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# Ethical behaviour in clinical practice: a multidimensional Rasch analysis from a survey of primary health care professionals of Barcelona (Catalonia, Spain)

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**Abstract**
*Purpose* Normative ethics includes ethical behaviour health care professionals should uphold in daily practice. This study assessed the degree to which primary health care (PHC) professionals endorse a set of ethical standards from these norms.
*Methods* Health care professionals from an urban area participated in a cross-sectional study. Data were collected using an anonymous, self-administered questionnaire. We examined the level of ethical endorsement of the items and the ethical performance of health care professionals using a Rasch multidimensional model. We analysed differences in ethical performance between groups according to sex, profession and knowledge of ethical norms.
*Results* A total of 452 Professionals from 56 PHC centres participated. The level of ethical performance was lower in items related to patient autonomy and respecting patient choices. The item estimate across all dimensions showed that professionals found it most difficult to endorse avoiding interruptions when seeing patients. We found significant differences in two groups: nurses had greater ethical performance than family physicians ($p < 0.05$), and professionals who reported having effective knowledge of ethical norms had a higher level of ethical performance ($p < 0.01$).
*Conclusions* Paternalistic behaviour persists in PHC. Lesser endorsement of items suggests that patient-centred care and patient autonomy are not fully considered by professionals. Ethical sensitivity could improve if patients are cared for by multidisciplinary teams.

**Keywords** Primary health care · Professional ethics · Codes of ethics · Rasch analysis

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## Introduction

Normative ethics in health care attempts to describe how professionals ought to behave when treating patients [1, 2]. In health care professions, the source of ethical norms has historically been enshrined in codes of ethics [3]. While the ethical norms of the various health care professions refer to almost the same values and commitments to patients, they also characterize the ethical sensitivity of each profession [4].

Since the 1950s, health care normative ethics has progressively incorporated the principle of autonomy to avoid paternalistic and unethical authoritarian behaviour among health care professionals. The patients' will became crucial when the first charter of patients' rights was approved [5], and subsequent ethical statements strengthened the importance of respecting patients' decision-making. These

ethical precepts also affected health care policies, directives and professionals' behaviour. Research into professional behaviour has distinguished between primary outpatient care and secondary or acute hospital care [6–8]. In many countries, the primary health care (PHC) is characterized by the multidisciplinary involvement of health care teams, including family physicians, nurses and social workers. PHC is often is the first place at which patients present with an illness, and without referral from another physician [9, 10]. The PHC centres provide an easily accessible route to care. PHC professionals deal with a wide range of physical, psychological and social problems, rather than specialists in any particular disease area. This commitment to patient-centred care has meant that studies of behaviour have focused on issues such as communication with patients or dealing with social inequalities [6, 11]. Despite the theoretical importance of ethical norms, some studies have reported that their relevance to professional behaviour is minimal, and other sources of morality, such as social, individual and organizational values, have a greater influence on professionals' attitudes [12, 13].

Self-reported questionnaires are the most widely used quantitative method of studying ethical behaviour. The sum of each individual item is normally used to provide an aggregate score [14–16]. However, this means that information from a specific item may be lost and ordinal variables from the items are transformed into a continuous variable [17, 18].

The aim of this study was to examine PHC professionals' ethical behaviour in daily practice using a reliable set of items [19]. We used a robust method [20] that allowed rigorous measurements to examine differences between groups of health care professionals to be assessed.

## Methods

### Design

We carried out a cross-sectional study using a set of items from a questionnaire which was previously studied and internally validated [19].

### Participants and data collection

The study was carried out in 56 PHC centres located in the urban area of Barcelona (Catalonia, Spain), with an assigned population of 1,377,352 in 2012 [21]. Family physicians, MD residents, nurses and social workers were invited to participate. The questionnaire was designed to be completed online. Briefly, the data collection method was that website forms were generated for each PHC centre included in the study. The supervisors of each PHC centre sent an email to PHC professionals with the study information sheet and a web link to the questionnaire attached. Professionals who agreed to participate accessed the web form and completed the questionnaire. Incomplete responses were not accepted by the web form system, ensuring that no missing data were found during the analysis.

### *Questionnaire*

The questionnaire was based on the charter of citizens' rights and obligations in relation to health and health care services [22], which is similar to patient charters in other countries, and has become a reference for health care institutions throughout Catalonia. It had 24 general items, each addressing a specific particular ethical action within the professional–patient relationship. The structure of the construction of this set of items was studied and reported previously [19]; it comprised five dimensions: "commitment to users according to their health care needs" (1), "communication between professionals and users and professional protection" (2), "use of information technology tools, continuing training and use of computerized health care records" (3), "self-identification of health care professionals to users" (4) and "patients' decisions after professional communication" (5). Participants were asked to score each item on a five-point scale (*never*, *rarely*, *sometimes*, very *often* and *always*). The set of items is shown in Table 1.

