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# Emotions reflected in colours: experiences of nursing students during the COVID-19 period

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## Abstract

**Background** The aim of this study was to identify nursing students' fears and emotions and to concretise the metaphors they used to describe their feelings towards the COVID-19 pandemic.

**Methods** This study was conducted with nursing students at a foundation university between December 2021 and February 2022 using a sequential mixed methods research design. In the quantitative part of the study, 323 nursing students answered the 'Positive and Negative Emotion Scale' and the 'COVID-19 Fear Scale'. In the qualitative part, students were asked to metaphorise COVID-19 with a colour and 21 in-depth interviews were conducted on the reasons for choosing this colour.

**Results** The average age of the students participating in the study was  $21.41 \pm 1.97$  years and 78% of them were female. It was observed that 15.8 of the students had previously tested positive for COVID-19. Most of the participants (98.5%) were vaccinated against COVID-19 and 31.9% had a relative who died due to COVID-19. When the participants were asked which colour they compared COVID-19 to, it was observed that more than half of them chose red (51.4%) among bright colours and 13% chose black among dark colours. In this study, it was determined that students who chose dark colours to describe COVID-19 had higher COVID-19 Fear and Negative Emotion Scale scores. In in-depth interviews, it was observed that students who chose dark colours were more deeply affected by the COVID-19 process, while students who chose light colours associated this period with negative emotions.

**Conclusion** In this study, it was observed that nursing students' feelings and thoughts about the COVID-19 period in line with their experiences affect the choice of colour in metaphorisation.

**Keywords** Colours, Pandemic, Nursing students, Positive emotions, Negative emotions, COVID-19, fear

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## Introduction

The COVID-19 pandemic has turned into a social trauma that has deeply affected individuals in many ways, such as in physical, social, economic, and psychological terms [1, 2]. The pandemic had devastating effects on society and higher education institutions, nursing education, and clinical learning environments [3]. Educators have had to move face-to-face online courses, conceptualize, offer alternative clinical experiences, and redefine how student performance is evaluated and graded [4]. As some students have expressed, the pandemic has deprived them of learning to provide nursing care in this new viral age [3]. Studies conducted on nursing students have shown that as the duration of social isolation increases, stress and fear increase too; however, psychological problems such as anxiety and depression, and coping behaviors weaken [5, 6]. Existing evidence indicates that nursing students felt negatively affected by lockdown during the pandemic, they felt overwhelmed and nervous, and they feared infection and death [3, 7]. Examining the emotions of nursing students during the pandemic process is challenging and insufficient when relying solely on standardized measurement tools. In recent years, metaphors have been frequently used to determine individuals' perceptions of phenomena and events they have encountered [8]. Therefore, the use of metaphors is a method that can significantly contribute to the in-depth examination of students' emotions.

Metaphors are defined as tools to explain events and objects using different concepts and representations [9]. They help associate individuals' perceptions of events with familiar situational images [10, 11]. Metaphors concretize abstract concepts by conveying the events experienced in an emotionally authentic way [12, 13]. Thus, they provide an opportunity to reveal how a person interprets experiences and events [14] and illuminate previously unperceived aspects of phenomena and deepen understanding [10]. An in-depth examination of nursing students' feelings towards the pandemic process is crucial in identifying their individual and professional needs and creating strategies to address them. However, there are few studies that deeply examine nursing students' feelings, thoughts, and experiences related to the pandemic process [15, 16].

Emotions such as fear and anxiety experienced by nursing students during the COVID-19 outbreak have mainly been evaluated using quantitative methods [5, 17]. Given the complexity of emotions and the inadequacy of standard measurement tools alone, the integration of metaphors can provide richer insights into nursing students' emotional experiences during the pandemic. Studies have analyzed metaphors to understand the feelings, thoughts, and experiences of various populations working on the

front lines during the COVID-19 pandemic [2, 9, 13]. For example, Çakmak et al. (2022) discovered that patients used metaphors like "black hole/dark" for COVID-19 treatment, "steel" for family relationships, and the "sea" for mental health. Fear of death and uncertainty negatively affected family relationships and mental well-being [9]. Gök & Kara (2022) employed metaphor analysis and identified seven categories: "being restricted," "restlessness," "uncertainty/obscurity," "deadly/dangerous," "struggling," "faith/destiny," and "supernatural." These categories reflected three themes: "anxiety/concern," "risk," and "faith." In their study aimed at revealing implicit collective emotions related to the COVID-19 pandemic among individuals aged 19 to 79 [13], Stanley et al. (2021) demonstrated four aligned mental models of the pandemic: (a) uncertainty, (b) danger, (c) grotesque, and (d) misery. According to these mental models, participants' implicit emotional experiences of COVID-19 converged around several deeply held emotions: (a) grief, (b) disgust, (c) anger, and (d) fear. The study emphasized that these findings have both theoretical and practical implications. It was highlighted that metaphors served to document collective emotions associated with a collective traumatic experience unfolding in real time [2].

