Evaluation of emotional skills in nursing using regression and QCA models: A transversal study

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ABSTRACT

Background: Emotional skills are fundamental for quality service by nursing professionals, providing more personalized attention and a close relationship between the professional and patient.
Objectives: To compare linear relationship models (linear regressions) and models based on comparative qualitative analysis (QCA) in the analysis of the possible influence of socio-demographic variables (age and sex), working conditions (type of contract and seniority) and academic training (type of degree and specific training) on emotional abilities (emotional intelligence and empathy) in nursing.
Design: It is a transversal design in a single temporary moment.
Participants: The sample of this study consisted of 217 direct patient care nursing professionals from 7 public hospitals in Valencia, Spain.
Methods: The Jefferson Scale for Nursing Empathy was used to measure empathy and the Trait of Meta-Mood Scale 24 to measure emotional intelligence. Two different statistical methodologies were used: traditional regression models and qualitative comparative analysis models of fuzzy sets (fsQCA).
Results: The results of the regression model suggest that only sex (negatively in the case of perspective taking) and positively (in compassionate care and thinking like the patient) is a predictive variable in the case of empathy, but not in emotional intelligence. Thus, the results of the fsQCA models provide a greater amount of predictive value for both emotional intelligence and empathy, although when varying the variables that best explained the dimensions, the type of contract and age were the main conditions that were sufficient but not necessary.
Conclusions: Given the differences in linear relationship models and fsQCA, far from prioritizing one technique over another, both are complementary and should be used simultaneously in other studies.

1. Introduction

We interact daily with other people, establishing relationships and generating affective bonds (Ghiyasvandian et al., 2014). The quality of these bonds depends to a large extent on our emotional abilities or competences, something especially relevant in the health field, where, among others, the ability to understand and put oneself in the patient's place is necessary to offer quality care(Ghiyasvandian et al., 2014). For care professions such as nursing, emotional skills are of great importance, as the professional must be able to control his own emotions and correctly detect, interpret and manage the emotions of others, to identify the other person's needs and provide individualized care (Adams and Iseler, 2014). For nurses, sensitivity to patients' moods and emotions is essential to understanding the patient's needs, thoughts and

actions (Parnell and St. Onge, 2015). Emotional skills are also key to nurses' daily work with other caregivers (Majerníková and Obročníková, 2017).

Among the different emotional abilities, empathy and emotional intelligence stand out for their importance, as well as for their presence in most of the studies carried out in the field of nursing (Hojat et al., 2015). Research on empathy sees it as an important component of the helping relationship, and it is the essence of care in the nursing profession (Terezam et al., 2017). The literature shows that empathic care improves patient health outcomes in different ways (American Association of Colleges of Nursing, 2010; Parks, 2015). Along the same lines, studies suggest that nurses who do not show empathy, do not consider the patient's point of view, do not express their fears or concerns with the patient, and instead orient their activity towards

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technical procedures (such as medication administration) neglect important aspects that affect patient safety and intensify their anxiety about the health problem (Navarro-Abal et al., 2018).

On the other hand, emotional intelligence (EI) plays a fundamental role in understanding our own feelings and motivations, as well as those of others. From this perspective, EI stands as a basic element in establishing and maintaining quality interpersonal relationships and therefore in developing an appropriate therapeutic relationship (Foster et al., 2015; Parnell and St. Onge, 2015). In addition, it has benefits for nursing staff, as it can directly affect their physical and psychological health, and self-awareness can improve satisfaction and mutually enrich nurse-patient relationships (Barton, 2018). EI can encourage teamwork, making the care provided more efficient and effective, and has a positive effect on the nursing service's leadership behaviors, improving interprofessional and patient relations (Majerníková and Obročníková, 2017). An empathic understanding of the patient and adequate emotional management are necessary for the patient to reach higher levels of well-being and comfort (Hojat et al., 2015).

