The role of Emotional Intelligence in Engagement in Nurses

María del Carmen Pérez-Fuentes*1, María del Mar Molero Jurado2, José Jesús Gázquez Linares3, and Nieves Fátima Oropesa Ruiz4

1 University of Almería (Spain); E-mail: mpf421@ual.es
2 University of Almería (Spain); E-mail: mmj130@ual.es
3 Universidad Autónoma de Chile (Chile); E-mail: jlinares@ual.es
4 University of Almería (Spain); E-mail: sej473@ual.es
* Correspondence: mpf421@ual.es; Tel.: +34 950015598

Abstract: 1) Background: Aware that engagement in the healthcare field needs high levels of emotional intelligence, we began this study in to the relationship between engagement and emotional intelligence in nurses. The objective of this study was to determine the explanatory value of the components of emotional intelligence for engagement in a sample of nurses, and to identify which of the emotional intelligence components have the greatest explanatory value for dimensions of engagement, by sex.; 2) Methods: The final study sample was made up of 2126 working nursing professionals with a mean age of 31.66 (SD=6.66). To compile the data, an ad hoc questionnaire was used to collect sociodemographic information, and to collect professional and employment information, the Utrecht Work Engagement Scale, and the Reduced Emotional Intelligence Inventory for Adults.; 3) Results: The results show that nurses with higher levels of emotional intelligence also scored more highly in engagement, with the Interpersonal factor being the greatest predictor of engagement.; and 4) Conclusions: This study have significant practical implications for the creation of intervention programs and activities to improve the performance of nurses in the workplace.

Keywords: Engagement; Emotional Intelligence; Nurses; sexo.

1. Introduction

Professional practice in healthcare requires much personal and organizational engagement. Nurses perform many different care and treatment activities with the primary aim of contributing to the promotion, stabilization and maintenance of their patients' health. Using a broad concept of health [1], understood as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, engagement becomes a fundamental variable for quality patient care [2,3,4].

Engagement has been empirically shown to influence nursing performance, with the consequent impact on health care results [5]. From a psychological point of view, engagement leads to subjective wellbeing [6], as it allows an individual to enter a flow state [7] and satisfy basic psychological needs of autonomy and competence [8,9]. Previous research in nursing has confirmed a positive relationship between engagement and self-efficacy as well as job satisfaction [10,11]. Research has also found significant associations between engagement and personal factors such as mental health, locus of control, and job satisfaction [12,13].

Engagement has been defined by three fundamental dimensions: Vigor, Dedication and Absorption [14]. Vigor is characterized by high levels of energy and mental resilience in the face of difficulties and implies effort and persistence at work. Dedication is defined as being closely involved in one's work, it has a cognitive dimension, or belief in what one is doing, and an affective dimension, related to feelings of enthusiasm, inspiration, pride, challenge and significance. Absorption is characterized

by a state of abstraction at work, experiencing a feeling of enjoyment associated with the desire to keep working. In that respect Maslach, Schaufeli & Leiter [15], demonstrated a strong, negative association between vigor and burnout, and between dedication and indifference to work performance, indicating those dimensions as respective polar opposites. However, absorption is not the opposite to a lack of professional efficacy, they are two distinct concepts [16].

Studies comparing engagement by sex have produced controversial results, from those confirming the existence of significant differences [17,18,19,20,21] to those which found no differences [22] or differences with a small effect size [18]. Where differences have been found in engagement according to sex, the results have not been conclusive. On the one hand, Schaufeli & Bakker [20] found that men exhibited greater general engagement and higher levels of dedication and absorption than women, whereas Mukkavilli et al. [19] found the opposite, with women scoring higher than men in overall engagement, and in absorption and dedication. Various researchers have found that women scored significantly higher than men in vigor [17,23,19]. In samples of nurses, age has been found to be positively related to engagement, although the associations were weak [18].

We may deduce from this that engagement is part of nurses' value system, and should be an important objective from an organizational point of view. Personal effort and identification with the task can lead healthcare professionals to experience positive emotions and exhibit greater satisfaction in patient care. For that reason, if engagement is a fundamental pillar of patient care, positive emotions and emotional intelligence (EI) must also be fundamental.