Michel et al. (2021) reported that pandemic stressors harmed students' well-being and learning, leading to frustration due to limited clinical experiences. Barriers included reduced engagement, poor communication, increased workloads, isolation, learning anxiety, and logistical challenges [7]. For this reason, it is thought to be important to express the feelings of nursing students, who will serve in the field as health professionals after graduation, about the COVID-19 pandemic through metaphors, including those related to colours, in order to increase the form and quality of nursing education to be provided in a similar pandemic. In addition, it is believed that expressing feelings about the pandemic process will increase both individual and professional resilience and thus the basic step of becoming a qualified healthcare professional will be taken.

Metaphors offer important support for understanding the strong relationships between colour concepts and abstract emotional states [18]. For instance, it has been published that university students associated the colour red with feelings of energy, love, passion, courage, excitement, danger, and aggression. This association with red can help us understand nursing students' experiences of intense emotions like passion for their work or the danger and stress they felt during the pandemic. Similarly, the colour blue was associated with feelings of pleasure, comfort, calm, confidence, security, and coldness. This can illustrate moments when nursing students felt calm or secure in their knowledge, as well as times when they

might have felt emotionally distant or isolated. The colour yellow, linked with feelings of warmth, joy, hope, optimism, pleasantness, and happiness, can highlight the moments of joy or optimism they experienced, even in challenging times. By using colour metaphors, we can better grasp the nuanced emotional experiences of nursing students during the pandemic, allowing for a more comprehensive understanding of their emotional landscape and helping to inform strategies to support them more effectively in future crises [16].

Based on the existing literature, this study aims to explore the fears and emotions of nursing students and capture the metaphors they employ to express their sentiments with appropriate themes regarding the COVID-19 pandemic, with a particular focus on the use of colours in these metaphors.

## Materials and methods

The study was conducted using an explanatory sequential mixed method research design with nursing students at a foundation university in Turkey between December 2021 and February 2022. This design involves two distinct phases: an initial quantitative phase followed by a qualitative phase to explain and build upon the quantitative results. Specifically, quantitative data was first collected using surveys, and then qualitative data was obtained through focus group interviews to gain deeper insights and explanations related to the survey findings [19].

## Research questions

What are the predominant fears and emotions experienced by nursing students during the COVID-19 pandemic?

How do nursing students use colour metaphors to express their psychological, social, and physical experiences related to the COVID-19 pandemic?

What are the common themes that emerge from the metaphors nursing students use to describe their sentiments towards the COVID-19 pandemic?

## Study sample

For the quantitative part of the study, a total of 387 nursing students from a foundation university in Turkey were invited to participate in the study between December 2021 and February 2022. The inclusion criteria for this study were to be an actively enrolled undergraduate student in the nursing department in 2021–2022 and to volunteer to participate in the study. Those who did not meet the inclusion criteria were excluded from the study. A sample size of 320 participants was calculated for a 50% heterogeneity, 3% margin error, and a 99% of confidence level. By the end of data collection period 323 valid questionnaires were received (83.46% participation

rate). In qualitative research, the quality of the sample is important. For this reason, research is usually conducted with a small number of purposively determined samples. As a result of in-depth interviews, individual interviews are terminated when the data reaches saturation [20]. For the qualitative part of the study, at least 2 participants representing each of the colours selected in the quantitative part were foreseen, but the final sample size was determined according to data saturation and in-depth interviews were conducted with 21 students.

## Data collection process and measurement tools

### Sociodemographic data collection

Sociodemographic details were collected, including participants' gender, academic year, previous COVID-19 positive diagnosis, COVID-19 vaccine status, chronic diseases, living with, previous family COVID-19 positive diagnosis, and any relative who died because of COVID-19.

### Quantitative data collection

Next, quantitative data were collected using the Positive and Negative Affect Scale initially created by Watson et al. (1988) and later validated into Turkish by Gençöz (2000) [21, 22]. Then, the COVID-19 Fear Scale, initially created by Ahorsu et al. (2020) [23] and validated into Turkish by Satıcı et al. (2020), was used [24].

The Positive and Negative Affect Scale consists of 20 items in two sub-dimensions (10 positive and ten negative emotions). The emotion in each item in the scale is scored between "1 = very little" and "5 = very much." Each sub-dimension varies between 1 and 50 points. The total score obtained from the sub-dimensions of the scale indicates positive or negative emotional loads. In the Turkish adaptation of the scale, the internal consistency coefficient for positive mood is 0.86, and the internal consistency coefficient for negative mood is 0.83. In this study, the internal consistency coefficient of the positive mood of the scale is 0.86, and the internal consistency coefficient of the negative mood is 0.86.