### *Variables*

Sociodemographic characteristics (sex, age) and professional category (family physician, nurse or social worker) were collected. A question to choose one of four options to describe knowledge of the charter of citizens' rights was added: *No knowledge, Know the charter but not its contents, Know the contents partially, Know the contents totally.* In the analysis, this variable was dichotomized to show whether participants knew the contents of the charter or not: categories one and two were represented as "*no effective knowledge"* and categories three and four as "effective knowledge".

### Analysis

### *Rasch analysis*

The family of Rasch models transforms the ordinal data from each item into continuous units (logits) [18]. In this study, Rasch analysis provided two values: an estimate of the endorsement of each item of all professionals and an

**Table 1** Ethical attitudes questionnaire for PHC professionals

| Ethical attitudes items |
|---|
| 1. Provide more time to patients who need more health care |
| 2. Record social issues that may relate to diseases in the medical record |
| 3. Avoid prejudices in professional practice (particularly with minority or ethnic groups) |
| 4. Ensure that the patient understands the health information given |
| 5. Listen and be attentive to patients' emotional expressions |
| 6. Provide an environment for children that lets them express themselves freely in a relaxed way |
| 7. Provide holistic health care and not only medical care to patients at the end of their lives |
| 8. Provide clinical information in such a way that lets the patient choose as freely as possible |
| 9. Whenever there are two valid options, explain them to the patient and let them express their opinion |
| 10. Be careful about the clinical information given to patients' relatives |
| 11. When seeing patients, use the features designed to protect patient privacy (e.g. curtains, door latches or red lights) |
| 12. Avoid interruptions when seeing patients. (phone calls or unplanned interruptions from other professionals) |
| 13. Collect the reasons that lead patients to reject recommended preventive measures (e.g. stopping smoking, recommended vaccinations) in the medical record |
| 14. Encourage patients to express all their worries about the disease process (proactive communication) |
| 15. Ask patients whether they require more information about their disease |
| 16. Inform patients of the possible consequences when choosing therapy |
| 17. When doubts arise, support patients' request for a second opinion |
| 18. Determine whether patients can access prescribed or recommended treatments |
| 19. Make sure you are correctly identified in the workplace |
| 20. Encourage patients to make suggestions or complaints in writing |
| 21. Offer patients the possibility of making contact using different media (e-mail, internet…) |
| 22. Explain to patients who their reference professionals are (family physician and nurse) |
| 23. Carry out regular continuing education and training programs |
| 24. Use the shared databases of medical health records when necessary |

estimate of the self-reported ethical performance of each professional—how well each participant adheres to ethical behaviour. Rasch analysis first requires choosing the appropriate Rasch model and secondly testing the data goodness-of-fit to the model by assessment of: category ordering, item fit, reliability and differential item functioning (DIF) between groups. We used ConQuest® version 3 software [23] to compute the Rasch analysis, and R version 3.0.1 software [24] for the subsequent statistical analysis.

**Table 2** Characteristics of participants

| Characteristics of participants | $N = 452$ |
|---|---|
| Age (years) | |
| Mean (*SD*) | 44.98 (9.80) |
| Range | 22–65 |
| Length of health care work (years) | |
| Mean (*SD*) | 21.21 (13.63) |
| Gender | |
| Male | 92 (20.36 %) |
| Female | 360 (79.64 %) |
| Professional category | |
| Nurse | 200 (44.25 %) |
| Family physician | 237 (52.43 %) |
| Social worker | 15 (3.32 %) |
| Degree of knowledge of the charter of citizens' rights and obligations in relation to health and health care services | |
| No knowledge | 58 (12.83 %) |
| Know but not its contents | 125 (27.66 %) |
| Know its contents partially | 212 (46.90 %) |
| Know its contents totally | 57 (12.61 %) |

### *The Rasch models*

As we used a questionnaire with items with a five-point scale, we tested the data fit to Rasch models for polytomous responses. We used the multidimensional random coefficients multinomial logit model (MRCML) [25, 26], which is considered more appropriate if the questionnaires comprise more than one dimension, the number of items in each dimension is small, and the expected correlations between the dimension are high [27]. A detailed description of the Rasch models is in "Appendix 1".

### *Model fit*

The data fit to a Rasch model can be tested against other Rasch models because they are hierarchically related [27]. We assessed our hypothesized five-dimensional structure versus the alternative of a one-dimensional structure. Data fit was assessed by examining the difference between the deviance ($G^2$) [28], which follows a chi-square distribution with degrees of freedom equal to the difference in the number of parameters estimated. We also examined indexes of goodness-of-fit, Akaike's Information Criterion (AIC) and Bayesian Information Criteria (BIC) [29], with smaller numbers indicating better adjustment.

