

Is early detection of eating disorders possible in primary care?

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Summary Background. Eating disorders are considered an important public health problem, due to the chronicity and mortality to which they are associated. They are time-dependent diseases, in which early detection and treatment can improve the prognosis.

Objectives. The objective of our work was to assess the psychometric properties of the SCOFF questionnaire as an instrument to detect the presence of eating disorders quickly and reliably in a primary care centre.

Material and methods. Observational, cross-sectional and multicentre study carried out on 291 people in all the health centres of the capital of Guadalajara. Stratified, multistage and proportional random sampling according to age, gender and health centres. The study was carried out in 2 phases: completion of the SCOFF questionnaire and clinical interview. Sensitivity, specificity, positive and negative predictive value, global value, positive probability ratio, ROC curve, Cronbach's alpha, and mean time to perform the test were observed.

Results. Sensitivity: 91.6% (95% CI: 71.8–100%); Specificity: 91% (95% CI: 87.5–94.5%); Positive predictive value: 30.5% (95% CI: 14.1–46.9%); Negative predictive value: 99.6% (95% CI: 98.6–100%); Positive probability ratio: 10.2 (95% CI: 6.8–15.4%); Efficiency: 91.1% (95% CI: 87.6–94.5%); Area under the ROC curve: 0.9099 (95% CI: 0.8082–1.0117); Cronbach's α : 0.725; Mean performance time: 3.98 (\pm 0.12) minutes.

Conclusions. The SCOFF is a short questionnaire, easy and brief to fill out, reliable and with indications of validity and sufficient diagnostic sensitivity to be applied with guarantee in primary care centres.

Key words: Primary Care – SCOFF questionnaire, ED – early detection, psychometric properties.

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Background

Eating disorders (ED) constitute a group of mental illnesses characterised by altered behaviour in the face of food intake or the appearance of weight control behaviours giving rise to physical problems or to the psychosocial functioning of the individual [1]. Today, they are considered an important public health problem, due to the chronicity and mortality to which they are associated [2].

The prevalence of eating disorders in Spain is between 4.1% and 6.4% for women and between 0.27% and 0.90% for men [1]. In recent decades, there has been a striking increase in these figures [3], placing eating disorders as the third chronic disease among the adolescent and young female population in developed and westernised societies [4].

These are time-dependent diseases, in which early detection and treatment improve prognosis [5]. In this sense, primary care specialists play a fundamental role, as they are the first healthcare resource that patients access to in certain countries with public healthcare systems [6]. It has been observed that young people with eating disorders attend their Primary Care Physician (PCP) complaining about more somatic pain in relation to the population the previous years of being diagnosed [7].

However, the reality is that there is an underdiagnosis of these pathologies in primary care, probably due to insufficient training of Primary Care Physicians (PCP), which perceive these patients as difficult and time-consuming patients [2].

Imaz Roncero et al. [8] compared the detection from three different levels of care: schoolchildren, adolescents treated in primary care and mental health centres, those hospitalised. They concluded that only one out of every five cases was detected in the health centres, with a lack of referral of the cases detected to child and adolescent psychiatry services.

Another aspect that hinders the correct approach to this problem is the actual overload of primary healthcare centres [9]. All of this leads to the need for short-term and valid tools that help clinicians in this environment in early identification of ED risk cases that require further evaluation. In this sense, we have found that the SCOFF questionnaire in its Spanish version can be a good support tool in this area [10].

Objectives

To assess the psychometric properties of the SCOFF questionnaire as an instrument to detect the presence of eating disorders quickly and reliably in primary care centres.

Material and methods

This was an observational, cross-sectional and multicentre study carried out within the framework of primary care and developed throughout 2019 in the 5 health centres of the capital of Guadalajara (Alamín, Balconcillo, Cervantes, Gu-Sur and Manantiales).



The sample size was calculated using the recommended formula for finite populations, case of proportions, whose algebraic expression is as follows: $n = t^2 p \times q / e^2$; where t is the confidence level (95%), p is the proportion of cases (in our case 25%), q is $p - 1$, and e , the error made (0.05). The sample obtained was 291 people.

