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# Construction and validation of the CAPA questionnaire of Nutritional Knowledge among Adolescents diagnosed with Feeding and Eating disorders

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## ABSTRACT

**Introduction.** Feeding and eating disorders represent a serious problem especially in young population. Nutritional education is essential in its treatment and prevention.

Among the actions developed in Spain the NAOS strategy highlights, which frames the *Perseo* educational program for schoolchildren. However, there are few tools to evaluate the knowledge after these programs are implemented. The aim of the study was to create and to validate a questionnaire that allows the evaluation of the acquired knowledge on young population diagnosed of eating disorders after participating on *Perseo* program.

**Methodology.** The on-line modified e-Delphi technique was applied, 26 mental health and nutrition experts took part, evaluating the consensus level on adequacy and relevance through a 4-points Likert scale and a field for comments. Basic and supplementary criteria for the development of the technique were previously established.

**Results.** On the basis of the *Perseo* program and the adapted version of GNKQ for Portuguese teenagers, an initial version of the questionnaire was developed with 30 items and 4 possible answers. After three rounds 26 of the items reached the required consensus both in adequacy and relevance.

Eventually a new questionnaire of 26 items was obtained with a high degree of general agreement according to the experts.

**Conclusions.** The questionnaire has demonstrated a strong validity of content that allows to evaluate an educational intervention on nutrition based on the *Perseo* program, among young population with eating disorders.

**Key words.** Feeding and Eating Disorders, Questionnaire, Validation Studies, Delphi technique, Adolescent Nutrition.

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## CONSTRUCCIÓN Y VALIDACIÓN DEL CUESTIONARIO C.A.P.A. CONOCIMIENTOS EN ALIMENTACIÓN DE PERSONAS ADOLESCENTES DIAGNOSTICADAS DE TRASTORNOS ALIMENTARIOS

### RESUMEN

**Introducción.** Los trastornos de conducta alimentaria representan un grave, problema especialmente en población joven. La educación nutricional es fundamental en su tratamiento y prevención.

Entre las acciones desarrolladas, en España destaca la estrategia NAOS, que enmarca el programa educativo *Perseo* destinado a escolares. Sin embargo, existen escasos instrumentos que evalúen los conocimientos tras la realización de este tipo de acciones. El objetivo del estudio ha sido elaborar y validar un cuestionario que permita evaluar los conocimientos tras realizar el programa *Perseo* en población juvenil diagnosticada de trastornos alimentarios.

**Metodología.** Se implementó la técnica e-Delphi modificada online, en la que participaron 26 expertos de salud mental y nutrición. Evaluándose el grado de consenso en adecuación y relevancia a través de una escala Likert de cuatro puntos y un campo para comentarios. Los criterios básicos y suplementarios del desarrollo de la técnica se establecieron previamente.

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**Resultados.** Tomando como base el programa *Perseo* y el cuestionario General Nutrition Knowledge Questionnaire (GNKQ) en su versión adaptada a adolescentes portugueses, se desarrolló una versión inicial del cuestionario de 30 ítems y 4 posibles respuestas. Tras tres fases, 26 ítems alcanzaron el consenso requerido tanto en adecuación como en relevancia. Finalmente, se obtuvo un nuevo cuestionario compuesto por 26 ítems con un alto grado de consenso en opinión de los expertos.

**Conclusiones.** El cuestionario ha demostrado una sólida validez de contenido. Permitiendo evaluar una intervención educativa sobre nutrición, basada en el programa *Perseo*, en población juvenil con trastornos alimentarios.

**Palabras clave.** Trastornos alimentarios, Cuestionario, Estudios de validación, Técnica Delphi, Nutrición del adolescente.

## INTRODUCTION

Eating disorders (ED)<sup>1</sup> represent a major problem, particularly in developed countries. Estimations regarding incidence and prevalence of ED vary according to the pathology, the population being studied, the medium and the assessment instruments used. Studies performed in Spain show a prevalence between 4.1% and 6.41% among the population at the highest risk (women between 12 and 21 years old),<sup>2</sup> in line with the rest of Europe.<sup>3</sup>

These pathologies develop at an early age. The average age for diagnosis of Anorexia Nervosa (AN) and Bulimia Nervosa (BN) is 18 years old,<sup>4</sup> and it can cause a wide variety of complications and even death, by presenting significant medical and psychiatric comorbidity.<sup>5</sup> The mortality of persons diagnosed with ED is 4 to 14 times greater than among the general population.<sup>6</sup>

According to scientific evidence, treatment should consider the individual and environmental characteristics of the patient and family<sup>7</sup> that might vary by age, particularly for children and teenagers.<sup>8</sup> Generally, the therapy plan includes pharmacotherapy, nutritional rehabilitation and psychotherapy,<sup>9,10</sup> being fundamental the early intervention.