Bar-On [24] stated that emotional intelligence referred to a variety of non-cognitive skills, competencies and abilities which influence a person's capacity to succeed in the face of daily demands and pressures. Being emotionally intelligent implies the ability to address, understand and feel one's own emotions and those of others, and being able to respond and act accordingly. In a healthcare context, emotional intelligence has been related to lower levels of stress, and job satisfaction [25,26,27,28].

In terms of sex-related differences, Liébana et al. [23] found that women scored significantly higher than men in emotional intelligence. In research analyzing each component of emotional intelligence separately, such as Gerits, Derksen & Verbruggen [29], female nurses scored higher than male nurses in the interpersonal dimension. However, Azimi, AsgharNejad Farid, Kharazi Fard, & Khoei [30] found no significant relationship between sex and scores in the interpersonal dimension in a sample of dental students.

Research into the relationship between other dimensions of emotional intelligence and sex has produced contradictory results. Van Dusseldorp et al. [31] found that female nurses scored significantly higher than male nurses in some aspects related to intrapersonal factors. However, in the study by Gerits et al. [29] male nurses scored higher than female nurses in intrapersonal components and stress management. Similarly, Azimi et al. [30] found higher scores in male nurses' intrapersonal components, stress management, and mood compared to female nurses. In addition, Arteche, Chamorro-Premuzic, Furnham, & Crump [32] found that men scored significantly higher in the adaptability dimension.

Age was not found to be associated with nurses' emotional intelligence in a study by Van Dusseldorp et al. [31], in contrast to results from Harper & Jones-Schenk [33], who found that nurses' empathy diminished with age. Kahraman & Hiçdurmaz [34] found no significant differences between emotional intelligence scores in nurses based on demographic variables such as age, sex, marital status, or having children.

Research about the relationship between engagement and emotional intelligence in healthcare by Zhu, Liu, Guo, Zhao & Lou [35] found that nurses with higher levels of emotional intelligence or

better opinions of organizational fairness tended to exhibit greater levels of engagement. In this same study the four emotional intelligence dimensions were found to be positively correlated with engagement. Garrosa, Moreno-Jiménez, Rodríguez-Muñoz & Rodríguez-Carvajal [36] found that personal resources, such as emotional competence, were closely related to engagement in nursing, whereas a study of nurses' perceptions about the skills they need to do their jobs successfully showed social intelligence to be a predictor of engagement [11]. Nel, Jonker & Rabie [37] suggested that people who were not emotionally intelligent would not be able to deal with the demands of their jobs and would be more likely to succumb to burnout and reduced commitment, which would end up affecting their wellbeing at work.

Starting from these premises, and aware that engagement in the healthcare field needs high levels of emotional intelligence, we began this study in to the relationship between engagement and emotional intelligence in nurses. We proposed the following objectives: 1) To determine the explanatory value of the components of emotional intelligence for engagement in a sample of nurses, and 2) to identify which of the emotional intelligence components have the greatest explanatory value for dimensions of engagement, by sex.

We began with the following hypotheses: 1) Despite the literature review not producing conclusive evidence, we expect to find differences in emotional intelligence and engagement according to sociodemographic variables, principally sex and age. 2) We expect to find significant positive correlations between emotional intelligence and engagement in nurses. 3) The emotional intelligence dimensions of stress management, mood and adaptability will have the greatest predictive value for engagement in male nurses. 4) The interpersonal component of emotional intelligence will be the strongest predictor of engagement in female nurses. 5) The interpersonal component of emotional intelligence will have the greatest predictive value for the engagement dimension of vigor in female nurses.

2. Materials and Methods

Participants

The initial sample was made up of 2218 nurses from Andalucía (Spain) who were randomly selected from various centers. We identified 92 cases who were removed from the sample for not completing the whole questionnaire (32 subjects) or because we found that they had completed it randomly (60 subjects). As the main variable in the study was engagement, selection of participants included noting their current working situation (permanent or temporary contracts). The resulting sample was made up of 2126 working nursing professionals (69.6% with temporary contracts n=1479, and 30.4% with permanent contracts n=647).

The mean age of the participants was 31.66 years old (SD=6.66), ranging between 22 and 60 years old. Over three-fifths (84.9%, n=1479) were women, 15.1% (n=321) were men. Just over two-thirds of the participants (69.7%, n=1482) had no children, 13.3% (n=284) had one child, 14.4% (n=306) had two children, and 2.5% (n=54) had three or more children.

