Original Article

Resilience as a predictor of empathy in Colombian nursing students

Resiliência como preditor de empatia em estudantes de enfermagem colombianos

Resiliencia como predictor de la empatía en estudiantes de enfermería colombianos

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How to cite:
Hernández-Alvarez G, López-Sáleme R, Escobar-Velásquez K, Gamarra-Moncayo JR, Reyes-Reyes F, Reyes-Reyes A, et al. Resilience as a predictor of empathy in Colombian nursing students. Acta Paul Enferm. 2025;38:eAPE001325i.

DOI
http://dx.doi.org/10.37689/acta-ape/2025AO001325i

Keywords
Empathy; Resilience; Student, nursing; Structural equation modeling; Colombia

Descritores
Empatia; Resiliencia; Estudantes de enfermagem; Colombia

Descriptores
Empatía; Resiliencia; Estudiantes de eEnfermería; Colombia

Submitted
June 6, 2024

Accepted
April 10, 2025

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Abstract

Objective: This study aims to determine whether individual resilience can predict empathic behavior in undergraduate nursing students and how resilience influences empathy (positively or negatively).

Methods: Descriptive, cross-sectional, and correlational study. The population consisted of 516 students from all academic semesters duly enrolled in the 2023 academic cycle in the Faculty of Nursing, Universidad Cartagena de Indias, Colombia. A convenience sample of 330 students was selected, with a predominance of women compared to men. To assess empathy, the Jefferson Scale of Empathy for Health Professionals was used, which has three dimensions (Compassionate Care, Perspective-Taking, and "Walking in the Patient's Shoes"), and resilience was measured using the Trait Resilience Scale composed of three dimensions (Engineering, Ecology, and Adaptation). Empathy and resilience data were subjected to psychometric analysis to verify compliance with the theoretical model and the presence of the dimensions of each construct in the data. Descriptive statistics of each scale are presented. The prediction of resilience on empathy was performed using Structural Equation Models (SEM).

Results: There is an overall positive relationship between resilience as a predictor of empathy; the goodness-of-fit indicators of the implemented SEM model prove to be adequate; however, not all dimensions of the resilience variable prove to be adequate predictors when associated with the empathy dimensions, the ecological dimension of resilience positively predicts the perspective-taking dimension of empathy. In contrast, the adaptation dimension negatively predicts the compassionate care dimension of empathy, with no statistically significant relationship in the engineering dimension.

Conclusion: Individual resilience is a variable that can predict empathetic behavior in nursing students from the studied Faculty of Nursing.

Resumo

Objetivo: Este estudo tem como objetivo determinar se a resiliência individual pode predizer o comportamento empático em estudantes de graduação em enfermagem e como a resiliência influencia a empatia (positiva ou negativamente).

Métodos: Estudo descritivo, transversal e correlacional. A população foi composta por 516 estudantes de todos os semestres acadêmicos matriculados no ciclo acadêmico de 2023 da Facultad de Enfermería, Universidad de Cartagena, Colômbia. Foi selecionada uma amostra de conveniência de 330 estudantes, com predominância de mulheres em comparação com os homens. A Escala Jefferson de Empatia para Profissionais de Saúde, com

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Conflicts to interest: nothing to declare.

três dimensões (Cuidado Compassivo, Tomada de Perspectiva e "Colocar-se no Lugar do Paciente") foi utilizada para avaliar a empatia, e a Escala de Traços de Resiliência, composta por três dimensões (Engenharia, Ecológica e Adaptativa), para avaliar a resiliência. Os dados de empatia e resiliência foram submetidos à análise psicométrica para verificar a conformidade com o modelo teórico e a presença das dimensões de cada construto nos dados. As estatísticas descritivas de cada escala são apresentadas e a Modelagem de Equações Estruturais (MEE) foi utilizada para a predição da resiliência na empatia.

Resultados: Existe uma relação global positiva entre a resiliência como preditora da empatia; os indicadores de bondade do ajuste da MEE implementada demonstram ser adequados. No entanto, nem todas as dimensões da variável resiliência demonstram ser preditores adequados quando associadas às dimensões da empatia. A dimensão ecológica da resiliência prediz positivamente a dimensão da tomada de perspectiva da empatia. Em contraste, a dimensão adaptativa prediz negativamente a dimensão do cuidado compassivo da empatia, sem relação estatisticamente significativa na dimensão engenharia.