Regarding a child therapy approach, authors such as Arail et al. 2018,<sup>11</sup> mention nutritional education as a treatment mainstay and emphasise that preventive actions should be implemented to reduce incidence. In this respect, several experiences in Spain include educational programmes acting on factors that condition eating choices and attitudes towards nutrition.<sup>12</sup> Among these programmes, the NAOS<sup>13</sup> strategy (Nutrición actividad física y prevención de la obesidad/Nutrition, physical activity and obesity prevention) is

particularly noteworthy, which was developed by the Ministry of Healthcare and Consumption in 2005 and included the *Perseo* programme, intended for schoolchildren, covering healthy habits, food and physical exercise at school, all based on a series of structured activities.

However, despite the numerous educational interventions implemented, barely any instruments are available to assess their effectiveness. In Spain, authors such as Lima-Serrano et al. 2012<sup>14</sup> have designed and validated two scales to measure knowledge and attitudes regarding food among teenagers. In the same respect, internationally, different questionnaires have been developed such as the adaptation and validation for the adolescent Portuguese population<sup>15</sup> of the English-language questionnaire General Nutrition Knowledge Questionnaire (GNKQ).<sup>16</sup>

These tools are useful to measure knowledge levels regarding healthy eating among the general population, but they are limited in terms of measuring the possible impact of a specific programme among the adolescent population diagnosed with ED.

Consequently, it is necessary to construct and validate a new questionnaire aimed at this population and age range that makes it easier to evaluate these educational interventions.

This paper is part of a study that aims to measure how effectively the *Perseo* programme adapts to new technologies, as a teaching tool among the infant/teenage population (12-18 years old) diagnosed with ED.

## METHODOLOGY

### Aim

Construct and validate the content of a questionnaire to assess the knowledge acquired after completing the *Perseo* educational programme with adolescents (12-18 years old) diagnosed with ED.

### Design

It took place in two phases. The first phase involved drafting a questionnaire based on the content of the *Perseo* programme. The questionnaire content was validated in the second phase, by applying the Delphi technique.

#### *Phase 1: Drafting the questionnaire*

Initially a semi-structured questionnaire was designed which the participants had to answer in the first round of the validation process. This option was preferred over start-

ing the process with an open question, as it would make data collection easier, faster and more efficient.<sup>17</sup>

To create the questionnaire, the GNKQ<sup>16</sup> was taken as the initial model, as it was widely used by the scientific community, choosing the version that was adapted for and validated by Portuguese adolescents,<sup>15</sup> once authorised by its authors. It was chosen due to the socio/cultural similarities of eating habits between the Portuguese and Spanish population and focussed on a similar age range.

Considering that the educational programme to be assessed was *Perseo*, used with adolescents with ED, items were selected from the Portuguese version of the GNKQ<sup>15</sup> that were consistent with the programme content, choosing 5 items.

Following the same question structure, the research team drafted the remaining items, so that the initial questionnaire was made up of 30 items with 4 multiple choice options. The questionnaire was called CAPA (Conocimientos Alimentación Personas Adolescentes/Nutritional Knowledge among Adolescents). When formulating the questions, special care was taken to ensure that the proposed items would not encourage inappropriate eating behaviour, given the population that would be sent this questionnaire.

### *Phase 2: Content validation.*

Content was validated using the Delphi technique,<sup>18</sup> with a group of 26 experts. The online modified e-Delphi was chosen due to its agility, security, efficiency and reliability.<sup>19</sup>

SurveyMonkey® was used as the online survey administration program and to develop the technique, its dimensional structure and ensure rigour and homogeneity in decision-making throughout the process, the funnel model from Falzarano 2013<sup>20</sup> was used.

### **Participants:**

Having reviewed the bibliography on the Delphi technique, no determining recommendation was found concerning the size of the group of experts, although most authors believe the decision should be based on the study type and available resources.<sup>21</sup> In this respect, authors such as Hsu 2007<sup>22</sup> recommend that, if the group is uniform and the topic to be studied is specific, between 10-15 participants might be sufficient. In this case, predicting possible withdrawals and given that the participants were going to provide a dual opinion on each item (adequacy and relevance), it was considered that the initial group should contain between 20 and 25 experts.