Instruments

We created a questionnaire ad hoc to collect sociodemographic data (age, sex, number of children, type of work contract).

The Utrecht Work Engagement Scale (UWES) [20]; is a self-reporting scale to evaluate engagement at work through 17 items with a seven-point Likert-type response scale. It produces information about three aspects of engagement: Vigor, Dedication, and Absorption. The scale gives and overall engagement score and a score for each of the specific dimensions. This instrument has demonstrated appropriate reliability and validity (Schaufeli et al., 2002). In our sample of nurses the internal

reliability indices in each of the dimensions were very good, with a Chronbach's alpha of .84 in the Vigor dimension, .89 in Dedication, and .81 in Absorption.

The Reduced Emotional Intelligence Inventory for Adults (EQ-i-20M) [38]; was validated and assessed by the authors for the adult Spanish population, and derived from the adaptation for adults of the Emotional Intelligence Inventory: Young Version (EQ-i-YV) from Bar-On & Parker [39]. It consists of 20 items with four response alternatives in Likert-type scales. It is structured as five factors: Intrapersonal; Interpersonal; Stress Management; Adaptability; and General Mood. Cronbach's alpha for each of the scales was: .90 for Intrapersonal; .75 for Interpersonal; .82 for Stress Management; .82 in Adaptability; and .87 for General Mood.

Procedure

Prior to collecting data we assured the participants that the treatment of data in the study would comply with applicable standards of data security, confidentiality and ethics. The study was approved by the Bioethics Committee of the University of Almería (Spain). The application of the questionnaire was done through a web platform which allowed subjects to complete them online. A series of control questions were included to monitor for random or incongruent responses, which were removed from the study.

Data analysis

We analyzed the sociodemographic variables such as sex, age, and number of children first. To identify significant differences between men and women we used the Student t test for independent samples, for the components of emotional intelligence and for each dimension of engagement. In order to identify the relationships between those variables and subjects' ages and numbers of children we calculated the Pearson correlation coefficient.

In order to understand how the predictor variables (Emotional intelligence: Intrapersonal, Interpersonal, Stress Management, Adaptability, and General Mood) related to the criterion variable (Engagement: Vigor, Dedication, and Absorption), we performed a stepwise multiple linear regression analysis for both the total sample and for each subgroup by sex. Finally, we performed a nonlinear predictive CHAID (Chi-square Automatic Interaction Detector) regression and constructs a classification tree. In order to do that, we used the median Engagement score (Md= 11.67) from all items. Scores below 11.67 were included in the Low Engagement group, and scores greater than or equal to 11.67 were included in the High Engagement group. All analyses were performed using SPSS ver. 23.0 statistical software for Windows.

3. Results

3.1. Emotional intelligence, engagement and sociodemographic variables

Table 1 shows the descriptive statistics for the sample as a whole and according to sex. It shows statistically significant differences, with women exhibiting higher scores than men in all of the emotional intelligence components (Intrapersonal: $t_{(2124)}$= -3.13, $p<.01$; Interpersonal: $t_{(2124)}$= -2.85; $p<.01$; Stress Management: $t_{(2124)}$= -3.54; $p<.001$; Adaptability: $t_{(2124)}$= -4.33; $p<.001$; General Mood: $t_{(2124)}$= -4.62; $p<.001$).

Table 1. Emotional intelligence and engagement. Descriptive statistics and t test by sex

	Total	Men	Women	*t*	Sig.

		N=2126		n=321		n=1805			
		M	SD	M	SD	M	SD		
Emotional Intelligence	Intrapersonal	2.62	.69	2.46	.69	2.65	.69	-3.13**	.002
	Interpersonal	3.06	.50	2.94	.53	3.08	.49	-2.85**	.005
	Stress Management	3.25	.56	3.26	.56	3.24	.56	-3.54***	.000
	Adaptability	2.91	.52	2.96	.52	2.90	.52	-4.33***	.000
	General Mood	3.08	.59	3.11	.60	3.08	.59	-4.62***	.000
Engagement	Vigor	3.85	.77	3.72	.80	3.87	.76	.39	.695
	Dedication	4.07	.79	3.94	.88	4.09	.77	2.02*	.043
	Absorption	3.52	.80	3.38	.84	3.55	.78	.88	.378

* The correlation is significant at .05; ** The correlation is significant at .01; *** The correlation is significant at .001.