**Table 3** Fit comparison between different Rasch models

| Number of dimensions | Rasch model | $G^2$ | Change in the deviance | *p* value | Parameters estimated | AIC | BIC |
|---|---|---|---|---|---|---|---|
| 1 | Rating Scale model | 25,454.66 | | *<0.001* | 28 | 25,510.66 | 25,625.85 |
| | Partial Credit model | 24,705.59 | 749.07 | *<0.001* | 92 | 24,889.59 | 25,268.05 |
| 5 | Rating Scale model | 25,077.73 | 376.94 | *<0.001* | 42 | 25,161.73 | 25,334.50 |
| | Partial Credit model | 24,284.33 | 1,170.33 | *<0.001* | 106 | 24,496.33 | 24,932.38 |

**Table 4** Item category frequencies (%)

| Dimension | Item | Never | Sometimes | Normally | Often | Always |
|---|---|---|---|---|---|---|
| 1 Commitment to patients according to their health care needs | 1 | 1 (0.22 %) | 4 (0.88 %) | 74 (16.37 %) | 239 (52.88 %) | 134 (29.65 %) |
| | 2 | 3 (0.66 %) | 43 (9.51 %) | 122 (26.99 %) | 188 (41.59 %) | 96 (21.24 %) |
| | 3 | 12 (2.65 %) | 9 (1.99 %) | 76 (16.81 %) | 203 (44.91 %) | 152 (33.63 %) |
| | 7 | 1 (0.22 %) | 21 (4.65 %) | 85 (18.81 %) | 212 (46.9 %) | 133 (29.42 %) |
| | 8 | 0 (0 %) | 7 (1.55 %) | 101 (22.35 %) | 214 (47.35 %) | 130 (28.76 %) |
| | 9 | 1 (0.22 %) | 32 (7.08 %) | 113 (25 %) | 202 (44.69 %) | 104 (23.01 %) |
| | 16 | 5 (1.11 %) | 35 (7.74 %) | 124 (27.43 %) | 189 (41.81 %) | 99 (21.9 %) |
| 2 Communication between professionals and patients and professional protection | 4 | 0 (0 %) | 5 (1.11 %) | 67 (14.82 %) | 223 (49.34 %) | 157 (34.73 %) |
| | 5 | 0 (0 %) | 2 (0.44 %) | 66 (14.6 %) | 220 (48.67 %) | 164 (36.28 %) |
| | 6 | 2 (0.44 %) | 13 (2.88 %) | 102 (22.57 %) | 205 (45.35 %) | 130 (28.76 %) |
| | 10 | 0 (0 %) | 6 (1.33 %) | 97 (21.46 %) | 208 (46.02 %) | 141 (31.19 %) |
| | 11 | 1 (0.22 %) | 8 (1.77 %) | 67 (14.86 %) | 168 (37.25 %) | 207 (45.9 %) |
| | 12 | 27 (5.97 %) | 126 (27.88 %) | 170 (37.61 %) | 116 (25.66 %) | 13 (2.88 %) |
| | 14 | 0 (0 %) | 10 (2.21 %) | 116 (25.66 %) | 227 (50.22 %) | 99 (21.9 %) |
| 3 Use of information technology tools, continuing training and use of computerized health care records | 13 | 4 (0.88 %) | 20 (4.42 %) | 85 (18.81 %) | 177 (39.16 %) | 166 (36.73 %) |
| | 21 | 26 (5.75 %) | 98 (21.68 %) | 116 (25.66 %) | 140 (30.97 %) | 72 (15.93 %) |
| | 22 | 3 (0.66 %) | 20 (4.42 %) | 89 (19.69 %) | 159 (35.18 %) | 181 (40.04 %) |
| | 23 | 2 (0.44 %) | 34 (7.52 %) | 128 (28.32 %) | 167 (36.95 %) | 121 (26.77 %) |
| | 24 | 6 (1.33 %) | 19 (4.2 %) | 65 (14.38 %) | 177 (39.16 %) | 185 (40.93 %) |
| 4 Self-identification of health care professional to patients | 19 | 43 (9.51 %) | 60 (13.27 %) | 56 (12.39 %) | 70 (15.49 %) | 223 (49.34 %) |
| | 20 | 56 (12.39 %) | 117 (25.88 %) | 111 (24.56 %) | 101 (22.35 %) | 67 (14.82 %) |
| 5 Patient decisions after professional communication | 15 | 19 (4.2 %) | 131 (28.98 %) | 144 (31.86 %) | 127 (28.1 %) | 31 (6.86 %) |
| | 17 | 35 (7.74 %) | 153 (33.85 %) | 128 (28.32 %) | 102 (22.57 %) | 34 (7.52 %) |
| | 18 | 24 (5.31 %) | 89 (19.69 %) | 178 (39.38 %) | 114 (25.22 %) | 47 (10.4 %) |

### *Category ordering*

We studied the number of responses in each category and the order of thresholds for each item [30] to assess the effectiveness of the rating scale. If necessary, categories were recoded according to the following criteria: (1) each category of each item must be observed, (2) thresholds of the categories—the point at which there is a probability of 50 % of a response being in one or another adjacent category—should be ordered and advance monotonically by category.