According to the model proposed by Falzarano 2013,<sup>20</sup> clear inclusion criteria must be used to ensure that the technique is developed correctly, this extreme is corroborated by different authors<sup>23</sup> who identify it as essential to the process.

For this reason, the following inclusion criteria were adopted, according to recommendations from literature in the field of the healthcare professions, that suggests not only acceptance to take part, but also at least three years of experience in the study field.<sup>24</sup> Furthermore, due to the questionnaire theme, it was decided to include participants from both the fields of nutrition and mental health.

The participants met at least two of the three following characteristics:

- a) University graduate in the field of mental health or nutrition.
- b) At least 3 years of clinical or teaching experience in the study area. (Experience in treatment of ED patients at a young age or in nutrition)
- c) Written and published research papers in the field of mental health or nutrition.

Intentional non probabilistic sampling was used, using email to contact candidates in the research team's contact network who were known to meet the inclusion criteria. In addition, they were encouraged to identify other potential experts among their colleagues. This recruitment technique, known as snowball sampling, helps to reduce identification bias if sampling is done exclusively by the research team.<sup>25</sup>

Following these premises, 19 potential participants were invited to take part, and the purpose of the study was explained to them. After applying the snowball sampling technique, 29 people confirmed that they were willing to participate; of these 29, 3 were excluded as they did not meet the inclusion criteria, making a final group size of 26 participants.

### **Data collection**

This was done in November 2017 and January 2018.

The participants that met the inclusion criteria were sent an email to inform them of the study proposals and aims, plus the instructions for each round. In addition, a URL link was provided that rerouted them to the initial version of the CAPA questionnaire. A similar email was sent in each successive round.

In each round, the experts were asked to apply two criteria to assess each item in the CAPA questionnaire:<sup>26</sup>

- 1) The degree of adequacy of the content of each item, understood to be the degree to which it adapted to the needs of the target population and whether the theoretical content of each statement and response options were correct.
- 2) The degree of relevance of each item, assessing whether the statement and answers were sufficiently important for the population it was targeting.<sup>26</sup>

Both criteria were evaluated using a Likert scale that had four possible assessment options: 1 "inadequate/irrelevant" 2 "quite inadequate/quite irrelevant" 3 "sufficiently adequate/sufficiently relevant" and 4 "highly adequate/highly relevant"

Furthermore, a field was provided for comments in each item where the experts could freely make suggestions on the statement and the response options. After the first round, an option was provided to include new items, to be assessed in subsequent rounds.-

Following recommendations from the literature, a deadline of two weeks was set to answer each round,<sup>24</sup> reminders were sent in the last week and the day before the deadline<sup>27</sup> and it took no longer than 30 minutes<sup>28</sup> to complete the questionnaire.

Concerning the number of rounds, evidence shows that too many raises a risk that experts might withdraw from the study due to fatigue, distraction or disappointment with the process,<sup>29</sup> recommending that the number should be limited to 2-3<sup>30</sup> for studies with similar characteristics.

Furthermore, they indicate that in this type of technique, from the third round onwards, it is unlikely that the experts will change their opinion.<sup>23</sup> On the other hand, it should be considered that the number of rounds will also depend on whether it begins with an open question or with a list of closed questions.<sup>23</sup>

Due to the above, as this is a semi-structured questionnaire and despite the possibility of including suggestions in each item, three rounds are considered sufficient.

### Ethical considerations

This study has been approved by the Government of Navarre Clinical Research Ethics Committee, CEIC, (Resolution pyto 2015/63) according to the principles of the

Helsinki declaration, plus authorisation from the centres which are involved.

If the invited participants met the inclusion criteria and they decided to participate, an invitation was sent by email which they had to answer, accepting to take part. The informed consent was sent out in the first round. It had to be accepted to access the questionnaire.

Particular attention was paid to making the study participants anonymous<sup>31</sup> so that the experts did not know the identity of the other participants and the research team only knew the overall outcome of the answers and not each answer individually, using the available SurveyMonkey® program tool for this purpose which ensured that it was only possible to find out who had not answered the survey.