Conclusão: A resiliência individual é uma variável que pode predizer o comportamento empático em estudantes de enfermagem da Facultad de Enfermería estudada.

Resumen

Objetivo: Este estudio tiene como objetivo determinar si la resiliencia individual puede predecir el comportamiento empático en estudiantes de la carrera de enfermería y cómo la resiliencia influye en la empatía (positiva o negativamente).

Métodos: Estudio descriptivo, transversal y correlacional. La población estuvo compuesta por 516 estudiantes de todos los años de la carrera matriculados en el ciclo académico 2023 en la Facultad de Enfermería, de la Universidad de Cartagena, Colombia. Se seleccionó un muestreo por conveniencia de 330 estudiantes, con predominancia de mujeres en comparación con los hombres. Para evaluar la empatía se utilizó la Escala de Empatía Médica de Jefferson, con tres dimensiones (atención con compasión, toma de perspectiva y ponerse en el lugar del paciente). Para evaluar la resiliencia se empleó la Escala de Rasgos de Resiliencia, compuesta por tres dimensiones (ingeniería, ecológica y adaptativa). Se realizó un análisis psicométrico de los datos de empatía y resiliencia para verificar la conformidad con el modelo teórico y la presencia de las dimensiones de cada constructo en los datos. Se presentaron las estadísticas descriptivas de cada escala y se utilizó el Modelo de Ecuaciones Estructurales (MEE) para la predicción de la resiliencia en la empatía.

Resultados: Existe una relación global positiva en la resiliencia como predictor de la empatía. Los indicadores de bondad de la adaptación del MEE implementado demostraron ser adecuados. Sin embargo, no todas las dimensiones de la variable resiliencia demostraron ser predictores adecuados cuando se las relaciona con las dimensiones de la empatía. La dimensión ecológica de la resiliencia predice positivamente la dimensión de toma de perspectiva de la empatía. En cambio, la dimensión adaptativa predice negativamente la dimensión de la atención con compasión de la empatía, sin relación estadísticamente significativa con la dimensión ingeniería.

Conclusión: La resiliencia individual es una variable que puede predecir el comportamiento empático de estudiantes de enfermería de la Facultad de Enfermería estudiada.

Introduction

Empathy is an intersubjective relationship between two human beings.[1] In the field of patient care, empathy is the relationship between the nursing professional and the patient in such a way that the professional can understand the thoughts and perceive the feelings and emotions of the patient without this understanding affecting the objectivity, efficiency, and effectiveness of the professional in providing adequate care and treatment to the patient.[2]

Therefore, it is possible to link empathy as an essential element of humanization in healthcare [3] with positive outcomes regarding the quality of patient care, satisfaction, and treatment adherence, among other benefits duly described in other works.[1-3] Individual resilience is the ability of a person to successfully confront exogenous negative factors that may arise throughout their life.[4] Empathy and individual resilience are two complex concepts, and their development occurs throughout a person's ontogeny, whose bases, neuronal networks, and mentalization processes are still under study.[5,6]

Empathy can be affected by external factors that may determine a decrease in the empathic attitude of the nursing professional, which has been described in various works.[7,8] For this reason, it is possible to infer that individual resilience could constitute an attribute that can protect against a possible decrease in empathy in nursing.[9,10] However, the theoretical relationship between individual resilience and empathy is still not clear;[12-18] therefore, it is important to provide more and better empirical evidence on this relationship.

Several studies have examined the relationship between resilience and empathy in university health sciences students, revealing a positive connection between both variables.

A study conducted with Peruvian nursing students found a positive association between positive mental health, resilience, and social skills, including empathy. This research suggests that students with higher levels of positive mental health tend to show better social skills, including empathic ability.[11] Additionally, resilience is an important factor in the academic success of nursing students.[12]

Several factors can explain the relationship between resilience and empathy in nursing students:

1) Both are complementary skills. On the one hand, resilience helps them cope with stress, while empathy allows them to connect emotionally and cognitively with their patients,[13] 2) Both resilience and empathy contribute to improving mental health in general, which favors nursing students in both their adaptation, satisfaction, academic performance,[14] adaptation to the academic environment[15] and emotional intelligence.[11,16]

In conclusion, the evidence suggests that resilience and empathy are related to nursing students. This relationship is explained by the complementarity of these skills in the context of the nursing career and their contribution to better adaptation to the academic and professional environment.

