Level of training in autistic spectrum disorders among hospital paediatricians

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Abstract

Background: Training in autistic spectrum disorders is crucial in order to achieve an early diagnosis. However, the number of papers describing this training is limited. This study describes the level of knowledge among paediatricians from tertiary care hospitals in different regions of Spain and detects areas that need improvement.

Material and method: A total of one hundred and fifty-seven (157) paediatricians working in tertiary healthcare hospitals located in three different regions in Spain consented to complete an online questionnaire divided in three sections (socio-demographic, knowledge about childhood autism, and opinion). Data were analysed using SPSS version 15.

Results: The total mean score of participating paediatricians in the questionnaire was 20.34 (±2.43 SD) out of a total possible score of 23. Approximately two-thirds (65%) of paediatricians scored more or equal to the mean score. The knowledge gap was found to be higher with symptoms of repetitive behaviour patterns, concept of autism, and comorbidity, with no statistical significance. There were no differences in paediatrician scores within different socio-demographic groups. Just under two-thirds (64%) of paediatricians subscribed to the opinion that their own knowledge about autism is limited, and there is a significant lack of knowledge about facilities in every region.

Conclusions: There is a sufficient level of knowledge about autism among paediatricians in tertiary healthcare, although a lack of awareness about the management of these patients, with poor coordination between the different specialists that are involved in their treatment.
Introduction

Autism spectrum disorders (ASDs) are biologically-based disorders characterised by abnormalities in two domains: social communication/interaction and the presence of stereotypic and repetitive patterns of interest and behaviour.\textsuperscript{1,3} They are usually diagnosed during childhood, so it is essential that paediatricians be knowledgeable of them.\textsuperscript{2,3}

In recent years, the concepts of autism and Asperger syndrome have been evolving towards what is currently considered a continuous clinical spectrum.\textsuperscript{1,4,5} These disorders are difficult to delimit into specific categories, which is consistent with emerging genetic models of ASD that propose the presence of polygenic interactions, polymorphisms, copy number variants and regulation by epigenetic factors. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM V) published in May 2013 consolidated the term ASD; it replaced the DSM IV category of pervasive developmental disorders, excludes Rhett syndrome (which is currently considered a specific genetic disorder that happens to have a few overlapping symptoms) and does not differentiate between childhood disintegrative disorder and pervasive developmental disorder not otherwise specified (they are all comprehended in the term ASD).\textsuperscript{1,4,5}

The diagnosis of ASD is essentially clinical and based on the presence of persistent deficits in social communication and interaction and restrictive, repetitive and stereotypic patterns of behaviour, interest or activity, hyper/hyporreactivity to sensory input or unusual interest in sensory aspects of the environment.\textsuperscript{1,5} The symptoms must be present since early childhood, although they may be undetected until social demands exceed the restricted capabilities of the child. In addition, the most novel aspect introduced by the DSM V is a dimensional measure of severity based on levels of functioning that can be used to determine the position of the individual within the continuous spectrum.\textsuperscript{1,4,5}

The prevalence of this group of disorders has been increasing in recent years, and they are also frequently associated to other diseases and mental illnesses.\textsuperscript{2,6-9}