### Data analysis

The qualitative and quantitative data was processed following the Falzarano funnel model.<sup>20</sup>

The quantitative data and the frequency analysis of the set criteria were processed using the statistical analysis tool from the SurveyMonkey® programme to detect and introduce new proposals or reformulations of the items and their answers. These modifications were subject to assessment in subsequent rounds.<sup>26</sup>

The following consensus levels were determined prior to carrying out the study:

For the two adequacy and relevance criteria:<sup>32</sup>

- (I) Percentage agreement  $\geq 75\%$  adding the "sufficiently adequate/relevant" in the "adequate/relevant" and "highly adequate/relevant" response categories as main criteria to establish the validity index for the content of each item;
- (II) Percentage agreement  $\geq 50\%$  in the "highly adequate/relevant" category ("4" points on the Likert scale);
- (III) Percentage agreement  $\geq 5\%$  in the "quite inadequate/irrelevant" category ("1" point on the Likert scale);

Items that did not attain 75% agreement on the basic principles were eliminated or modified according to the suggestions, in the successive rounds.

The elements that met the basic criteria (I) but did not meet one of the extra criteria II and/or III were examined

by the research team who either chose to keep them in their original format or modify them, depending on the comments as per the adequacy criterion. It was agreed that they would not be eliminated as long as they met the basic criteria (I).

Items that were re-administered for assessment in the consequent rounds had not reached the consensus level  $\geq 75\%$ .

The process finished when all the items reached a pre-set consensus level or the assessments remained stable in low consensus levels, under 70% both for adequacy and relevance in all rounds.

The comments provided in the different items were analysed by means of content analysis, systematically and objectively identifying specific characteristics in the text<sup>33</sup> that were considered if the research team understood them to be relevant or several participants coincided.

## RESULTS

### Sample

The group comprised 26 experts in the field of nutrition and mental health, the response rate was 100% in all three rounds. Table 1 describes the sociodemographic data and the main characteristics of the sample. The results are given below, as obtained in each of the rounds.

#### Round 1:

In the first round, 23 items out of the initial 30 reached the pre-set consensus ( $>75\%$ ) both for relevance and adequacy.

The consensus levels are summarised in table 2.

This shows the number of items, the consensus percentage reached both for adequacy and for relevance and it shows which items did not reach the pre-set consensus.

Items 19 and 25 did not reach an agreement on adequacy, so it was decided to include them in the next round despite having reached an agreement on relevance.

Out of the 23 items that reached the consensus, 16 were subject to modification due to recommendation from the experts, either in the statements, the answer options, or both, as shown in table 3.

Table 1		
Sociodemographic characteristics of the sample		
Características	N	Porcentaje
<b>Sex</b>		
Men	5	19.23%
Women	21	80.77%
<b>Age</b>		
Range: 26-66		
Mean: 43.53		
<b>Profession</b>		
Mental Health Nursing	17	65.38%
Nutrition and dietetics graduates	5	19.23%
Endocrinology and nutrition medicine doctors	2	7.69%
Professors of nutrition and food science	2	7.69%
<b>Actual position</b>		
Assistance	14	53.58%
Teacher	6	23.08%
Management	3	11.54%
Investigation	3	11.54%
<b>Training</b>		
Graduate	26	100%
Doctorate	6	23.08%
Professor	2	7.69%
<b>Years of experience</b>		
Range: 7-42 years		
Mean 17.73 years		

In addition, on the participants request, a new item was added which was assigned number 31 for assessment in subsequent rounds.

#### Round 2:

Out of the 8 items presented to the experts to be assessed, 3 achieved consensus, 1 item achieved consensus on adequacy but not on relevance and 4 or more did not

Table 2		Consensus percentage first phase	
Item	Adequacy % consensus	Relevance % consensus	
1	88,50 %	90,50 %	
2	81,75 %	81,75 %	
3	94,25 %	91,25 %	
4	78 %	79,75 %	
5	86,5 %	89,5 %	
6	79,75 %	78 %	
7	79,75 %	84,5 %	
8	82,75 %	84,5 %	
9	88,5 %	93,25 %	
10	<b>60,5 %</b>	<b>52 %</b>	
11	79,75 %	79,75 %	
12	85,50 %	90,50 %	
13	78 %	75 %	
14	88,5 %	98 %	
15	85,5 %	93,25 %	
16	81,75 %	90,50 %	
17	89,50 %	90,50 %	
18	79,75 %	78 %	
19	63,50 %	80,75 %	
20	86,50 %	89,50 %	
21	<b>69,25 %</b>	<b>56,75 %</b>	
22	<b>72 %</b>	<b>67,75 %</b>	
23	<b>74 %</b>	<b>72 %</b>	
24	88,5 %	94,25 %	
25	<b>70,25 %</b>	<b>81,75 %</b>	
26	89,50 %	91,25 %	
27	<b>66,25 %</b>	<b>66,25 %</b>	
28	80,75 %	85,50 %	
29	82,75 %	87,50 %	
30	89,50 %	91,25 %	
Bold and italic items that did not reach consensus and their percentage			

achieve consensus, 2 of them remained in low consensus percentages. (Table 4).

