

The role of anxiety, fear and resilience in preventive behaviors against COVID-19: a cross-sectional study with nursing students

El papel de la ansiedad, el miedo y la resiliencia en las conductas preventivas frente al COVID-19: un estudio transversal con estudiantes de enfermería

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Abstract

Objectives: This study aims to explore the relationships between resilience, fear of COVID-19, anxiety and use of preventive behaviors related to COVID-19 among nursing students.

Methods: A cross-sectional study was conducted with 220 first-year nursing students during 2020.

Results: A significant relationship emerged between resilience ($p < .05$), fear of COVID-19 ($p = .01$), anxiety ($p < .01$) and use of preventive behaviors. Overall, the independent predictors were fear of COVID-19 ($p = .003$) and male sex ($p = .016$).

Conclusions: It is essential to develop resilience among students further to increase their preventive behaviors against COVID-19.

Key words: Anxiety, COVID-19, Fear; Nursing Students, Psychological Resilience, Preventive Behaviors.

Resumen

Objetivos: Este estudio tiene como objetivo explorar las relaciones entre la resiliencia, el miedo al COVID-19, la ansiedad y el uso de comportamientos preventivos relacionados con el COVID-19 entre estudiantes de enfermería.

Metodología: Se realizó un estudio transversal con 220 estudiantes de primer año de enfermería durante el año 2020.

Resultados: Surgió una relación significativa entre resiliencia ($p < .05$), miedo al COVID-19 ($p = .01$), ansiedad ($p < .01$) y uso de conductas preventivas. En general, los predictores independientes fueron el miedo a la COVID-19 ($p = 0,003$) y el sexo masculino ($p = 0,016$).

Conclusiones: Es esencial desarrollar aún más la resiliencia entre los estudiantes para aumentar sus comportamientos preventivos contra el COVID-19.

Palabras clave: Ansiedad, COVID-19, Miedo; Estudiantes de Enfermería, Resiliencia Psicológica, Comportamientos Preventivos.

Introduction

The pandemic's severity and the associated uncertainty become stressors affecting people's mental health¹⁻³. The virus does not spread by itself, but through people's social behaviour which remains the only vehicle for transmission of the virus despite the recommendations and restrictions issued by the health authorities⁴.

Psychological models, such as the common-sense model of illness self-regulation, explain how individuals acquire and maintain health-related behaviours⁵. But what are the psychological factors behind compliance with the established preventive measures against COVID-19? One of them may be resilience, which is understood as a measure of the ability to cope with stress and which results from the combination of different individual characteristics. Keener et al. (2021) recommend resilience training to improve life quality and maintain clinical performance among healthcare professionals during the COVID-19 pandemic⁶. High resilience scores are also associated with enhanced self-care in samples of patients requiring long-term care (like in the case of diabetes mellitus), as reported by Boell et al. (2020)⁷. For Zager et al. (2021), resilience seems to be an essential protective factor for people to manage stressful situations such as the coronavirus pandemic and associated lockdowns⁸.

In addition, other factors such as fear and anxiety can generate more lavish use of self-protection measures from individuals against COVID-19 and those who trivialise its consequences. For instance, during the first months of the pandemic in Wuhan (China), Liu et al. (2020) reported that younger people experienced higher psychological stress than older people did, and most survey respondents adhered to specific measures stipulated by health authorities⁹. However, Leung et al. (2005) make some differentiation from these results in their study during the SARS epidemic in Hong Kong: where subjects, who perceived a higher likelihood of contracting SARS and dying, scored higher on anxiety and presented a better adoption of personal protective measures¹⁰.

There are multiple literature reviews and studies on the psychological repercussions of this health crisis¹¹⁻¹³, and the psychological factors that influence compliance with COVID-19 preventive measures⁹, but a small number of studies have focused on the behavioural factors that make health sciences students comply with health measures in the current crisis¹⁴. Considering that nursing students must face situations of risk of contagion both in their clinical practices and in their social environment, the present study aims to explore the association of resilience, fear and anxiety caused by COVID-19 with the level of compliance with preventive behaviours against COVID-19 within nursing students.

Methods

Participants

A cross-sectional study was conducted with first-year nursing students (2020) in a public university in Madrid (Spain). All first-year students were invited to participate in the study (n = 230). A total of 220 students agreed to participate. The study objectives and methodology were explained to them, and they signed an informed consent form prior to their participation. Students, who did not accept the conditions of the study, did not sign the informed consent form, and those who stated personal health reasons for not participating were excluded.

