post comparison. All participating units were informed in detail about the study. Twelve nurses were excluded from the sample because they declined to participate out of disagreement with the necessity of the music intervention (n=3) or because they were on leave (n=9). The final sample included 38 voluntarily nurses.

2.2. Measurement and Instruments

Data was collected using a descriptive characteristics form (Form 1), a music preference survey (Form 2), the Caring Behaviors Inventory-24 (CBI-24) (Form 3), and the Maslach Burnout Inventory (MBI) (Form 4).

2.2.1. Form 1: Descriptive characteristics form

This form included nine items concerning sociodemographic characteristics and working conditions (age, sex, education status, marital status, work experience, working hours, shifts, etc.).

2.2.2. Form 2: Music preference survey form

This form was prepared by the researcher to inquire into participants' preferred music genres, and was reviewed by a staff musicologist. The 9-item survey concerned nurses' opinions on music, music-listening habits, time spent listening, preferred genres, any medical conditions that might affect hearing, etc.

2.2.3. Form 3: Caring behaviors inventory-24

Wu et al. developed the CBI-24 to evaluate nursing care process (Wu et al., 2006). Kurşun and Kanan (2012) assessed the Turkish version. The scale consists of 24 items in 4 subscales: assurance of human presence, professional knowledge and skill, respectful deference to others, and positive connectedness. It is scored on a Likert-type scale (1=never; 6=always), and scores range from 24 to 144. Nurses' perceptions of caring behavior increase as subscores and total scores increase (Kurşun and Kanan, 2012). The Cronbach's alpha of the Turkish version was reported to be 0.93. In our study, we calculated this value as 0.87.

2.2.4. Form 4: Maslach burnout inventory

The MBI was improved by Maslach and Jackson in 1981 to measure occupational burnout. The original MBI is a 7-point Likert-type scale that includes 22 items in three domains: emotional exhaustion, depersonalization, and personal accomplishment. The validity and reliability of the Turkish version were assessed by Ergin (1992), who

converted the scale to a 5-point Likert scale (0=never; 4=always). Low personal accomplishment scores and high emotional exhaustion and depersonalization scores indicate severe burnout. The reported Cronbach's alpha is 0.93 (Çapri, 2006). In our study, we calculated this value as 0.78.

2.3. Data Collection

A preliminary study was performed with 10 daytime general surgery nurses between September 1 and 3, 2020, to estimate the applicability of the forms. They were not changed after the preliminary study; therefore, data from pilot participants were also included in the main study. The study was conducted between September 9, 2020, and December 1, 2020. The application phase was divided into pre-intervention, intervention, and post-intervention.

2.3.1. Pre-Intervention

After obtaining the necessary permissions, we first interviewed the persons in charge of the relevant units and provided information about the study. All participants signed informed consent forms before participation and subsequently completed all data collection forms. The surveys were conducted by the researcher through 15-minute face-to-face interviews.

The music preference survey results revealed that the majority of the participants (78.9%) preferred classical music. Studies (Lai and Li, 2011; Huang et al., 2017) have stated that listening to instrumental music in 15–30-minute sessions at least once a day has a therapeutic effect. Based on these findings and the opinion of the staff musicologist, we evaluated survey results and decided to play 30 minutes of music between 8 a.m. and 4 p.m. as part of the intervention. The staff musicologist prepared a 30-minute-long CD of eight classical music tracks, each 3–4 minutes in length.

2.3.2. Music Intervention

The participating units received the prepared music, thus beginning the intervention phase. The music intervention was implemented for eight weeks between September 28, 2020, and November 23, 2020. Music (60–70 dB) was played for daytime nurses between 9.00 and 9.30 a.m. through a central sound system with speakers in ward corridors, break rooms, and treatment preparation rooms.

2.3.3. Post-Intervention

After the intervention was complete, the CBI-24 and MBI were repeated for pre/post comparison.