They were all subject to modifications both in the statements in the answer options following the participants recommendations, as shown in table 5.

Table 3		First phase items modifications	
Item	Statement	Answer options	
2		Modified 3rd option	
4	Reformulated		
5		Modified 3rd option	
6	Reformulated	Modified all options	
7	Reformulated		
9		Modified 3rd option	
11	Reformulated	Modified 3rd option	
14		Modified 4rd option	
15		Modified 4rd option	
16	Reformulated	Modified 2rd option	
17	Reformulated	Modified 4rd option	
20	Reformulated	Modified 2rd option	
24	Reformulated		
26		Modified 1rd option	
28	Reformulated	Modified 3rd option	
29	Reformulated		
Item number, reformulated statement, or modified response option			

Table 4		Consensus percentage second phase	
Ítem	Adecuación % consenso	Relevancia % consenso	
10	<b>60,5 %</b>	<b>48 %</b>	
19	75 %	79,75 %	
21	66,27 %	50 %	
22	<b>72 %</b>	<b>70,25 %</b>	
23	<b>78,75 %</b>	<b>74 %</b>	
25	84,5 %	88,5 %	
27	<b>72 %</b>	<b>60,5 %</b>	
New item 31	81,75 %	88,5 %	
Bold and italic items that did not reach consensus and their percentage			

### Round 3:

Although there did not seem to be significant variations in the previous rounds, the research team decided on a third

Item	Statement	Answer options
10	Reformulated	
19		Modified 4rd option
21		
22		Modified 1rd option
23	Reformulated	
25		Modified 2rd option Modi-fied 4rd option
27	Reformulated	
Item number, reformulated statement, or modified response option		

and final round to check whether the items that were close to achieving consensus in both dimensions should be included in the end, in addition to meeting the pre-set protocol that required 3 rounds.

3 items were included that had been close to achieving consensus in the previous round.

Two items were definitively discarded as they remained stable in percentages under 70% both for relevance and adequacy so it is understood that consensus had been achieved to exclude them.

Finally, out of the 3 items that were included in this round, none of them achieved the necessary consensus to be included in the CAPA questionnaire. (Table 6)

In the light of the results obtained in this study, it was possible to obtain the CAPA questionnaire composed of 26 items and 4 possible answers.

Item	Adequacy % consensus	Relevance % consensus
<b>22</b>	<b>72 %</b>	<b>74 %</b>
<b>23</b>	<b>74 %</b>	<b>73 %</b>
<b>27</b>	<b>66,25 %</b>	<b>62,5 %</b>
Bold and italic items that did not reach consensus and their percentage		

Figure 1 shows the flow diagram summarising the Delphi technique.

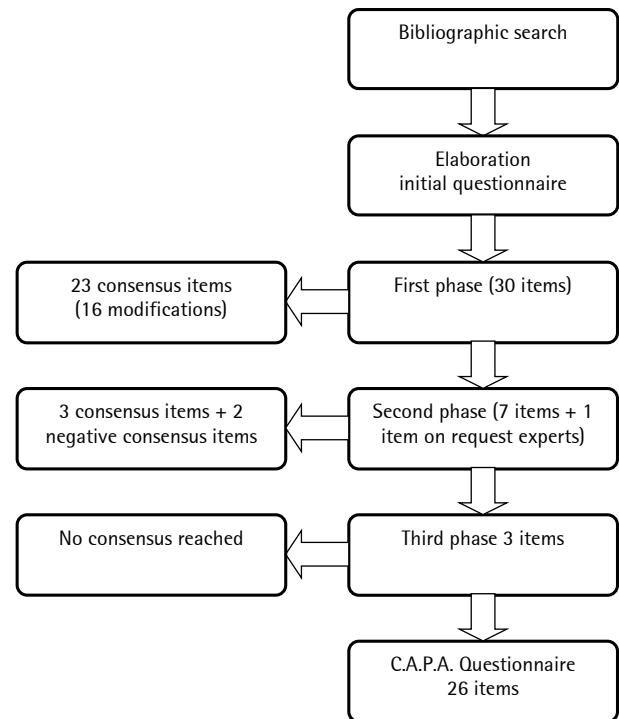


Figure 1

Delphi technical process development flowchart

## DISCUSSION

The main aim of this study was to develop and validate the CAPA questionnaire using the Delphi technique to generate consensus in a group of experts.<sup>34</sup>