Instruments

Each participant was given a survey based on several questionnaires collecting data on sociodemographic characteristics, resilience status, preventive behavioral habits, anxiety levels, and fear of COVID 19. In addition, the participants were asked if they had been in contact with patients with mild, moderate or severe symptoms of COVID-19. The sociodemographic data collected to control analyses were age, gender, marital status, and employment status. The following validated self-report questionnaires, among others, were used to assess participants' habits concerning COVID-19:

- **Resilience:** The Spanish adaptation of the Connor-Davidson Resilience Scale (CDRS) was used to measure resilience status¹⁵. It contains 25 items grouped into 5 dimensions: persistence-tenacity-self-efficacy, control under pressure, adaptability and support networks, control and purpose, and spirituality. Each item is rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (almost always). The total score constitutes the total Resilience value, whose cut-off points are ≤ 70 (low), 70-87 (intermediate), and ≥ 88 (high). The Spanish version obtained a high level of internal consistency as measured with Cronbach's α ($=.86$)¹⁶.

- **Anxiety:** The Coronavirus Anxiety Scale (CAS) was used to assess anxiety levels among students¹⁷. The tool consists of 5 items rated on a scale of 0 to 4 according to the frequency of symptoms, with 0 being "never" and 4 being "nearly every day". The following manifestations of coronavirus anxiety were covered: cognitive (repetitive thinking; worry), behavioral (dysfunctional activities; avoidance; compulsive behaviors), emotional (fear and anxiety), and physiological (sleep disturbances). The Spanish version has a high level of internal consistency ($\omega=0.89$; ordinal $\alpha=0.89$)¹⁸.

- **Preventive behaviors:** The Use of Preventive Behaviors scale (UPB) was employed to analyze preventive behaviors. This scale was developed by the researchers of this study to assess behaviors to prevent the spread of the coronavirus as prescribed by the CDC¹⁹. It includes 8 behaviors "wear a face mask", "wear gloves", "keep

a safe distance with other people”, “wash or sanitize hands”, “clean objects and surface with hand sanitizer, bleach, alcohol, etc.”, “take precautions when coming home from the supermarket by washing food, sanitizing the mobile phone or keys, etc.”, “protect oneself when touching potentially infectious areas such as doorknobs, lifts, credit card readers, etc.” and “avoid enclosed spaces or make sure they are properly ventilated”. A true or false response is required for each statement. Each behavior was scored as 10, -10, 7, 5, -5, 4, -4, 2, -2 according to the consensus reached by the researchers regarding importance given to these behaviors to prevent the dissemination of the disease and the level of self-protection. An example of the weights of each behavior is shown in **table I**.

• **The Coronavirus Fear Scale (CFS)**, designed to assess the fears and concerns experienced by individuals during the COVID-19 pandemic, was used to analyse levels of fear among students^{20,21}. The questionnaire contains four factors: (F1) fear of contagion, disease, and death; (F2) fear of shortages of basic consumer goods; (F3) fear of social isolation; and (F4) work and income-related fears. The CFS is made up of 18 items rated on a 5-point Likert scale ranging from 1 (“Not at all or very little”) to 5 (“Very much or extremely”). Internal consistency as measured using α was =.89²².

Procedure

Data collection took place between October and December 2020, and the survey was conducted anonymously online (prior to the survey they had had to sign an electronic informed consent form to participate). Participants' personal data were anonymized for confidentiality using a numerical code. The survey data were transcribed into a database using the anonymous identifier codes for each participant. The principles enshrined in the Helsinki Declaration on Biomedical Research Involving Human Subjects were always observed. The faculty's Research Committee approved the research protocol.

Data analysis

A descriptive analysis was performed using proportions and numbers of events for variables sex, employment

status, marital status and close contact with a person with COVID-19. In addition, performed age in years with means and standard deviations. Potential relationships between the different dimensions (resilience, anxiety and fears with preventative behaviors) were identified using univariate and multivariate linear regression, with a significance level of 5%. All analysis were performed using SPSS program version 25.

Results

Sample characteristics

Of the total number of students participating, 84.3% were female, 50% were over 18 years old (mean (standard deviation) = 19.9(5.6)), approximately 80% were single, and 88.6% were unemployed. 53% of those who were employed worked in the healthcare sector. Since the start of the pandemic, 26% of participants had been in close contact with a person with severe COVID-19 symptoms, 39.8% had been in close contact with a person with mild COVID-19 symptoms, and 34.2% had not been in close contact with anyone with COVID-19 (**Table II**).