It is assumed that individual resilience theoretically operates as a predictor of empathy, with empirical evidence supporting this hypothesis.[9,10,17]

In summary, resilience is what would contribute to nullifying the disruptive factors that occur in the training of nursing students by developing in them the capacities to absorb or resist a disturbance, the capacity to recover equilibrium after any disturbance and, finally, the capacity to manage the adaptation process in the face of such a disturbance. Consequently, empathy should not be affected if resilience is present in nursing students. For example, "empathic erosion" could not occur when a disturbance cannot affect one or more empathy dimensions.[17,18] Then, patient care will be empathetic or more empathetic, which contributes to a more humanized care of the patient.

This study aims to determine whether individual resilience can predict empathic behavior in undergraduate nursing students and how resilience influences empathy (positively or negatively).

Methods

This study adopted a descriptive, cross-sectional, and correlational design following the STROBE guidelines. Was conducted at the Faculty of Nursing, Universidad de Cartagena de Indias, Colombia. The population comprised all students from all academic semesters duly enrolled in the educational cycle 2023. The sample (n) comprised 366 students (64% of the total population) who voluntarily responded to the two instruments. The sample consisted of 309 women (84.4%) with a mean age of 20.9 years (SD=2.4). Thus, the only inclusion criterion was voluntary participation, indicating a convenience sampling approach. Students who did not attend classes or who did not sign the informed consent were excluded from the present study.

Individual Resilience was measured using the Trait Resilience Scale.[18] This scale evaluates three facets of resilience: engineering, ecological, and adaptive (EEA). It consists of a 12-item Likert-type format, with five response levels per item, ranging from "Strongly disagree" [1] to "Strongly agree" [5]. The EEA (Engineering, Ecological, and Adaptive) resilience model has three dimensions: (a) Engineering resilience is understood as the ability of a person to recover quickly after facing some crisis, stressful situations, or difficulties, managing to quickly restore their original state of functioning; (b) ecological resilience highlights the person's ability to be resilient and maintain stability in the face of challenges, relying on their strengths when facing life's challenges; (c) adaptive capacity is understood as the ability to adjust to new circumstances, being flexible to use strategies in the face of adverse situations. The EEA Trait Resilience Scale has demonstrated satisfactory internal and test-retest reliability (Omega de MacDonald = [.70 - .86]; Cronbach's alpha = [.68 – 0.82]). Additionally, it exhibits a cross-culturally stable factor structure, convergent and construct validity concerning associations with personality, and a positive contribution to clinical and non-clinical psychological health states.[18,19]

Empathy was measured using the Jefferson Scale of Empathy for Health Professionals (JSE-HPS).[19] This scale comprises 20 items that measure empathy levels with patients in health science students of any specialization. Items are rated on a 7-point response scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The scale gauges three dimensions: Compassionate Care (CC, items 1, 7, 8, 11, 12, 14, 18, 19), Perspective-Taking (PA, items 2, 4, 5, 9, 10, 13, 15, 16, 17, 20), and "Walking in the Patient's Shoes" (WIPS, items 3 and 6). JSE-HPS is struc-

tured based on three dimensions: a) Perspective-taking refers to the ability to understand the other, achieving an understanding of the patient's situation and feelings from the patient's perspective; b) compassionate care involves the desire to help and support the patient, consisting of an emotional response that motivates healthcare professionals to be concerned about the patient's well-being and show compassion; c) putting oneself in the patient's place is related to the ability to experience a connection (emotional and cognitive) with the other that favors a sensitive and humane response.[19,20] The scale has demonstrated adequate internal consistency (α=0.78-0.92) and appropriate correlations with other psychological variables.[19,20]

The instruments were administered in a group setting, using a pen-and-paper format, during the students' regular class hours. Data was collected by faculty members from the Faculty of Nursing who were not involved in this research and had received the necessary training to administer the instruments correctly, address students' queries, and ensure the proper reception of responses. All students signed informed consent before completing the instruments, ensuring their autonomy, voluntariness, and confidentiality of information. The data were collected in the second academic semester of 2023.