There were significant differences between the sexes in the engagement dimension Dedication ($t_{(2124)}$= 2.02; $p<.05$) with men scoring higher in this case (*M*=3.94; *SD*=.88) than women (*M*=3.55; *SD*=.78).

Age was negatively correlated with the emotional intelligence Interpersonal factor (*r*=-.05; *p*<.01) and positively correlated with Stress Management (*r*=.05; *p*<.01). The three engagement dimensions were negatively correlated with age (Vigor: *r*=-.04, *p*<.05; Dedication: *r*=-.05, *p*<.01; Absorption: *r*=-.05; *p*<.01).

Finally, we found negative correlations between the number of children with the emotional intelligence Interpersonal factor (*r*=-.06, *p*<.01), and with the engagement dimensions of Vigor (*r*=-.04, *p*<.05) and (*r*=-.05, *p*<.05) Absorption.

3.2. Components of emotional intelligence as predictors of engagement in nurses. Complete sample

The correlation coefficients we calculated showed that nurses with high levels of emotional intelligence also exhibited higher scores in engagement. The correlation analysis showed that all of the emotional intelligence components were positively correlated with each of the engagement dimensions, with correlation indices ranging from *r*=.15 to *r*=.40, and *p*<.001 in all cases.

Table 2 shows that the regression analysis for the engagement dimension Vigor gave four models, the fourth of which demonstrated the greatest explanatory power, with 22.8% (R^2=.22) of the variance explained by the factors in the model. To confirm the validity of the model we analyzed the independence of the residuals. The Durbin-Watson *D* statistic was *D*=1.98, confirming the absence of positive or negative autocorrelation. The value of *t* was associated with a probability of error of less than .05 in all of the included variables in the model. The standardized coefficients show that the variable with the greatest explanatory weight is the Interpersonal factor. Lastly, the values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

Table 2. Multiple stepwise linear regression model (Complete sample; N=2126)

VIGOR

Model	R	R^2	Adjusted R^2	Standard Error of Estimation	Change in R^2	Change in F	Sig. of change in F	Durbin Watson
1	.39	.15	.15	.70	.15	397.48	.000	
2	.46	.21	.21	.68	.05	158.30	.000	1.98
3	.47	.22	.22	.68	.00	21.04	.000	
4	.47	.22	.22	.67	.00	10.76	.001	

Model 4	Non-standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
	B	Std Error	Beta			Tol.	VIF
(Constante)	1.13	.11		9.58	.000		
Estado de ánimo	.26	.03	.20	8.09	.000	.57	1.75
Interpersonal	.36	.03	.23	9.95	.000	.64	1.54
Manejo del estrés	.13	.02	.09	4.68	.000	.87	1.13
Adaptabilidad	.12	.03	.08	3.28	.001	.51	1.92

DEDICATION

Model	R	R^2	Adjusted R^2	Standard Error of Estimation	Change in R^2	Change in F	Sig. of change in F	Durbin Watson
1	.40	.16	.16	.72	.16	419.69	.000	
2	.45	.20	.20	.70	.04	119.95	.000	1.95
3	.46	.21	.21	.70	.00	19.34	.000	
4	.46	.21	.21	.70	.00	4.85	.028	

Model 4	Non-standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
	B	Std Error	Beta			Tol.	VIF
(Constante)	1.39	.12		11.43	.000		
Estado de ánimo	.33	.03	.25	10.66	.000	.65	1.52
Interpersonal	.35	.03	.22	10.05	.000	.74	1.34
Manejo del estrés	.13	.02	.09	4.54	.000	.87	1.14
Intrapersonal	.05	.02	.04	2.20	.028	.77	1.29

ABSORPTION

Model	R	R^2	Adjusted R^2	Standard error of estimation	Change in R^2	Change in F	Sig. of change in F	Durbin Watson
1	.31	.10	.10	.75	.10	236.96	.000	
2	.36	.13	.13	.74	.03	75.68	.000	1.95
3	.36	.13	.13	.74	.00	12.72	.000	
4	.37	.14	.13	.74	.00	8.43	.004	

