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APPLIED RESEARCH ARTICLE

Measurement of empathy among Argentine cardiologists: psychometrics and differences by age, gender and subspecialty

Short title: Empathy among Argentine cardiologists

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ABSTRACT
Background: Cardiologists are involved in the management of patients with multiple cardiovascular risk factors and chronic heart diseases, so empathy is a necessary feature to deal with them.
Aim: To evaluate the validity and reliability of the Spanish version of the Jefferson Scale of Physician Empathy (JSPE) among Argentine cardiologists and to explore the potential differences by age, gender and subspecialty.

Methods: Between August and September 2012, we performed a survey in a non-randomized sample of 566 Spanish speaking cardiologists of Argentina. A Principle Component Analysis (PCA) was used to explore the link between observed variables and latent variables in order to identify factor structure. The PCA criteria for identifying factor structure were examined with the Kaiser-Meyer-Olkin (KMO) analysis.

Results: The KMO measure of sampling adequacy was 0.86 and Bartlett's test of sphericity was highly significant (p= 0.000), determining the suitability of the data set for factor analysis. The PCA of 20 items yielded a three factor model that accounted for 40.6% of the variance The JSPE mean rank score for women was 307.9 *vs*. 275.0 for men (p= 0.017). The comparison of mean rank score according to age (quartiles) showed a significant relation between older age and empathy. No difference was found when mean rank score was compared by respondent subspecialty

Conclusions: JSPE provides a valid and reliable scale to measure Argentine cardiologists' attitudes towards empathy. Female cardiologists seem to be more empathic than their male colleagues and a positive relationship between age and empathy was found.

Key words: empathy, Jefferson scale of physician empathy, cardiologists, Argentine

INTRODUCTION

Most patients agree that being empathic is a valuable trait in their physicians, and recent research suggests that emotional communication between patient and physician positively influences healing[1-4]. For instance, physician empathy seems to be associated with better clinical outcomes for patients with diabetes[5-6].

The quantitative measurement of empathy in health care professionals is not easy, but is considered crucial to evaluate the effectiveness of educational interventions aimed at promoting empathy[7-8]. The Jefferson Scale of Physician Empathy (JSPE) is the most widely used tool to measure empathy in the context of patient care[9-10]. Nevertheless, its psychometric properties such as validity and reliability must be proved and culturally adapted for the specific population of interest. The JSPE has been translated into 42 languages and recently, these different versions were used for

assessing empathy among American[9], English[8], Italian[11], Japanese[12], Mexican[13], French14, German[15], Polish[16], Korean[17] and Iranian[18] physicians or medical students.

Empathic engagement is particularly important in specialties which treat chronically ill patients requiring continuity of care. These patients need a solid physician-patient relationship to achieve an adequate adherence to medication. Cardiologists are involved in the management of patients with multiple cardiovascular risk factors and chronic heart diseases, so empathy is a necessary feature to deal with them.

The purpose of this study was to evaluate the validity and reliability of the Spanish version of the JSPE among Argentine cardiologists and to explore the potential differences by age, gender and subspecialty.

METHODS

Between August and September 2012, we performed a survey in a non-randomized sample of 566 Spanish speaking cardiologists included in the Argentine Society of Cardiology register, proportionally representing the Argentine distribution of cardiology specialists. They answered via e-mail a Spanish version of the JSPE questionnaire previously validated by Alcorta-Garza A. et al.[13] The participation in the study was anonymous and voluntary, and the questionnaire took less than 10 minutes to be completed. The JSPE is a self-administrated 20-item scale designed to measure physician empathy in the context of patient care and doctor-patient relationship[9-10]. The level of empathy for each item is calculated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Additionally, information about age, gender and subspecialty provided by respondents was required to complete the form.

Statistical analysis

First, to facilitate interpretation and analysis, responses for negative items were reversed. Due to the question structure, the occurrence of ceiling effect was expected, and the non-Gaussian distribution of empathy scores was assessed with the Kolmogorov-Smirnov goodness-of-fit test. The median score was adopted as representative value; nevertheless, mean and standard deviation (SD) were included in factor analysis. Although the underlying JSPE components were studied in other populations, a Principle Component Analysis (PCA) was locally used to explore the link between observed variables (items) and latent variables (factors) in order to identify