Data analysis. The analysis began by verifying the psychometric properties of the instruments used, so the original database with 366 applications was segmented. Regarding the empathy scale, upon reviewing the data, 25 cases of multivariate outliers (p<.001) were detected through Mahalanobis distances.[21] This procedure was also carried out for the resilience scale, where 16 observations were detected, five of which coincided in both scales, eliminating 36 observations, and forming a sample of 330 participants. Descriptive analyses of univariate (skewness and kurtosis) and multivariate normality were performed for both instruments. Confirmatory Factor Analysis (CFA) was conducted using the Maximum Likelihood Robust (MLR) estimator for the empathy scale. It has items with seven response options and can thus be treated as continuous variables.[22] For the resilience scale, the Weighted Least Squares Mean and Variance Adjusted (*WLSMV*) estimator was used, as it is suitable for analyzing ordinal variables based on a matrix of polychoric correlations.[23]

Cut-off points considered for fit indices were: *CFI* > .90, *TLI* > .90, *RMSEA* < .08, *SRMR* < .05,[22] and *WRMR* < 1,[24] the latter only for the resilience scale, as it is ideal for ordinal indicators. Omega coefficient was applied to evaluate reliability, with values above .70 considered adequate.[25,26]

Once the proper functioning of the instruments was evidenced, Structural Equation Modeling (SEM) was conducted with the *MLR* estimator, considering the same fit goodness indicators as those used in the *CFA* conducted for the instruments.

Analyses were performed using SPSS 27 and R software with its RStudio interface, along with the statistical packages Lavaan version 0.6-17, Psych version 2.4.1, SemTools version 0.5-6, and *MVN* version 5.9.

The study adhered to the ethical principles outlined in the Declaration of Helsinki (2013). Approval for the research project and informed consent was obtained from the Institutional Ethics Committee of Andrés Bello University (Chile, File: 020-2022). All sociodemographic, personal data, and instrument responses were treated as confidential.

Results

Table 1 shows that some items of the empathy scale [2, 4, 7, and 14] exceed the |2| threshold for skewness; however, no item exceeded the |7| threshold for kurtosis, considered indicators of severe non-normality. Meanwhile, expected values were found for the resilience scale. Multivariate normality was also assessed, revealing that both instruments do not meet this condition (p <.001).

Initially, the original model of three correlated empathy factors was tested using the MLR estimator, but an adequate fit was not observed (χ^2 = 291.66; *df* = 168; *CFI* = 0.88; *TLI* = 0.86; *RMSEA* [IC 90%] = 0.05 [0.04 - 0.06]; *SRMR* = 0.06). Upon reviewing the factor loadings, it was noted

Table 1. Univariate descriptive statistics of empathy and resilience items

Empathy Scale					Resilience Scale				
Item	M	SD	g1	g2	Item	M	SD	g1	g2
1	5.06	2.16	-0.66	-1.08	1	3.53	0.94	-0.54	-0.02
2	6.59	0.79	-2.37	6.49	2	3.25	0.98	-0.27	-0.56
3	4.39	1.45	-0.02	-0.53	3	3.45	0.96	-0.53	-0.38
4	6.60	0.75	-2.30	5.90	4	3.34	0.96	-0.33	-0.55
5	5.74	1.30	-1.05	0.80	5	4.23	0.76	-0.92	0.82
6	4.04	1.54	-0.12	-0.51	6	3.79	0.89	-0.46	-0.24
7	6.38	1.45	-2.61	5.92	7	3.89	0.89	-0.65	0.04
8	5.68	1.59	-1.09	0.20	8	3.94	0.76	-0.53	0.43
9	6.03	1.19	-1.16	0.69	9	3.74	0.89	-0.51	0.04
10	5.84	1.22	-0.93	0.17	10	3.12	0.96	0.01	-0.39
11	5.97	1.37	-1.46	1.49	11	3.17	1.01	-0.08	-0.69
12	5.70	1.66	-1.26	.52	12	3.74	1.03	-0.67	-0.05
13	6.16	1.24	-1.73	3.03					
14	6.37	1.25	-2.47	5.88					
15	5.82	1.37	-1.33	1.72					
16	6.36	0.98	-1.72	2.82					
17	5.28	1.48	-0.70	-0.08					
18	3.44	1.79	0.30	-0.87					
19	5.77	1.46	-1.12	0.52					
20	6.54	0.79	-1.95	3.92					

