The SCOFF questionnaire: a new screening tool for eating disorders

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Competing interests: None declared.

This paper was originally published in the *BMJ* 1999;319:1467–1468

Eating disorders are among the most common psychiatric disorders in young women. Early detection and treatment improve the prognosis, but the presentation of eating disorders is often cryptic—for example, via physical symptoms in primary care. The ability to diagnose the condition varies and can be inadequate,[1] and existing questionnaires for detection[2,3] are lengthy and may require specialist interpretation. No simple, memorable screening instruments are available for nonspecialists. In alcohol misuse, the CAGE questionnaire (questions about Cutting down, Annoyance with criticism, Guilty feelings, and Eye-openers)[4] has proved popular with clinicians because of its simplicity. We developed and tested a similar tool for eating disorders, with questions designed to raise the suspicion that an eating disorder might exist before rigorous clinical assessment.

PARTICIPANTS, METHODS, AND RESULTS

We developed five questions addressing core features of anorexia nervosa and bulimia nervosa, using focus groups of patients with eating disorders and specialists in eating disorders. We tested the questions in a feasibility study of patients and staff at an eating disorders unit. None of these participants was involved in the subsequent study. We created the acronym SCOFF from the questions (see box).

We recruited patients sequentially from referrals to a specialist clinic: 116 women aged 18 to 40 years who were confirmed as having either anorexia nervosa (n=68 [35 binge eaters, and 33 restricted their food intake]) or bulimia (n=48), according to the criteria specified in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition.[5] For controls, we recruited 96 women (through advertising at local colleges), aged 18 to 39 years, who were confirmed not to have an eating disorder. Patients and controls were asked the SCOFF questions orally; they also completed the eating disorder inventory[3] and the Bulimic Investigatory Test, Edinburgh (BITE), a self-rating scale for bulimia.[2]

No significant differences existed between patients and controls for age or ethnicity. As expected, more patients than controls were in the highest socioeconomic groups ($P<0.001$; $\chi^2_3=47.4$), and patients were more likely to be single, separated, or divorced ($P<0.001$; $\chi^2_1=13.0$). The mean length of illness for patients was 8 years (SD, 4.8; range, 1-25 years). The mean (SD) body mass index (weight [kg]/[height (m)]^2) for controls, patients with bulima, and patients with anorexia was 22.3 (1.9), 24.4 (1.8), and 15.1 (0.8), respectively. All scores on the eating disorder inventory and the BITE scale were consistent with published data for women with or without eating disorders.[2,3]

The SCOFF questions*

Do you make yourself **S**ick because you feel uncomfortably full?

Do you worry that you have lost **C**ontrol over how much you eat?

Have you recently lost more than **O**ne stone (14 lb) in a 3-month period?

Do you believe yourself to be **F**at when others say you are too thin?

Would you say that **F**ood dominates your life?

*Each "yes" equals 1 point; a score of 2 indicates a likely diagnosis of anorexia nervosa or bulimia

All participants found the questions and the term "SCOFF" acceptable. Setting the threshold at two or more yes answers to all five questions provided 100% sensitivity for anorexia and bulimia, separately and combined (all patients: 95% confidence interval, 96.9%-100.0%; patients with bulimia: 92.6%-100.0%; and patients with anorexia: 94.7%-100.0%), with a specificity of 87.5% (79.2%-93.4%) for controls (table)

COMMENT

The SCOFF questionnaire seems highly effective as a screening instrument for detecting eating disorders. It is simple, memorable, easily applied and scored, and has been designed to suggest a likely case rather than to diagnose.

We consider that the SCOFF questionnaire performed well against the 10 questions suggested by Greenhalgh to assess screening tests.[6] The false-positive rate of 12.5% is an acceptable trade-off for high sensitivity.