### *Evaluation of item fit*

In Rasch models, analysis of the item fit shows the discrepancies between the data and the model [20] and serves to detect measurement disturbances. We assessed the item fit using the *infit* and *outfit* mean-square-error statistics outside a range of 0.6–1.4 [31]. *Infit* gives more importance to discrepancies when professionals had an ethical performance closer to the parameter of item endorsement. *Outfit* provides data on unexpected responses of professionals with high ethical performance, but low endorsement of easy-to-endorse items, or vice versa.

**Table 5** Item location and fit statistics values for all 24 items

| Dimension | Average ethical performance per dimension (SD) | Item Num | Ethical endorsement of items | Professionals who attained ethical endorsement | Error | Outfit | Infit | $\tau_1$ | $\tau_2$ | $\tau_3$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Commitment to patients according to their health care needs | 0.998 (*0.06*) | 1 | −0.671 | 421 (93.14 %) | 0.05 | 1.1 | 1.09 | −3.25 | −0.75 | 1.99 |
| | | 2 | 0.544 | 283 (62.61 %) | 0.05 | 1.17 | 1.15 | −1.18 | 0.4 | 2.42 |
| | | 3 | −0.155 | 384 (84.96 %) | 0.05 | 1.15 | 1.09 | −1.81 | −0.39 | 1.73 |
| | | 7 | −0.042 | 364 (80.53 %) | 0.06 | 1.01 | 1.01 | −1.81 | −0.28 | 1.96 |
| | | 8 | −0.47 | 410 (90.71 %) | 0.06 | 0.78 | 0.8 | −3.1 | −0.31 | 2 |
| | | 9 | 0.325 | 312 (69.03 %) | 0.05 | 0.97 | 0.96 | −1.51 | 0.16 | 2.32 |
| | | 16 | *0.469* | 289 (63.94 %) | 0.05 | 0.92 | 0.93 | −1.35 | 0.36 | 2.39 |
| 2 Communication between professionals and patients and professional protection | 1.143 (*0.06*) | 4 | −0.635 | 419 (92.70 %) | 0.05 | 0.86 | 0.87 | −3.04 | −0.74 | 1.87 |
| | | 5 | −0.886 | 425 (94.03 %) | 0.05 | 0.83 | 0.84 | −3.63 | −0.81 | 1.79 |
| | | 6 | −0.025 | 373 (82.52 %) | 0.06 | 0.92 | 0.92 | −2.19 | −0.05 | 2.17 |
| | | 10 | −0.415 | 408 (90.27 %) | 0.06 | 0.96 | 0.98 | −3.03 | −0.25 | 2.04 |
| | | 11 | −0.587 | 417 (92.26 %) | 0.05 | 1.24 | 1.11 | −2.46 | −0.56 | 1.26 |
| | | 12 | 2.517 | 57 (12.61 %) | 0.05 | 1.37 | 1.31 | 0.39 | 2.14 | 5.02 |
| | | 14 | *0.03* | 367 (81.19 %) | 0.14 | 0.88 | 0.89 | −2.57 | 0.03 | 2.63 |
| 3 Use of information technology tools, continuing training and use of computerized health care records | 0.642 (0.04) | 13 | −0.287 | 388 (85.84 %) | 0.05 | 0.91 | 0.93 | −1.63 | −0.36 | 1.12 |
| | | 21 | 0.897 | 166 (36.73 %) | 0.12 | 1.07 | 1.08 | −0.17 | 0.72 | 2.11 |
| | | 22 | −0.343 | 393 (86.95 %) | 0.05 | 0.9 | 0.92 | −1.69 | −0.3 | 0.96 |
| | | 23 | 0.079 | 323 (71.46 %) | 0.06 | 1.05 | 1.03 | −1.44 | 0.14 | 1.55 |
| | | 24 | *−0.345* | 393 (86.95 %) | 0.04 | 1.07 | 1.06 | −1.49 | −0.52 | 0.96 |
| 4 Self-identification of health care professional to patients | −0.001 (0.04) | 19 | −0.446 | 327 (72.35 %) | 0.04 | 1.3 | 1.15 | −0.83 | −0.45 | −0.06 |
| | | 20 | *0.446* | 132 (29.20 %) | 0.04 | 0.92 | 0.92 | −0.37 | 0.38 | 1.31 |
| 5 Patient decisions after professional communication | −0.762 (0.05) | 15 | 0.053 | 103 (22.79 %) | 0.04 | 1.01 | 1.01 | −1.46 | −0.18 | 1.79 |
| | | 17 | 0.202 | 77 (17.04 %) | 0.04 | 1.18 | 1.09 | −1.06 | 0.03 | 1.63 |
| | | 18 | *−0.255* | 152 (33.63 %) | 0.09 | 0.87 | 0.86 | −1.91 | −0.17 | 1.31 |

A parameter estimate in italics indicates that it is constrained for model identification

*Differential item functioning*

DIF occurs when respondents from different groups have different probabilities of rating an item. If there is DIF, the probability of a between-group response differs and the overall estimate might be biased [32]. We assessed DIF in groups according to: sex, type of profession and level of knowledge of the charter of rights. An item was considered to exhibit DIF if there was a difference of ≥0.5 logits (equal to an odds ratio of 1.65) between groups [33].