M = Mean, SD = Standard deviation, g1 = Skewness, g2 = Kurtosis

that item 18 had a significantly lower loading (0.08) compared to others, leading to its omission. In the re-specified model, improvements in fit indices were observed (χ^2 = 234.64; *df* = 149; *CFI* = 0.92; *TLI* = 0.91; *RMSEA* [IC 90%] = 0.04 [0.03 - 0.05]; *SRMR* = 0.05), indicating adequate construct validity. Regarding reliability, omega coefficients of 0.73, 0.76, and 0.57 were obtained for the dimensions of compassionate care, perspective-taking, and walking in the patient's shoes, respectively. In the case of resilience, the original model of three correlated factors was tested using the *WLSMV* estimator. While an acceptable fit was found (χ^2 = 171.06; *df* = 51; *CFI* = 0.98; *TLI* = 0.97; *RMSEA* [IC 90%] = 0.08 [0.07 - 0.09]; *SRMR* = 0.05; *WRMR* = 0.99), a significant modification index suggested a correlation between items 3 and 4. Incorporating this correlation improved the model fit (χ^2 = 114.95; *df* = 50; *CFI* = 0.99; *TLI* = 0.98; *RMSEA* [IC 90%] =0.06 [0.05 - 0.08]; *SRMR* = 0.05; *WRMR* = 0.79). Thus, this model was chosen as the final, demonstrating construct validity. Additionally, internal consistency assessed by the omega coefficient yielded values of 0.84, 0.82, and 0.71 for the engineering, ecological, and adaptation dimensions, respectively. Regarding the analysis of measurement invariance across genders, it was not feasible due to the limited subsample of males.

Dimensions of Resilience and Empathy

Resilience has three dimensions. Ecological: It reflects a student's ability to absorb or resist a disturbance (exogenous or endogenous) before realigning the "mechanisms" that he or she has (resources and coping) to maintain a stable psychological state. It focuses on the magnitude of the disturbance and its control. Engineering: It is the student's ability to regain balance after resisting any disturbance. Adaptation: It is the ability to accommodate their psychological state to the change produced by the disturbance without the disturbance affecting their state in terms of the original purposes that the student had.

Empathy has three dimensions

Compassionate care

It reflects the degree of emotionality the student has and how his or her own emotionality allows him or her to perceive the patient's emotions without being infected. Perspective Adoption: It is the cognitive ability of the student to penetrate the patient's mind, understand the patient's point of view, experiences, and perspective, and predict what his or her behavior would be in different situations. Putting yourself in the patient's shoes: A student's cognitive ability allows him to perceive what another person would feel or sense if they were in the same situation.

Explanatory model

Table 2 shows the descriptive statistics and correlation coefficients of the study variables. It is observed that compassionate care is negatively related to adaptation (r= -.16, p <.01), whereas perspective-taking is positively associated with the engineering (r=.11, p <.01) and ecological (r= .22, p < .01) dimensions.

In this study, the structural model achieved relevant fit indices (χ^2 = 666.98; *df* = 448; p < .001; *CFI*=.92; *TLI*=.91; *RMSEA*=.038 [IC90% .032–.044] y *SRMR* = .056). It is worth noting that despite having a low factor loading, item 18 in the empathy scale was included in the final model.