Although at present there is widespread awareness of the importance of early diagnosis\textsuperscript{2,3,7-9,11} and ASD is a frequent reason for seeking paediatric care both in primary care and hospital settings, paediatricians have different...
<table>
<thead>
<tr>
<th>Research team</th>
<th>Year published</th>
<th>Country</th>
<th>Population with autism spectrum disorders</th>
<th>No. of health professionals under study</th>
<th>Type of professionals studied</th>
<th>Salient findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zerbo et al.⁹</td>
<td>2015</td>
<td>USA</td>
<td>Adults</td>
<td>922</td>
<td>Physicians, psychologists, social workers, nurses</td>
<td>Adequate level of symptom recognition/lack of training and education</td>
</tr>
<tr>
<td>Bakare et al.¹²,¹³</td>
<td>2008, 2009</td>
<td>Nigeria</td>
<td>Children</td>
<td>134</td>
<td>Health care workers in tertiary care settings</td>
<td>Low-level knowledge of symptoms/greater training in psychiatrists</td>
</tr>
<tr>
<td>Garg et al.¹⁰</td>
<td>2014</td>
<td>Australia</td>
<td>Children</td>
<td>734</td>
<td>Family physicians</td>
<td>Variability in physicians’ self-perceived skills/age of doctor, personal interest in ASD and country of graduation are relevant factors</td>
</tr>
<tr>
<td>Golnik et al.⁷</td>
<td>2009</td>
<td>USA</td>
<td>Children</td>
<td>539</td>
<td>Family physicians and primary care paediatricians</td>
<td>Need for more training and improvement of primary care</td>
</tr>
<tr>
<td>Hartley-McAndrew et al.²</td>
<td>2014</td>
<td>USA</td>
<td>Children</td>
<td>280</td>
<td>Doctors, nurses, speech therapists, occupational therapists, physical therapists and teachers</td>
<td>Knowledge on symptoms and diagnosis below recommended level</td>
</tr>
<tr>
<td>Khanna and Jariwala⁸</td>
<td>2012</td>
<td>USA</td>
<td>Children</td>
<td>147</td>
<td>Pharmacists</td>
<td>Lack of general knowledge on autism/need for more thorough training</td>
</tr>
<tr>
<td>Rahbar et al.¹⁷</td>
<td>2011</td>
<td>Pakistan</td>
<td>Children</td>
<td>348</td>
<td>General practitioners</td>
<td>Lack of training on symptoms and diagnosis/better training in younger physicians</td>
</tr>
<tr>
<td>Igwe et al¹⁹</td>
<td>2011</td>
<td>Nigeria</td>
<td>Children</td>
<td>80</td>
<td>Paediatric and psychiatric nurses</td>
<td>Gaps in general knowledge about autism/lack of training</td>
</tr>
<tr>
<td>Imran et al.¹¹</td>
<td>2011</td>
<td>Pakistan</td>
<td>Children</td>
<td>240</td>
<td>Psychiatrists, paediatricians, neurologists, family physicians, psychologists, speech therapists</td>
<td>Better detection of ASD symptoms among non-medical providers/lack of training</td>
</tr>
<tr>
<td>Heidgerken et al.¹⁸</td>
<td>2005</td>
<td>USA</td>
<td>Children</td>
<td>111</td>
<td>Psychiatrists, speech therapists, psychologists, family physicians, paediatricians, neurologists</td>
<td>Adequate and accurate knowledge of DSM IV criteria</td>
</tr>
<tr>
<td>Bruder et al²⁰</td>
<td>2012</td>
<td>USA</td>
<td>Adults</td>
<td>346</td>
<td>Family physicians</td>
<td>Lack of training on autism in adults</td>
</tr>
<tr>
<td>Eseigbe et al.²¹</td>
<td>2015</td>
<td>Nigeria</td>
<td>Children</td>
<td>175</td>
<td>Paediatricians, psychiatrists, general practitioners</td>
<td>Adequate knowledge in paediatricians and psychiatrists in tertiary level hospitals/lack of training knowledge in general practitioners</td>
</tr>
</tbody>
</table>
levels of knowledge of ASD, and this can lead to feeling of helplessness in both health care providers and the families of patients that seek care after detecting warning signs.\textsuperscript{3, 7, 9, 10, 12-21} Furthermore, few studies have measured this knowledge among paediatricians in Spain (a few studies have been published in other countries, some of them even in the adult population, and assessing general knowledge about ASD in different health care settings\textsuperscript{7, 12}). Table 1 lists the studies published to date on the knowledge of ASD in different types of health care workers and different subsets of patients. Overall, these studies have reported an inadequate training on ASD, an incomplete knowledge of the possible diagnoses, and a lack of competence in the management of children with ASD in individual practitioners.\textsuperscript{2, 6, 10, 12, 17-21} To date, there are few published studies that focus solely on the training level of paediatricians, and as far as we know, none such study has been published in Spain.

For all of the above, the main objectives of this study were:

1. To determine the level of knowledge about ASD of hospital-based paediatricians in different regions of Spain (Autonomous Community of Valencia, Community of Madrid and Region of Murcia).

2. To determine how hospital-based paediatricians perceive their own knowledge of ASD.

3. To learn the opinion of hospital-based paediatricians regarding the availability of information on the diagnosis and management of these patients.

4. To determine the main changes needed in the educational curriculum to contribute to improving the knowledge of paediatricians and to the early detection of ASD in each region under study.

### Materials and methods

We made a brief questionnaire available to paediatricians (adjunct physicians and residents) working in various Spanish hospitals distributed through three autonomous communities: Autonomous Community of Valencia, Community of Madrid and Region of Murcia (Table 2).