Further work is needed to establish validity and reliability in a wider population, particularly in those in the general population who are at risk for eating disorders. Nonetheless, the evidence of validity is sufficient for it to

*Numbers of cases (true positives) and controls (true negatives) identified by SCOFF questionnaire as likely to have an eating disorder**

Cases	Total no. of subjects	No of participants identified by SCOFF as likely to have eating disorder
All cases	116	116
Bulimic cases	48	48
Anorectic cases:	68	68
Bingeing	35	35
Restricting	33	33
Controls	96	12

*If participants gave positive responses to at least two of the five questions (see box)

be used routinely in all patients considered at risk for eating disorders.

We thank Martin Bland, professor of medical statistics, for guidance in planning the research methods.

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COMMENTARY

A promising instrument, but more research is needed

One strength of the SCOFF questionnaire is its simplicity and ease of use. The instrument can be administered and scored in a matter of minutes. Further, it seems to need no specialized training or qualifications to use. Preliminary diagnostic results from the SCOFF questionnaire are impressive. The SCOFF questionnaire was able to correctly identify 100% of participants with eating disorders (both anorexia nervosa and bulimia nervosa) and correctly rule out 87.5% of controls who did not have eating disorders. The sample size, although not impressive, was sufficient to provide meaningful conclusions in the present sample.

It is unclear from the article how the diagnoses of eating disorders and the absence of eating disorders in controls were established. The use of a structured diagnostic interview such as the Structured Clinical Interview from the *Diagnostic and Statistical Manual of Mental Disorders* (SCID) to confirm or rule out eating disorder diagnoses would clearly strengthen the study.

It is also unclear that Americans will correctly interpret "make you really sick" in the first question ("make yourself sick" may be clearer), and the use of "one stone" will be meaningless (about 6.3 kg, or 14 lb). Also, some will find the term "SCOFF" unpleasant at best.

The sample is limited in several respects. First, all cases presumably met full diagnostic criteria for anorexia nervosa or bulimia nervosa. It is, therefore, unclear how participants who were subthreshold for these conditions would score on the SCOFF questionnaire. Further, the ratio of patients with eating disorders to those without eating disorders in the present study—roughly 1.2:1—is not representative of that found in the general population. Although this should not influence estimates of sensitivity and specificity (because each is calculated within cases and controls, respectively), it would artificially inflate estimates of positive predictive power—that is, what percentage of those testing positively actually have an eating disorder. Another concern with the present sample is that all of the patients had previously been diagnosed as having an eating disorder. This may have artificially inflated the sensitivity of the instrument because these participants may have been more willing to answer yes to items on the SCOFF questionnaire than those with eating disorders who had not been previously diagnosed.

No data are presented on the reliability of the SCOFF questionnaire. Because the proposed scoring assumes equivalence of items (that all items have equal weight), it would be important to examine the internal consistency of the items (for example, the Cronbach alpha). Test-retest reliability coefficients would also be informative. Further, if the SCOFF questionnaire is intended to be administered in interview form (as it was in the present study), interrater reliability may also be relevant. It would have been informative if data had been presented on responses to individual SCOFF items by diagnostic group. Also, the authors should consider presenting a receiver operating characteristic curve showing sensitivity and specificity across a range of cutoff scores.

One issue that is likely to be raised with respect to the SCOFF questionnaire—but that is by no means specific to the instrument—is the relatively low base rate of eating disorders (anorexia nervosa, 0.5%, and bulimia nervosa, 1%-2% in the age groups at risk) in the general population. As a result, the SCOFF questionnaire is likely to produce a relatively large number of false-positive cases (respondents who test positively on the instrument but do not have a diagnosis of an eating disorder). Whether this false-positive rate is a matter of concern can only be evaluated by the relative costs, financial and otherwise, of classification errors in the specific situation in which the SCOFF questionnaire is used. Costs to be considered (including those to patients) should include those associated with administration, with following up a patient who is falsely positive, and with missing a patient who has the disease. Different situations may have different costs associated with these errors. These costs may dictate whether the instrument should be used at all, or whether alternative cutoff points should be used to better balance the relative costs of misclassification.

This study represents the first logical step in the psychometric development of the SCOFF questionnaire. Although the preliminary results are impressive, further development is clearly needed.

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West J Med 2000;172:165