*Reliability/correlations/discrepancies*

Reliability was viewed as an index of the accuracy of the measures produced by the Rasch model [34]. Values with a minimum of 0.7 in each of the dimensions were expected to consider reliability as sufficient.

The degree of the relationships between the dimensions was verified using the correlations-covariance matrix [27]. To illustrate the extent of variation of ethical performance across all dimensions, we applied a discrepancy index (DI) to the ethical performance values of each participant. The threshold for a discrepant case was set at DI = 0.5 [27]. A detail of the formula is shown in "Appendix 1".

*Ethical performance of professionals and ethical endorsement of items*

Once the data were shown to fit the Rasch model, professionals' ethical performance was assessed using a Wright map [20]. The left side of the map shows professionals' self-reported ethical performance level, from less, at the bottom to more, at the top. The right side displays the items from the least difficult to endorse, at the bottom, to the most difficult, at the top. If professionals and items have the same position, we expect that they would achieve the behaviour of the item. Finally, we examined the mean ethical endorsement per each dimension with the percentage of professionals who attained it.

*Differences between groups*

Differences between ethical performance across all dimensions and groups of participants according to sex, age (we categorized four groups according to quartiles), professional category (*family physician* or *nurse*) and knowledge of the charter of rights ("no effective knowledge" and "effective knowledge") were examined with a MANOVA test for comparing the averages of each dimension using a set of plausible values of professionals' ethical performance [35].

## Ethical considerations

The appropriate ethics committees of the study centres reviewed the study protocol (Reference numbers: 6263 and P11/21). Ethical directives of the Helsinki Statement and local laws were respected. Data collection was anonymous. Voluntary completion and submission of the questionnaire was guaranteed and implied consent to participate in the study.

## Results

### Participants

Of the 1,941 potential participants from 56 PHC centres, we received a total of 452 (23.28 %) completed questionnaires. The results of the descriptive analysis are shown in Table 2: 183 (40.49 %) professionals reported having no effective knowledge of the charter of rights and 269 (59.51 %) reported having effective knowledge. Of the participants, 360 (79.64 %) were females, 200 (44.25 %) were nurses, and 237 (52.43 %) PHC physicians.

### Model selection and category ordering

Table 3 shows the data-to-model fit. On the basis of a comparison of $G^2$, AIC and BIC, the data best fitted into the five-dimension PCM than other models, and therefore, this model was selected.

The frequency distribution of the responses (Table 4) showed that the lowest category (*never*) was not observed in five items, and seven items of the adjacent category (*sometimes*) had <10 observations. To avoid imprecision in the step calibrations, we collapsed the lower categories (*never/sometimes*) into one in all items, without affecting the meaning of the original rating scale.

**Table 6** Conditional covariance/correlation matrix

| Dimension | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Commitment to patients according to their health care needs | | 1.360 | 0.771 | 0.501 | 1.019 |
| 2. Communication between professionals and patients and professional protection | 0.900 | | 0.883 | 0.649 | 1.181 |
| 3. Use of information technology tools, continuing training and use of computerized health care records | 0.747 | 0.808 | | 0.524 | 0.717 |
| 4. Self-identification of health care professional to patients | 0.525 | 0.642 | 0.757 | | 0.565 |
| 5. Patient decisions after professional communication | 0.767 | 0.840 | 0.746 | 0.635 | |
| Variance | 1.428 | 1.599 | 0.747 | 0.640 | 1.235 |
| Reliability | 0.857 | 0.872 | 0.774 | 0.652 | 0.788 |

Values below the diagonal are correlations and values above are covariances

### Item fit and DIF analysis

Table 5 shows the ethical endorsement of each item and fit indices. Item 12 was the most difficult to endorse (2.517 logits), and all other items were close to zero logits. The range of *infit* and *outfit* indices was between 0.78 and 1.37, indicating that there were no unexpected deviations from the model. The threshold values (represented by letter $\tau$ in Table 5) were ordered and increased monotonically by category. In the DIF study, the subgroup of social workers was not considered due to the low sample size ($n = 15$). There were no significant differences between groups (>0.5 logits) and therefore no significant DIF for any item. These indicators showed that the data fitted the selected Rasch model well.

### Reliability/correlations/discrepancies

The reliability of each dimension ranged from 0.652 to 0.872 (Table 6) and was considered sufficient for effective measurement. The correlation values were moderate-to-strong (0.52–0.90) and showed that the five-dimension model gave more precise estimates than a one-dimension model. The correlations were higher between dimension one and two (0.90), which shared 81 % of the variance.

The percentage of discrepant cases between dimensions (DI) was 67.03 %. This indicated that each dimension was providing slightly different information and therefore applying a model with only one dimension would lead to a loss of information.