2.3.4. Research process flowchart

Interview with participating units
⬇
Information and consent
⬇
Application of the descriptive characteristics form, the music preference survey, the Caring Behaviors Inventory-24, and the Maslach Burnout Inventory
⬇
Statistical analysis of the music preference survey
⬇
Expert assessment of survey results
⬇
Preparation of the music CD
⬇
Technical arrangements for music intervention
⬇
Music intervention: 30 minutes of music per day during the day shift for 8 weeks
⬇
Second application of Caring Behaviors Inventory-24 and Maslach Burnout Inventory
⬇
Data analysis

2.4. Data Analysis

The data were analyzed using SPSS v.17.0 (Statistical Package for the Social Sciences). The p-value was used to assess statistical significance and $P<0.05$ was accepted as statistically significant. The normality of the numerical data was evaluated using the Shapiro–Wilk test, and the homogeneity of variance and assumption of equal variances were tested using Levene's test. Descriptive statistics were presented as numbers and percentages for categorical variables, and as mean or median for continuous numerical variables.

Any statistically significant changes in the CBI-24 subscores and total scores pre- to post-music intervention were evaluated with the Wilcoxon signed-rank test. The significance of these changes was analyzed using the dependent *t*-test. The combined effect of all changes in scores was investigated using multiple regression analysis, including regression coefficients, 95% confidence interval, and *t* statistics for each independent variable.

3. Results

The average age of the participating nurses was $\bar{X}$ =36.8±7.7 years; all (100%) were female; and most were married (71.1%) with children (63.2%). Most nurses had completed a bachelor's degree (73.7%), had over 20 years' experience ($\bar{X}$ = 16.50±7.95, min=1 max=33), were employed as nurses (86.8%), and worked 40 hours per week (68.4%). Most participants indicated that music aroused feelings of beauty and delight (65.8%) and provided mental relief (63.2%) (Table 1).

All CBI-24 subscale scores (assurance, knowledge and skill, respectful, connectedness) and the mean total score significantly increased after the music intervention ($P<0.001$). The most prominent improvement was recorded in the connectedness score (0.70±0.65), and the smallest in the knowledge and skill score (0.42±0.52). The mean increase in the total score was 0.56±0.41 (Table 2).

The emotional exhaustion subscore of the MBI significantly decreased after the music intervention ($P=0.010$). Moreover, the depersonalization subscore decreased, the personal accomplishment subscore increased, and the overall MBI score decreased. However, these findings were not significant ($P>0.05$) (Table 2).

We investigated the relationship between the changes in the CBI-24 and MBI and found that the assurance subscale of the former and the depersonalization subscale of the latter were negatively and significantly related (r=−0.418, P=0.009). In other words, an increased assurance subscore was associated with a decreased depersonalization score (Table 3).

Table 1. Descriptive characteristics of the participants (n = 38)

Introductory Features	Number	%
Age		
≤ 35	16	42.1
36–44	15	39.5
≥ 45	7	18.4
$\overline{X}$ ±SD=36.8 ±7.7 min=24 years max = 50 years		
Sex		
Female	38	100.0
Male	-	-
Marital Status		
Married	27	71.1
Single	11	28.9
Children		
Yes	24	63.2
No	14	36.8
Educational status		
Associate degree	8	21.1
Bachelor's degree	28	73.7
Master's degree	2	5.2
Nursing Experience		
1–5 years	6	15.8
6–10 years	8	21.1
11–15 years	4	10.5
16–20 years	5	13.2
≥ 21 years	9	23.7
$\overline{X}$ ±SD=16.50±7.95 min=1 years max=33 years		
Weekly work hours		
40 hours	26	68.4
> 40 hours	12	31.6
Position		
Nurse in charge	5	13.2
Nurse	33	86.8
The feeling evoked by music*		
Beauty and delight	25	65.8
Mental relief	24	63.2
Events or situations	6	15.8
A social event	5	13.2
Personal characteristics	5	13.2

* n has increased due to multiple responses.

Table 2. Mean CBI-24 and MBI subscale and total scores before and after music intervention (n = 38)

Scales	Music Intervention		P-value*	Change
	Before $\bar{X}$±SD	After $\bar{X}$±SD		
CBI-24				
Assurance of human presence	4.93±0.65	5.44±0.56	<0.001	0.51±0.41
Knowledge and skill	5.22±0.65	5.64±0.52	<0.001	0.42±0.52
Respectful difference to others	4.70±0.71	5.30±0.59	<0.001	0.60±0.57
Positive connectedness	4.55±0.71	5.25±0.62	<0.001	0.70±0.65
Total	4.85±0.61	5.41±0.53	<0.001	0.56±0.41
MBI				
Emotional exhaustion	22.76±7.15	18.24±7.74	0.010	−4.53±10.24
Depersonalization	6.63±4.81	5.68±3.88	0.347	−0.95±5.97
Personal accomplishment	8.13±4.48	9.29±5.33	0.220	1.16±5.72
Total	37.53±13.60	33.21±13.11	0.118	−4.32±16.61

* Wilcoxon signed-ranks test CBI-24: Caring Behaviors Inventory; Dependent t-test. MBI= Maslach burnout inventory.

