

Title: Determinants of knowledge and attitudes towards pain among nurses in a tertiary hospital in Spain.

Running Title: Determinants and knowledge about pain among Spanish nurses

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Competing Interest

The authors declare no competing interest.

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Determinants and knowledge about pain among Spanish nurses

**Determinants of knowledge and attitudes towards pain among nurses in a tertiary
hospital in Spain.**

ABSTRACT

Poorly controlled pain in patients is related to several complications, such as increased nosocomial infections and mortality, where nurses play a crucial role.

Purpose: To analyse the determinants, as well as nurses' knowledge and attitudes towards pain in the inpatient services of a tertiary centre in the Spanish public health network.

Methods:

The "Knowledge and Attitudes Survey Regarding Pain" questionnaire was administered to all nurses in the centre from January to March 2019. Additional sociodemographic variables such as gender, age, employment status, work experience, professional group and academic degree were collected and analyzed. The Item Response Theory was used for the discriminant analysis of each question and its relationship with the final score.

Results: A total of 282 questionnaires were collected from those distributed among the nurses working in medical, surgical, oncological and intensive care services. The average score obtained on pain-related knowledge and attitudes was 58.89%. We found significant differences ($p < 0.001$) between the KASRP score and the professional group. There were no differences between academic level or age with the final score. The KASRP allowed discriminating between nurses with low levels of pain knowledge. Questions related to pharmacology obtained low scores and did not discriminate between

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levels of knowledge, being considered as difficult. We did not find items that allowed discriminating between levels of knowledge.

Conclusions: There is a knowledge gap regarding nurses' pharmacological and assessment concepts, and there are differences in knowledge depending on the professional group. The KASRP allows for a good discrimination of low levels of knowledge.

Key words: Pain; Health Knowledge, Attitudes, Practice; Nursing.

INTRODUCTION

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2 Pain is defined as “*an unpleasant sensory and emotional experience associated with, or*
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4 *resembling that associated with, actual or potential tissue damage (Raja et al., 2020)*”.

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7 Poorly controlled pain in patients is related to complications, such as: delayed wound
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9 healing, increased nosocomial infections, cardiac arrhythmias, increased risk of
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11 thromboembolic events, increased delirium severity, extended hospital stays, as well as
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13 increased healthcare costs and mortality (Dale et al., 2013; Dunwoody, Krenzischek,
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15 Pasero, Rathmell, & Polomano, 2008; Malchow & Black, 2008; Payen, Bosson,
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17 Chanques, Mantz, & Labarere, 2009; Robinson et al., 2008; Sacco & LaRiccia, 2016;
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19 Yamashita, Yamasaki, Matsuyama, & Amaya, 2017). Due to the fact that nurses are the
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21 professionals who spend the most time interacting with inpatients, they need to have an
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23 adequate level of knowledge about pain and an appropriate attitude towards it. This
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25 should include assessment, pharmacological and management aspects, regardless of the
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27 age, sex or origin of the patient (McCaffery, Ferrell, & Pasero, 2000; Yildirim, Cicek, &
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29 Uyar, 2008).

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37 In recent years, different studies have assessed nurses' pain-related knowledge, as
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39 well as their attitudes towards pain, in different settings (Al Qadire & Al Khalaileh, 2014;
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41 Chia, Yap, & Wong, 2018; Eid, Manias, Bucknall, & Almazrooa, 2014; Omran, Qadire,
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43 Ali, & Al Hayek, 2014; Samarkandi, 2018; Yildirim et al., 2008), and they have showed
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45 how low levels of knowledge and attitudes are limiting factors to achieving good pain
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47 control. Likewise, an adequate level of knowledge and attitude implies a better approach
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49 towards pain and better pain management (Issa et al., 2019; Jarrett, Church, Fancher-
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51 Gonzalez, Shackelford, & Lofton, 2013; Keen et al., 2017; Purser, Warfield, &
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53 Richardson, 2014; Topolovec-Vranic et al., 2010). Other authors have studied in detail
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55 the elements that best discriminate pain-related knowledge in different countries, and
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have determined their main characteristics (Gretarsdottir, Zoëga, Tomasson, Sveinsdottir, & Gunnarsdottir, 2017; Jarrett et al., 2013).