These variables are affected by very diverse conditions, whether internal (socio-demographic variables, personality) or external (working conditions, organizational culture) (Navarro-Abal et al., 2018). The first several studies observed that sociodemographic aspects such as sex or training (Taleghani et al., 2018) affect the emotional competence of nurses (Giménez-Espert and Prado-Gascó, 2017a), with women showing greater emotional skills than men. In terms of external variables, labor conditions such as length of service or type of contract stand out (Dobbs et al., 2014). In this sense, uncertainty about working conditions (Navarro-Abal et al., 2018) as well as the nursing professional's lack of experience, can increase stress levels and tensions in the workplace (Lee et al., 2018), which in turn could directly affect EI and empathy (Ramírez and Müggenburg, 2015).

However, despite their importance, few studies have simultaneously analyzed and compared the effect that sociodemographic aspects and working conditions have on the emotional competencies (empathy and emotional intelligence) of active nursing professionals (Giménez-Espert and Prado-Gascó, 2014).

Therefore, the aim of this study is to analyze the effect of socio-demographic variables (age and sex), academic training (degree and specific training courses) and work variables (type of contract and seniority) on emotional abilities in nursing. Given that traditional regression models, which are the ones that prevail in this type of study, do not account for the interaction or combination of the different variables under study, it was decided to combine two differential strategies: hierarchical regression and fuzzy-set qualitative comparative analysis (fsQCA) (Calabuig Moreno et al., 2016).

2. Methods

2.1. Participants

The study population is made up of 217 direct patient care nurses from 7 public hospitals in Valencia, Spain. The age of the participants ranges from 22 to 64 years old, with an average age of 44.58 (SD = 10.72). In terms of gender distribution, 74.2% are women (161) and 25.8% are men (56). Depending on the employment situation of the participants, 54.4% (118) have a fixed place, compared to 30% (65) who are temporary workers and 15.7% (34) who have a temporary contract. The experience ranged from 1 month to 43 years and 4 months. The average was 16 years (M = 194.89; SD = 146.03 (months)). Regarding the level of training, 76% (165) are graduates compared to 24% who have a master's or doctoral degree (52). Finally, with regard to the number of courses received for specific training, 49.8% (108) have received few, 38.2% some (83) and 12% (26) quite a few.

2.2. Instruments

- Jefferson Scale of Nursing Empathy (JSNE) is an adaptation of the Jefferson Scale of Empathy for Nursing Students, adapted from the Jefferson Scale of Physician Empathy (JSPE) (Ward et al., 2009) and translated by the research team. It consists of 19 items (JSNE) grouped into three factors to assess empathy. It presents adequate psychometric properties: S-B χ^2(df) = 174.74 (87); χ^2(df) = 3.82; RMSEA(CI) = 0.047 (0.037–0.057); CFI = 0.92, NNFI = 0.90, IFI = 0.91; Perspective taking (PT) Confidence Interval of Cronbach's Alpha (CIα) = 0.87 (0.85–0.89) CR = 0.88 AVE = 0.47; Compassionate care (CC): CIα = 0.78 (0.75–0.81), CR = 0.78, AVE = 0.48; Thinking as the patient (TP): CIα = 0.76(0.71–0.80), CR = 0.76, AVE = 0.61.
- Trait Meta-Mood Scale (TMMS24), a scale of 24 items grouped in three dimensions, Spanish version adapted from Fernández-Berrocal and adapted to the nursing context (Fernandez-berrocal et al., 2004), allows us to evaluate EI. It presents adequate psychometric properties in the nursing population (Giménez-Espert and Prado-Gascó, 2017b): S-B χ^2 (df) = 370.20 (149); χ^2 (df) = 3.58; RMSEA(CI) = 0.057 (0.050–0.065); IFC = 0.91. NNFI = 0.90, IFI = 0.91; Emotional attention (EA): Confidence Interval of Cronbach's Alpha (CIα) = 0.80 (0.77–0.83), CR = 0.80, AVE = 0.45; Emotional Clarity (EC): CIα = 0.87 (0.85–0.89), CR = 0.87, AVE =0.46 Emotional Repair (ER): CIα = 0.85 (0.82–0.87), CR = 0.85, AVE = 0.49.
- Socio-demographic variables: sex (male or female), age, type of contract (fixed, temporary or temporary position), seniority (number of months in the job), type of degree (degree or master's degree) and finally whether they had received specific training on empathy and EI (few, some and many).