Content validation can be considered as one of the most important parts of psychometric validation for any tool and becomes particularly relevant when producing a questionnaire.<sup>35</sup> For this content, one of the methods used is the Delphi technique, although some reservations have been expressed regarding this technique.<sup>36</sup> Consequently, the procedure must be rigorous, previously setting the inclusion criteria, the group size and construction of the prior questionnaire, the analysis method, the number of rounds and the accepted level of consensus, so it was decided to follow the model proposed by Falzarano 2013<sup>20</sup> for this study. To construct the initial round, a semi-structured questionnaire was chosen, previously designed by the research team, and using a validated questionnaire as a model, which the participants had to answer in the initial round. It should be mentioned

that this way of starting the Delphi technique is increasingly widely accepted<sup>24</sup> and its use is particularly recommended to verify content validity<sup>37</sup>.

Following the proposed model, it is advisable to determine the necessary level of consensus prior to carrying out the Delphi technique.<sup>20</sup> The two criteria most used to define when consensus has been achieved are criteria based on a statistical approximation, normally in central trend measurements,<sup>38</sup> and criteria represented by means of a consensus percentage.<sup>22</sup> The latter was chosen in this study due to its characteristics.

As there is no agreement in the literature on what an acceptable level might be, the decision must be made based on the study objectives and considering that stricter levels make it more complex to reach the set minimum.<sup>39</sup> Despite the above, several studies<sup>40, 41</sup> recommend a minimum of 70% consensus to maintain rigour in all its phases, so this study was particularly scrupulous by setting it at 75%. Furthermore, it was necessary to achieve the minimum level in both areas, adequacy and relevance, for each item to be accepted. Consensus was reached in the second round, but, despite this, a third round was carried out to confirm this extreme and meet the pre-set rounds.

One of the advantages of the Delphi technique is that it facilitates an exchange of opinions and assessments between the research team and the experts, keeping the latter anonymous.<sup>17</sup> In this study, this exchange has made it possible not only to select the items considered to be appropriate and relevant, but also the adequacy and improvement of the answer options and even inclusion of a new item, thereby enriching the final result. Thanks to the SurveyMonkey® program that helps keep the participants answers anonymous but makes it possible to know whether an expert has not answered the survey, reminders were sent one week and one day before the deadline, as it has been widely demonstrated that controlled feedback involves the participants and encourages them to take part.<sup>40</sup>

As far as the assessment of each item is concerned, a Likert scale was chosen as this was the most frequently used psychometric scale in all types of questionnaires and the most widely applied in all disciplines of research studies.<sup>24</sup>

Regarding the appropriateness of the designed questionnaire, it should be mentioned that there are currently very few instruments available to assess food-related knowledge among the population with ED. Scales such as EAT-26<sup>42</sup> or the EDI-3 inventory of eating disorders, perhaps one of the most widely used instruments to detect these disorders, as indicated in the literature,<sup>43</sup> are more appropriate to screen and diagnose the illness. They are also not designed to assess

the knowledge of the child-youth population, after completing an educational programme, so construction and validation of the CAPA questionnaire might resolve this aspect.

## Limitations

The main limitations of this study are derived from using the Delphi technique. One limitation of this methodology, mentioned in the literature, is the possibility of introducing bias when selecting the participants.<sup>44</sup> As previously explained, the snowball sampling technique is used to avoid this. On the other hand, in this paper, as it involves experts with very specific characteristics, it might be possible to recognise a colleague who is taking part, although it would be impossible to see his or her answers. Nevertheless, this fact might be considered a difficulty although some authors see it as an advantage as it might encourage participation and arouse interest to get involved.<sup>24</sup> Despite having taken these precautions and ensured the rigour of the entire process, following the model suggested by Falzarano 2013,<sup>20</sup> due to the methodological limitations of this type of study, it is possible that an auto-selection bias might have remained.<sup>45</sup>

It should also be mentioned that it is necessary to be scrupulous when constructing the initial questionnaire, as bias might be introduced in this part of the methodological process.<sup>24, 31</sup> In order to limit the appearance of bias, experts could suggest improvements, both in the format and in the content of each item, which might refer to the statement or the answer options or there was even the possibility in the first round of adding new items if deemed convenient.