In Spain, despite the fact that specific pain training is not explicitly included in nursing training plans (Ministerio de Ciencia e Innovación, Gobierno de España., 2008), they do mention the need to acquire knowledge through evidence-based practice; and training is given on the need to provide comfort and relief to patients, on the basis of their autonomy and comprehensive care. Therefore, the objectives of this study were: to evaluate the level of knowledge and attitudes towards pain among nurses working in the inpatient services of a tertiary university centre in the Spanish public health network, and to carry out a detailed analysis of the determinants of such knowledge.

METHODS

Study design

A descriptive, cross-sectional study was carried out in the inpatient services and in the general intensive care services of a tertiary university centre of the Spanish public health network, between January and March 2019. This medical centre had, at the time, 938 beds and moreover, it is specialized in skull base surgery, surgery for Parkinson's disease, as well as for work-related pulmonary diseases, familial cardiomyopathies and treatment for refractory neuropathic pain.

Sample

All the nurses who, during the study period, worked on medical, surgical and oncological wards, as well as in the general intensive care unit of the medical centre, were contacted.

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The purpose of the study and procedure to completing the questionnaire were explained to the consenting participants, both orally and in writing. There were no exclusion criteria.

Instrument

To evaluate the level of knowledge and the attitudes towards pain, the “Knowledge and Attitudes Survey Regarding Pain” (KASRP) (Ferrell & McCaffery, 2014) was used in its Spanish version (Cronbach’s alpha: .781; Pearson’s r: .881; ICC: .883) (Zuazua-Rico, Maestro-González, Mosteiro-Díaz, & Fernández-Garrido, 2019). It stands out for being the most used instrument to assess nurses’ knowledge and attitudes regarding pain and the one providing the strongest evidence to assess this concept. It consists of 39 items divided into 3 sections (22 true or false questions, 15 multiple-choice questions and 2 clinical cases) based on the guidelines on analgesia of the "World Health Organisation", the "American Pain Society" and the "National Comprehensive Cancer Network Pain Guidelines” (American Pain Society, 2016; Swarm, Gafford, & Rabow, 2018; World Health Organization, 2012). Each question answered correctly was awarded 1 point and those not answered or answered incorrectly were awarded 0 points, the maximum score being 41 points. The final score was stated both as an absolute value and as a percentage of correct answers. Professionals reaching a percentage of 80% or higher were considered to have an adequate level of knowledge (McCaffery & Robinson, 2002). In addition, variables regarding their age, sex, academic level and work experience were collected.

Analysis

The following demographic variables were collected: Age, work experience, correct answers (%), gender, employment status, professional group, academic degree.

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1 The comparison of quantitative variables between two categories was carried out
2 through the Student's T-test (with Welch correlation when variances were different). The
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4 comparison of quantitative variables between 3 categories was carried out with the
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6 ANOVA test and Tukey's Post Hoc Test.
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10 In order to evaluate the individual discriminating power of the questionnaire items
11 on the final score, the Item Response Theory (IRT) was used, using the same statistical
12 analysis as Gretarsdottir et al. (2017). With this type of analysis, the probability of getting
13 a correct response in a questionnaire item is modelled according to the individual's
14 position in the latent trait (or skill) and one or more characteristics of the item.
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23 A model with the following 2 parameters was proposed: difficulty and
24 discrimination. The discrimination parameter describes how well an item can differentiate
25 between individuals with low skill levels and individuals with high skills. The difficulty
26 of the item is defined as the level of skill at which an individual has a 50% probability of
27 answering an item correctly.
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36 A significance level set at $p < 0.05$ was used. The statistical analysis was carried
37 out using the R programme (R Development Core Team) version 3.4.3.
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44 **Ethical considerations**