The COVID-19 Fear Scale consists of seven 5-point Likert type items (1 = strongly disagree, 5 = strongly agree) and one dimension. The scale is scored between 7 and 35, indicating that individuals with high scores have a high fear of COVID-19. In the Turkish adaptation of the scale, the Cronbach's coefficient of the scale is 0.82. In this study, the Cronbach's coefficient of the scale is 0.86.

In the last step of the quantitative data collection tool, a triggering question was asked: "With which colour does COVID-19 define/remind/represent you?" This is a single question and not a scale. This question was asked to prepare the ground for the qualitative data collection part of the research and to create a group of students

who prefer different colours when selecting the students to be interviewed in the focus group. The students were free to choose colours, and all of the students chose colours without separating them into shades. Then, as a result of the in-depth interviews, the colour choices and expressions of the students according to the answers were evaluated by the researchers, and the participants were divided into two groups (dark and light colours). Six participants were purposively selected from 67 students expressing dark colours (black, grey, or purple) and 21 participants were purposively selected from 256 students expressing bright colours (white, orange, blue, or green).

### Qualitative data collection

Open-ended questions were used for the qualitative part. Interviews were conducted face-to-face in a safe and quiet room at the university. All interviews were audio recorded and transcribed verbatim immediately after. To encourage anonymity, students were referred to as Participant 1, Participant 2 instead of using their personal information. Interviews lasted approximately 35 min and were performed by a researcher with proven experience performing qualitative interviews. The script of the interview was created by the researchers in line with the literature [5, 19], and it was approved using discussion and consensus techniques with all the research members and two experts from the Department of Guidance and Psychological Counseling and the Psychology Department.

The interview included five open-ended questions:

- *“How did the COVID-19 pandemic affect you psychologically?”*
- *“How did the COVID-19 pandemic affect you socially?”*
- *“How did the COVID-19 pandemic affect you physically?”*
- *“What is the most intense feeling you feel in the COVID-19 pandemic?”*
- *“What is the reason for choosing the colour ... for what COVID-19 makes you feel?”*

### Data analysis

Quantitative data was analyzed using descriptive and inferential statistics with the support of the software IBM SPSS Statistics for Windows, Version 23.0. Spearman Correlation Analysis Test was used to investigate the relationship with continuous variables. Statistical significance was set at a p-value < 0.05.

Qualitative data was analyzed using the Metaphor Identification Procedure (MIP) with the support of MAXQDA 22 software. Below are the stages suggested by MIP:

- 1) Read the entire text to form a general understanding of the meaning.
- 2) The words in the text are determined.
- 3) a. It determines how the meaning of each word in the text applies to an entity, relationship, or attribute in context. The words that come before and after the determined word are taken into account.
  - b. Determine if each word has a more basic meaning out of context.
  - c. If the word has a more basic meaning in other contexts than the given context, the contextual meaning is compared with the basic meaning and it is examined whether it contradicts.
- 4) If yes, that word is marked as a metaphor [20]. At the beginning of the form, a written instruction containing explanations was provided to help students understand the concept of metaphor. Students were first asked to generate a colour metaphor to describe COVID-19, and then they were asked to explain in detail the reasons for their selected metaphors. In the initial stage, the metaphors were identified and selected. They were read in detail by a researcher to gain insight into the context in which the participants' metaphors emerged. A total of 23 metaphors produced by the students were considered for evaluation. Based on the evaluation, metaphors that expressed common meanings and showed similarities were grouped together. After grouping, metaphors consisting of positive and negative colours related to the research topic were obtained. The explanatory texts obtained from the research, the generated metaphors, and the themes created by the researcher through analysis were validated and verified for reliability by obtaining expert opinions from two academics. The expert opinions were compared with the researcher's analyses until consensus was reached.

The emotions expressed by the colours were grouped using the existing literature [25–29]. Dark colours were identified as black, gray, purple colours and bright colours were identified as white, orange, blue, and green. According to AL-Ayash et al. (2016) [30] and Hemphill (1995) [31] it was accepted that bright colours elicited mainly positive emotional associations, and dark colours elicited mainly negative emotional associations (Table 1).