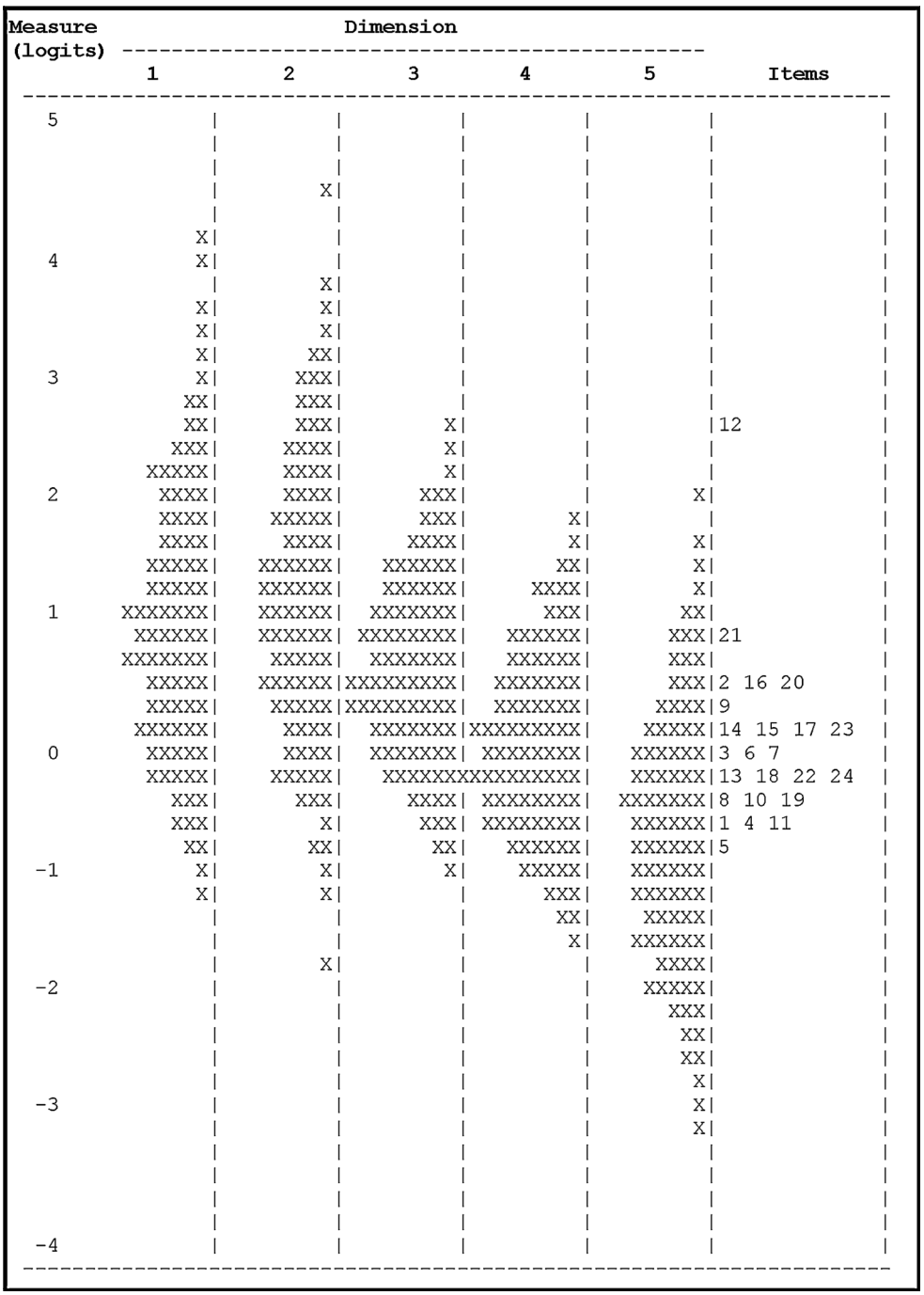


**Fig. 1** Multidimensional Wright map. Each "X" represents 4.6 cases. Dimensions: *1* commitment to patients according to their health care needs. *2* communication between professionals and patients and professional protection. *3* use of information technology tools, continuing training and use of computerized health care records. *4* self-identification of health care professional to patients. *5* patient decisions after professional communication

*Professionals' ethical performance and endorsement of items*

The Wright map (Fig. 1) showed a relatively higher position of the first three dimensions compared to the fourth and fifth, suggesting that professionals had a different level of ethical performance according to the dimension. Endorsement to items across all dimensions was relatively concentrated around the zero logits mark, except for a few items, indicating that most items had a similar level of endorsement. The most difficult to endorse item was item 12 ("Avoid interruptions when seeing patients …"), where $<20\ \%$ of professionals had sufficient endorsement (12.61 %). In addition, items 15, 17, 18, 20 and 21 had a low level of ethical performance compared to the mean endorsement for each dimension.