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47 This study has been developed in accordance with the principles set forth in the
48 Declaration of Helsinki, the Belmont Report, the CIOMS Guidelines and the provisions
49 of Organic Law 3/2018 of 5 December 2018 on Personal Data Protection and Digital
50 Rights Guarantee. It was approved by the Regional Committee on Ethics and Research
51 (71/18). The submission of the completed questionnaire was considered as the nurses'
52 acceptance and consent to participate in the study.
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RESULTS

A total of 282 questionnaires were collected, corresponding to a 61.2% response rate. The study population was mainly female (83%) with an average age of 38.4 years (SD 9.98 years), and an average professional experience of 14.83 years (SD 9.37 years) as shown in **table 1**.

There was a higher percentage of professionals with basic nursing education (83.7%) compared to those with postgraduate studies, and a higher percentage of professionals with open-ended contracts (68.8%) compared to those with fixed-term contracts. Regarding their professional group, most professionals carried out their services in the medical, surgical and intensive care units in comparison to those working in the oncology department (4.3%) (**table 1**).

With regard to the KASRP questionnaire, the average percentage of correct answers obtained by the professionals was 60.41% (SD 9.80%), with no statistically significant differences between the different socio-demographic variables, as shown in **table 2**. The distribution of correct answers is shown in **table 3**.

There were no differences between the KASRP score and age ($p=0.978$), academic level ($p=0.133$) and employment status ($p=0.700$) were found. However, statistically significant differences were found between the KASRP score and the nurses' professional group ($p<0.001$). A post hoc analysis using Tukey's test was carried out and differences were observed between the oncology service and the medical ($p=0.047$) and surgical ($p=0.011$) services; and between the intensive care service and the medical ($p=0.009$) and surgical ($p<0.001$) services. There were no differences between the oncology service and the intensive care service ($p=0.720$) **figure 1**.

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3 **Discriminant analysis of KASRP items**
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6 The individual discriminant analysis of the items, as well as their difficulty, determined
7 that they have different behaviours. **Figure 2** shows how the KASRP questionnaire
8 allows discriminating well low levels of knowledge; however, it is not sensitive to
9 differentiate between those with medium or very good knowledge on pain management.
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16 Items 11, 12, 13, 27 and 29 had a high percentage of correct answers, and they
17 identified only very few subjects with low levels of skills. On the other hand, in item 16,
18 the correct answer was inversely related to high ability, as shown in **chart 1**.
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24 Moreover, there were items that obtained a high level of difficulty and, in addition,
25 did not discriminate between levels of skills. This was the case of 4, 8, 17, 28 and 39, as
26 shown in **chart 2**. No items capable of discriminating between subjects with high levels
27 of skills and subjects with low levels of skills were found.
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38 **DISCUSSION**
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41 The results obtained show that nursing professionals in the aforementioned centre
42 (60.41%) have an insufficient knowledge regarding pain. This data is similar to another
43 study carried out in Italy (62.7%) (Bernardi, Catania, & Tridello, 2007). By contrast, our
44 results are lower than the results of other studies carried out in the United States (78.1%,
45 69.1%, 80.9% and 76%) (Al-Shaer, Hill, & Anderson, 2011; Jarrett et al., 2013; Keen et
46 al., 2017; Mocerri & Drevdahl, 2014), Norway (75%) (Utne, Småstuen, & Nyblin, 2018),
47 Iran (66.6%) (Shahriary et al., 2015) and Iceland (68.8%) (Gretarsdottir et al., 2017), and
48 higher than the results of other studies carried out in Jordan (48.2% and 42.5%) (Al Qadire
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2 & Al Khalaileh, 2014; Omran et al., 2014), Spain (48.6%) (Salvadó-Hernández et al.,
3 2009), China (50,5%) (Lai et al., 2003), Turkey (35.41%) (Yildirim et al., 2008), Greece
4 (45.35%) (Kiekkas et al., 2015) and Saudi Arabia (42.25%) (Eid et al., 2014), Singapore
5 (56%) (Chia et al., 2018), Turkey (54%) (Tufecki, Karaman Ozlu, Arslam, & Gumus,
6 2013) and United Arab Emirates (45%) (Al-Atiyyat et al., 2019).