2.3. Data Analysis

First, descriptive analyses of the participants were estimated; then, calibration values for fsQCA were calculated, and after that, hierarchical regression models (HRM) and a fuzzy-set qualitative comparative analysis (fsQCA) were performed. To perform the fuzzy-set qualitative comparative analysis, the raw data from participants' responses were transformed into fuzzy-set responses. First, as suggested in the literature, all missing data were deleted, and all constructs (variables) were recalibrated: Type of contract (temporary = 0) (interim = 0.49) (fixed = 1); Specific training courses (few courses = 0) (some courses = 0.49) (many courses = 1); Sex (female = 0; male = 1); Type of degree (degree = 0) (Master's degree = 1). The fsQCA 2.5 software by (Claude and Christopher, 2014) recalibrated the values of age, seniority, emotional attention, emotional clarity, emotional repair, perspective taking, compassionate attention and thinking like the patient, considering the three thresholds (Woodside, 2013): 10% (low agreement or fully outside the set), 50% (intermediate level of agreement, neither inside nor outside the set), and 90% (high agreement or fully in the set).

Once the responses were transformed, necessary and sufficient condition tests were used to evaluate the effect of demographics, working and training on the dimensions of TMMS24 and JSNE. To identify sufficient conditions, the fsQCA analysis involves two stages (Eng and Woodside, 2012): first, a truth-table algorithm transforms the fuzzy-set membership scores into a truth table that lists all logically possible combinations of causal conditions and each configuration's empirical outcome. Secondly, fsQCA analysis generates three possible solutions: complex, parsimonious, and intermediate. The last one (the one presented here) is recommended (Ragin, 2008). The software IBM SPSS Statistics 24 (IBM Corporation) was used to perform hierarchical regression, and fsQCA 2.5 software (Claude and Christopher, 2014) was used to perform fsQCA.

Table 1
Main descriptions and calibration values.

	JSNE				TSMM24		
	Age	Seniority	PT	CC	TP	EA	EC	ER
M	44.58	194.89	4.56	1.75	1.99	6.56	3.86	3.86
SD	10.72	146.03	0.57	0.83	1.02	0.77	0.68	0.77
Min	22	1	1.11	1	1	1	1.38	1.67
Max	64	521	5	5	5	5	5	5
Calibration values								
P10	29	17.60	3.78	1	1	2.60	3	2.83
P50	45	192	4.78	1.50	2	3.60	3.88	3.83
P90	59	409.80	5	3	3	4.60	4.88	5

Note. M = mean; DT = standard deviation; Min = minimum; Max = maximum; P10 = 10th percentile; P50 = 50th percentile; P90 = 90th percentile; TMMS-24: Trait Emotional Meta-Mood Scale; JSNE: Jefferson Scale Nursing Empathy PT = perspective taking; CC = compassionate care; TP = thinking as patients; EA = emotional attention; EC = emotional clarity; ER = emotional reparation.

3. Results

First, the main descriptors and calibration values for the variables under study are presented (Table 1).

3.1. Hierarchical Regression Model (HRM)

Next, the predictive power of the variables under study was analyzed using hierarchical regression models (HRM), where the criterion variables were being: the dimensions of empathy (PT, CC, TP) and emotional intelligence (EA, EC, ER) and the predictor variables: sociodemographic variables (sex and age), variables related to academic training (type of degree and specific training in emotional skills) and working conditions (type of contract and seniority). In each of the models, three differential steps were established: first, the socio-demographic variables were included; second, the variables of academic training were introduced; and finally, those of working conditions. In the regression models of emotional intelligence, none of the variables analyzed significantly predicted any of the dimensions studied: in the case of emotional attention (TSMM24), neither the socio-demographic variables ($\Delta R^2 = 0.01$; $p = .32$) nor academic training ($\Delta R^2 = 0.01$; $p = .44$) nor working conditions ($\Delta R^2 = 0.02$; $p = .22$) were predictive. In the predictor model of emotional clarity (TSMM24), neither the socio-demographic variables ($\Delta R^2 = 0.02$; $p = .15$) nor academic education ($\Delta R^2 = 0.02$; $p = .06$) nor the working conditions ($\Delta R^2 = 0.01$; $p = .15$) were predictive. Finally, in emotional reparation, neither the