### Ethical considerations

Ethical approval was received from the Hasan Kalyoncu University Faculty of Health Sciences Non-Invasive Research Ethical Board, and permission was received

**Table 1** Summary of emotions associated to colours

Colour	Emotion associated
Grey	Bad weather, sadness, hopelessness, depression, boredom, confusion, fatigue, loneliness, anger, and fear
Black	Mighty/powerful/mastery, formal, mystery, modernity, grace, death, mourning, tragic events, sadness, hopelessness, depression, fear, seriousness, and anger.
White	Youth, innocence, peaceful, hope, purity, and simplicity.
Green	Nature, revival, peace, balance, hope, relaxation, coolness, calmness, and happiness.
Purple	Relaxation, serenity, wealth, money, fatigue, strength, fear, boredom, excitement, ease, solemnity and majestic.
Red	Energy, passion, courage, excitement, danger, and aggression.
Blue	Comfort, relaxation, pleasure, trust, security, and coldness.
Yellow	Hope, optimism, pleasantness, joy, and happiness.
Orange	Enthusiasm, courage, pleasure, and happiness.

[25–29]

from the universities where the study was conducted (Date:6 December 2021, Decision No:2021/036). All participants were provided with detailed oral and written information about the study. No risks were identified for participating in the study. All participants provided informed consent. All data collected was anonymous and treated confidential. This study was conducted in accordance with the provisions of the Declaration of Helsinki.

## Results

### Quantitative results

The mean age of the students participating in the study ( $n = 323$ ) was  $21.41 \pm 1.97$  years, and 78% were female. Of the students, 6.2% ( $n = 20$ ) had chronic diseases, and 68.7% lived with their families. It was observed that 15.8% had previously tested positive for COVID-19. Most (98.5%) participants were vaccinated against COVID-19,

and 31.9% had a relative who died due to COVID-19 (Table 2).

When the answers given to the question of which colour the participants represent COVID-19 to were analyzed, it was determined that more than half of them chose red ( $n = 16$ , 51.4%), while 16.7% selected green, and 5.9% chose blue among the bright colours for COVID-19. Regarding the selected dark colours, 42 of the participants associated black colour (13%), 17 of them related gray (5.3%), and eight of them related purple (2.5%) with COVID-19 (Table 3).

There was no statistically significant relationship between the COVID-19 Fear Scale scores and the Positive Affect sub-dimension. However, it was observed that there was a moderate positive relationship between the scores obtained from the COVID-19 Fear Scale and the scores of the Negative Affect sub-dimension. As the

**Table 2** Participants' sociodemographic data ( $n = 323$ )

Descriptive	<i>n</i>	%	Descriptive	<i>n</i>	%
Gender			Chronic Diseases		
Female	252	78	Yes	20	6.2
Male	71	22	No	303	93.8
Academic year			Living with		
1st Year	104	32.2	Family	222	68.7
2nd Year	100	31	Roommate	48	14.9
3rd Year	64	19.8	Alone	14	4.3
4th Year	55	17.0	Other	39	12.1
Previous COVID-19 Positive Diagnosis			Previous Family COVID-19 Positive Diagnosis		
Yes	51	15.8	Yes	112	34.7
No	272	84.2	No	211	65.3
COVID-19 Vaccine Status			Any relative dead because of COVID-19		
Yes	318	98.5	Yes	103	31.9
No	5	1.5	No	220	68.1



**Table 3** Colours that participants linked to COVID-19

Colours	n	%
Red <sup>a</sup>	166	51.4
Green <sup>a</sup>	54	16.7
Blue <sup>a</sup>	19	5.9
Yellow <sup>a</sup>	6	1.9
Orange <sup>a</sup>	6	1.9
White <sup>a</sup>	5	1.5
Black <sup>b</sup>	42	13.0
Grey <sup>b</sup>	17	5.3
Purple <sup>b</sup>	8	2.5

<sup>a</sup> Bright colour

<sup>b</sup> Dark colour

**Table 4** Correlation coefficients between COVID-19 fear scale, positive emotion and negative emotion

Variables	COVID-19 Fear Scale	Positive Emotion	Negative Emotion
COVID-19 Fear Scale	1		
Positive Emotion	$r = -0.01$	1	
Negative Emotion	$r = 0.328^{**}$	$r = 0.015$	1

$r =$  Spearman Correlation Test  $^{**}p < .01$  statistically significant

fear of COVID-19 increased, so did the negative emotions of the students ( $r = 0.328, p = 0.015$ ) (Table 4).

Scores of the students in the Positive Affect sub-dimension were similar in terms of the colour group they chose (bright and dark colours) ( $t = 1.022, p = 0.30$ ). However, when the mean scores of the Negative Affect sub-dimension were examined, a statistically significant difference was found between the bright and dark-coloured student groups ( $t = 2.802, p < 0.001$ ). In addition, the COVID-19 Fear Scale mean scores of the students who preferred dark colours were higher than

those who preferred bright colours ( $t = 2.514, p = 0.01$ ) (Table 5).