Model 4	Non-standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
	B	Std Error	Beta			Tol.	VIF
(Constante)	1.36	.12		10.58	.000		
Interpersonal	.32	.03	.20	8.77	.000	.74	1.34
Estado de ánimo	.20	.03	.15	6.04	.000	.65	1.52
Intrapersonal	.09	.02	.08	3.76	.000	.77	1.29
Manejo del estrés	.08	.03	.06	2.90	.004	.87	1.14

The analysis of the Dedication component produced four models, the fourth of which demonstrated the greatest explanatory power, with 21.8% (R^2=.21) of the variance explained. The Durbin-Watson statistic confirmed the validity of the model (D=1.95). The value of t was associated with a probability of error of less than .05 in all of the included variables in the model. The standardised coefficients

indicate that General Mood was the strongest predictor of Dedication in the sample.   The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

For the Absorption dimension, the regression analysis produced four models, the fourth of which accounted for 14% of the explained variance (R^2=.14) with D=1.95, confirming the validity of the model. The value of t was associated with a probability of error of less than .05 in all of the included variables in the model. In this case the Interpersonal component of emotional intelligence was the strongest predictor of Absorption. The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

3.3. Components of emotional intelligence as predictors of engagement in nurses, by sex

Table 3 shows the models resulting from the regression analysis of the Vigor dimension, with sex as the selection variable, and the selection being "male".

For Vigor, the third model produced the highest percentage of explained variance at 23.7% (R^2=.23). The Durbin-Watson D statistic confirmed the validity of the model (D=1.96). The value of t was associated with a probability of error of less than .05 in all of the included variables in the model: General Mood, Interpersonal, and Intrapersonal. The standardized coefficients indicate that General Mood was the strongest predictor of Vigor in the male participants. The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

The regression analysis of Dedication gave two models, with the second explaining 24.5% of the variance (R^2=.24). The Durbin-Watson D statistic confirmed the validity of the model (D=2.00). The association between the variables was presented with a probability of less than .05, both for General Mood and for the Interpersonal factor, which were the variables included in this model. The standardized coefficients indicate that General Mood had the greatest explanatory value. The high values for tolerance indicators and low VIF suggest the absence of collinearity between the variables included in the model.

The analysis of the results for Absorption produced three models, the third explaining 15.3% of the variance (R^2=.15). The Durbin-Watson statistic of D=1.95 confirmed the absence of positive or negative autocorrelation. The value of t was associated with a probability of error of less than .05 in all of the included variables in the model (Interpersonal, General Mood, and Intrapersonal). The standardized coefficients indicate that the strongest predictor in the equation was the Interpersonal factor.   The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

Table 3. Stepwise multiple linear regression model. Vigor, Dedication, Absorption (Male nurses; n=321)

	Adjusted	Change statistics

Model	R	R²	R²	Standard Error of Estimation	Change in R²	Change in F	Sig. of change in F	Durbin Watson
1	.42	.17	.17	.73	.17	68.71	.000	
2	.47	.22	.22	.71	.04	20.07	.000	1.96
3	.48	.23	.22	.70	.01	4.37	.037	

Model 3	Non standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
	B	Std. error	Beta			Tol.	VIF
(Constante)	1.26	.25		4.98	.000		
Estado de ánimo	.37	.07	.27	4.90	.000	.74	1.34
Interpersonal	.33	.08	.21	3.78	.000	.72	1.37
Intrapersonal	.13	.06	.11	2.09	.037	.80	1.23

DEDICATION

Model	R	R²	Adjusted R²	Change statistics				Durbin Watson
				Standard Error of Estimation	Change in R²	Change in F	Sig. of change in F	
1	.43	.18	.18	.79	.18	72.96	.000	2.00
2	.49	.24	.24	.77	.05	24.60	.000	

Model 2	Non standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
	B	Std. error	Beta			Tol.	VIF
(Constante)	1.22	.27		4.49	.000		
Estado de ánimo	.44	.08	.30	5.52	.000	.78	1.27
Interpersonal	.45	.09	.27	4.96	.000	.78	1.27

ABSORPTION

Model	R	R²	Adjusted R²	Change statistics				Durbin Watson
				Standard Error of Estimation	Change in R²	Change in F	Sig. of change in F	
1	.33	.11	.10	.80	.11	39.75	.000	
2	.37	.14	.13	.78	.03	11.01	.001	1.95
3	.39	.15	.14	.78	.01	4.64	.032	

Model 3	Non standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
	B	Std. error	Beta			Tol.	VIF
(Constante)	1.29	.28		4.62	.000		
Interpersonal	.33	.09	.20	3.41	.001	.72	1.37
Estado de ánimo	.23	.08	.16	2.79	.005	.74	1.34
Intrapersonal	.15	.07	.12	2.15	.032	.80	1.23

Table 4 shows the models resulting from the regression analysis for each of the engagement dimensions with sex as the selection variable, and "female" as the option selected.