The questionnaire was based on the study objectives, taking into account the DSM V diagnostic criteria for ASD and comparing our questions with items used in similar studies in the literature. As has been done in other studies,\textsuperscript{11} we structured the questionnaire into three parts (Appendix B1-3):

### Table 2 Sociodemographic variables of participating paediatricians.

<table>
<thead>
<tr>
<th>Sociodemographic variables</th>
<th>N (%) = 139 (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group (years)</strong></td>
<td></td>
</tr>
<tr>
<td>20–29</td>
<td>51 (36.6)</td>
</tr>
<tr>
<td>30–39</td>
<td>47 (33.8)</td>
</tr>
<tr>
<td>40–49</td>
<td>13 (9.3)</td>
</tr>
<tr>
<td>50 or more</td>
<td>28 (20.1)</td>
</tr>
<tr>
<td><strong>Sex M/F</strong></td>
<td>37 (26.6)/102 (73.3)</td>
</tr>
<tr>
<td><strong>Paediatric specialty</strong></td>
<td></td>
</tr>
<tr>
<td>Paediatrics resident</td>
<td>55 (39.5)</td>
</tr>
<tr>
<td>General Paediatrics Adjunct physician</td>
<td>27 (19.4)</td>
</tr>
<tr>
<td>Paediatric Neurology Adjunct physician</td>
<td>10 (7.2)</td>
</tr>
<tr>
<td>Adjunct physician in a different paediatric specialty</td>
<td>47 (33.8)</td>
</tr>
<tr>
<td><strong>Years of experience in Paediatrics</strong></td>
<td></td>
</tr>
<tr>
<td>1–5 years</td>
<td>70 (50.3)</td>
</tr>
<tr>
<td>6–10 years</td>
<td>20 (14.3)</td>
</tr>
<tr>
<td>11–15 years</td>
<td>17 (12.2)</td>
</tr>
<tr>
<td>16–19 years</td>
<td>4 (2.8)</td>
</tr>
<tr>
<td>20 years or more</td>
<td>28 (20.2)</td>
</tr>
<tr>
<td>Previous work experience with ASD patients</td>
<td>Yes, 59 (42)/no, 80 (58)</td>
</tr>
<tr>
<td><strong>Hospital employing respondent</strong></td>
<td></td>
</tr>
<tr>
<td>Hospital Clínico Universitario Virgen de la Arrixaca (Murcia, general hospital)</td>
<td>59 (42)</td>
</tr>
<tr>
<td>Hospital Universitario de Móstoles (Madrid, secondary care level)</td>
<td>31 (22.3)</td>
</tr>
<tr>
<td>Hospital General Universitario Santa Lucía (Cartagena, Murcia, secondary care level)</td>
<td>6 (4.3)</td>
</tr>
<tr>
<td>Hospital Rafael Méndez ( Lorca, Murcia, secondary care)</td>
<td>2 (1.43)</td>
</tr>
<tr>
<td>Hospital Nisa 9 de Octubre (Valencia, secondary care level)</td>
<td>1 (0.71)</td>
</tr>
<tr>
<td>Hospital Universitario Infanta Leonor (Vallecas, Madrid, secondary care level)</td>
<td>17 (12.2)</td>
</tr>
<tr>
<td>Hospital General Universitario de Elche (Alicante, secondary care level)</td>
<td>10 (7.19)</td>
</tr>
<tr>
<td>Hospital Universitario de Torrevieja (Alicante, secondary care level)</td>
<td>7 (5.03)</td>
</tr>
<tr>
<td>Hospital Universitario del Vinalopó (Alicante, secondary care level)</td>
<td>2 (1.43)</td>
</tr>
<tr>
<td>Hospital General Universitario de Alicante (general hospital)</td>
<td>1 (0.71)</td>
</tr>
<tr>
<td>Hospital Público de Sagunto (secondary care level)</td>
<td>3 (2.15)</td>
</tr>
</tbody>
</table>
Knowledge of ASD

1. Sociodemographic (SDASD questionnaire): includes demographic data of participating paediatricians, including sex, age, paediatric specialty, years of professional experience, prior experience with ASD patients, and hospital in which they worked.

2. Knowledge about ASD (KASD questionnaire): further divided into four domains with questions assessing the general knowledge of health care workers about ASD.

3. Opinion on the currently available care for patients with ASD (OASD questionnaire): questions to explore the opinion of health care workers regarding the availability of information on the diagnosis and management of these patients, as well as the training of specialists, in their particular geographical regions.