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12 The relationship between our KASRP score and the socio-demographic variables
13 matches the findings in Italy, Greece, the United States, Jordan, Turkey and Singapore
14 (Al Qadire & Al Khalaileh, 2014; Al-Atiyyat et al., 2019; Alkhatib, Al Qadire, &
15 Alshraideh, 2019; Chia et al., 2018; Erkes, Parker, Carr, & Mayo, 2001; Kiekkas et al.,
16 2015; Latina et al., 2015; Mocerri & Drevdahl, 2014; Tufecki et al., 2013), where no
17 relation among them was found. However, research conducted in Turkey, Taiwan,
18 Iceland, and the United States (Al-Shaer et al., 2011; Gretarsdottir et al., 2017; Lai et al.,
19 2003; Yildirim et al., 2008), there were relationship between KASRP scores and
20 academic level, as well as professional experience. We believe that this fact may be due
21 to a difference or variability in the content of nursing qualifications between those
22 countries and ours.

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40 Just like other studies conducted in the United States (Keen et al., 2017), there
41 were no statistical relationship between the scores obtained by nurses in the medical
42 service and those obtained by nurses in the surgical service. And, like other authors, our
43 group of oncology nurses scored significantly higher than nurses in other services, except
44 those nurses in intensive care (Al Qadire & Al Khalaileh, 2014; Omran et al., 2014;
45 Rushton, Eggett, & Sutherland, 2003; Salvadó-Hernández et al., 2009). This is logical,
46 given that this group of professionals is expected to have higher knowledge about pain.
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58 Our results are consistent with others where limited percentage of correct
59 responses in clinical cases were found (Al Qadire & Al Khalaileh, 2014; Lai et al., 2003;
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1 Mocerri & Drevdahl, 2014; Omran et al., 2014; Yildirim et al., 2008), unlike another study
2 carried out in Turkey (Tufecki et al., 2013), where the percentage of correct answers was
3 close to 100%. This showed us how the efforts made to consider pain as a vital constant
4 in the early 2000s were not enough (Merboth & Barnason, 2000), and to this day many
5 nurses still put their professional judgment ahead of the patients' assessment of their own
6 pain.
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15 When analysing the KASRP questionnaire using the IRT, our results are in line
16 with those of Gretarsdottir (2017) regarding the overall discriminant power of the
17 questionnaire, which allowed for a good discrimination of low levels of knowledge. This
18 characteristic should help establish the objectives when designing nursing training plans,
19 as they should cover those concepts where important knowledge gaps were detected. Our
20 results also concur with another study carried out in the United States in which no item
21 was a good predictor (Jarrett et al., 2013).
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33 Furthermore, items with a high percentage of correct answers and which do not
34 discriminate low levels of knowledge could be taken out of the questionnaire, since they
35 are related to general concepts, which are well-known among Spanish nurses. It is
36 remarkable that those items are related to pain assessment, yet the percentage of correct
37 answers in the clinical cases were very low, not discriminating between levels of
38 knowledge.
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48 The items considered as difficult are mainly related to pharmacological concepts
49 and, just like in the study carried out by Jarret et al. (2013), they are also not good
50 discriminants. Nursing professionals are the fundamental pillar for pain management. For
51 this reason, we believe that pharmacological training should be promoted so that nurses
52 increase their knowledge and the comfort and quality of life of patients improve,
53 regardless of the medical responsibility when prescribing drugs.
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CONCLUSIONS

There is a knowledge gap regarding pharmacological concepts, as well as regarding information related to pain assessment. Training related to these concepts should be encouraged. Nurses in the oncology department and in the intensive care units show a higher level of knowledge compared to other professionals.