Stratified, multistage and proportional random sampling was carried out according to age, gender and health centres from the population database of the Guadalajara Area Information System.

The inclusion criteria to participate in the study was to be between 14 and 19 years of age. The exclusion criterion was the existence of physical, mental, cultural limitation or a concurrent illness that did not make it possible to apply the study tests, as well as having participated in the sampling on a previous visit.

Recruitment was carried out through opportunistic recruitment in the primary care consultation of the adolescent who met the necessary criteria to participate in the study, to whom the purpose of the study was explained, and their participation was requested. In the case a minor, they contacted their parents. In case of refusal, they were replaced by another adolescent.

We study the following variables:

- Socio-demographic (age and gender).
- Anthropometric data: Weight, height, BMI (body mass index). The latter was calculated by applying the formula: weight (kg)/height (m²).
- Types of eating disorders: anorexia nervosa, bulimia (non-purgative and purgative) and unspecified eating disorders (7 types).
- Risk of developing an eating disorder using the SCOFF questionnaire, which consists of 5 short, self-reported questions. For our study, we used the version translated and validated into Spanish, with a cut-off point of 2, as this is the score with the best psychometric properties [10].
- Semi-structured interview: Eating Disorder Examination version 12 (EDE-12). This is a tool made up of 62 questions that refer to the last 3 months, capable of identifying diagnostic cases of eating disorders based on the criteria of the DSM-IV manual.

The study was carried out in 2 phases: in the first, each patient was given a booklet, where they had to fill out a questionnaire with socio-demographic data, the SCOFF test, and they were later weighed (without shoes) and measured height.

In the second phase, those patients with a positive result in any of the screening questionnaires were chosen, and they were summoned in person to consultations at the health centre to carry out the EDE-12 clinical interview in order to diagnose those cases suggesting an ED.

To avoid possible false negatives, a homogeneous and representative subsample with a negative result was randomly selected in the first phase, and the same clinical interview was carried out. This subsample consisted of 60 people. In all cases, the interview was conducted by a doctor who was an expert on this subject.

The data was introduced into a database created with the Excel program and processed using the statistical package SPSS version 25 for Windows.

In order to determine the diagnostic validity of the test, we calculated its sensitivity (proportion of individuals with the disease who had a positive outcome in the test), specificity (proportion of individuals without the disease who had a negative result) and the ratio of probability for a positive result or likelihood ratio (number of times it is more likely to find a positive result in the group of patients compared to those without a disease).

We evaluated this behaviour through the positive predictive value (probability that an individual with a positive result had the disease), the negative predictive value (probability that an individual with a negative result did not have the disease) and the global value of efficiency (total proportion of subjects classified correctly) [11].

In order to evaluate the discriminatory capacity of the test, we calculated the diagnostic efficacy curve using the ROC curve and the area under the curve (AUC) – probability of correctly classifying a pair of individuals (one healthy and one sick) selected at random when applying the test to them.

To establish its internal consistency and reliability, we calculated Cronbach's alpha [12], and to determine its viability, we calculated the mean time it took to fill out the questionnaire.

The study was approved by the Sanitary Research Ethics Committee of the Guadalajara Integrated Area (registry P07/18). All participants were informed of the nature of the study and its objectives and agreed to participate by signing an informed consent, with the ability to withdraw at any time

Results

124 men (42.6%) and 167 women (57.4%) were part of the sample studied. The mean age was 16.3 years (SD 1.6). 37.1% (108 people) were between 14 and 15 years old, 35.4% (103) between 16 and 17 years old, and 27.5% (80) between 18 and 19 years old. The mean weight of this population was 65.2 kg (SD 39.8), with a mean height of 166.9 cm (SD 8.6).

Using the SCOFF questionnaire, we achieved a prevalence of ED risk of 12.4% (95% CI: 8.4–16.4%), and with the clinical interview, the prevalence of ED was found to be 4.1% (95% CI: 1.7–6.6%). The prevalence of the various types of eating disorders by interview is shown in Table 1.