We administered the questionnaire using Google Forms, which allowed paediatricians to complete them online and submit them directly to the author. We sent the link to the online questionnaire to all professionals that agreed to participate, emphasising that they did not need to consult any educational materials before completing it.

We analysed the data using the Google Forms tools and SPSS version 15. We calculated the mean, median and mode for the total sample for the items in the KASD questionnaires, and compared sociodemographic data by means of ANOVA to assess the association between the knowledge of ASD and the different sociodemographic variables. We also calculated the absolute frequency and percentage of the different opinions assessed in the OASD questionnaire.

Results

A total of 139 paediatricians completed the questionnaire and were included in the study. Seventy-three percent were female, and the highest proportion corresponded to the 20- to 29 years age group, followed closely by the 30- to 39 years group. Consequently, most of the paediatricians (39%) were Paediatrics residents-in-training (MIR). We ought to highlight that 58% of the surveyed paediatricians reported having no past experience with patients with ASD. Table 2 summarises the rest of the sociodemographic variables.

Questionnaire on the knowledge of autism spectrum disorders: description of the survey results

- Domain 1 (knowledge about deficits in social interaction and communication): our results showed adequate knowledge, with paediatricians answering a mean of 92% of questions correctly. The areas with the most errors had to do with the difficulty engaging in joint pretend play (22 incorrect answers) and the belief that all patients with ASD will have language impairments (9 incorrect answers).
- Domain 2 (restrictive or repetitive patterns of behaviour): the percentage of correct answers was lower in this domain (mean, 86%). The aspects paediatricians were most knowledgeable of were the presence of stereotypic movements or the repetitive use of objects/language (94% answered correctly) and the presence of very restricted interests (91% answered correctly). However, the percentage that answered correctly declined to 81%, 82% and 85%, respectively, when it came to the aversive responses to specific sounds or textures (25 answered incorrectly), hyper/hyporeactivity to sensory inputs (24 answered incorrectly) or inflexible adherence to routines (19 answered incorrectly).
- Domain 3 (other features that inform the diagnosis): 19% of paediatricians answered incorrectly when asked about the onset of symptoms in patients with ASD.
- Domain 4 (which examined finer details of the definition of ASD and the presence of comorbidities): the domain in which paediatricians had the largest percentage of incorrect answers corresponded to questions regarding comorbidities (potential association or lack thereof with intellectual disability or epilepsy), as well as the concept of neurodevelopmental disorder (44% of paediatricians did not define ASD as such). However, a high percentage answered correctly (95%-98%) when it came to differentiating autism from schizophrenia and regarding the importance of early diagnosis of patients with ASD and it being essentially a clinical diagnosis.

Features of the distribution of the scores obtained in the questionnaire on autism spectrum disorders

The highest possible score of the KASD was 23 (9, 5, 2 and 7 for each domain, respectively) and the lowest possible score was 0.

The mean ± standard deviation of the scores obtained by participating paediatricians was 20.34 ± 2.43, the median was 21 and the mode 23. Table 3 shows the mean scores obtained in each of the domains.

Correlation between knowledge of autism spectrum disorders and sociodemographic characteristics of paediatricians (Table 4)

We did not find significant differences in the mean score of the KASD based on any of the sociodemographic variables under study. We found the highest difference between the scores of Paediatric Neurology adjacent physicians (21.2 ± 2.17) and those of residents in Paediatrics (19.70 ± 6.28), but it was not statistically significant (P= .20) (Table 4).

Questionnaire on the opinion regarding the care currently available for patients with ASD: description of the survey results

Below, Table 5 summarises the answers given by paediatricians regarding their perception of their own knowledge of ASD and the resources available in their regions.

As the table shows, 64% of paediatricians believed their own knowledge of ASD was limited, and that they did not have sufficient information or resources to diagnose ASD early. Nearly all paediatricians stated that there should be more training on ASD during the residency period or in subsequent years, and when it came to how it should be delivered, the preferred options were: rotations in Paediatric Neurology/Psychiatry, rotations in early intervention centres, and
the availability of protocols for ASD screening and the management of these patients.

We ought to highlight the lack of knowledge regarding the available resources, as 48% of paediatricians did not know whether there was a specific protocol for referral and follow-up in their region, and 36% reported not knowing whether adequate multidisciplinary care was available for these patients (25% of respondents answered that they believed that it was not available).