The Spanish version of the KASRP questionnaire allows for an adequate discrimination between professionals with low knowledge. In addition, there are no items associated with a higher score.

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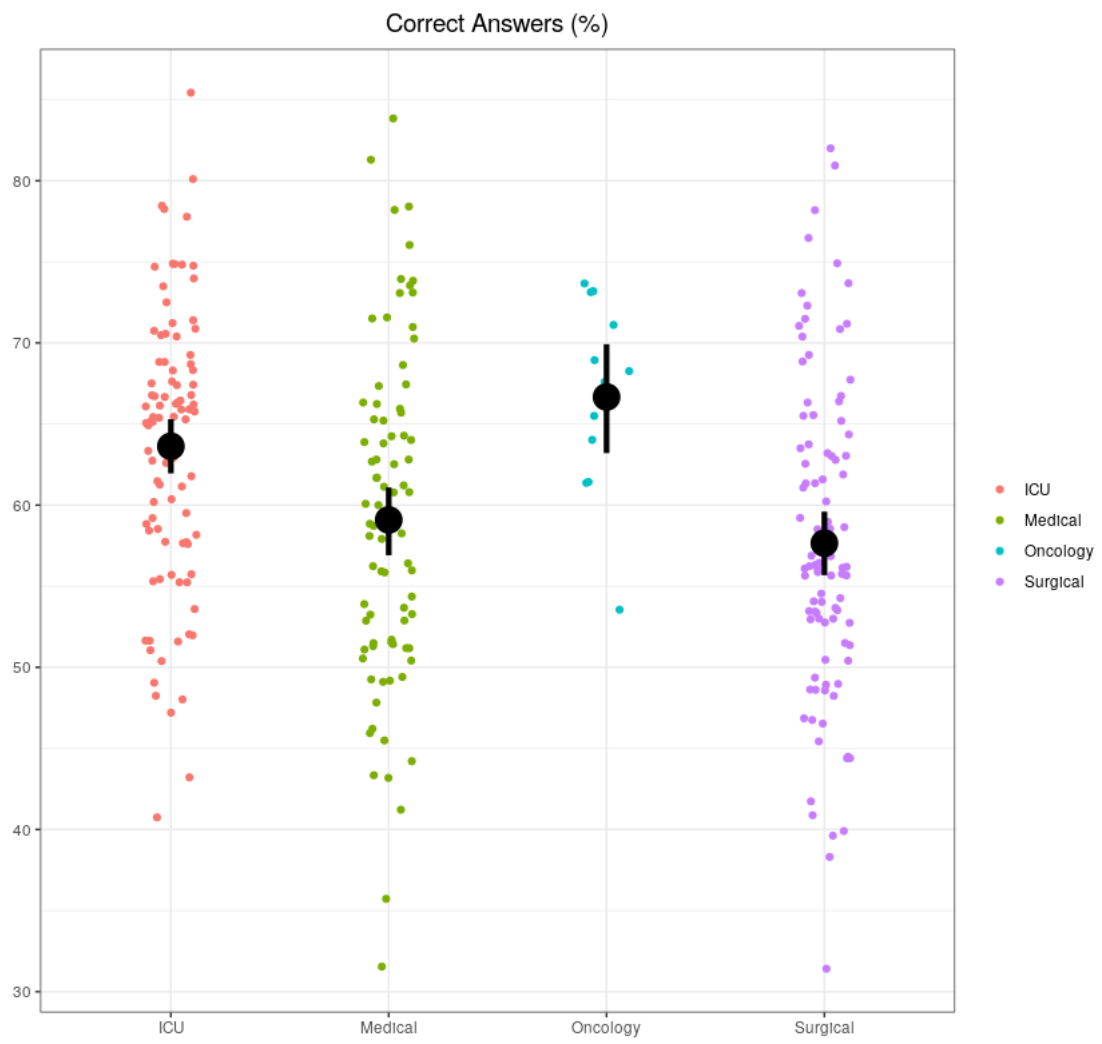
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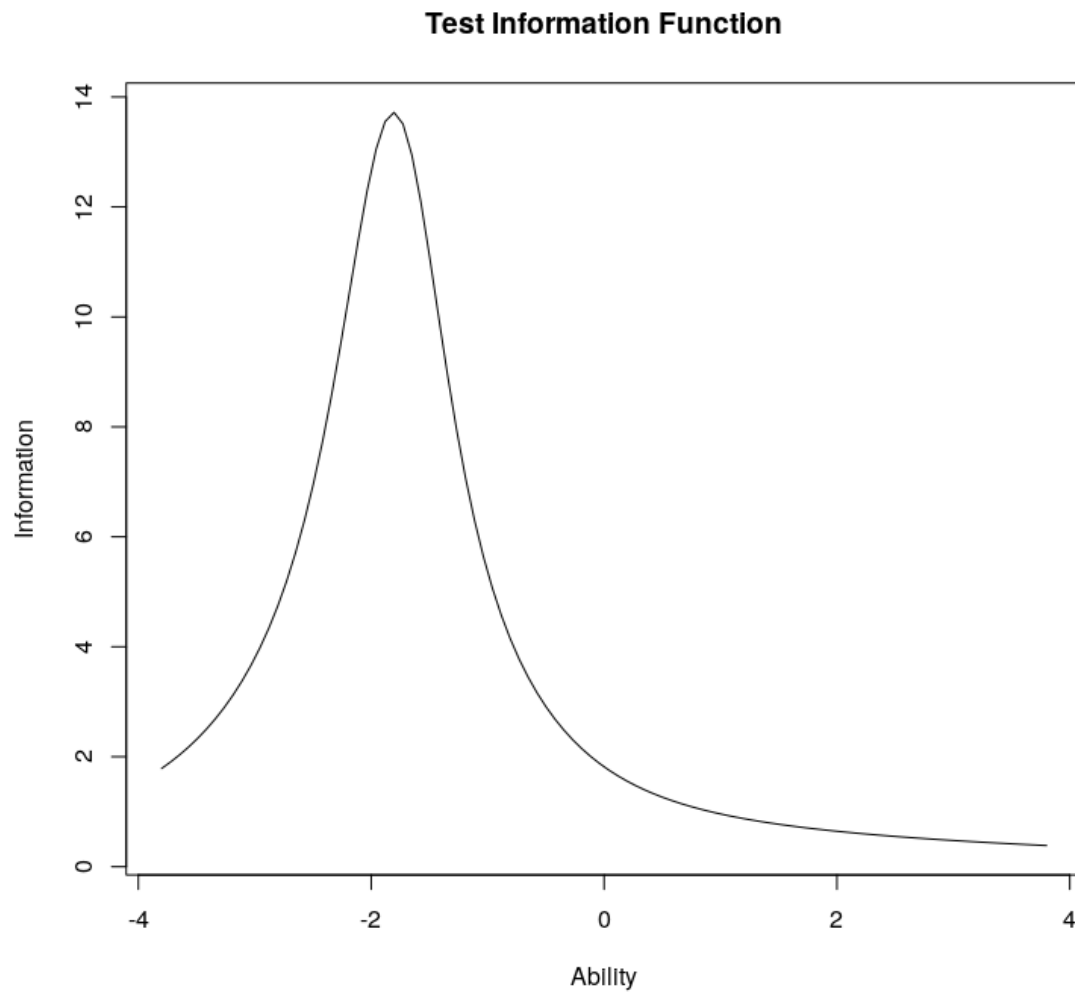
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Figure 1. Comparison between groups