Table 1. Prevalence of ED types by clinical interview

ED type	n	Prevalence
Anorexia nervosa	0	0%
Bulimia	4	1.4% (95% IC: 0.4–3.5%)
non-purgating type	3	1% (95% IC: 0.2–3%)
purgating type	1	0.3% (95% IC: 0.009–1.9%)
ED not otherwise specified	8	2.7% (95% IC: 0.7–4.8%)

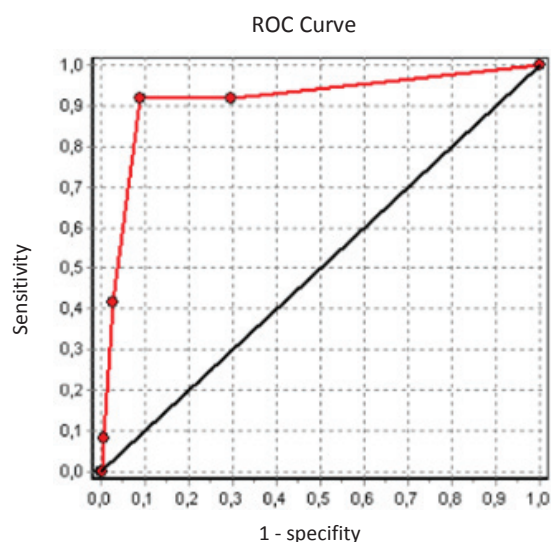
The indices of diagnostic and behavioural validity of the SCOFF test are shown in Table 2.

Table 2. Diagnostic and behavioural validity indices of the SCOFF test

Sensitivity	91.6% (95% IC: 71.8–100%)
Specificity	91% (95% IC: 87.5–94.5%)
Positive predictive value	30.5% (95% IC: 14.1–46.9%)
Negative predictive value	99.6% (95% IC: 98.6–100%)
Positive probability ratio	10.2 (95% IC: 6.8–15.4%)
Negative probability ratio	0.09 (95% IC: 0.01–0.60)
Efficiency	91.1% (95% IC: 87.6–94.5%)

The area under the ROC curve (AUC) was 0.9099 (95% CI: 0.8082–1.0117) (Figure 1), and the best cut-off point was 2 (Table 3 and 4).

The Cronbach's alpha obtained was 0.725. On the other hand, the mean time for completing the questionnaire was 3.98 (\pm 0.12) minutes.



AUC	SE	95% IC
0.9099	0,0519	0,8082–1,0117 Delong
	0,0573	0,7976–1,0223 Hanley and McNeil

Figure 1. ROC curve of the SCOFF questionnaire

Detection threshold			Positive	Negative
Positive answers	Sensitivity	Specificity	Predictive value	Predictive value
0 +	100% (73.5–100%)	0% (0–1.4%)	100% (90.3–100%)	0% (0–1.5%)
1 +	91.6% (61.5–99.7%)	29.7% (24.2–35.2%)	97.2% (85.5–99.9%)	76.5% (71.1–81.9%)
2 +	91.6% (71.8–100%)	91% (87.5–94.5%)	30.5% (14.1–46.9%)	99.6% (98.6–99.8%)
3 +	41.6% (15.1–72.3%)	97% (94–99.3%)	22.8% (14.6–36.2%)	100% (98.6–100%)
4 +	8.3% (0.2–38.4%)	99.3% (96.2–99.5%)	8.3% (1.7–22.4%)	100% (98.6–100%)
5 +	0% (0–26.4%)	99.7% (99.2–99.9%)	2.7% (0.7–14.5%)	100% (98.6–100%)

Values are presented as percentage (95% CI).

	Bulimia		EDNOS	
	Sensitivity	Specificity	Sensitivity	Specificity
0+	100% (95% IC: 54.8–100%)	0% (95% IC: 0–1.9%)	100% (IC: 95% 63.1–100%)	0% (IC: 95% 0–1.3%)
1+	100% (95% IC: 54.8–100%)	69.2% (95% IC: 63.6–74.7%)	87.5% (IC: 95% 79.8–98.1%)	69.3% (IC: 95% 63.7–74.8%)
2+	100% (95% IC: 54.8–100%)	89.5% (95% IC: 85.7–93.2%)	87.5% (IC: 95% 79.8–98.1%)	89.7% (IC: 95% 86–93.5%)
3+	33.3% (95% IC: 20.1–41.3%)	96.2% (95% IC: 93.7–98.5%)	62.5% (IC: 95% 47.3–84.5%)	97.2% (IC: 95% 95.1–99.3%)
4+	0% (95% IC: 0–9.7%)	99.2% (95% IC: 97.5–99.9%)	12.5% (IC: 95% 0.3–24.5%)	99.3% (IC: 95% 97.5–99.3%)
5+	0% (95% IC: 0–9.7%)	99.5% (95% IC: 98.1–99.9%)	0% (IC: 95% 0–14.1%)	99.7% (IC: 95% 98–99.9%)