factor structure. Only factors with eigenvalues greater than 1.25 were retained, and factor coefficients greater than 0.40 were required for the interpretation of factor structure, using Varimax rotation. The PCA criteria for identifying factor structure were examined with the Kaiser-Meyer-Olkin (KMO) analysis. To establish whether the data set was suitable for factor analysis, a KMO index greater than 0.50 was adopted[19-20]. Previous research determined that the JSPE model represents empathy as a multidimensional construct with perspective taking, compassionate care and emotional detachment as conceptually independent factors[7,12] Finally, the internal consistency of the scale was assessed with Cronbach's alpha, and a value greater than 0.70 was considered to be an acceptable reliability coefficient. Two-tailed Mann-Whitney U and Kruskal-Wallis non-parametric tests were used to compare non-normal score distributions. All statistical analyses were performed using SPSS 17.0 software.

RESULTS

Five hundred and sixty six of 900 surveyed cardiologists (62.9%) completed the questionnaire. Mean age was 51.4 (SD= 11.4, range= 24 - 84), 75.5% were male, 80.9% (n= 458) were clinical cardiologists and the rest belonged to other subspecialties (imaging, electrophysiology, critical care, interventional cardiology or cardiac surgery).

The distribution of JSPE scores was J-shaped and 59.5% (n= 337) of physicians obtained the maximum score. In order to counteract the severely skewed distribution and the extreme ceiling effect, a non-parametric analysis was adopted.

The KMO measure of sampling adequacy was 0.86 and Bartlett's test of sphericity was highly significant ($\chi^2_{(190)}$ = 2476; p= 0.000), determining the suitability of the data set for factor analysis. The PCA of 20 items yielded a three factor model that accounted for 40.6% of the variance (Table 1). The first factor denoted by 'perspective taking' was explained by eight items; the second factor identified as 'compassionate care' was described by seven items; while the third factor labeled 'emotional detachment or standing in the patient's shoes' contained five items. These three dimensions were used to compare the results by gender, age and subspecialty.

The JSPE mean rank score for women was 307.9 *vs*. 275.0 for men (p= 0.017). The same comparison by gender and divided into the three dimensions is shown in Table 2. The comparison of mean rank score according to age (quartiles) showed a significant relation between older age and empathy (Table 3). On the contrary, no

difference was found when mean rank score was compared by respondent subspecialty (clinical cardiology (n= 458) *vs*. the rest (n= 108), p= 0.626).

DISCUSSION

The results of this study support the JSPE reliability and validity for measuring empathy among Argentine cardiologists. The resulting factor structure of the Spanish version responded by our physicians was very similar to that reported for Mexican medical students[13], and somewhat different to that communicated for Anglo-Saxons[8-9]. The multidimensional concept involving empathy and cross-cultural contrasts would explain these differences. The PCA did not exclude any item and identified the three factor model previously described. Likewise, psychometric data like KMO index, sphericity, variance and eigenvalues assigned to each factor were similar to those reported in other communications[8,13].

In opposition to other authors, our statistical approach included a non-Gaussian treatment of data and a non-parametric testing in order to counteract the ceiling effect of skewed distributions. These methods allowed us a better approximation to match for gender and age differences.

The prevailing view seems to be that female physicians have higher JSPE empathy scores compared to their male colleagues. In our study, female cardiologists had a higher global ranking than males, particularly based on the "perspective taking" and the "compassionate care" factors. Similar results were reported by Tavakol S. et al.[8] in UK medical students, where the empathy scores of female students were significantly different on the three dimensions. The observed gender differences may have implications for sustaining empathy, specially taking into account that the number of female physicians in Argentina has increased rapidly in the past years[21].

We did not find differences between empathy scores in relation to cardiology subspecialties. Nevertheless, other authors have demonstrated that physicians who practice in "people-oriented" specialties like psychiatry, pediatrics, internal and family medicine obtain a significantly higher mean empathy score than their counterparts in "procedure or technology-oriented" specialties, as surgery, radiology or obstetrics[10,12].

Previous studies could not demonstrate a correlation between age and empathy. It is possible that the true relationship between these variables cannot be fully captured with the extreme ceiling effect of empathy scores, unless a non-parametric approach is used. When we adopted the median score distributed by age quartiles to counterbalance

the severely skewed data distribution, a significant relationship between older age and empathy was found in the three dimensions. With control for gender, older physicians seem to be more empathic than younger doctors. A possible explanation would be that empathy could improve with increasing practice and clinical experience. On the other hand, younger physicians could despise the value of empathy in favor of a better technology-based medical practice. Though Barnsley et al.[22] found that recent graduates were significantly more likely to report an empathetic communication style with patients, to the best of our knowledge no other author has reported a close relationship between empathy and physician age. These findings demonstrate that it is necessary to improve the communication of humanistic skills on empathy among young physicians, in both undergraduate and graduate educational programs. Teaching empathy to younger cardiologists is essential to understand the patient's perspective and develop a better medical professionalism.