Table 2. Descriptive statistics and correlations between variables

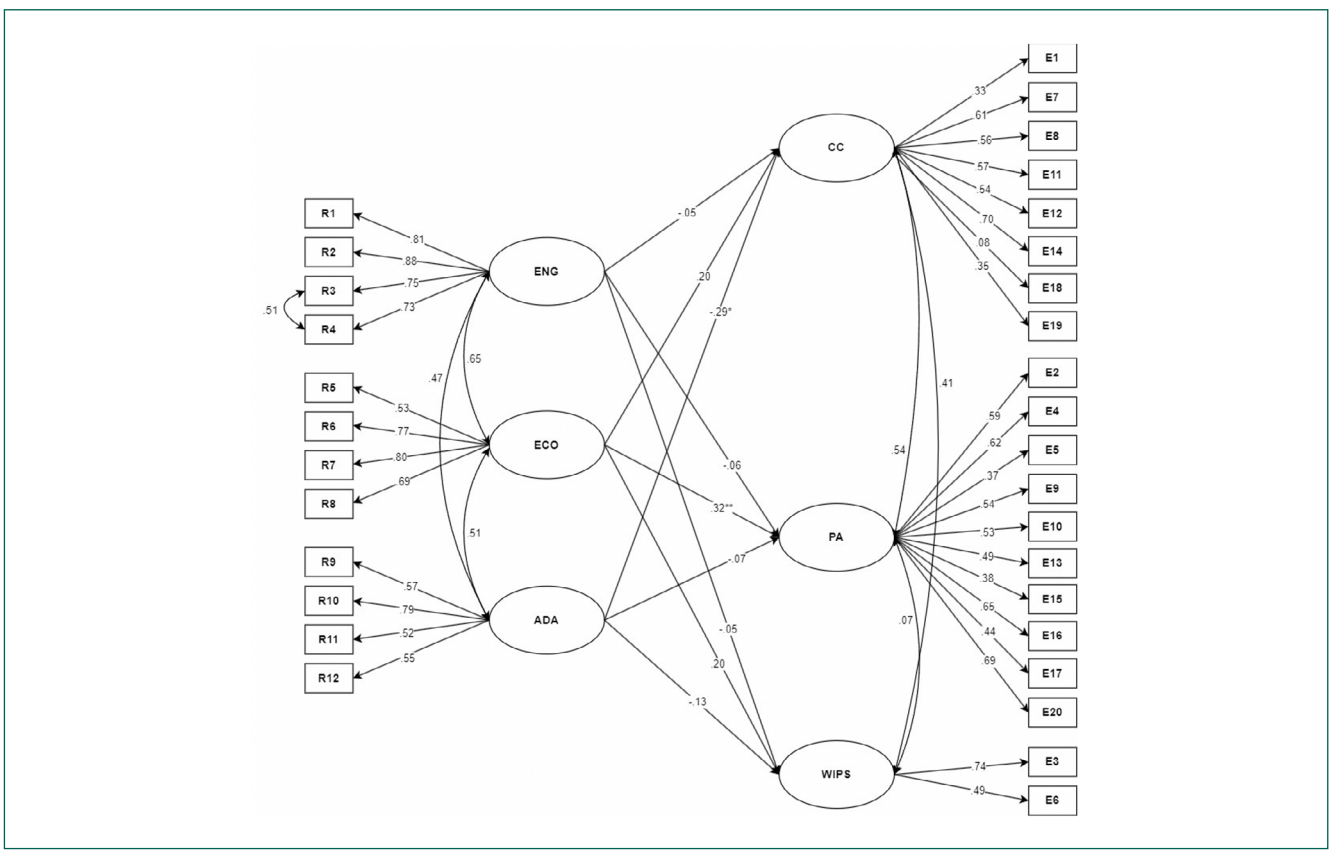
Variable	Min	Max	M	SD	g1	g2	1	2	3	4	5	6	7
1. ING	4	20	13.49	3.33	-0.45	-0.01							
2. ECO	9	20	15.82	2.61	-0.22	-0.47	0.53**						
3. ADA	4	20	13.72	2.84	-0.41	0.23	0.35**	0.35**					
4. RES	18	59	43.03	6.85	-0.23	0.12	0.83**	0.78**	0.72**				
5. CC	8	56	44.28	6.96	-1.48	3.48	-0.05	0.03	-0.16**	-0.08			
6. PA	39	70	60.94	6.50	-0.88	0.54	0.11*	0.22**	0.09	0.18**	0.30**		
7. WIPS	2	14	8.40	2.46	-0.14	-0.27	0.01	0.06	-0.02	0.02	0.27**	0.03	
8. EMP	80	137	113.63	11.59	-0.87	0.58	0.03	0.16**	-0.05	0.05	0.83**	0.75**	0.39**