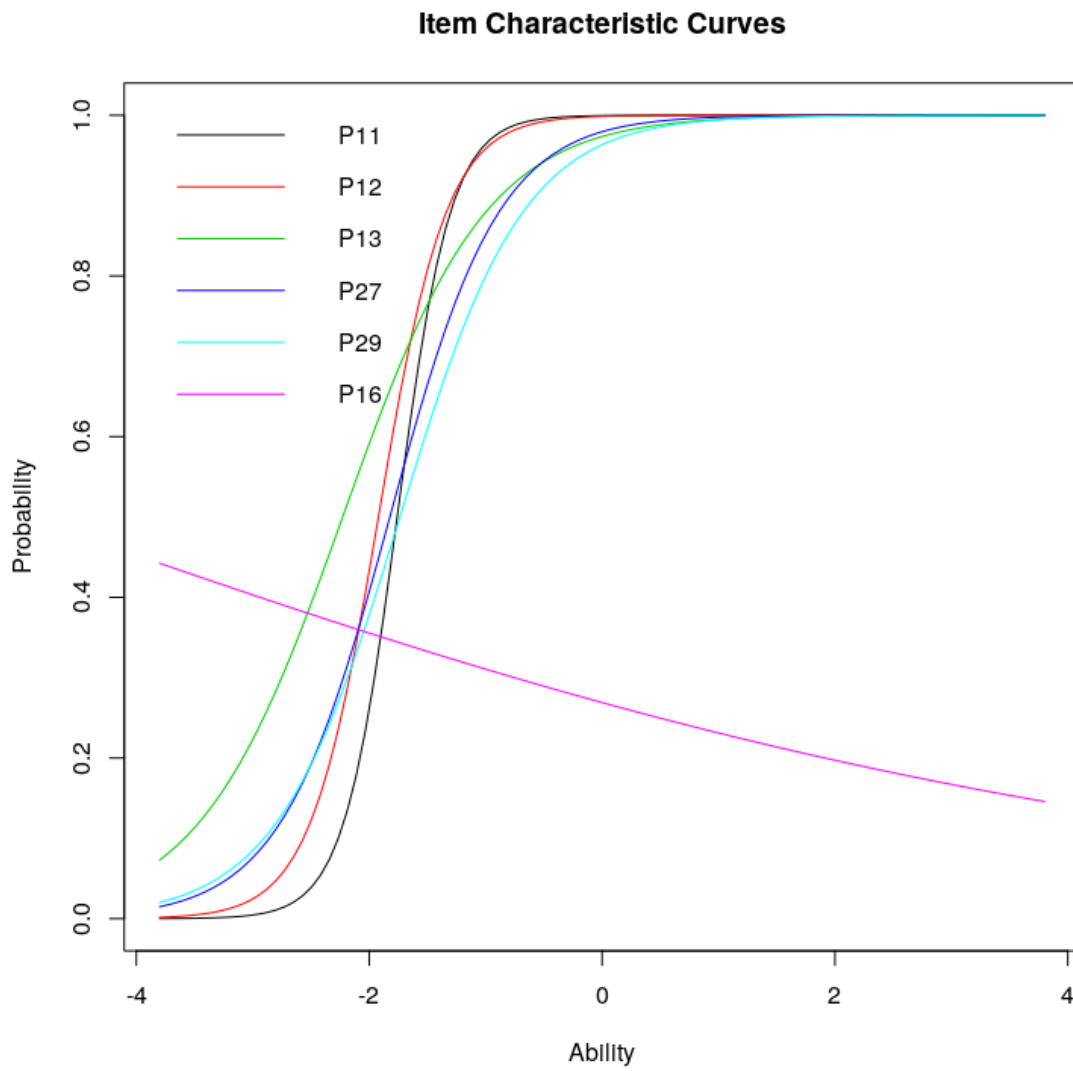
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Figure 2. Test Information at each level of ability