Discussion

As we have verified in the existing bibliography, our work is one of the few that analyses the psychometric properties of the Spanish version of the Scoff questionnaire in adolescents attending primary care.

The sensitivity and specificity obtained were higher than those found by other authors in primary care [13, 14] but was also lower than that seen by others [10, 15]. As is known, the sensitivity and specificity of a test vary according to the cut-off point chosen to classify the population as sick or not sick [11]. To fix this point, we constructed a ROC curve, calculating these two indices for all possible cut-off points. The best threshold

achieved corresponded to a cut-off point of 2+, as established in previous studies [10].

On the other hand, the result obtained from the area under the curve (AUC) indicates that the diagnostic capacity of the test is appropriate, since it is agreed that areas under this curve above 0.75 possess this characteristic.

In general terms, we think that our sensitivity and specificity results can be considered quite good, taking into account that for the most part, a diagnostic test is considered to have acceptable validity if its sensitivity and specificity are equal to or greater than 0.80 [16, 17].

The same can be said of the results of these indices with regard to bulimia (sensitivity 100% and specificity 89.5%) and

ED not otherwise specified (sensitivity 87.5% and specificity 89.7%). Interestingly, we have not detected any case of anorexia nervosa, perhaps in part because, as Luck et al. [18] point out, some patients do not recognise that they suffer from this disorder and consciously distort the answers to the questionnaire, a fact that must be taken into account when administering a self-administered test.

Regarding the behaviour of the test, we obtained a fairly acceptable global or efficiency value, though with a low positive predictive value. In this last aspect, it must be taken into account that the predictive values, especially the positive values, fundamentally depend on the prevalence of the disease.

If the prevalence is low (as in eating disorders), the predictive value decreases, as when applying the test to a mostly healthy population, it is easier to obtain a higher proportion of false positives, which directly affects the positive predictive value. In fact, Morgan et al. [19] state that SCOFF can provide up to 12.5% false positives (in our study, the percentage of false positives was 8.3%). For this reason, some authors propose that the questionnaire be used only in the population at risk of suffering from eating disorders and not in the general population [19].

In order to avoid the influence of prevalence on the validity of the diagnostic test, we have used likelihood ratios that relate sensitivity and specificity in a single measurement, and therefore, it is independent of the prevalence of the process [11].

In practice, the most used is the positive predictive value. In our study, we observed that the probability that a participant with a positive result has the disease is 10.2 times greater than one with a negative result.

On the other hand, the observed reliability was quite acceptable, which allows us to deduce that the degree of precision of the instrument we used is high. We also verified that this tool is viable, given that the time it takes to complete it is acceptable in an environment frequented as much as primary care.

One of the major strengths of this study was based on the high participation in it as all the health centres of the capital of Guadalajara were included thus improving the generalisation of the results. Another positive aspect is that it was carried out in consultations in this area, a place where patients at risk attend [20]; however, most of the studies that deal with these types of disorders are usually carried out with the general population in schools.

The main deficiency was not including children under 14 years of age, despite publications that speak of eating disorders from the age of 12 [21]. We opted for this decision when verifying, in a pilot study, the lack of understanding in some questions of the questionnaire by a high percentage of people included in this age range, which could distort the results.

Conclusions

We think that our work shows that the Spanish version of the SCOFF questionnaire, despite some limitations of its psychometric properties, is excellent for the early detection in primary care of patients at risk of suffering from an eating disorder. It is a short questionnaire, easy to fill in, reliable and with indications of validity and sufficient diagnostic sensitivity to be applied with guarantee in first-level consultations.

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