ING= Engineering, ECO= Ecological, ADA= Adaptation, RES= Resilience, CC= Compassionate care, PA= Perspective-taking, WIPS= Walking in the patient's shoes, *EMP*= Empathy, *M*= Mean, *SD*= Standard deviation, *g1*= Skewness, *g2*= Kurtosis. *p<.05, **p<.01

While the *CFI* and *TLI* slightly improved after its removal, the *RMSEA* and *SRMR* remained within acceptable ranges in the initial version. As depicted in figure 1, the adaptation dimension only negatively predicted compassionate care (β = -.29; p <.05), while it did not have such an effect on the other dimensions. Regarding the ecological dimension, it positively predicted perspective-taking (β =.32; p<.01); however, the same was not observed for the other dimensions. Lastly, the adaptation dimension failed to predict any component of empathy.

Discussion

The concept of empathy is subject to theoretical contradictions. Empathy encompasses cognitive and affective components, but some authors argue that clinical empathy should prioritize the former over the latter.[19] However, others propose that empathy operates as a system in which all its components interact, suggesting that empathy, as a system, functions with specific impacts on the nursing professional's interaction with the patient.[27]



ENG = Engineering, ECO = Ecological, ADA = Adaptation, CC = Compassionate Care, PA = Perspective-Taking, WIPS = Walking in the Patient's Shoes

Figure 1. An explanatory model of resilience dimensions as predictors of empathy dimensions

Similarly, individual resilience can be conceptualized as a system.[28] Studying whether resilience can predict empathy is essentially examining how two inherently complex systems can relate to each other.[4] Consequently, empirical findings must be interpreted cautiously and within the framework of a supporting theoretical model.

To provide empirical evidence contributing to the theoretical development of the relationship between resilience and empathy, it was essential to assess the fulfillment of theoretical models of resilience and empathy within the study sample. This ensures that relationships between dimensions of both constructs are methodologically supported.[4,5,29] Nursing science students are exposed to exogenous disturbances that hinder their performance in the educational process.[1-3] Resilience measures can thus be associated with different traits that enable successful coping with external negative factors.[28]

Considering the significant correlations, the findings of this study demonstrate that the ecological dimension of resilience positively predicts the perspective-taking dimension (PA) of empathy. In this way, ecological resilience, as a cognitive dimension, would indicate that you stand firm in the face of the demands of the environment, as you trust in your competencies to cope with them, then in this way perspective-taking, from the point of view of empathy, implies a similar cognitive function by understanding the other as being part of that environment.

Thus, both concepts promote resilience and inner strength. Perspective-taking, the ability to put oneself in the place of the other requires cognitive and emotional flexibility, which can strengthen the ability to cope with challenges, maintain resilience in the face of adversity, and rely on one's own strengths from the ecological perspective of resilience. In this way, both dimensions enable a more adaptive response, being able to cope with difficulties more efficiently.

On the other hand, the adaptation dimension of resilience negatively predicts the compassionate care dimension (CC). Concerning the relationship between adaptive capacity, as a component of individual resilience, and compassionate care of empathy, both dimensions focus on responses to challenging situations from different perspectives.

Compassionate care involves an emotional response focused on the patient's well-being, motivating the professional to provide help. This dimension depends on an emotional connection and deep empathy towards the other, guiding actions towards alleviating the patient's suffering.

On the other hand, adaptive capacity refers to the ability to adjust and transform strategies according to adverse circumstances. In a clinical setting, this flexibility may involve adapting to the changing needs of patients or complex health situations, which may include decisions that prioritize efficiency or the health professional's personal and professional balance.

An inverse relationship between the two concepts could hypothetically exist if the adaptive capacity to adjust to adversity involved a reduction in direct emotional response (compassion), since, in some cases, the focus on efficiency or flexibility in the face of adversity could limit the expression of strong emotions, such as compassion, as a form of protection to avoid emotional exhaustion or compassion burnout. However, they are not inherently opposite dimensions; thus, compassion may require adaptability in how care is delivered in different contexts, and adaptive capacity may be motivated by a desire to better care for the patient.

