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ORIGINAL ARTICLE

# Evaluation of short food-frequency questionnaires to assess the dietary pattern associated with atherosclerotic cardiovascular diseases



*Évaluation de questionnaires nutritionnels pour l'étude du profil alimentaire associé aux maladies cardiovasculaires athéromateuses*

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## KEYWORDS

Cardiovascular disease;  
Diet;  
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## Summary

**Objectives.** – Cardiovascular diseases are strongly related to dietary habits. Diet can be assessed using dedicated questionnaires that can be self-completed by subjects but with the risk of errors.

**Aim.** – To compare the completion error rate of two questionnaires designed to assess dietary pattern linked to cardiovascular diseases and to study the correlation between the two questionnaires.

**Abbreviations:** 14-item FFQ, 14-item Food Frequency Questionnaire; CDQ2, Cardiovascular dietary questionnaire 2; GS, Global score; MUFA, Mono Unsaturated Fatty Acids; PUFA, Poly unsaturated Fatty acids; SFA, Saturated fatty acids; VDS, Vascular dietary score.

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**MOTS CLÉS**

Alimentation ;  
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cardiovasculaires

**Materials and methods.** – Two questionnaires were used to assess dietary patterns of students: the 14-item Food-Frequency-Questionnaire (FFQ) that was validated against biomarkers, and the Cardiovascular-Dietary-Questionnaire 2 (CDQ2), which is a 19-item-FFQ derived from the previous 14-item FFQ. Both questionnaires assessed the intake of various food groups associated with either favourable or unfavourable effects on cardiovascular risk. A global dietary score was calculated for each questionnaire.

**Results.** – FFQ and CDQ2 were completed by 150 sport degree students. In the case of FFQ, 111 questionnaires out of 150 (74.0%) were incomplete compared to only 1 CDQ2 out of 150 (0.7%) ( $P < 0.001$ ). The correlation coefficient between the overall CDQ2 score and the FFQ dietary score was 0.53 ( $P < 0.01$ ).

**Conclusion.** – The self-completion of CDQ2 compared to FFQ was associated with far less errors. There was a significant correlation between CDQ2 and FFQ. Preference should be given to CDQ2 in clinical practice and in studies where dietary pattern are evaluated without any interviewer. © 2018 Elsevier Masson SAS. All rights reserved.

**Résumé**

**Objectifs.** – Les maladies cardiovasculaires sont liées aux comportements alimentaires. L'alimentation peut être évaluée par des questionnaires dédiés qui peuvent être remplis seuls mais avec un risque d'erreurs. Les objectifs sont de comparer les erreurs lors du remplissage de deux questionnaires développés pour évaluer l'alimentation liée aux maladies cardiovasculaires athéromateuses et d'étudier la corrélation entre ces deux questionnaires.

**Matériels et méthodes.** – Deux questionnaires ont été utilisés pour évaluer l'alimentation d'étudiants : un court questionnaire de 14 questions (FFQ) qui a été préalablement validé contre des biomarqueurs et un second questionnaire (CDQ2) de 19 questions dérivées du premier questionnaire (FFQ). Les deux questionnaires évaluent des groupes alimentaires qui ont des effets favorables et défavorables sur le risque cardiovasculaire. Un score global alimentaire était calculé pour chaque questionnaire.

**Résultats.** – Les deux questionnaires ont été remplis par 150 étudiants en faculté de sport. Pour le FFQ, 74 % ( $n = 111$ ) des questionnaires étaient incomplets comparativement à 0,7 % ( $n = 1$ ) pour le CDQ2 ( $p < 0.001$ ). Le coefficient de corrélation entre les scores globaux du CDQ2 et du FFQ était de 0,53 ( $p < 0.01$ ).

**Conclusion.** – L'auto-remplissage du CDQ2 est associé à un moindre nombre d'erreurs. Il existe une corrélation significative entre les deux questionnaires. Le CDQ2 devrait être préféré en pratique clinique et dans les études où l'alimentation est évaluée sans interviewer.

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**Introduction**

Several studies have shown that diet is a risk factor in cardiovascular diseases [1–4]. Public policies adopted by high-income countries promoting healthier life styles and healthy eating based on a Mediterranean diet should help to decrease the cardiovascular mortality [5]. Lifestyles are often acquired during the first part of the subject's life and the effect of lifestyle is related to exposure time. In this context, questionnaires could be used to assess the subjects' dietary pattern.

Numerous tools with potential application to dietary assessment in clinical settings have been reported [6]. All these tools do not report the same dietary information (fat intake, with or without other nutrients, adherence to the Mediterranean diet, or fruit and vegetable intake). The questionnaires used presented in this study has been specifically developed in France and reports quality diet [7]. A short questionnaire on foods related to vascular risk, comprising of 14 questions (14-item FFQ) was validated against biological markers and a 7-day foodsurvey [7]. A

connection between vascular diseases and a risk-related diet had already been highlighted in cases of myocardial infarction, lower limb arterial disease and ischemic stroke [7–12]. Using this questionnaire, the scores for different food groups linked with cardiovascular diseases can be calculated [7,9,13]. In previous studies, the food evaluation was carried out with an interviewer, who ensured that all of the questions were answered. In fact, a missing answer meant that the corresponding food score could not be calculated. The fact that an interviewer was required precluded the widespread use of this questionnaire. Furthermore, this questionnaire included several open questions that could raise issues. A new questionnaire (Cardiovascular dietary questionnaire 2; CDQ2) based on the 14-item FFQ was therefore developed to rule out open responses and includes only closed answers. We assume that CDQ2 generates fewer errors than FFQ when self-completed and that there is a satisfactory correlation between the two questionnaires. The primary objective of this study was to compare the number of correctly completed questionnaires and the secondary objective was

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