Correlations with use of preventive behaviours

A moderate positive relationship was found between the UPB score and the scores obtained from the CAS. Also, there was a moderate relationship between the score obtained from the UPB and the scores obtained from the overall CFS. There was a moderate relationship between the “fear of contagion, disease, and death activity (F1)” factor score of the CFS and a low relationship the score obtained from the “fear of shortages of basic consumer goods (F2)” of the CFS. There was not a statistical relationship between the score obtained from the CDRS and the UPB. No significant relationships were found between “fear of social isolation (F3)” and “work and income-related fears” factors of the CFS with the UPB scale (**Table III**).

Relationships among anxiety, fear of COVID-19, resilience and preventive behaviours

When analyzing the relationships of the study variables, as a result of univariate analyses regarding the prediction of the use of preventive behaviours by nursing students,

Table I: Weighting was awarded to the UPB questionnaire responses according to expert consensus.

| Item | Yes (Weighting) | No (Weighting) |
|--|-----------------|----------------|
| 1. Do you always or almost always wear a face mask when you leave your home? | 10 | - 10 |
| 2. Do you always or almost always wear gloves when you leave your home? | -5 | 5 |
| 3. Do you always or almost always keep a safe distance from other people outside your home (at least 2 meters)? | 10 | - 10 |
| 4. Do you think you wash or sanitize your hands too often? | 7 | -4 |
| 5. Do you regularly clean objects and surfaces with hand sanitizer, bleach, alcohol, etc.? | 4 | -2 |
| 6. Do you regularly take precautions when coming home from the supermarket by washing your food, sanitizing your mobile phone or keys, etc.? | 4 | -2 |
| 7. Do you usually protect yourself when touching potentially infectious areas such as doorknobs, lifts, credit card readers, etc.? | 4 | -2 |
| 8. Do you avoid enclosed spaces or make sure they are properly ventilated? | 10 | -10 |

Table II: General characteristics of the sample.

| | | N=220 | response % |
|---|--------------------------|--------------------------|------------|
| Sex | Female | 172 | 84.3 |
| | Male | 32 | 15.7 |
| | No response | 16 | |
| Employment status | Unemployed | 178 | 88.6 |
| | In the healthcare sector | 13 | 6.5 |
| | In another sector | 10 | 5.0 |
| | No response | 19 | |
| Marital status | Single | 173 | 85.6 |
| | Not single | 29 | 14.4 |
| | No response | 18 | |
| Close contact with a person with COVID-19 | No contact | 67 | 34.2 |
| | Mild symptoms | 78 | 39.8 |
| | Severe symptoms | 51 | 26.0 |
| | No response | 24 | |
| Age in years | 19.9 (mean) | 5.6 (standard deviation) | |

Table III: Correlations of levels of resilience, anxiety and fear of COVID-19 with use of preventive behaviours.

| | Use of preventive behaviours (UPB) |
|--|------------------------------------|
| Anxiety (CAS) | $r = .185^{**}$ $p = .006$ |
| Resilience (CDRS) | $r = .076$ $p = .267$ |
| Total fear (CFS) | $r = .191^{**}$ $p = .005$ |
| “Fear of contagion, disease, and death” (F1) | $r = .274^{**}$ $p = .000$ |
| “Fear of shortages of basic consumer goods” (F2) | $r = .159^{*}$ $p = .019$ |
| “Fear of social isolation” (F3) | $r = .020$ $p = .768$ |
| “Work and income-related fears” (F4) | $r = .075$ $p = .271$ |

Abbreviations: UPB, use of preventive behaviours scale, CAS, coronavirus anxiety scale; CDRS, Connor-Davidson Resilience Scale; CFS, coronavirus fear scale.
*low level correlational relationship.
**moderate correlational relationship

Table IV: Univariate linear regression between fear of COVID-19 (CFS), types of fears (F1 and F2) anxiety (CAS) and use of preventive behaviours (UPB).

| Dependent Variable: UPB | | | | | |
|-------------------------|-------|-----------|---------|-------------|-------------|
| | Coeff | Std.Error | p-value | Lower-CI95% | Upper-CI95% |
| CFS | 0.30 | -0.11 | .01 | 0.09 | 0.51 |
| CFS-F1 | 0.86 | 0.21 | .00 | 0.45 | 1.27 |
| CFS-F2 | 0.96 | 0.40 | .02 | 0.16 | 1.75 |
| CAS | 1.21 | 0.44 | .01 | 0.35 | 2.07 |

Abbreviations: UPB, use of preventive behaviours scale, CAS, coronavirus anxiety scale; CFS, coronavirus fear scale.

which was assessed with the linear regression analysis, a statistically significant difference was determined between the use of preventive behaviors (UPB) and the Resilience scale ($p=.032$). Therefore, individuals with a low or moderate resilience obtained similar mean values on the UPB. Conversely, individuals with a high resilience status got higher mean values on the UPB than the other two groups (**Figure 1**).