socio-demographic variables ($\Delta R^2 = 0.01$; $p = .88$) nor the academic training ($\Delta R^2 = 0.01$; $p = .93$) nor the working conditions ($\Delta R^2 = 0.01$; $p = .67$) were predictive. However, in the models of the dimensions of empathy, in perspective taking (JSNE), in the first step, the socio-demographic variables significantly increased the variance by 4% ($\Delta R^2 = 0.04$; $p = .02$), as well as the academic formation, explaining 7% of the variance ($\Delta R^2 = 0.03$; $p \le .01$) and 8% of the variance of the working conditions ($\Delta R^2 = 0.02$; $p \le .01$). In this last step, sex showed a significant negative beta coefficient ($\beta = -0.17$; $p \le .01$) and a significant positive beta coefficient for specific training courses ($\beta = 0.16$; $p = .02$). In the compassionate care model (JSNE), the only variables that explained the variance of compassionate care in a meaningful way were the demographic variables, which explained 3% of the variance ($\Delta R^2 = 0.03$; $p = .03$) with sex being the only one that showed a significant positive beta coefficient in the last step ($\beta = 0.13$; $p \le .05$). Finally, in the model of thinking as the patient, the only variables that predicted the variance were the sociodemographic variables, explaining 3% of the variance ($\Delta R^2 = 0.03$; $p \le .05$) with sex being the only variable that showed a statistically significant positive beta coefficient ($\beta = 0.16$; $p = .02$).

3.2. Comparative Qualitative Analysis of Fuzzy Sets (fsQCA)

3.2.1. Requirements Analysis

Based on the results obtained (Table 2), it appears that there was no necessary condition for the occurrence or non-occurrence of the dimensions of emotional intelligence (emotional attention, emotional clarity and emotional repair), since in all cases, the consistency was < 0.90 (Ragin, 2008). However, given the values of consistency, the most important condition not necessary was the type of contract. Regarding the empathy data (Table 3), it seems that there was also no necessary condition for the occurrence or non-occurrence of empathy. However, given the values of consistency, the most important condition, which was not necessary, was again the type of contract and the absence of specific training courses.

3.2.2. Sufficiency Analysis

In the analyses of Sufficiency, the resulting models for each of the dimensions offered the following results, based on the premise that in fsQCA, a model is informative when the consistency is around or above 0.74 (Eng and Woodside, 2012).

The prediction of EI (Table 4): In the prediction of high levels of EA, 6 pathways were observed that explained 45% of the cases with high levels of EA (Overall Consistency = 0.73; Overall Coverage = 0.45). The most relevant path or combination to predict emotional care was the result of the interaction of a permanent contract, being young and

Table 2
Necessity analysis for dimensions' emotional intelligence (TMMS24).

	EA		~EA		EC		~EC		ER		~ER	
	Cons	Cov	Cons	Cov	Cons	Cov	Cons	Cov	Cons	Cov	Cons	Cov
Men	0.24	0.44	0.27	0.56	0.22	0.41	0.29	0.59	0.25	0.51	0.26	0.49
Women	0.76	0.50	0.72	0.50	0.78	0.50	0.71	0.50	0.75	0.52	0.74	0.48
Senior	0.61	0.58	0.63	0.64	0.61	0.57	0.63	0.65	0.61	0.63	0.63	0.60
Young	0.62	0.61	0.58	0.61	0.62	0.60	0.58	0.63	0.61	0.64	0.60	0.59
Training courses	0.39	0.61	0.38	0.63	0.39	0.61	0.37	0.64	0.39	0.65	0.37	0.59
~Training courses	0.76	0.54	0.77	0.57	0.77	0.53	0.77	0.58	0.75	0.56	0.78	0.54
Degree	0.26	0.54	0.22	0.46	0.29	0.57	0.20	0.43	0.25	0.54	0.23	0.46
Master's degree	0.74	0.47	0.78	0.53	0.71	0.45	0.80	0.55	0.75	0.51	0.77	0.49
Type of contract	0.74	0.52	0.76	0.57	0.74	0.51	0.77	0.58	0.72	0.54	0.78	0.54
~Type of contract	0.38	0.60	0.35	0.59	0.39	0.60	0.36	0.60	0.39	0.66	0.34	0.54
More seniority	0.54	0.55	0.62	0.68	0.55	0.56	0.60	0.66	0.56	0.62	0.60	0.61
Little seniority	0.69	0.63	0.59	0.57	0.67	0.60	0.60	0.60	0.64	0.63	0.62	0.57