The effect of a negative exogenous factor may involve a partial disorder of the essential mechanisms of the psychological system, destabilizing its function, purpose, structure, and identity. [30]

Ecological resilience entails the ability to absorb and resist such negative effects, irrespective of their magnitude. Traits associated with this dimension include robustness, confidence in one's strengths and abilities to confront external effects, and stoic perseverance in achieving long-term goals. [19] These traits may explain why exogenous disturbances experienced by nursing students do not affect their intellectual or imaginative understanding of the patient's condition. Specifically, they would not affect the adoption of perceptual (ability to represent the other's perspective based on their situation), cognitive (ability to represent the patient's thoughts in one's mind), and affective (ability to infer the patient's emotional state) perspectives.

The ecological dimension of resilience also showed relatively "high" correlations with the CC and WIPS dimensions of empathy, although not significant. This finding should be considered since the lack of significance may be due to sampling effects (sample size and voluntary student participation) rather than the absence of a statistically significant positive prediction of the ecological dimension regarding CC and WIPS. Therefore, obtaining predictions with statistical significance, which might not be achievable in local studies, requires simultaneously studying large samples from various populations. [1, 2]

The CC dimension of empathy reflects the student's emotions and their ability to assist the patient, which can only be appreciated through action. [4]

Adaptive resilience is fundamentally characterized by the ability to accommodate change generated by exogenous disturbances in terms of permanent resistance. [18, 19] Psychological traits of this dimension are associated with adaptability, flexibility in response to changes, innovation, modification, and effective responses to negative exogenous effects. Theoretically, it is not acceptable that a decrease in adaptability can be interpreted as an increase in empathy. Indeed, if we analyze that CC values in this student population are 44.28 (Table 2) and fall within the 5th percentile of the classification of very high levels [48 points], in line with estimates of cut-off points observed in nursing students in Latin America.[30] There are no studies measuring resilience cut-off points, and adaptive resilience levels were 13.72 points, a relatively low value. The observed negative correlation may be explained by the fact that students, despite having high levels of CC, tend to express a lack of traits associated with adaptability to changes caused by exogenous disturbances.

Although not the focus of this research, the findings show that any intervention aimed at improving empathy levels in nursing students must begin with an empathic diagnosis to obtain, in addition to observed empathy levels, knowledge regarding explanations for the aforementioned levels. Additionally, it is necessary to study how traits of ecological resilience may explain an increase in the PA dimension in nursing students, considering that PA belongs to the cognitive component of empathy.

Lastly, it is crucial to highlight that the non-significant correlations of empathy dimensions (CC, PA, and WIPS) with the Engineering dimension and of the PA and WIPS dimensions of empathy about the Adaptability dimension of resilience could reflect that empathy cannot only be predicted by individual resilience but also by other factors. This further supports the hypothesis that empathy could be the consequence of many factors influencing it.[30]

The main limitation of the present study is that the results of the associations found cannot be generalized a priori to all nursing students in Colombia and Latin America due to the lack of representativeness of the sample and the significant variability in empathy and its dimensions existing in Latin America.[31]

The reliability of the last dimension was much lower than expected; however, this may be because it only contains two items, which may not be sufficient, considering that the ideal number of items in a factor is three to four.[32,33]

Conclusion

Individual resilience is a variable that can predict empathic behavior in nursing students, at least partially. The findings presented here provide empirical evidence supporting the notion that empathy can be defined as a dependent variable, while individual resilience and its dimensions can be a predictor variable. In general, the positive prediction of ecological resilience, in relation to the three dimensions of empathy, shows that students possess the traits associated with this dimension and, therefore, have the capacity to resist disturbances, and this capacity impedes the good empathic functioning of these students in the process of coping with the disturbance. However, adaptive resilience negatively predicts the three dimensions of empathy, which shows that students have a deficit in the capacity to adapt to the necessary change that the presence of the disturbance implies after having adequately resisted it. Therefore, the training of these students will imply the need not only

for empathic training but also for resilient training, especially for the traits associated with adaptive resilience. However, based on the low values of the significant correlations found, it is inferred that both factors may be being modulated by other factors, so further research is needed.

Collaborations

Hernández-Alvarez G, López-Sáleme R, Escobar-Velásquez K, Gamarra-Moncayo JR, Reyes-Reyes F, Reyes-Reyes A and Díaz-Narváez V were involved in the design and interpretation of the analysis, contributed to the writing of the manuscript and read and approved the final manuscript.

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