



## Original Article

Validation of a Questionnaire in Spanish on Asthma Knowledge in Teachers<sup>☆</sup>

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## ABSTRACT

**Objective:** To evaluate the reliability and validity of the Spanish version of the Newcastle Asthma Knowledge Questionnaire (NAKQ) for determining asthma knowledge in teachers.

**Methods: Design and sample:** A cross-sectional observational study in educational centers of A Coruña providing preschool, primary school and/or compulsory secondary education. Centers were selected by random sampling, stratified by ownership and educational level (24 centers, 864 teachers). A total of 537 (62.1%) teachers responded (precision,  $\pm 4\%$ , confidence, 95%).

**Measurements:** Age, sex, academic training, teaching experience, personal/family history of asthma, NAKQ.

**Analysis:** Evaluation of internal consistency (Cronbach's alpha). Concurrent validity was determined by comparing scores of asthmatic teachers or with asthmatic relatives with teachers with no contact with asthma. Test-retest reliability was evaluated in 2 randomly selected centers by the kappa index, Bland-Altman method and intraclass correlation coefficient.

**Results:** Mean score on the NAKQ was  $15.7 \pm 5.3$  (median 17), correctly answering 50.6% of items.

Cronbach's alpha coefficient was 0.824 (95% CI: 0.802–0.845). NAKQ score was higher in asthmatic teachers or with close asthmatic relatives ( $17.7 \pm 3.3$ ) than in teachers with distant asthmatic relatives ( $16.1 \pm 5.4$ ) and teachers without close contact with asthma ( $15.1 \pm 5.6$ ;  $P < .001$ ).

In the test-retest analysis (kappa 0.33–1), there were no differences in NAKQ score between the first and second completion (mean difference,  $0.3 \pm 2.3$ ; intraclass correlation coefficient, 0.863).

**Conclusions:** Scores obtained with the Spanish version of the NAKQ in teachers of Spanish school centers are reliable and valid to measure their degree of asthma knowledge.

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## Validación de un cuestionario en castellano sobre conocimientos de asma en profesores

## RESUMEN

**Objetivo:** Evaluar la fiabilidad y la validez de la versión en castellano del cuestionario *NewCastle Asthma Knowledge Questionnaire* (NAKQ) para la determinación de conocimientos sobre asma en profesores.

**Métodos: Diseño y muestra:** estudio observacional, transversal, en centros educativos de A Coruña con segundo ciclo de educación infantil, primaria y/o secundaria obligatoria. Los centros se seleccionaron mediante muestreo aleatorizado, estratificado según titularidad y nivel educativo (24 centros, 864 profesores). Contestaron 537 (62,1%) docentes (precisión,  $\pm 4\%$ , seguridad, 95%).

**Mediciones:** Edad, sexo, formación académica, experiencia docente, antecedentes personales/familiares de asma, cuestionario NAKQ.

## Palabras clave:

Asma

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**Análisis:** Evaluación de consistencia interna (alfa de Cronbach). La validez concurrente se determinó comparando la puntuación en docentes asmáticos o con familiares asmáticos y docentes sin contacto con el asma. Se evaluó la fiabilidad test-retest en 2 centros seleccionados aleatoriamente, mediante índice Kappa, metodología de Bland–Altman y el coeficiente de correlación intraclase.

**Resultados:** La puntuación media del cuestionario NAKQ fue  $15,7 \pm 5,3$  (mediana 17), contestando correctamente el 50,6% de ítems.

El coeficiente alfa de Cronbach fue 0,824 (IC 95%: 0,802–0,845). La puntuación NAKQ fue mayor en asmáticos o con familiares próximos asmáticos ( $17,7 \pm 3,3$ ) que en docentes con familiares lejanos asmáticos ( $16,1 \pm 5,4$ ) y docentes sin contacto próximo con el asma ( $15,1 \pm 5,6$ ;  $P < 0,001$ ).

En el análisis test-retest (Kappa 0,33 a 1) no hubo diferencias entre la puntuación NAKQ en la primera y la segunda cumplimentación (diferencia media,  $0,3 \pm 2,3$ ; coeficiente de correlación intraclase, 0,863).

**Conclusiones:** Las puntuaciones obtenidas con la versión española del NAKQ en profesores de centros escolares españoles son fiables y válidas para medir su grado de conocimiento de asma.