Note: EC: emotional attention EC: emotional clarity; ER: emotional repair; Cons: consistency; cov: coverage; ~: absence of condition; Condition needed: consistency ≥ 0.90.

Table 3
Necessity analysis for empathy dimensions (JSNE).

	PT		~PT		CC		~CC		TP		~TP	
	Cons	Cov	Cons	Cov	Cons	Cov	Cons	Cov	Cons	Cov	Cons	Cov
Men	0.21	0.45	0.30	0.55	0.29	0.52	0.23	0.48	0.31	0.55	0.21	0.45
Women	0.78	0.55	0.70	0.45	0.70	0.44	0.77	0.56	0.69	0.42	0.79	0.58
Senior	0.61	0.63	0.61	0.57	0.64	0.57	0.57	0.61	0.60	0.53	0.58	0.63
Young	0.58	0.62	0.60	0.58	0.56	0.53	0.60	0.66	0.58	0.53	0.56	0.63
Training courses	0.40	0.69	0.34	0.53	0.36	0.54	0.38	0.66	0.37	0.54	0.36	0.64
~Training courses	0.73	0.55	0.80	0.54	0.77	0.51	0.74	0.58	0.76	0.49	0.74	0.59
Degree	0.24	0.52	0.24	0.48	0.21	0.40	0.27	0.60	0.24	0.45	0.24	0.55
Master's degree	0.76	0.53	0.76	0.47	0.79	0.48	0.73	0.52	0.76	0.45	0.76	0.55
Type of contract	0.74	0.57	0.75	0.51	0.78	0.52	0.71	0.55	0.74	0.48	0.75	0.59
~Type of contract	0.36	0.62	0.37	0.56	0.33	0.49	0.38	0.67	0.38	0.55	0.35	0.62
More seniority	0.54	0.60	0.59	0.59	0.61	0.59	0.52	0.60	0.57	0.55	0.52	0.60
Little seniority	0.64	0.63	0.60	0.54	0.59	0.51	0.64	0.66	0.59	0.50	0.62	0.64

Note: PT: perspective taking; CC: compassionate care; TP: thinking as the patient; Cons: consistency; cov: coverage; ~: absence of condition; Condition needed: consistency ≥ 0.90.

female, and having graduate or diploma training (Raw coverage = 0.26; explaining 26% of cases with high EA). On the other hand, with regard to the prediction of low levels of EA, 10 roads or pathways were observed that explained 53% of the cases with low levels of EA (Overall Consistency = 0.75; Overall Coverage = 0.53). The most relevant way or combination to predict low emotional attention was the result of the interaction of youth and being a woman (Raw coverage = 0.19; explaining 19% of cases with low EA).

Likewise, in the prediction of high levels of EC, 3 paths were observed that explained 19% of the cases with high levels of EC (Overall Consistency = 0.75; Overall Coverage = 0.19). The most relevant way or combination to predict emotional clarity was the result of the interaction of an indefinite contract, having a master's degree and being young (Raw coverage = 0.14; explaining 14% of the cases with high EC). On the other hand, with the appearance of low levels of EC, 7 roads or pathways were observed that explained 48% of the cases with low levels of EC (Overall Consistency = 0.78; Overall Coverage = 0.48). The most relevant path or combination to predict low emotional clarity was the result of longstanding interaction, graduate or diploma training, few specific training courses and being young (Raw coverage = 0.24; explaining 24% of cases with low EC).