An analysis of the relationships between preventive behaviors, anxiety levels, and fear levels also showed a significant positive relationship between the CFS scale and UPB scale ($p<.05$) (**Table IV**).

Figure 1: Resilience and Use of Preventive Behaviours (UPB).

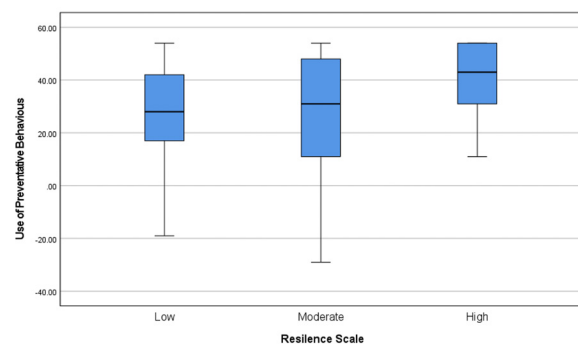


Table V: Stepwise multiple linear regression model: relationships between fear of COVID-19 and sex with UPB scale.

| Model | R | R ² | Adjusted R ² | Standard error of estimate | Change statistic | | Sig. of change in F |
|-------|-------------------|----------------|-------------------------|----------------------------|--------------------------|-------------|---------------------|
| | | | | | Change in R ² | Change in F | |
| 1 | .243 ^a | .059 | .054 | 18.29037 | .059 | 11.396 | .001 |
| 2 | .299 ^b | .089 | .079 | 18.04579 | .030 | 5.940 | .016 |

| Model | | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|-------|----------|-----------------------------|----------------|---------------------------|--------|------|
| | | B | Standard Error | Beta | | |
| 1 | CFS | .377 | .112 | .243 | 3.376 | .001 |
| 2 | CFS | .332 | .112 | .214 | 2.971 | .003 |
| | Male Sex | -8.789 | 3.606 | -.176 | -2.437 | .016 |

Abbreviations: UPB, use of preventive behaviours scale, CFS, coronavirus fear scale.

Table VI: Stepwise multiple linear regression model: relationships between types of fear of the CFS scale and sex with UPB scale.

| Model | R | R ² | Adjusted R ² | Standard error of estimate | Change statistic | | Sig. of change in F |
|-------|-------------------|----------------|-------------------------|----------------------------|--------------------------|-------------|---------------------|
| | | | | | Change in R ² | Change in F | |
| 1 | .325 ^a | .105 | .100 | 17.83684 | .105 | 21.304 | .000 |
| 2 | .365 ^b | .133 | .124 | 17.60296 | .028 | 5.842 | .017 |

| Model | | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|-------|----------|-----------------------------|----------------|---------------------------|--------|------|
| | | B | Standard Error | Beta | | |
| 1 | F1 | .997 | .216 | .325 | 4.616 | .000 |
| 2 | F1 | .924 | .215 | .301 | 4.295 | .000 |
| | Male Sex | -8.467 | 3.503 | -.169 | -2.417 | .017 |

Abbreviations: UPB, use of preventive behaviours scale, CFS, coronavirus fear scale.

This means that higher scores on the CFS will result in higher scores on UPB. Of the four factors or dimensions on the CFS scale, only F1 ("fear of contagion, disease, and death") and F2 ("fear of short-ages of basic consumer goods") ($p < .05$ for F1 and F2) influence scores on the UPB scale, with the result that higher scores on F1(F2) result in higher scores on the UPB. (Table IV). It also follows that higher CAS scores indicate higher UPB scores ($p < .05$) (Table IV).

Finally, the experience of close contact with a person with COVID-19 since the start of the pandemic was not associated with the UPB scale ($p = .58$).

When the scales of the study were introduced in a stepwise multiple linear regression model, with sociodemographic variables, a statistically significant difference was determined between the UPB scale based on the CFS scores ($p = .003$) and male sex ($p = .016$). The most significant models are presented in table V. When the four factors of the CFS scale were introduced in the model only F1 predicted scores on the UPB scale ($p < .001$) together with male sex ($p = .017$) (Table VI).