**Qualitative results**

Twenty-one students with age ranged 18–22 were interviewed (14 female). Eight students were in their 4th year, six were in the 3rd year, four were in their 2nd year, and three were in the 1st year. Nursing degree in turkey lasts four years.

Regarding the colours, six students identified COVID-19 with a dark colour (black, gray, and purple), and 15 did so using bright colours (white, orange, blue, and green) group. Nursing students’ perceptions about the COVID-19 process were examined in-depth using the colour metaphor and focusing on physical, psychological, and social factors. These themes were then classified into two positive effects and adverse effects within themselves (Fig. 1).

**Physical factors**

Nursing students participating in the study were physically affected at different levels by the COVID-19 pandemic process. The adverse effects of physical factors included changes in existing routines in meeting basic needs, such as excessive nutrition, sleep disturbance, and immobility, as well as new habits like increased digital exposure, disease development, and acquiring COVID-19. The sub-themes of sleep disturbance, immobility, and digital exposure were prominent among the adverse effects. According to the results, these adverse effects were mainly expressed by students who chose dark colours like black, gray, and purple.

*“Of course, it caused many sleep irregularities; you play with the phone until 1–2 a.m., and you get up around 11-noon” (P2, chose black colour.)*

*“During the COVID period, we stayed at home during the curfew time. We worked at home, and I also had to study, and I spent the whole time sitting at a*

**Table 5** Comparison of Scale Mean scores according to students who prefer Bright and Dark colours

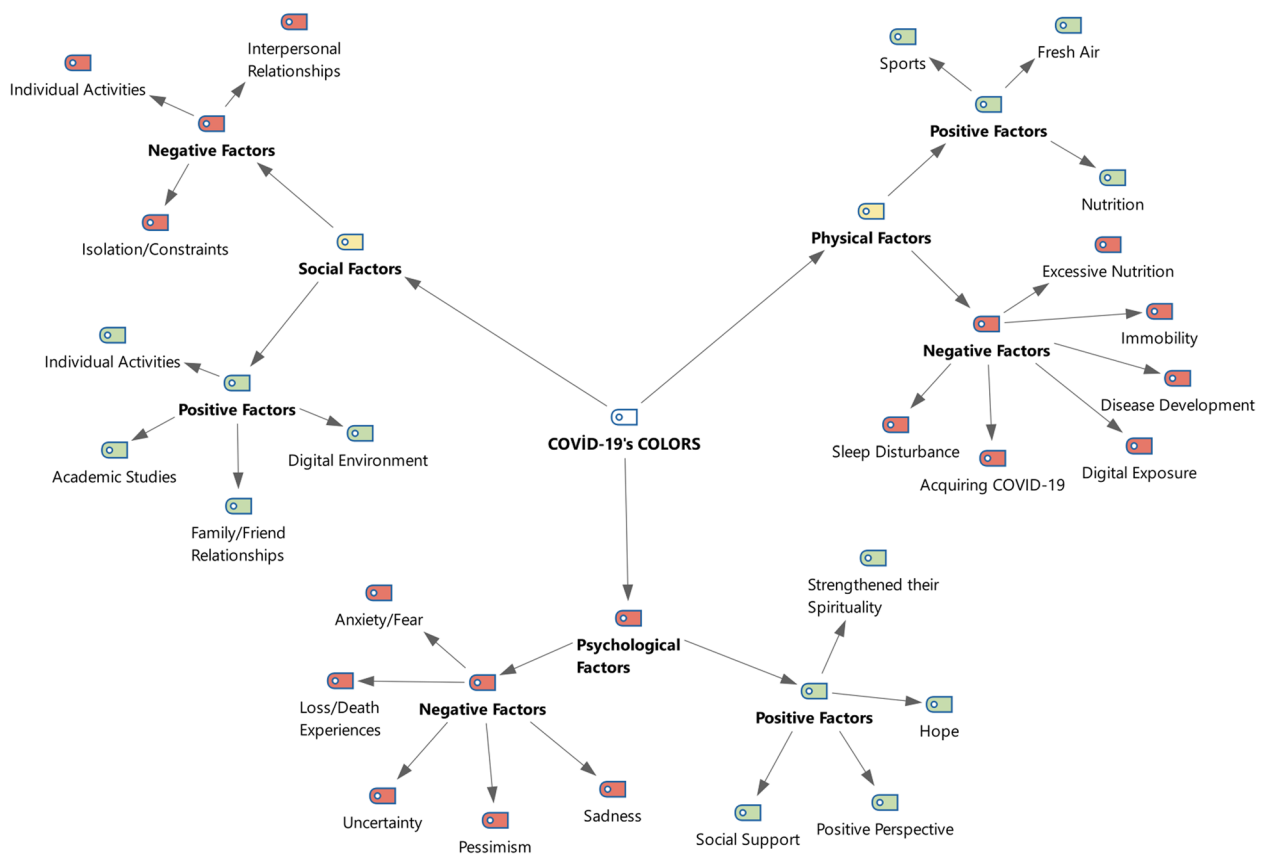
Measurement	Group	n	$\bar{x} \pm SS$	Test and p
Positive Emotion Sub-Dimension	Bright Colour <sup>a</sup>	256	25.74 ± 6.52	$t = 1.022$ $p = 0.30$
	Dark Colour <sup>b</sup>	67	24.81 ± 7.14	
Negative Emotion Sub-Dimension	Bright Colour <sup>a</sup>	256	24.71 ± 7.32	$t = 2.802$ $p < 0.001^{**}$
	Dark Colour <sup>b</sup>	67	27.69 ± 9.13	
COVID-19 Fear Scale	Bright Colour <sup>a</sup>	256	17.08 ± 5.32	$t = 2.514$ $p = 0.01^*$
	Dark Colour <sup>b</sup>	67	19.31 ± 6.75	