In the prediction of high levels of ER, 11 pathways were observed that explained 48% of the cases with high levels of ER (Overall Consistency = 0.77; Overall Coverage = 0.48). The most relevant way or combination to predict emotional reparation was the result of low seniority, temporary contract and older age (Raw coverage = 0.15; explaining 15% of cases with high ER). On the other hand, with regard to the appearance of low levels of ER, 5 roads or pathways were observed that explained 16% of the cases with low levels of ER (Overall Consistency = 0.76; Overall Coverage = 0.16). The most relevant path or combination to predict low emotional clarity was the result of the interaction of a permanent contract, having graduate or diploma training, few specific training courses, being young and being male (Raw coverage = 0.06; explaining 6% of the cases with low ER.

The prediction of empathy (Table 5): In the prediction of high levels of PT, 9 pathways were observed that explained 47% of the cases with high levels of PT (Overall Consistency = 0.73; Overall Coverage = 0.47). The most relevant way or combination to predict perspective taking was the result of the interaction of little seniority, fixed contract, having graduate or diploma training and being older (Raw coverage = 0.24; explaining 24% of cases with high PT). On the other hand, with regard to the prediction of low levels of PT, 7 roads or pathways were observed that explained 39% of the cases with low levels of PT (Overall Consistency = 0.78; Overall Coverage = 0.39). The most relevant way or combination to predict low emotional attention was the result of the interaction of a lot of seniority, a permanent

contract, having graduate/diploma training, few specific training courses and being male (Raw coverage = 0.13; explaining 13% of the cases with low PT).

Likewise, in the prediction of high levels of CC, 3 paths were observed that explained 15% of the cases with high levels of CC (Overall Consistency = 0.78; Overall Coverage = 0.15). The most relevant path or combination to predict compassionate care was the result of long-standing interaction, graduate/diploma training, being young and being male (Raw coverage = 0.07; explaining 7% of cases with high CC). On the other hand, with the appearance of low levels of CA, 8 roads or pathways were observed that explained 54% of the cases with low levels of CC (Overall Consistency = 0.77; Overall Coverage = 0.54). The most relevant path or combination to predict low compassionate care was the result of low seniority interaction, graduate or diploma training, and being female (Raw coverage = 0.29; explaining 29% of cases with low CC).

Finally, in the prediction of high levels of TP, 9 pathways were observed that explained 29% of the cases with high levels of TP (Overall Consistency = 0.77 Overall Coverage = 0.29). The most relevant way or combination to predict how the patient would think was the result of the interaction of a lot of seniority, a permanent contract, graduate training, few courses, being older and being female (Raw coverage = 0.11; explaining 11% of cases with high TP). On the other hand, with the appearance of low levels of PP, 7 pathways or combinations were observed that explained 30% of the cases with low levels of TP (Overall Consistency = 0.74; Overall Coverage = 0.30). The most relevant path or combination to predict low levels of PP was the result of low seniority interaction, a temporary contract, having graduate or diploma training, few specific training courses, being young and being female (Raw coverage = 0.18; explaining 18% of cases with low TP).

4. Discussion

This study explores and compares the predictive capabilities of sociodemographic characteristics, working conditions and academic training received in the prediction of empathy and emotional intelligence while comparing two analytical methodologies, namely, linear models and QCA models.

In general, the results of the regression models suggest that only sex is an adequate predictor of empathy, but not of EI, so sex predicts skills related to perspective, compassionate care and the ability to think like the patient, as previous studies (Giménez-Espert and Prado-Gascó, 2017a) indicated, but not the type of contract, seniority, level of training, specific training received in relation to emotional development, or age. With respect to EI, none of the variables studied predicts EI significantly, differing from previous studies that indicate the

Table 4
Summary of the three main sufficient conditions for the intermediate solution of emotional intelligence dimensions (TMMS24).