**Table 7** Mean ethical performance differences by sub-group of professionals across the multivariate distribution of all five dimensions

| Group and sub-group | MANOVA test | | | | | *p* value |
|---|---|---|---|---|---|---|
| | Mean level and standard deviation of ethical performance on each dimension | | | | | |
| | *D*1 (SD) | *D*2 (SD) | *D*3 (SD) | *D*4 (SD) | *D*5 (SD) | |
| Gender | | | | | | |
| Female ($n = 360$) | 0.974 (*1.18*) | 1.123 (*1.25*) | 0.645 (*0.84*) | 0.038 (*0.76*) | −0.782 (*1.08*) | 0.287 |
| Male ($n = 92$) | 0.975 (*1.09*) | 1.043 (*1.23*) | 0.548 (*0.87*) | −0.072 (*0.80*) | −0.736 (*1.03*) | |
| Age | | | | | | |
| 22–36 ($n = 112$) | 0.905 (*1.21*) | 1.056 (*1.26*) | 0.603 (*0.89*) | 0.024 (*0.78*) | −0.804 (*1.05*) | 0.623 |
| 37–43 ($n = 109$) | 1.115 (*1.14*) | 1.217 (*1.22*) | 0.705 (*0.82*) | 0.024 (*0.77*) | −0.683 (*1.02*) | |
| 44–52 ($n = 106$) | 0.942 (*1.11*) | 0.985 (*1.21*) | 0.593 (*0.84*) | −0.051 (*0.74*) | −0.901 (*1.08*) | |
| 53–65 ($n = 125$) | 0.942 (*1.19*) | 1.159 (*1.28*) | 0.604 (*0.85*) | 0.057 (*0.78*) | −0.715 (*1.11*) | |
| Profession | | | | | | |
| Family physician ($n = 237$) | 0.764 (*1.06*) | 0.846 (*1.17*) | 0.500 (*0.83*) | −0.075 (*0.77*) | −0.950 (*1.03*) | *0.004* |
| Nurse ($n = 200$) | 1.177 (*1.25*) | 1.364 (*1.28*) | 0.748 (*0.86*) | 0.108 (*0.78*) | −0.607 (*1.09*) | |
| Level of knowledge | | | | | | |
| No knowledge ($n = 183$) | 0.804 (*1.16*) | 0.885 (*1.21*) | 0.462 (*0.79*) | −0.114 (*0.77*) | −0.987 (*1.02*) | *0.014* |
| Knowledge ($n = 269$) | 1.090 (*1.16*) | 1.257 (*1.25*) | 0.736 (*0.87*) | 0.104 (*0.75*) | −0.627 (*1.08*) | |

Significant values of the Wilk's test statistic are shown in italics

*Differences between groups*

The subgroup of social workers ($n = 15$) was excluded due to the small sample size. According to our results on Table 7, self-reported ethical performance of PHC nurses was higher than that of PHC physicians ($p < 0.01$), and professionals who reported knowing the norms of The charter had greater endorsement than those who did not ($p < 0.05$).

## Discussion

Our results showed that professionals had less ethical endorsement of behaviours related to adopting new strategies in clinical management and to patients' wishes, providing a viewpoint of professionals' understanding of the principle of autonomy. Likewise, we found that knowledge of The charter of citizens influenced the self-reports of ethical performance of professionals and that there were differences in ethical endorsement between professions: nurses and family physicians. The results provided evidence of the substantive and structural validity of the self-administered questionnaire used [36].

Ethical endorsement was acceptable in items related to more socially accepted and historically established behaviours. Professionals reported that they respected behaviours related to commitment to the patients' health care needs: listening, providing holistic care from the clinical point of view and comforting patients did not present major moral conflicts. In contrast, ethical endorsement was lower in dimensions with items reflecting non-traditional health care relationships. Our results showed that PHC professionals viewed themselves as low performers of behaviours such as facilitating a second opinion or allowing patients making suggestions and complaints. This finding suggests that paternalism persists in PHC professionals and therefore contradicts the evidence that reports the opposite [6, 37, 38]. In PHC, empowering, moving towards professional–patient partnerships and rejecting paternalistic, old-fashioned behaviours are essential to adequate patient health care [39–42]. We believe that these results show the real status of the professionals' level of practice with respect to act according the ethical norms and patients' wishes.

The item most difficult to endorse, with more responses at lower categories of the scale, was related to interruptions when seeing patients. As professionals who participated were not working in emergency departments, ordinarily these interruptions in PHC are caused by interference in consultations, such as inter-professional consultations or phone calls. These interruptions dramatically hinder the professional–patient relationship and cause ethical distress, mistakes and loss of patient adherence to treatment [43]. Specific policies to reduce this interference and ensure the patient consultation is put before other professional tasks would require more self-ethical instruction and follow-up at the institutional level [44, 45].

The higher level of ethical performance of professionals who reported effective knowledge of the charter of rights is line with previous findings [19, 46, 47]. As the prestige of the health care professions is grounded in the commitment to their normative ethics [48], the lack of methods to assess respect for these standards in everyday clinical practice is somewhat paradoxical.