The principal limitation of this study was the reduced response rate of the questionnaire and the non probabilistic characteristic of the sample, which prevent extending the results to all Argentine cardiologists. Since more than 20% of selected cardiologists don't participate in the survey, the missing data could have an important effect on the generalization of collected results. Argentine Society of Cardiology register contains 2887 cardiologists and the total number of specialists all over the country probably would double this figure; that is why sample size could constitute a weak point in our data. Moreover, the self-reported data of the JSPE survey may limit the validity of findings, since respondents may over or underestimate their own empathic practice. Though the JSPE is a frequently used method to assess "empathy", it has some important limitations. Perhaps the most important is that JSPE allows an evaluation of the empathy as perceived from the physicians' viewpoint and on the contrary, it doesn't allow any evaluation of the perception of empathy from the patients, who are the other half of the action. This point must be stressed, since patients have been shown to interpret empathy in a different fashion as physicians do[23].

CONCLUSIONS

In conclusion, this study showed that the JSPE provides a valid and reliable scale to measure Argentine cardiologists' attitudes towards empathy. Female cardiologists seem to be more empathic than their male colleagues, at least in two of the three factors of the multidimensional empathy structure. Finally, a positive relationship

between age and empathy was found, and older cardiologists ranked better in the scale than younger doctors. Since empathy has been linked not only to patient satisfaction, but to clinical competence, this unexpected finding must be considered to promote empathic skills in young physicians, in both undergraduate and graduate medical education.

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Table 1. Principle component analysis of items in the Jefferson Scale of Physician Empathy (n = 566)

No. Item	Factor 1	Factor 2	Factor 3	h²	Mean	SD
2	0.59	-	-	0.35	6.52	1.18
4	0.64	-	-	0.43	6.25	1.37
10	0.67	-	-	0.49	6.10	1.29
13	0.66	-	-	0.48	6.05	1.32
15	0.58	-	-	0.42	6.15	1.40
16	0.59	-	-	0.51	6.30	1.14
20	0.59	-	-	0.45	6.52	1.09
1*	-	0.49	-	0.34	5.78	2.09
7*	-	0.52	-	0.30	5.59	1.99
8*	-	0.53	-	0.39	6.08	1.58
11*	-	0.55	-	0.42	6.28	1.31
12*	-	0.57	-	0.33	6.06	1.81
14*	-	0.58	-	0.36	6.52	1.25
19*	-	0.47	-	0.32	6.44	1.28
3*	-	-	0.70	0.53	5.29	1.76
6*	-	-	0.54	0.43	5.79	1.63
9	-	-	0.53	0.55	5.57	1.68
17	-	-	0.55	0.52	5.38	1.69
18*	-	-	0.41	0.18	3.83	2.04
eigenvalues	4.89	1.92	1.31			
% of variance	24.40	9.59	6.56			
Alpha	0.792	0.620	0.613			

Factor 1, perspective taking; Factor 2, compassionate care; Factor 3, emotional detachment

Factor pattern coefficients ≤ 0.40 were omitted

h² = communalities of each item

* Items were reverse scored (strongly agree = 1, strongly disagree = 7)

Table 2. Comparison between male (n = 419) and female (n = 147) responses on the Jefferson Scale of Physician Empathy

Dimension	Male Mean rank	Female Mean rank	p*
Perspective taking	278.3	298.3	0.149
Compassionate care	277.8	299.8	0.075
Emotional detachment	286.2	275.9	0.501
Global ranking	275.0	307.9	0.017

* Two-tailed Mann-Whitney U test

Table 3. Comparison of responses on the Jefferson Scale of Physician Empathy, according to age

Dimension	<43 years Mean rank	43-53 years Mean rank	53-59 years Mean rank	>59 years Mean rank	p*
Perspective taking	230.9	273.9	304.1	321.8	0.000
Compassionate care	261.5	286.1	303.4	315.1	0.005
Emotional detachment	251.8	275.8	285.5	320.3	0.005
Global ranking	238.7	280.2	294.5	329.3	0.000

* Kruskal Wallis test