<sup>a</sup> Red, Blue, Yellow, Green, Orange, White

<sup>b</sup> Black, Grey, Purple

\* $p < 0.05$

\*\* $p < 0.01$  statistically significant



**Fig. 1** Nursing students' perceptions of the Covid-19 process, concept map model

*desk. My movements were languid. It was difficult to walk; a need to sleep was present all the time” (P17, chose gray colour).*

Nursing students who chose bright colours such as blue, yellow, orange, and white also mentioned the positive effects despite the negative ones related to their experiences in this process. Among the physical factors, the sub-themes of fresh air, nutrition, and sports were evaluated positively. P4, account illustrates the efforts made to adapt to the conditions *“I tried different sports that I could do at home”. “Exercises like Pilates and yoga were activities I could do in calm and quiet environments without going outside.”*

**Psychological factors**

Nursing students were most affected psychologically by the COVID-19 pandemic. They reported negative emotions such as loss/death experiences, uncertainty and pessimism, sadness, and anxiety/fear. These adverse effects were more frequent in students who chose dark colours like black, gray, and purple.

*“COVID-19 came down on us like a black cloud;*

*that is, the whole world was affected by it. Black expressed fear for me, a pitch-black dark environment. It is something like death. When you close your eyes, everything is dark” (P1, chose black colour).*

*“I had a panic attack when the first death occurred.” (P12, chose red colour).*

Another sub-theme was uncertainty about the future. Students expressed the uncertainty created by the pandemic as a negative feeling, particularly concerning the education process, gaining professional knowledge and experience, and its effects on their family and social lives.

*“It was our exam week; that is, when I was studying for the exams, the schools being closed suddenly created a feeling of uncertainty in me. Moreover, I did not know what to do. Should I sit down and study? Were the schools going to re-open? Was this going to continue? I had a feeling of uncertainty a lot” (P18, chose gray colour).*

*“...Nursing is an applied profession and due to the*

*pandemic, we couldn't get clinical practice. Right now I am feeling a lot of uncertainty about my profession. For example, will I be able to get full satisfaction in my profession with the education I have received? For example, since I am currently in the 3rd grade, how much can I learn until the next year? How much can I improve myself? How much can I put into practice? I honestly don't know" (P7, chose red colour).*

In addition, P1, who stated that his family had difficult times after being diagnosed with COVID-19 and chose the black colour, referred to the concept of hopelessness accompanying uncertainty, saying:

*"I felt like I was in such a vacuum. I felt this period would never end as if we would be constantly exposed to it, and I would continue to live this life continuously."*

Although the COVID-19 pandemic has had many adverse psychological effects on the lives of nursing students, it has also been observed that this process has given them a positive perspective and strengthened their spirituality, awareness of social support systems, and expressions of hope. Notably, these sub-themes are expressed mainly by students who chose bright colours such as white, blue, and orange.

*"There was much negativity in us, but I always tried to look at it from the bright side. For example, my father is a workaholic and has a heart condition. Since COVID-19 prevented him from going to work, he had the opportunity to rest" (P5, chose white colour).*

### Social factors

The data showed that the COVID-19 pandemic had a comprehensive social impact on nursing students, their families, and friends. The sub-themes of the factors that negatively affected nursing students socially included interpersonal relationships, isolation/constraints, and obstacles encountered in individual activities. Interpersonal relations were discussed broadly, including relations with family, relatives, and friends. Nursing students emphasized a decrease in interaction and sharing with their immediate environment due to measures to maintain physical and social distance and conflicts related to spending extended periods with family during isolation.