Analysis of the Vigor dimension gave four models, the last of which produced 23% of the explained variance (R^2=.23). Model validity was confirmed by the Durbin-Watson D statistic D=1.96. The value of t was associated with a probability of error of less than .05 in all of the included variables in the model. The standardised coefficient indicates that the Interpersonal factor had the greatest explanatory power. The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

Table 4. Stepwise multiple linear regression model. Vigor, Dedication, Absorption (Female nurses; n=1805)

	Model	R	R^2	Adjusted R^2	Standard Error of Estimation	Change in R^2	Change in F	Sig. of change in F	Durbin Watson
						Change statistics			
VIGOR	1	.39	.15	.15	.70	.15	333.82	.000	
	2	.46	.21	.21	.67	.05	128.96	.000	1.96
	3	.47	.22	.22	.67	.01	28.76	.000	
	4	.48	.23	.22	.67	.00	12.84	.000	

	Model 4	Non standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
		B	Std. error	Beta			Tol.	VIF
VIGOR	(Constante)	1.10	.12		8.67	.000		
	Estado de ánimo	.23	.03	.18	6.77	.000	.56	1.76
	Interpersonal	.35	.04	.22	8.78	.000	.64	1.55
	Manejo del estrés	.16	.03	.12	5.42	.000	.86	1.15
	Adaptabilidad	.14	.04	.10	3.58	.000	.51	1.93

	Model	R	R^2	Adjusted R^2	Standard Error of Estimation	Change in R^2	Change in F	Sig. of change in F	Durbin Watson
						Change statistics			
DEDICATION	1	.40	.16	.16	.70	.16	352.21	.000	
	2	.44	.20	.20	.69	.03	86.32	.000	1.92
	3	.46	.21	.21	.68	.01	30.45	.000	

	Model 3	Non standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
		B	Std. error	Beta			Tol.	VIF
DEDICATION	(Constante)	1.45	.12		11.26	.000		
	Estado de ánimo	.33	.03	.25	10.44	.000	.70	1.41
	Interpersonal	.34	.03	.21	9.34	.000	.79	1.26
	Manejo del estrés	.16	.03	.12	5.51	.000	.86	1.15