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## Introduction

Asthma is the most common chronic childhood disease in developed countries.<sup>1</sup> In Spain, between 7.1% and 18.8% of children present the most typical characteristics of the disease.<sup>2,3</sup> Most treatment-compliant patients are well-controlled, thanks to diagnostic and therapeutic advances, but good control is not achieved in up to 70% of childhood sufferers.<sup>4</sup>

Expert consensus papers agree that treatment education must form part of disease management, and emphasize it as an essential component for improving a patient's condition. Knowledge of the different aspects of the disease is a determinant factor in patient progress. For children and adolescents, this education must extend to family members, teachers and any adult responsible for the care or supervision of a young asthma patient.<sup>5–8</sup>

Teachers' knowledge of asthma must be assessed in order to determine the need for educational activities, and to design their content and evaluate their efficacy. Children and adolescents spend long hours at school, under the supervision of their teachers. Thus, it is of interest to evaluate the knowledge of asthma among these professionals, to determine if training and/or informative sessions are required and what the content should be.<sup>9</sup>

Epidemiological studies in asthma knowledge can only be performed using a tool that is reliable and feasible from both an organizational and an economic point of view. Self-administered questionnaires, that are easy and inexpensive to complete, are useful, but they must be validated in a typical study population.

Before this study, only 3 papers evaluating teachers' knowledge of asthma had been published. All 3 used self-administered questionnaires, but no data about validation techniques were provided.<sup>10–12</sup> To date, no data on the validation of any questionnaire in Spanish on the knowledge of teachers in this area have been published.

The Newcastle Asthma Knowledge Questionnaire (NAKQ) for the evaluation of asthma knowledge was created and validated in English in 1990.<sup>13</sup> It was subsequently used in the original language<sup>14–18</sup> and in Spanish<sup>19</sup> in different populations (primarily parents,<sup>13,15</sup> educators,<sup>14</sup> students<sup>14,18,19</sup> and healthcare personnel<sup>17</sup>). In 2008, Praena Crespo et al.<sup>20</sup> made a transcultural adaptation of the questionnaire to Spanish, and analyzed its validity and reliability in a population of parents of asthma patients. Hence, the NAKQ questionnaire has been widely used, and 2 studies have been published confirming its reliability and validity: the original in English<sup>13</sup> and the Spanish adaptation,<sup>20</sup> both performed in parents of asthmatics. However, reliability and validity are not intrinsic properties of questionnaires; their value depends more on their use in specific populations,<sup>21</sup> so they must be verified in each study population.

The aim of our study was to determine the reliability of scores from the Spanish version of the NAKQ in a population of teachers,

and its validity for quantifying knowledge of asthma among teachers in Spanish schools.

## Materials and Methods

This was an observational, cross-sectional, descriptive study using a self-administered questionnaire on asthma knowledge completed by teachers in the region of A Coruña (Spain) between June and April 2009. This region comprises 9 municipal areas (Abegondo, Arteixo, Bergondo, Cambre, Carral, A Coruña, Culleredo, Oleiros and Sada) and covers an area of 470.7 km<sup>2</sup> with 384 616 inhabitants.

Two-stage cluster sampling was performed. Participating schools were selected by proportional, stratified, randomized sampling, according to whether they were public or private and their educational level (public primary schools, public secondary schools or private centers). In each school, all teachers actively imparting any type of classes in the 2008–2009 school year, at any level of preschool, primary or compulsory secondary education were included. Teachers working exclusively in post-compulsory secondary education were not included.

In the 2008–2009 school year, 4089 teachers were actively employed in the area in 96 schools (46 public primary schools, 25 public secondary schools and 25 private schools) (data from the Education Department of the Regional Administration of Galicia). It was estimated that 873 teachers would need to be included (precision,  $\pm 4\%$ ; confidence, 95%), and a response rate of 60% was expected. On the basis of the mean number of teachers, 22 schools were included, stratified by public/private status and educational level (10 public primary schools, 6 public secondary schools and 6 private schools). A reserve list of randomly selected schools was generated in case any of the initially selected schools refused to participate.

The study was performed with the approval of the Clinical Research Ethics Committee of Galicia (approval number 2009/016) and the Education Department of the Regional Administration of Galicia, which sent a letter to the selected schools informing them of the study objectives. The board of each school was then contacted, the project was explained, and they were invited to participate.

Each teacher received a letter informing them of the study objectives and requesting their consent to participate. Pursuant to the Data Protection Act 15/1999, data confidentiality was guaranteed at all times.

The NAKQ<sup>20</sup> was used to determine teachers' knowledge of asthma. This questionnaire consists of 31 items: 25 are true/false questions and 6 have open answers. Correct responses score 1 and incorrect 0. Open answers were interpreted in the same way as the original version,<sup>13</sup> as adapted by Praena Crespo et al.<sup>20</sup> Total score is obtained by adding the score of the 31 items:

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