*"Frankly, tension can be experienced for any reason. In other words, even if there was an event that would not be misunderstood, there was a problem arising from seeing each other all the time" (P16, chose red colour).*

*"I am a person who loves school very much. I loved the school environment, the friendly environment. Unfortunately, the school closed and constantly opened because of the virus. Being away from teachers and friends, being away from school affected me badly because I could not go to school" (P19, chose purple colour).*

Nursing students who chose dark colours like black, purple, and gray, as well as red, were more negatively affected in social aspects during the COVID-19 process. Individual activities were included in the negative factors because the constraints and isolation measures limited students' ability to engage in social and academic activities, leading to feelings of frustration and loneliness. However, students also mentioned the benefits of academic studies, individual activities, family/friend relationships, and online personal and professional development trainings in the digital environment, which made this period instructive in many ways.

*"I am 22 years old, but I spent more time with my family during this period. I think we had our first breakfast at that time. After the prohibitions, I became happier because I spent more time with my parents" (P3, chose green).*

Similarly, participant P16, who thought they had more opportunities for individual activities during the pandemic process and chose the red colour, said, *"I took the time to read books. In addition, I watched many foreign series"*.

### Discussion

This study showed that COVID-19 had significant physical, psychological, and social effects on nursing students. The results revealed that the negative emotions of nursing students increased as their COVID-19 fears increased, and the negative emotions and fears of COVID-19 were higher in students who described COVID-19 in dark colours. In studies examining colour-emotion associations, negative emotions and experiences are expressed by individuals in dark colours such as black and gray, while positive emotions are expressed in bright colours such as white, pink, and green [29, 31]. Black has been associated with fear, sadness, and hatred [29], while gray has been related to depression, boredom, and disappointment [32]. During the pandemic, the most intense emotions experienced by the nursing students were fear, sadness, and anxiety [5, 17]. In accordance with previous evidence [5, 6], this study shows that nursing students' negative emotions and fears related to COVID-19 were more present in students who defined COVID-19 in dark colours compared to those who chose bright colours.



The study identified fear, sadness, and anxiety as the predominant emotions experienced by nursing students during the COVID-19 pandemic. These emotions were particularly intense for those who associated the pandemic with dark colours. The findings align with previous studies that link dark colours with negative emotions, providing insight into the emotional state of nursing students during this period [5, 17].

Those choosing dark colours were more deeply affected physically, socially, and psychologically in the in-depth interviews. This is an expected result considering the prolonged nature of the COVID-19 pandemic, the detailed knowledge nursing students have due to their vocational training, and the fact that the majority of them are young adults [7, 33, 34]. Clarke et al. (2008) stated that bright colours such as blue, green, and white induced low anxiety levels and had relaxing effects on individuals [27]. In this study, it is observed that nursing students who chose bright colours also had positive experiences despite the negativities faced during this process. Students who chose the colours white, blue, and green reported positive gains during the pandemic.

The study showed that nursing students used colour metaphors to vividly express their psychological, social, and physical experiences related to the COVID-19 pandemic. Dark colours were linked to negative feelings and experiences, whereas bright colours were associated with more positive experiences and outcomes. This use of colour metaphors provided a unique and expressive way for students to communicate their inner states and coping mechanisms.

Some nursing students described COVID-19 in dark colours due to its adverse effects on physical factors, such as nutrition, inactivity, and changes in sleep patterns during the pandemic. Similarly, studies indicate that nutrition and inactivity problems occur due to changes in the habits of university students, such as sleeping and waking up late and the deterioration of sleep quality [7, 35, 36]. The deterioration in meeting basic life needs means that individuals face the risk of degeneration in their health, which is a state of complete well-being in biopsychosocial terms.

The study also determined that the COVID-19 pandemic had adverse social effects, particularly affecting interpersonal relationships and restrictions, on nursing students who chose dark colours. Restrictions experienced during the pandemic made individuals feel at risk and vulnerable [13], reduced social activities with individuals and social groups, moved communication to the digital environment, and negatively affected interpersonal relationships [36]. However, WHO (2020) maintained that people are inherently social beings and need each other during such crises. They reported that

alternative solutions, such as regular phone calls with family and friends and video conferences, would help bridge the gap created by social distance and restrictions [37]. Notably, students who stated that their family relations had strengthened and that they efficiently used this period for activities carried out individually and within the family environment associated COVID-19 with bright colours (green, white, orange).