Table 3. Relationship between changes in mean CBI-24 and MBI scores after music intervention (n = 38)

CBI-24 \ MBI	Emotional exhaustion	Depersonalization	Personal accomplishment	Total
Assurance of human presence				
r	−0.267	−0.418	−0.056	−0.276
P-value	0.105	0.009	0.739	0.093
Knowledge and skill				
r	0.064	0.026	−0.230	0.033
P-value	0.703	0.876	0.164	0.846
Respectful difference to others				
r	−0.039	−0.194	−0.088	−0.054
P-value	0.817	0.244	0.598	0.747
Positive connectedness				
r	0.062	−0.063	−0.130	0.017
P-value	0.713	0.709	0.435	0.921
Total				
r	−0.018	−0.169	−0.137	−0.041
P-value	0.913	0.311	0.411	0.805

* Spearman rank-order correlation test, MBI= Maslach burnout inventory, CBI-24= Caring behaviors inventory.

4. Discussion

The study results show a statistically significant increase in all subscales and total scores of the CBI-24 after the music intervention. Inocian et al. (2021) reported lower caring behavior subscale scores of clinical nurses during the pandemic than the current study. These results demonstrate the positive effect of music support on the caring behaviors of nurses working with COVID-19 patients.

The nurses we surveyed in the pre-intervention period scored highest in the knowledge and skill subscale and least in the positive connectedness subscale of the CBI-24. However, when comparing pre- and post-intervention CBI-24 scores, we observed that the greatest increase was in the positive connectedness subscale, and the smallest was in the knowledge and skill subscale.

No studies have examined the effect of music on nurses' care behaviors. Therefore, we compared our results with studies on care behaviors of nurses without music intervention. Pre-pandemic studies reported that nurses scored the highest in the knowledge and skill subscale and the lowest in the positive connectedness subscale of the CBI-24 (Karlou et al., 2015; Sarafis et al., 2016). During the pandemic, Inocian et al. (2021) pointed out that CBI-24 scores of the nurses were highest in the assurance subscale, but lowest in the knowledge and skills subscale. In the current study, this smallest change in the knowledge and skill subscale score may be attributable to nurses' insufficient knowledge regarding COVID-19. In contrast, we observed the greatest post-

intervention improvement in the positive connectedness subscale, in which nurses generally score the lowest. Our results suggest that music intervention has positive effects on nurses, helping them better plan and use their knowledge and skill with a trusting patient-centered approach. In the study of Apps and Sunderland (2021), nurses stated that music changes the emotion and mood of the hospital environment, increases communication and support between nurses to patients, and makes it easier for them to focus. Our results support the H_11 hypothesis.

We investigated the impact of music on nurses' burnout levels and found a significant decrease in the emotional exhaustion subscale of the MBI. This subscale measures debilitation and fatigue, overextension and exhaustion from one's work, and emotional depletion. Prior to the pandemic, Kacem et al. (2020) found that music reduced emotional exhaustion on operating room staff. Factors that lead to emotional exhaustion among nurses include providing 24 hour/day frontline care, working with protective equipment for long hours, witnessing the rapid deterioration of patients, more frequent end-of-life care, and working in unfamiliar areas for longer durations (Häussl et al., 2021; ICN, 2021). Even with increased stress levels due to the pandemic, we observed a significantly decrease in nurses' emotional exhaustion levels after music intervention. This finding partially supports the H_12 hypothesis.

Music reduces neuroendocrine and sympathetic activity, and promotes feelings of calmness and relaxation (Huang et al., 2017). When asked about the feelings evoked by music, our participants most commonly described feeling "beauty and delight" and "mental relief." Therefore, the relaxing effect of music may partly explain why music relieves emotional exhaustion.