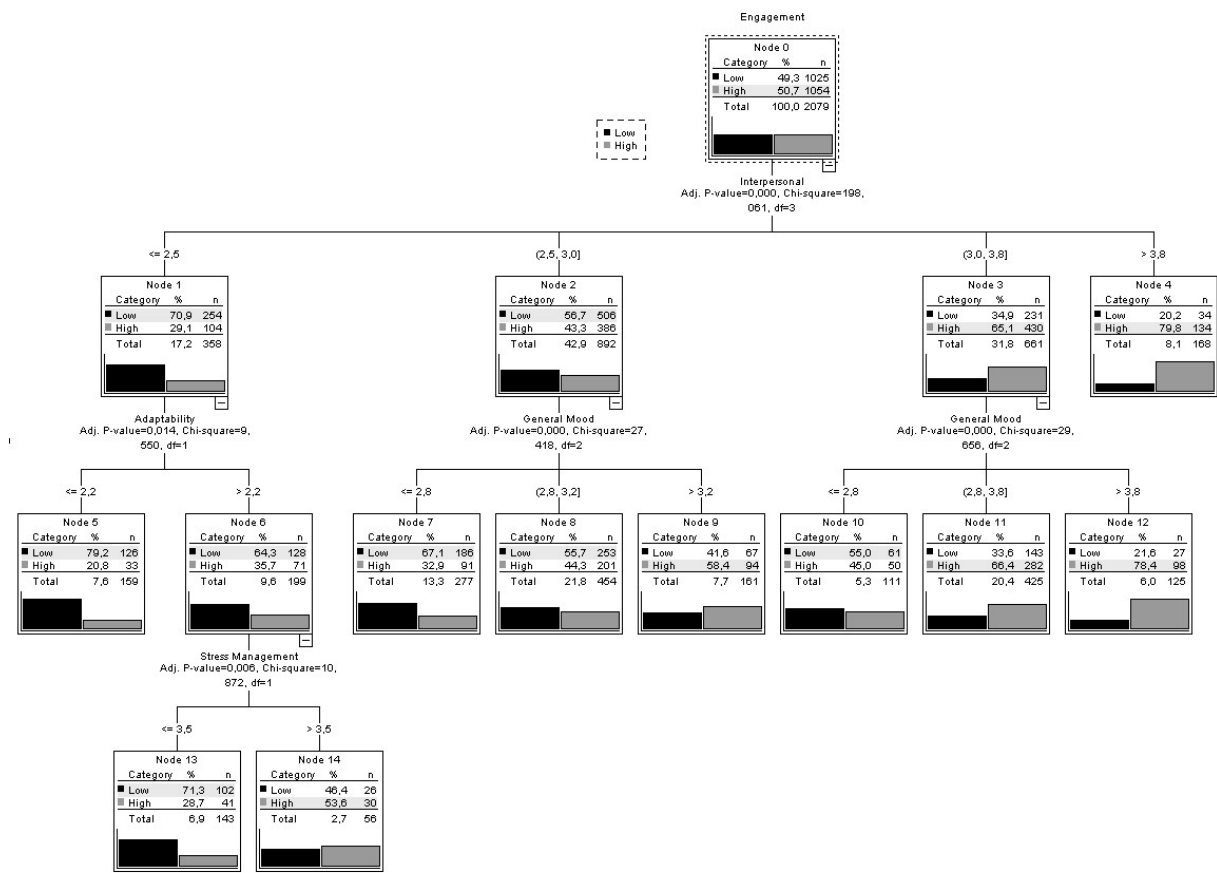
	Model	R	R^2	Adjusted R^2	Standard Error of Estimation	Change in R^2	Change in F	Sig. of change in F	Durbin Watson
						Change statistics			
ABSORPTION	1	.30	.09	.09	.75	.09	187.95	.000	
	2	.35	.12	.12	.73	.03	68.24	.000	1.95
	3	.36	.13	.13	.73	.00	12.18	.000	
	4	.37	.13	.13	.73	.00	8.71	.003	

	Model 4	Non standardised coefficients		Standardised coefficients	t	Sig.	Collinearity	
		B	Std. error	Beta			Tol.	VIF
ABSORPTION	(Constante)	1.36	.13		9.82	.000		
	Interpersonal	.31	.04	.19	7.76	.000	.74	1.33
	Estado de ánimo	.19	.03	.14	5.44	.000	.63	1.56
	Manejo del estrés	.12	.03	.08	3.69	.000	.86	1.15
	Intrapersonal	.08	.02	.07	2.95	.003	.76	1.30

Regression analysis of the Dedication dimension produced three models. In the third model the percentage of variance explained was 21.5% (R^2=.21), a D statistic D=1.96 confirming the validity of the model. The value of t was associated with a probability of error of less than .05 in all of the included variables in the model: General Mood, Interpersonal and Stress Management. In this case General Mood was the strongest predictor of Dedication in female nurses. The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

Finally, the regression analysis of the Absorption engagement dimension resulted in four models from the female sample. The fourth model included the factors Interpersonal, General Mood, Stress Management and Intrapersonal. It explained 13.7% of the variance (R^2=.13). The Durbin-Watson D statistic was D=1.95, which confirmed the absence of positive or negative autocorrelation. The value of t was associated with a probability of error of less than .05 in all of the included variables in the model. The standardised coefficients indicate that the Interpersonal factor was the variable with the greatest explanatory weight. The values of tolerance indicators and VIF suggest the absence of collinearity between the variables included in the model.

The decision tree (Figure 1) shows that the Interpersonal factor was the best predictor of engagement. Participants with low scores in the interpersonal factor and low adaptability exhibited low levels of engagement (79.2%). High levels of engagement were present in those with high scores in the interpersonal variable (79.8%). Finally the goodness of fit of the model functioning can be seen in its correct classification of 65.7% of the participants.

Figure 1. Regression and classification tree Engagement

4. Discussion

This study has achieved our two initial objectives, determining the explanatory value of the components of emotional intelligence in engagement in a sample of nurses, and identifying which components of emotional intelligence have the greatest explanatory value for the dimensions of engagement in terms of sex.