The differences found between nurses and PHC physicians in this study might constitute empirical evidence of the theoretical differences between the two professions. According to Weaver [4], the ethical sensitivity of nurses is focused mainly on patient relationships, and therefore, the nurses would have felt more comfortable with these items than family physicians. The greater ethical performance of nurses compared to physicians might support the idea that multidisciplinary PHC teams provide effective, integrated health care with greater ethical sensitivity towards patients [49–52].

### Limitations

As we assessed the opinion of the ethical behaviour in a sample of professionals of Barcelona (Catalonia, Spain), additional social, cultural and legal factors might influence the professional's opinion. Therefore, part of the conclusions of this study may not be generalizable; results suggest further studies with an international population sample using reliable questionnaires in different languages using similar methods. As the study was voluntary, we cannot determine why professionals declined to participate. However, while the low response rate was important, the size of the sample suggests the results are reliable. Ethical performance was self-reported, and the clinical reality could only be provided by third party observers, which would not be feasible given the issues we examined. We did not assess the data fit to a within-item multidimensional model—where items would share more than one dimension, which was the case of items from the first and second dimensions where items shared a high amount of variance. This analysis would require further studies. We believe that the estimates obtained in the analysis are robust and present a reliable picture of ethical behaviour in practice.

## Conclusions

Professionals showed a high level of ethical performance with respect to issues such as listening, compassion and protecting the patient. However, other issues, such as promoting patients' wishes and patient self-management, suggest that paternalism persists in health care professionals. Ethical performance could improve if professionals acknowledge ethical norms and if care were provided by a multidisciplinary team. The methods used in the study were effective and consistent. Future studies to assess specific interventions and clarify how ethical behaviour might be improved in daily practice are warranted.

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## Appendix 1: Rasch models formulae

The Rating Scale Model (RSM)

$$\pi_{nix} = \frac{\exp \sum_{j=0}^{x} \left[\theta_n - \delta_i - \tau_j\right]}{\sum_{k=0}^{m} \exp \sum_{j=0}^{k} \left[\theta_n - \delta_i - \tau_j\right]}$$

On ethical behaviour latent trait continuum, $\pi_{nix}$ is the probability of professional $n$ to score category $x$ of item $i$; $\theta_n$ is professionals ethicality, and $\delta_i$ represents the extent of professional's ethical endorsement for item $i$. Categories are ordered from 0 to $m$, and the $\tau_j$ are the rating scale structure parameters (e.g. thresholds) and represent the points on the continuum of behaviour in clinical practice, where adjacent categories are equally probable [23].

The Partial Credit Model (PCM)

$$\pi_{nix} = \frac{\exp \sum_{j=0}^{x} \left[\theta_n - \delta_{ij}\right]}{\sum_{k=0}^{m} \exp \sum_{j=0}^{k} \left[\theta_n - \delta_{ij}\right]}$$

$\pi_{nix}$ is the probability of professional $n$ to score category $x$ of item $i$ ¡. $\theta_n$ is ethicality of professional $n$, and $\delta_{ij}$ represents the extent of professional's ethical endorsement for item $i$ with a $j$ particular thresholds from item categories. Thus, the PCM allows each item to vary its number of categories an estimate the probability of the threshold for each item instead that all entirely [28].

Multidimensional Random Coefficients Multinomial Logit Model (MRCML)

$$P(X_n;\delta|\theta_n)=\frac{\exp\left[x_n^{'}(B\theta_n-A\delta)\right]}{\sum_{z\in\Omega}\exp\left[z_n^{'}(B\theta_n-A\delta)\right]}$$

The MRCML assumes that a set of dimensions determines ethical endorsement. In the formula, the position of the professionals $n$ in each dimension is described by the $D \times 1$ column vector $\theta_n = (\theta_{n1}, \theta_{n2}, \theta_{nD})$, $\delta$ is the vector of ethical endorsement corresponding to each dimension, and $\Omega$ is the set of all possible response vectors. $Z$ denotes a vector coming from the full set of response vectors, while $x_n$ denotes the vector of interest. Matrices $A$ and $B$ are known as the design and scoring matrices, respectively. Scoring matrix $B$ allows the description of the score that is assigned to each response category $k$ on each of the $D$ component ethical behaviour latent traits. Design matrix $A$ is used to specify the linear combinations of the $D$ component parameters $\delta$ to describe the ethical performance to each item [27].

The discrepancy index (DI) formulation

$$\mathrm{DI}_n=\sum_{d=1}^{D_i}\left(\overline{\theta}-\theta_d\right)^2$$

where $D$ is the number of dimensions, $n$ the number of professionals, $\overline{\theta}$ the endorsement of each item in a given dimension and $\theta$ the mean estimate of endorsement across all dimensions. The percentage of PHC professionals showing discrepant measures between dimensions would show how each dimension was providing differing information on ethical performance [27].

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