Frequency cutoff: 1	EA Consistency cutoff: 0.75			~EA Consistency cutoff: 0.78			EC Consistency cutoff: 0.79			~EC Consistency cutoff: 0.78			ER Consistency cutoff: 0.77			~ER Consistency cutoff: 0.77		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Type of contract	●					●	●		●			○	○		○	●		
Degree	○	○				○	●	●		○		○			○	○	●	●
Senior	○	●	●	●		○	●	●	○	●	●	○	●	○		○		
Men		○	○	○	○			●	●	○	○		○	○	●	○	●	●
More seniority	○	●		○	●				○	○	○	●		●				
Training courses			●	○	○	●		●	●	○		●			●	○	●	●
Raw coverage	0.26	0.21	0.15	0.20	0.19	0.14	0.14	0.12	0.05	0.24	0.20	0.14	0.15	0.13	0.12	0.06	0.06	0.05
Unique coverage	0.11	0.04	0.04	0.04	0.03	0.08	0.06	0.03	0.00	0.03	0.06	0.01	0.01	0.03	0.05	0.02	0.02	0.04
Consistency	0.73	0.76	0.82	0.79	0.83	0.73	0.81	0.73	0.81	0.86	0.80	0.87	0.87	0.84	0.72	0.81	0.80	0.72
Overall solution consistency	0.73			0.76			0.75			0.78			0.77			0.76		
Overall solution coverage	0.45			0.53			0.19			0.48			0.48			0.16		

● = presence of condition, ○ = absence of condition. ~ = absence of condition (low levels). All sufficient conditions are adequate, raw coverage between 0.25 and 0.65; EA: emotional attention EC: emotional clarity; ER: emotional repair.
Expected vector for EA, EC, ER: 1,1,1,1,0,0,1,1 (0: absent; 1: present).
Expected vector for ~EA, ~EC, ~ER: 0.0.0.1.0.0.

Table 5
Summary of the three main sufficient conditions for the intermediate solution of empathy dimensions (JSNE).

Frequency cutoff: 1	PT Consistency cutoff: 0.75			~PT Consistency cutoff: 0.75			CC Consistency cutoff: 0.75			~CC Consistency cutoff: 0.76			TP Consistency cutoff: 0.75			~TP Consistency cutoff: 0.75		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Type of contract	●			●	○				●	○			○		●	○		●
Degree	○	●		○		●	○		●	●		●	○		●	○	●	●
Senior	●	○	○		○	●	○	●	○		○		●	○		○		○
Men			●	●	●	○	●	●		○	●		●	●	○	○	○	●
More seniority	○		○	●	○		●	○		○	●	○		○	○	○	○	
Training courses		●		○	○		●	○	●	○	○	●	○	○	○	○	●	●
Raw coverage	0.24	0.20	0.19	0.13	0.10	0.10	0.07	0.05	0.04	0.28	0.20	0.09	0.11	0.08	0.06	0.18	0.07	0.04
Unique coverage	−0.00	0.05	0.01	0.09	0.09	0.08	0.05	0.03	0.04	0.18	0.09	0.03	0.11	0.000	0.000	0.18	0.02	0.000
Consistency	0.78	0.73	0.77	0.77	0.77	0.76	0.87	0.87	0.64	0.77	0.78	0.79	0.75	0.86	0.89	0.75	0.74	0.80
Overall solution consistency	0.73			0.78			0.78			0.77			0.77			0.0.74		
Overall solution coverage	0.47			0.39			0.15			0.54			0.29			0.30		

● = presence of condition, ○ = absence of condition. ~ = absence of condition (low levels). All sufficient conditions are adequate, raw coverage between 0.25 and 0.65; PT: perspective taking; CC: compassionate care; TP: thinking as the patient.
Expected vector for PT, CC, TP: 1,1,1,1,0,1,1,1. (0: absence; 1: presence).
Expected vector for ~PT, ~CC, ~TP:0,0,0,0,1,0,0,0.

influence of these variables on emotional intelligence (Dobbs et al., 2014; Ramírez and Müggenburg, 2015; Taleghani et al., 2018).

Based on the results obtained in the fsQCA analyses, no necessary conditions were observed for the prediction of the dimensions of EI or Empathy. As far as the sufficiency analyses are concerned, it seems that the most important interactions in the prediction of EI were those of the following conditions: fixed contract, being a graduate, being young and being female (for EA); fixed contract, having a master's degree and being young (for EC); and being older, having a temporary contract and being of little seniority (for ER). Therefore, the type of contract, the type of degree and age stand out in EI prediction. Perhaps the prominent role played by youth is related to the current training of nursing professionals, where greater importance is attached to appropriate emotional management.