We found that women exhibited higher levels of emotional intelligence in all emotional intelligence components (Interpersonal, General Mood, Stress Management, and Intrapersonal). These findings agree with our second hypothesis, in which we expected to find significant, positive correlations between emotional intelligence and engagement in nurses. Other research has produced similar results, especially about the relationship between the Interpersonal (Arteche et al., 2008; Gerits et al., 2004; Van Dusseldorp, van Meijel & Derksen, 2011) and the Intrapersonal dimensions of emotional intelligence (Azimi et al., 2010; Van Dusseldorp et al., 2011).

Some studies have found higher scores in men for the dimensions of Stress Management (Gerits et al., 2004), General Mood (Azimi et al., 2010), and Adaptability (Arteche et al., 2008). However, it is important to note that men were over-represented in the samples in those studies (Gerits et al., 2004; Arteche et al., 2008), and in order to draw more safely definitive conclusions it would be necessary to have samples which are more evenly balanced between men and women.

Our results show that age is negatively correlated with the Interpersonal factor of emotional intelligence and positively correlated with Stress Management. Harper & Jones-Schenk (2012) found that nurses' empathy diminished with age. Kahraman & Hiçdurmaz (2016) found a negative correlation between the number of children and the Interpersonal factor of emotional intelligence, which does not agree with our results.

We found significant differences between the sexes in the Dedication dimension of engagement, with men scoring higher, this is in line with other research (Schaufeli & Bakker, 2004). The three engagement dimensions were negatively correlated with age, which is similar to findings from other studies (Lovakov et al., 2017; Schaufeli & Bakker, 2004; Schaufeli et al., 2006). We also saw negative correlations between numbers of children and the engagement dimensions of Vigor and Absorption.

We also achieved our objective of developing an explanatory model of engagement showing that nurses with higher levels of emotional intelligence also scored more highly in engagement, with the Interpersonal factor being the greatest predictor of engagement. Other studies support the relationship between the two variables (Garrosa et al., 2011; Nel et al., 2013; Walker & Campbell, 2013; Zhu et al., 2015).

Our results have significant practical implications for the creation of intervention programs and activities to improve the performance of nurses in the workplace. The results should, however, be considered with some care owing to the following limitations: Firstly, the data was gathered through online questionnaires completed by the nurses and may be biased, as the subjects' responses may be subject to desirability bias.   Secondly, as the sample we used is very specific, limited to one type of professional in the healthcare field, it is possible that the results cannot be generalized to other related healthcare professions. Thirdly, the study design did not allow us to determine whether the engagement and emotional intelligence scores remained constant over time. Finally, in Spain nursing is a predominantly female profession, which is reflected by the sample, and may be a limitation on the results.

Finally, we are continuing to work on the analysis of elements that encourage worker engagement, and future research should address other variables related to the subject (personality, self-esteem, etc.) and the work environment (such as number of patients dealt with, shift patterns etc.) in order to continue describing this construct.

5. Conclusions

The results show that there are significant differences in emotional intelligence and engagement when we look at the sociodemographic variables in the study (sex, age, number of children). These findings support our first research hypothesis, in which we expected to find differences in emotional intelligence and engagement according to sociodemographic variables, although the results found in the reviewed literature vary.

Emotional intelligence explained 22.8% of the variability in the engagement dimension Vigor, with the Interpersonal factor having the greatest explanatory weight. It explained 21.8% of the variability in the Dedication dimension, with General Mood being the strongest predictor, and it explained 14% of the variability in the Absorption dimension, with the Interpersonal component being the strongest predictor.

In the male nurses, emotional intelligence explained 23.7% of the variability of engagement Vigor, with General Mood being the best predictor. It explained 24.5% of the Dedication dimension, with General Mood again being the variable with the greatest explanatory value. It also explained 15.3% of the variability in the Absorption dimension, with the Interpersonal factor having the highest predictive value.

In female nurses, emotional intelligence explained 23% of the variability of engagement Vigor, with the Interpersonal factor having the best explanatory power. It explained 21.5% of the Dedication dimension, with General Mood being the strongest predictor, and it explained 13.7% of the variability of the Absorption dimension of engagement, with the Interpersonal emotional intelligence factor being the variable with most explanatory weight.

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