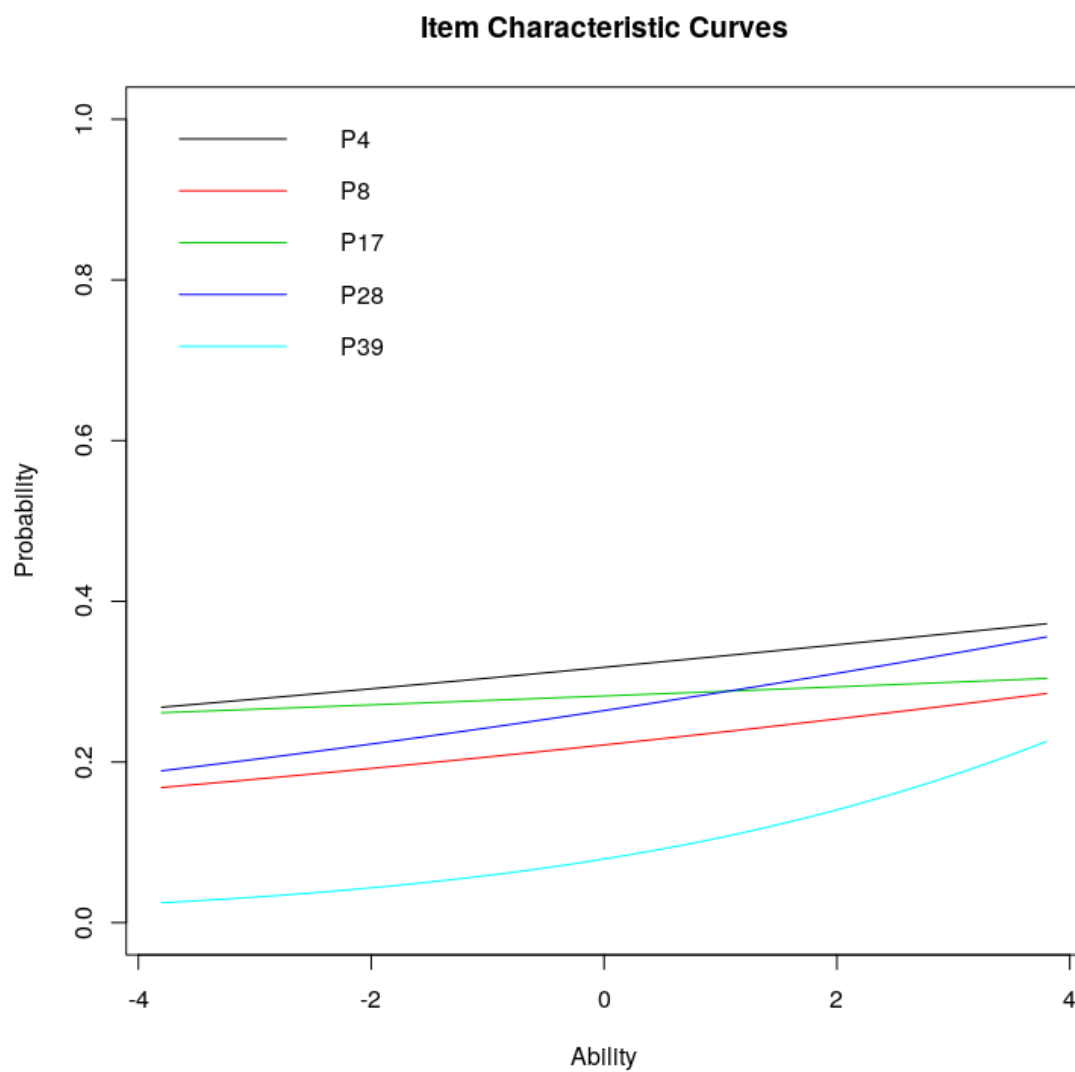
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Graphic 1. Item Characteristic Curves 1



Determinants and knowledge about pain among Spanish nurses

Graphic 2. Item Characteristic Curves 2



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