As for the two questions regarding the resources available in each region, Table 5 shows the distribution of the answers by autonomous community. The most salient finding was that Murcia was the autonomous community in which the highest percentage of paediatricians reported that such treatment was available (45%), although a similar percentage (40%) answered that they did not know. In the Autonomous Community of Valencia, 45% of respondents answered that multidisciplinary treatment was not

### Table 3  Mean score by domain.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Knowledge area</th>
<th>Total possible score</th>
<th>Score mean ± SD</th>
<th>N (%) of paediatricians that scored at or above the mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1</td>
<td>Deficits in social interaction and communication</td>
<td>9</td>
<td>8.23 ± 1.03</td>
<td>110 (80)</td>
</tr>
<tr>
<td>Domain 2</td>
<td>Restrictive or repetitive patterns of behaviour</td>
<td>5</td>
<td>4.36 ± 0.93</td>
<td>112 (80)</td>
</tr>
<tr>
<td>Domain 3</td>
<td>Other features used in diagnosis</td>
<td>2</td>
<td>1.71 ± 0.52</td>
<td>103 (74)</td>
</tr>
<tr>
<td>Domain 4</td>
<td>Definition of ASD, comorbidities</td>
<td>7</td>
<td>6 ± 1.12</td>
<td>104 (74)</td>
</tr>
<tr>
<td>Full questionnaire</td>
<td></td>
<td>23</td>
<td>20.34 ± 2.43</td>
<td>91 (65)</td>
</tr>
</tbody>
</table>

### Table 4  Correlation between scores and sociodemographic variables.

<table>
<thead>
<tr>
<th>Sociodemographic variables</th>
<th>Mean KASD score</th>
<th>ANOVA (one-way)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–29 years</td>
<td>19.5 ± 7.0</td>
<td>F-ratio: 1.55; df, 3</td>
</tr>
<tr>
<td>30–39 years</td>
<td>20.65 ± 4.62</td>
<td>P = .20</td>
</tr>
<tr>
<td>40–49 years</td>
<td>20.23 ± 4.52</td>
<td></td>
</tr>
<tr>
<td>50 years or more</td>
<td>20.25 ± 7.75</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>20.15 ± 5.77</td>
<td>F-ratio: 0.01; df, 1</td>
</tr>
<tr>
<td>Male</td>
<td>20.22 ± 7.37</td>
<td>P = .89</td>
</tr>
<tr>
<td><strong>Speciality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paediatrics resident</td>
<td>19.70 ± 6.28</td>
<td>F-ratio: 1.55; df, 3</td>
</tr>
<tr>
<td>Adjunct in general paediatrics</td>
<td>20.62 ± 6.31</td>
<td>P = .20</td>
</tr>
<tr>
<td>Adjunct in paediatric neurology</td>
<td>21.2 ± 2.17</td>
<td></td>
</tr>
<tr>
<td>Adjunct in a different paediatric specialty</td>
<td>20.23 ± 6.44</td>
<td></td>
</tr>
<tr>
<td><strong>Years of experience in paediatrics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–5</td>
<td>19.89 ± 6.38</td>
<td>F-ratio: 1.20; df, 4</td>
</tr>
<tr>
<td>6–10</td>
<td>21.25 ± 2.30</td>
<td>P = .31</td>
</tr>
<tr>
<td>11–15</td>
<td>20.00 ± 7.25</td>
<td></td>
</tr>
<tr>
<td>16–19</td>
<td>20.50 ± 5.66</td>
<td></td>
</tr>
<tr>
<td>20 or more</td>
<td>20.14 ± 7.46</td>
<td></td>
</tr>
<tr>
<td><strong>Previous professional experience with ASD patients</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20.25 ± 6.33</td>
<td>F-ratio: 0.11; df, 1</td>
</tr>
<tr>
<td>No</td>
<td>20.11 ± 6.07</td>
<td>P = .73</td>
</tr>
<tr>
<td><strong>Autonomous community</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomous Community of Valencia</td>
<td>19.86 ± 5.75</td>
<td>F-ratio: 1.27; df, 2</td>
</tr>
<tr>
<td>Region of Murcia</td>
<td>19.89 ± 5.98</td>
<td>P = .28</td>
</tr>
<tr>
<td>Community of Madrid</td>
<td>20.58 ± 6.50</td>
<td></td>
</tr>
</tbody>
</table>
available, and this percentage was very similar in Madrid (33%, 31% and 35%, respectively, answered that it was available, was not available, or did not know).