Another potential limitation of the Delphi method is that there are no universally accepted directives on sample size in this type of study.<sup>24</sup> A total of 26 experts took part in this study which, in light of the aims, might be considered completely appropriate.<sup>21, 22</sup>

## CONCLUSIONS

In conclusion, to construct and validate questionnaires and ensure that they are useful to meet the planned aims, they must guarantee high levels of reliability and content validity. When correctly implemented, the Delphi technique is presented as extremely useful to meet these aims.<sup>46</sup>

The questionnaire being developed has demonstrated solid content validity based on the high response rate: 100%.<sup>45</sup> This percentage can be considered to be highly relevant as various studies recommend a minimum accepted answer rate of around 40%-50%.<sup>47</sup> This data, along with the high degree of agreement achieved in the various rounds, reinforced the validity of the results, also considering that the group compiled a wide-ranging view of the topic as



it encompassed experts in nutrition and experts in mental health.

The final version of the CAPA is a fast, user-friendly tool that can be used by any health professional that, through its 26 items, will make it possible to assess educational intervention on nutrition, based on the *Perseo* Programme, among the adolescent population diagnosed with ED.

Finally, it should be mentioned that, as this involves the *Perseo* programme, integrated within the NAOS strategy,<sup>13</sup> for an education programme on healthy habits, widely implemented in the general school-age population, the CAPA questionnaire developed to find out about the knowledge acquired afterwards, due to its general character and despite containing items specifically designed for persons with ED, might also be useful to assess knowledge among the child-youth population that does not necessarily belong to a specific educational programme or a group with a determined pathology, thereby opening up its use to a range of collectives.

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## CONFLICT OF INTERESTS

The authors declare that they have no conflict of interest relating to this study or to this publication.

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## Annex 1

## Questionnaire on nutritional knowledge among adolescents (CAPA)

1) Juices and soft drinks can quench our thirst, but there are many types, and they are not all the same. Out of the following statements, which do you think is CORRECT?

- A. Soft drinks contain a lot of sugar.
- B. Freshly squeeze orange juice does not provide the same nutrition as eating the fruit without squeezing it.
- C. Industrial fruit juices generally contain a lot of water and sugar.
- D. They are all correct.

2) It is important to consider what we ate for lunch to be able to complement it at dinner. Which of the following dinners are LESS well-balanced with lunch?

- A. I had pasta for lunch-I'll have green beans for dinner.
- B. I had fillet steak for lunch-chicken thighs for dinner.
- C. At lunch, there was yoghurt for dessert-I'll have an apple for dessert with dinner.
- D. I had hake for lunch - I'll have eggs for dinner.

3) In terms of consuming alcohol. Which of the following statements seems CORRECT to you?

- A. It is healthy to drink alcohol at least once a week.
- B. If I get drunk every weekend, I might have a problem.
- C. Alcohol has very few calories.
- D. An alcoholic is someone who drinks every day.

4) Energy-boosting foods provide "the fuel" that the organism needs to be able to work normally. Which of the following is NOT considered to be an energy-boosting food?

- A. Potatoes.
- B. Bread.
- C. Meat.
- D. Oil.

5) How many times a week is it recommended to eat breakfast? (Choose)

- A. 3 times a week.
- B. 4 times a week.
- C. Every day.
- D. I don't know.

6) There are many well-known sayings and myths concerning food, but some of them are false. Out of the following statements, which do you think is FALSE?

- A. Appropriate exercise and a balanced, varied diet are basic to achieve a healthy weight.
- B. The less weight we gain in adolescence, the healthier adults we'll be.
- C. What we eat during childhood should be varied and balanced.
- D. Not everyone with the same age and same height should weigh the same.

7) Many things are said about mid-morning and mid-afternoon snacks, some are CORRECT, and others are INCORRECT. Can you identify which are INCORRECT?

- A. It is healthier to eat a sandwich than a bag of crisps.
- B. Fruit and nuts can be a good afternoon snack.
- C. It's better not to eat mid-afternoon, so I'll be hungrier at dinner time and eat more then.
- D. It is recommended to eat mid-morning and mid-afternoon snacks, even when you are on holiday.

8) One food group is called regulators because they help adjust our bodies. This food contains a lot of vitamins and minerals. Out of the following list, which do you think has the LEAST vitamins and minerals?

- A. Orange.
- B. Tomato.
- C. White bread.
- D. Walnuts.

9) Drinking water is basic to a healthy diet, but a lot of things are said about water and many are INCORRECT. Out of the following, which do you think is CORRECT?