The common themes that emerged from the metaphors used by nursing students included loss/death experiences, uncertainty, pessimism, sadness, and fear. These themes were particularly prevalent among students who described COVID-19 in dark colours. The lack of clear protocols regarding infection control and treatment procedures heightened feelings of fear and alarm caused by uncertainty. Social isolation and restrictions further intensified feelings of panic and anxiety, contributing to the negative emotions associated with dark colours [8, 13].

During the COVID-19 pandemic, nursing students frequently expressed themes such as loss/death experiences, uncertainty, pessimism, sadness, and fear. The lack of a clear protocol regarding infection control and treatment procedures increased feelings of fear and alarm caused by uncertainty in individuals. Social isolation and restrictions also led individuals to experience panic by increasing their feelings of intolerance and anxiety towards the process [9]. As COVID-19 is a global health crisis threatening the entire world, this process is considered the most challenging form of psychological struggle [13]. This may have contributed to the negative emotions experienced by nursing students who associated COVID-19 mainly with the colours black, gray, and purple. Additionally, nursing students paired COVID-19 with red and associated this period with a sense of alarm. While some studies associate red with positive emotions [27, 28], others relate red with anger, hatred, and alarm [29]. Jonauskaite et al. (2020) stated that individuals' colour choices are related to universal associations and may differ according to language, culture, geography, and physical environmental conditions [29]. Therefore, although the pandemic process has positive and negative effects globally, it is considered that nursing students may have associated negative emotions such as danger, alarm status, and fear with the colour red.

The discussion highlights the complex and multifaceted impact of the COVID-19 pandemic on nursing students, emphasizing the need for supportive measures to address their physical, psychological, and social well-being.

#### Limitations

This study has some limitations that must be considered. First, this study was conducted only with students

in the nursing department of a foundation university, and it is possible to obtain different results when a multicenter study is conducted. Since the researchers are faculty members/staff of the university, the students may have felt under pressure in their answers and interviews. Finally, this study was conducted when the pandemic subsided, cases decreased, and students started face-to-face education. Therefore, findings are limited to students' recollections and expressions.

## Conclusions

Nursing students expressed their fears, feelings, and experiences about the COVID-19 pandemic. Metaphors obtained through in-depth interviews have yielded crucial insights into nursing students' implicit feelings regarding their pandemic experiences. It has been observed that nursing students associating COVID-19 with dark colours are more adversely affected physically, socially, and psychologically, whereas students associating it with bright colours may experience both positive and negative effects. Developing emotional support programs is essential to better understand nursing students' pandemic experiences and enhance their emotional well-being. These programs should be tailored to meet the unique needs of students during such challenging times and foster a supportive environment.

Comprehensive research based on various colour metaphors should be undertaken to thoroughly investigate and understand different emotional responses and experiences among nursing students. This research will provide valuable insights into how colour associations may impact their coping mechanisms and emotional states. Encouraging interdisciplinary studies is necessary to gain a more holistic understanding of the pandemic's effects on health sciences students. Collaborative research efforts can help identify commonalities and differences in experiences across disciplines, facilitating the development of targeted support strategies.

It is crucial to prepare emergency action plans for similar crisis periods post-pandemic. These plans should encompass various potential challenges and uncertainties that may arise, ensuring that institutions and individuals are better equipped to handle future crises. Continuous updates to these plans are imperative to adapt to changing circumstances and improve preparedness. By addressing these areas, we can better support nursing students and enhance their ability to cope with current and future challenges, ultimately fostering a more resilient and well-prepared healthcare workforce.

## Authors' contributions

EA: Conceptualization, Methodology, Formal analysis, Writing - Original Draft, Visualization. ED: Conceptualization, Data curation, Writing-Original draft

preparation. KP: Writing - Original Draft, Visualization, Investigation. BT: Methodology, Formal analysis, Writing - Original Draft, Visualization Supervision. AY: Formal analysis, Writing - Original Draft, Visualization. AY: Reviewing and Editing, Visualization, Supervision. JML: Reviewing and Editing, Visualization, Supervision.

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## Availability of data and materials

The data that support the findings of this study are available from the authors, but access to these data is restricted to protect the personal information of the participants.

## Declarations

### Ethics approval and consent to participate

This study was in accordance with the Declaration of Helsinki and approved by Hasan Kalyoncu University Health Sciences Non-Invasive Research Ethics Committee. Written informed consent was obtained after all participants understood the content of the tool and were informed about the research objectives. In addition, the participants explained the procedures on how to keep their records confidential, such as not revealing the identity of the participants, deleting the records and destroying the transcripts six months after the analysis, and ensuring the security of the devices containing the recording files through passwords and encryption. There is no conflict of interest with any person or organization in the study. This research has not received any specific grants from any funding organizations, commercial or non-profit sectors.

### Competing interests

The authors declare no competing interests.

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