Discussion

Individuals with high resilience score higher on use of preventive behaviors than individuals with low/moderate

resilience, with no differences observed between these two groups. These results are consistent with the conclusions of Keener et al. (2021) focused on health professionals⁶ and those obtained with patient samples according to Boell et al. (2020)⁷.

The difference between the results of this study and those mentioned above is that preventive behaviors in response to COVID-19 are only observed among subjects with very high resilience scores. In contrast, no preventive behaviors are observed among people with moderate and low resilience scores. This indicates that subjects with very high resilience scores cope better with preventive behaviors than people with moderate and low resilience in environments where self-care measures vary significantly (use of face masks, social distancing, ventilation of enclosed spaces, limited family gatherings). According to Zager et al. (2021), resilience may be an essential protective factor for individuals to adapt to stressful situations such as the coronavirus pandemic and associated lockdowns⁸. This can also be since the sample is of students of recent incorporation, and only the very resilient can reconcile self-care with the development of their lives.

In addition, a significant relationship was observed in the study: higher CFS scores indicate higher use of preventive behaviors (UPB). During the initial months of the pandemic in Wuhan, China, Liu et al. (2020) reported that younger

people experienced more tremendous psychological stress than older people. Most respondents adhered to the specific behaviors stipulated by the health authorities⁹. However, it is also true that these measures are not as flexible as in Spain.

Examining the four factors or dimensions of the CFS, it was observed that only “fear of contagion, disease, and death” and “fear of shortages of basic consumer goods” affect the UPB score, with “fear of contagion, disease, and death” being the most influential, as seen in the multivariate regression model. This echoes the findings of Leung et al. (2005) during the SARS epidemic in Hong Kong: subjects who perceived a greater likelihood of contracting SARS and dying scored higher on anxiety, and higher anxiety levels indicated greater adoption of personal protective measures. However, the results of this study also revealed that male respondents, highly young people, significantly older people, and people with lower levels of education were less likely to engage in preventive behaviors (10). According to our study, in the multivariate linear analysis, male sex is related to lower use of preventive behaviors consistent with other studies²³.

Further studies should be carried out to further explain the lack of association between close contact with a person with severe COVID-19 and use of preventive behaviors. This absence may be due to the effect of some variable such as fear as reported in Sandin et al. (2020) who found that a close contact with a person with severe COVID-19 and the fear of COVID-19 were closely related²⁴.

Limitations

The limitations of this study include the lack of data from students in other health science disciplines. Future studies should include larger samples from different academic years to ascertain whether maturity level or patient exposure influences compliance with protective measures and resilience scores.

Given that only subjects with very high resilience scores were correlated with adherence to preventive behaviors, it is essential to develop resilience among students further to increase their mean scores.

This and other similar studies could help identify the most suitable nurses for COVID-19 wards and hospitals to avoid the unintentional scattering of these professionals.

The data also showed that students who were more compliant with preventive behaviors feared death and contagion and were females. This may inform prevention strategies based on self-preservation and economic recovery as motivating factors for compliance.

The lack of instruments to evaluate the use of preventive behaviors has led us to develop our own instrument. Despite not having carried out a validation study, due to the nature of the questions, it has allowed us to identify

the use that students make of preventive behaviors and relate them to validated scales. Future studies could be proposed to validate this instrument.

Finally, we believe that these findings may be used to develop programs targeting different student psychological profiles to enhance resilience and improve students' ability to fulfil their professional roles and set a daily example on compliance with personal preventive behaviors, which will become an essential skill for future professionals in the pandemic era.

Conclusions

Taking the results mentioned above into consideration can draw the following implications regarding the relationship between resilience, fear, and anxiety in complying with preventive behaviors in response to COVID 19:

- Only individuals with high resilience score higher on the use of preventive behaviors.
- Higher anxiety level indicates higher use of preventive behaviors.
- “Fear of contagion, disease, and death” and “fear of shortages of basic consumer goods” affect the use of preventive behaviors, with “fear of contagion, disease, and death” being the most influential.
- Students who had been in close contact with a person with severe COVID-19 did not score higher on prevention behaviors.
- Fear of coronavirus, especially “fear of contagion, disease and death”, and female sex independently predict use of preventive behaviors.

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Author contribution

AMM and LIMS designed the study and collected the data. GM and PRGD analysed the data. All authors aided in interpreting the results and have made a significant contribution to the final manuscript.

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