- A. If you drink water during meals, you can put on more weight.
- B. You should drink at least 1.5- 2 litres of water a day, even if you're not thirsty.
- C. Water also contains calories so if you drink a lot, you can feel bloated.
- D. It is equally healthy to exchange water for soft drinks at mealtimes, as they both quench your thirst in the same way.

10) Plastic or constructor foods are used to grow and build our body like building block. Which of the following food is considered to be plastic or "constructive"?

- A. Lettuce.
- B. Sugar.
- C. Egg.
- D. Apple.

11) Breakfast is one of the most important meals of the day as it provides energy to start the day well. Which of the following foods do you think is NOT part of a healthy breakfast?

- A. Milk.
- B. Cereals.
- C. Fresh fruit.
- D. They are all part of a healthy breakfast.

12) Which of the following foods do you think is NOT part of a healthy diet?

- A. Fish.
- B. Walnuts.
- C. Olive oil.
- D. They are all part of a healthy diet.

13) Diet food "is a good option because it is low in calories." What do you think about this? (Pick one).

- A. Correct.
- B. Incorrect.
- C. Sometimes.
- D. Always.

14) A good diet helps prevent diseases, but excessive consumption of a particular type of food can cause them. Out of the following diseases, which do you believe is related to too much salt in the diet?

- A. High blood pressure.
- B. Caries.
- C. Anaemia.
- D. None.

15) To maintain a healthy weight, we should remove fat entirely from our diet. What do you think about this? (Pick one).

- A. Correct.
- B. Incorrect.
- C. Sometimes.
- D. Always.

16) Eating bread always makes you put on weight. What do you think about this? (Pick one).

- A. Correct.
- B. Incorrect.
- C. Sometimes.
- D. Never.

17) For a healthy diet, there are foods we should eat every day and, on the other hand, others that we should just eat from time to time. Out of these foods, which do you think we should eat sporadically?

- A. Bread.
- B. Chocolate biscuits.
- C. Rice.
- D. Fruit.

18) A healthy diet requires us to eat fish often. Do you know how many times a week it is recommended to eat fish?

- A. Once a week.
- B. Twice a week.
- C. 3-4 times a week.
- D. 8-9 times a week.

19) Water is not only found in drinks, but also in food. Which of the following foods do you think holds the most water?

- A. Sea bream.
- B. Chicken.
- C. Melon.
- D. Walnuts.

20) One of the main functions of fibre is to help us go to the bathroom regularly. But do you know which foods contain the most fibre?

- A. Yoghurt.
- B. Fresh fruit.
- C. Fillet steak.
- D. Potatoes.

21) There are foods that we should eat every day and others several times a day. Among the following groups and portions per day, one is INCORRECT, pick which one.

- A. Fruit, 3 portions every day.
- B. Pulses (lentils, chickpeas, beans, etc.), 3 portions a week.
- C. Milk, cheese, yoghurt, 1 portion a day.
- D. Cereals, bread and potatoes, 6 portions a day.

22) Which of the following statements is incorrect for a healthy lifestyle?

- A. From now on, I'm going to eat breakfast before school.
- B. If I'm not hungry when I get up, it's best to go to school without breakfast and snack early.
- C. I don't really like fruit, but I know I should eat it.
- D. I am going to spend less time in front of the computer and the TV.

23) Which of the following statements on fibre seems CORRECT to you?

- A. Eating it every day can cause constipation.
- B. It is found in animal-based foods.
- C. The digestive system does not digest some types of fibre entirely.
- D. Wholemeal cereals contain almost no fibre.

24) People also say a lot of things about sweets. Which of the following statements do you think is INCORRECT?

- A. It is best to brush your teeth after eating sweets.
- B. They should never be eaten.
- C. Fruit can be a good substitute for sweets.
- D. Most sweets contain a lot of sugar.

25) Bags of crisps are a tasty snack, but we should consume them in moderation. Why?

- A. Most of them contain a lot of salt.
- B. They contain a lot of calories.
- C. They have a lot of fat.
- D. For all the above reasons.

26) How many portions of fresh fruit and vegetables are recommended every day? (One portion of fruit would be, for example, an apple and a portion of vegetables, a plate of spinach).

- A. 2.
- B. 3.
- C. 4.
- D. 5 or more.

#### Answer template

1	D
2	B
3	B
4	C
5	C
6	B
7	C
8	C
9	B
10	C
11	D
12	D
13	B

14	A
15	B
16	B
17	B
18	C
19	C
20	B
21	C
22	B
23	C
24	B
25	D
26	D