Since burnout involves physical, emotional, and mental exhaustion, it is also understandably associated with stress. Giordano et al. (2020) concluded that five weeks of music therapy reduced stress levels of healthcare professionals during the pandemic. Some studies have concluded that music therapy has helped reduce nurses' levels of stress, anxiety, and depression during the pandemic (Pinho et al., 2021; Vajpeyee et al., 2021). Other studies on stress levels of healthcare workers in the work environment have reached the same conclusion (Bittel et al., 2021; Matoso et al., 2021), which echoes our findings.

Our study sample consisted entirely of female daytime nurses. In addition, most of the participants were married and had children, which may have represented additional stress factors. Studies during the pandemic indicated that female nurses had more emotional exhaustion (Hu et al., 2020; Duarte et al. 2020; Chen et al., 2021). The lack of a significant reduction in other burnout subscale scores in the current study may be attributable to various exhausting factors, especially the possibility of the nurses unknowingly transmitting the virus, as well as separation from their families.

We observed a significantly negative, albeit moderate, relationship between the changes in the assurance of the human presence subscale of the CBI-24 and the depersonalization subscale of the MBI. In other words, a decreased depersonalization subscore was associated with increased assurance subscore. Considering that the fundamental idea behind the assurance of human presence is "trust that the nurse establishes with the patient", and the fundamental idea for depersonalization is "to display informal unprofessional attitudes and emotions and disregard that a patient is a person", the emotionally reparative effects of music therapy may help the nurse perceive the patient as a person and develop deeper trust. Our findings partially support the H_13 hypothesis. Before the pandemic, Sarafis et al. (2016) indicated that total stress score was associated with the caring behaviors. Shen et al. (2018) found that while emotional exhaustion and depersonalization were negatively correlated with caring behaviors, personal accomplishment was positively associated, and they indicated that burnt-out oncology nurses showed low caring behaviors. Findings of the aforementioned studies support the current study.

5. Conclusion

Nurses need support during the pandemic. Nurse leaders should develop strategies to reduce burnout and enhance caring behaviors. These strategies should aim to improve the quality of patient care. As in other countries around the world, in Türkiye has taken some measures at the national level to protect the mental health of nurses during the pandemic. However, as seen from the researches, these measures could not prevent nurses from experiencing burnout. We found that music is effective in decreasing burnout levels and improving nurses' care behavior in this study. We found a significantly negative relationship between the changes in the "assurance of human presence" subscale of the CBI-24 and the "depersonalization" subscale of the MBI. Accordingly, we conclude that music may be beneficial for nurses during this challenging time. These results can contribute to strategies for improving nurses' caring behaviors and reducing burnout. The results of this study can guide policymakers to develop better workplace policies to reduce burnout and increase care behaviors during crises such as the COVID-19 pandemic. Accordingly these results, we recommend that hospitals provide music therapy at intervals, and that proper institutional policies are developed. Further studies with larger samples and different intervention protocols are needed, however.

Limitations

Research was, unfortunately, only allowed by the hospital management during day shift. Some nurses worked both day and night shift. However, music was unable to be delivered for the night shift. This meant that the same nurses would not listen to music every day

during the study. Therefore, the study only included daytime nurses. This reduced the number of nurses in the study. Another limitation was the inability to test the delivered music due to the pandemic. Furthermore, this study was only conducted in one hospital, meaning the results might not represent all nurses working in COVID-19 units in Türkiye.

Author Contributions

The percentage of the author(s) contributions is presented below. All authors reviewed and approved the final version of the manuscript.

	İ.A.	E.E.K.
C	60	40
D	50	50
S	20	80
DCP	100	
DAI	60	40
L	20	80
W	20	80
CR	20	80
SR		100
PM	50	50

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management.

Conflict of Interest

The authors declared that there is no conflict of interest.

Ethical Approval/Informed Consent

The study was approved by the Ethics Committee of Ankara Yildirim Beyazit University (approval date: December 17, 2019, protocol code: 49/11). The hospital administration granted written permission. All participants were voluntary, and written consent was obtained. Permission to use the Turkish versions of the CBI 24 and the MBI was obtained from their authors.

Acknowledgements

This study was produced from a master's thesis by İlkay Akçay's. We would like to acknowledge the all nurses who participated in this study. We would also like to acknowledge Prof. Dr. Burçin Uçaner Cifdalöz to support and advice for music preference survey and prepared of music CD.

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