When it came to whether there was a protocol for the referral and followup of patients with ASD in their region, the percentage of paediatricians responding that there was one was highest in the autonomous community of Valencia (50%), while Murcia was the autonomous community where the highest percentage of paediatricians did not know whether there was one (61%), followed by Madrid.

### Conclusions

The mean score in the KASD questionnaire of participating paediatricians was $20.34 \pm 2.43$, while the maximum possible score was 23. Thus, this was a high score that indicated an adequate knowledge of paediatricians about ASD (a total of 91 paediatricians [65%] had a score at or above the mean in every domain).

Although the studies published to date have not focused on the field of paediatrics and have been conducted in other countries, we ought to highlight that the level of knowledge found in our study exceeded those reported in similar works.12,13

We found that the main problem areas involved the concept of restrictive or repetitive patterns of behaviour (fewer paediatricians knew about the aversive responses to certain sounds or textures, hyper/hyporreactivity to sensory inputs or inflexible adherence to routines) and in the definition of ASD and the presence of comorbidities, the latter being the question which paediatricians most frequently answered incorrectly. We also ought to highlight that 19% of paediatricians answered the question regarding the onset of symptoms in patients with ASD incorrectly, a particularly relevant aspect given the importance of early diagnosis in these patients.

We did not find noteworthy or statistically significant differences in questionnaire scores between subsets of paediatricians (by age, sex, work title, years of experience etc.), unlike what has been described in other studies.12,13 We found the greatest difference between the scores of paediatricians working as adjunct physicians in Paediatric Neurology and those of Paediatrics residents, with the former scoring higher, as would be expected, but it was not statistically significant. When it came to the number of years of experience in the field of Paediatrics, the group with six to ten years of experience scored highest, which could be explained by, on one hand, the short time elapsed since the MIR residency training period and, on the other, the years of experience as an adjunct in Paediatrics.

Despite the good results observed in the questionnaire scores, paediatricians generally reported believing that training in ASD was lacking, which is consistent with previous studies on the subject. Sixty-four percent of paediatricians stated that their own knowledge of ASD was limited and that they did not have sufficient training or resources for the early diagnosis of ASD.7,10,12-16 Most considered that education on ASD should be expanded during residency or in subsequent years. Another important finding was that there was a considerable lack of knowledge as to the available resources in the different regions under study, which probably contributes to the feelings of insecurity and lack of control in the management of these patients. We found this lack of knowledge in every autonomous community under study, and the prevailing response of paediatricians as to whether there was a protocol for the referral or the specialised management of patients with ASD was either that there was none, or that they did not know.

According to the data presented above, paediatricians have an adequate general knowledge of ASD, but there are

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Number and percentages of the different answers of paediatricians regarding their perception of their own knowledge of ASD and the resources available in their region.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not know</td>
<td>Yes</td>
</tr>
<tr>
<td>Is adequate multidisciplinary management of the social and health care needs of patients with ASD available in your region?</td>
<td>49 (36.3%)</td>
</tr>
<tr>
<td>Autonomous Community of Valencia</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>Region of Murcia</td>
<td>24 (40%)</td>
</tr>
<tr>
<td>Community of Madrid</td>
<td>19 (35%)</td>
</tr>
<tr>
<td>Do you think you have sufficient training or resources for the early diagnosis of ASD?</td>
<td>Deficient: 87 (64%)</td>
</tr>
<tr>
<td>How would you rate your knowledge and skills in the area of ASD?</td>
<td>Yes: 132 (97.8%)</td>
</tr>
<tr>
<td>Should there be more education on ASD during residency and training activities?</td>
<td>65 (48%)</td>
</tr>
<tr>
<td>Is there a specific protocol for the referral and followup of patients with ASD in the region where you work?</td>
<td>Autonomous Community of Valencia</td>
</tr>
<tr>
<td>Region of Murcia</td>
<td>36 (61%)</td>
</tr>
<tr>
<td>Community of Madrid</td>
<td>25 (46%)</td>
</tr>
</tbody>
</table>

The most frequent answer is displayed in bold face.
deficiencies in their knowledge about the management of these patients and in the coordination between the different multidisciplinary teams that participate in the care of these patients, which lead to incomplete and deficient care delivery in these patients. Thus, future efforts should focus on achieving adequate communication between these teams (paediatricians, educational institutions, administrations, early intervention) and in keeping the knowledge of ASD updated in order to develop a well-organised system to provide expeditious, efficient and—to the degree possible—convenient care for children with ASD and their families.

Conflict of interests

The authors have no conflict of interests to declare.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.anpede.2016.05.007.

References