On the other hand, as far as empathy is concerned, the important interactions were having a permanent contract, being a graduate, having more experience and younger (PT); or being young, being a graduate/diploma, being a man and being very old (CC). It is necessary to remember that CC is measured in a negative sense (since higher scores in this dimension denote lower levels of empathic capacity), as is TP (where high levels refer to little importance given to thinking like the patient). In the prediction of these latter dimensions, in the resulting interactions, although all the dimensions studied appear in the possible combinations of conditions, the most prominent ones seem to be older and have more experience. In short, in the prediction of empathy, the conditions that best predict it are mainly age and seniority, so that it seems that with more experience dealing with patients, it is easier to present higher levels of empathy.

In general, the results observed seem to support, at least partially, the existing literature on the incidence of sociodemographic (Giménez-Espert and Prado-Gascó, 2014), working (Dobbs et al., 2014; Ramírez and Müggenburg, 2015)) and academic (Taleghani et al., 2018) variables on emotional skills (Empathy and EI). However, few studies have addressed this objective, and most existing studies have focused on linear relationship models, ignoring the complementary nature of other techniques such as fsQCA models. When comparing both methodologies, the fsQCA models have a greater predictive value than the HRM; in addition, they include variables that in spite of their importance go unnoticed if we only focus on the HRM, and they are important predictors when interacting with other conditions. In addition, another advantage of fsQCA models over traditional regression models is the so-called equifinality, the possibility of achieving the same results from different paths. This is particularly important from the point of view of intervention, since there are conditions on which we cannot act, such as sex, but others that are susceptible to intervention, such as the type of contract or training.

As the existing literature suggests, emotional capabilities in nursing are really important in maintaining a satisfactory relationship between the patient and nursing provider (Ghiyasvandian et al., 2014), allowing nursing staff to provide individualized care where patient needs are a priority (Adams and Iseler, 2014), which in turn appears to result in improved care, increased adherence to medical treatment, a better teamwork climate(Lee et al., 2018), reduced stress and improved mental health in nursing (Barton, 2018).

In short, nursing staff with EI competencies and empathy generally offer better quality care services and produce more satisfied patients (Majerníková and Obročníková, 2017). In this sense, our results will contribute to improving these emotional skills by identifying conditions or variables, and/or combinations of them, that seem to have a positive impact. They will allow the development of different labor and training or academic policies that will lead to an improvement in the emotional competencies of the nursing staff, which in turn will have a direct, positive impact on the treatment of the patient.

4.1. Limitations of the Study

One of the main limitations of this study is the sample, both in terms of sampling procedures, which were not probabilistic, and geographical location, given that this study was based solely on hospitals in the Valencian Community. These strategies make it difficult to generalize the results. In the future, a stratified probability sampling considering different geographical areas would improve the possible generality of the data. Another limitation relates to the use of self-reports for data collection; although self-reports are a common tool in research, they can introduce social desirability biases. It would therefore be advisable to have another type of hetero completed instrument and/or to have objective external measures. All of these limitations will be considered in future research.

5. Conclusion

Emotional intelligence and empathy are key skills for nurses involved in patient care. Thus, appropriate emotional competencies have important consequences for both patients and nursing staff. There are sociodemographic, working and academic variables that seem to be related to these abilities. Only the sex variable is a predictor variable in HRM for empathy, but not in EI. In the case of the fsQCA models, other variables such as the type of contract or age also seem to play an important role. In general, fsQCA models appear to be better predictors than regression models and allow us to account not only for individual input but also for the combination or interaction between different variables that may lead to a given result. Given the differences in linear relationship models and fsQCA, far from prioritizing one technique over another, both are complementary and should be used simultaneously in other studies.

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Conflicts of Interest

The authors have no conflicts of interest.

Ethical Considerations

Ethical approval was granted by the Research Ethics Committee of the University of Valencia H1432032268924 and the Ethics Committees for Clinical Research of the hospitals selected. All participants received detailed information about the aims and procedures and were informed of confidentiality. Nurses who had previously provided informed consent to participate complete the instrument.

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