Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

In a Sample of Subjects With Coronary Artery Disease From a Bilingual Swiss State, is Linguistic Identity Related to Dietary Intake? The Coronahrung Study

Aurélien Clerc
aurelien.clerc@h-fr.ch
University of Fribourg
Serban Puricel
University of Fribourg
Yannick Faucherre
University of Fribourg
Mario Togni
University of Fribourg
Stéphane Cook
University of Fribourg

Research Article

Keywords: Dietary intake, diet quality, coronary artery disease, language, smoking

Posted Date: August 7th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10212585/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Purpose. Dietary habits are a major determinant of prognosis in coronary artery disease (CAD), yet adherence to recommendations remains suboptimal. In Switzerland, dietary patterns differ across linguistic regions, but data from bilingual settings are lacking. This study evaluated the diet quality of patients with CAD in the bilingual setting of the canton of Fribourg, and investigated potential differences between language, recurrence of CAD, sex and smoking status.

Methods. This monocentric observational study included patients aged 18–75 years with angiographically confirmed CAD. Dietary intake was assessed using the Swiss eFFQ.

Results. 186 participants were predominantly male (72.6%), with a mean age of 63.5 ± 7.9 years and a mean BMI of 27.4 ± 4.5 kg/m²; 35.5% were current smokers. Overall, dietary intake were suboptimal: low fruit (195 ± 144 g/day) and vegetable (143 ± 77 g/day) intake, low fiber intake (19 ± 8 g/day), and high consumption of meat (103 ± 54 g/day) and bread (96 ± 63 g/day), suggesting excessive sodium intake. No significant differences in dietary intake were observed between French- and German-speaking participants. Similarly, no differences were found between newly diagnosed and recurrent cases. Women reported higher fruit intake (+ 66 g/day, $p = 0.005$) and lower alcohol consumption ($p = 0.001$) than men. Current smokers had lower intakes of fruits, vegetables, nuts, and fiber compared with former smokers ($p < 0.05$).

Conclusion. Diet quality in these patients with CAD was inadequate and not superior to those observed in the general population. Speaking language was not associated with dietary differences. These findings underline the need for more effective nutrition interventions in secondary prevention of CAD.

INTRODUCTION

Cardiovascular diseases (CVD) remain the leading cause of mortality worldwide (1) and in Switzerland (2). Despite advances in treatment, secondary prevention remains suboptimal, with lifestyle factors—particularly lifestyle habits like diet and smoking—playing a central role in long-term prognosis (1, 3–5).

Dietary habits are a key determinant of coronary artery disease (CAD) outcomes (6, 7) and adherence to recommended dietary patterns, such as the Mediterranean diet, has been shown to reduce recurrence risk (8, 9). However, data from the Swiss national nutrition survey (menu.CH) indicate that adherence to dietary recommendations remains limited, even in the general population. Moreover, dietary behaviors vary across linguistic regions, suggesting that cultural factors may influence nutrition-related health outcomes. They also vary according to sex (10).

The canton of Fribourg provides a unique setting to explore this question, as it is one of the few bilingual regions in Switzerland. While national data suggest differences in dietary patterns and cardiovascular mortality across linguistic regions (2), it remains unclear whether such differences persist within a shared geographic and healthcare environment. In addition, patients with established CAD might be expected to adopt healthier dietary habits following diagnosis, although evidence for this remains inconsistent.

To date, no study has specifically assessed dietary habits in patients with CAD in this bilingual context. Understanding whether linguistic identity, CAD history, sex and smoking habits are associated with dietary behaviors in a high-risk population could help inform targeted prevention strategies.

This study therefore aimed to evaluate the diet quality of patients with CAD in the canton of Fribourg, Switzerland and to assess potential differences between French- and German-speaking populations, between patients with and without established CAD, between sex and between smoking status.

METHODS

Study design and population. This monocentric observational study recruited patients aged 18–75 years with CAD from the interventional cardiology department of Fribourg Hospital (HFR) between January 2025 and March 2026.

The target sample size was 170 participants, corresponding to the number of participants per canton included in the menu.CH survey (10). To account for potential exclusions or incomplete questionnaires, the target was increased by 10%. Recruitment was stratified according to the linguistic distribution of the canton of Fribourg and the sex distribution typically observed in CAD cohorts, with approximately 70% men and 30% women (11–13). Accordingly, the study aimed to include French- and German-speaking men and women in proportions reflecting both cantonal language distribution and CAD epidemiology.

Inclusion criteria. Participants were eligible if they were aged 18–75 years, had angiographically confirmed coronary artery disease (≥ 50% stenosis of at least one coronary artery(14)), resided in the canton of Fribourg, and spoke one of its two official languages (French or German).

Data collection. Dietary intake was assessed using a recently validated food frequency questionnaire called Swiss eFFQ, which was adapted from the study menu.CH. It is linked with the Swiss food composition database, allowing estimation of macro- and micronutrients intake (15). From the available outputs, 13 food groups considered relevant to the study objectives were analyzed, along with total energy and macronutrient intake.

Data collection took place after coronary angiography, during the post-procedural observation period. After providing informed consent, participants were interviewed by the principal investigator (PI), who collected sociodemographic data (primary language, age, education), lifestyle factors (smoking status and physical activity using the International Physical Activity Questionnaire [IPAQ]), and anthropometric data. BMI was calculated from measured weight and self-reported height and categorized according to WHO criteria (16).

Participants were also classified as newly diagnosed or recurrent cases based on their CAD history. The PI provided standardized instructions for completing the FFQ, which could be completed on paper or electronically.

Statistical analyses. Descriptive statistics were used to characterize the study population and dietary intake. Differences in dietary intake were analyzed across subgroups defined by language, disease status (new vs recurrent), sex and smoking status. Comparisons between binary variables were performed using Student's t-test or the Wilcoxon–Mann–Whitney test, depending on data distribution. For smoking status (three categories), analysis of variance (ANOVA) was used. A two-sided significance level of 0.05 was applied. Analyses were conducted using Stata® (College Station, Texas, USA).

RESULTS

Study population

The **Figure 1** summarizes the selection process. A total of 186 people were finally included. The planned sex distribution was achieved for French-speaking participants; however, among German-speaking participants, additional male subjects were included due to a lower number of eligible women.

Most exclusions were due to the absence of significant coronary artery disease. Communication barriers, including language and cognitive impairment, accounted for additional exclusions.

The characteristics of the study population are presented in **Table 1**. The mean age was 63.5 years, and the sample was predominantly male (72.6%). The linguistic distribution (73% French-speaking, 27% German-speaking) reflected the demographics of the canton. The mean BMI was 27.4 kg/m², indicating a predominantly overweight population. Most participants had secondary education, 61% reported current or former smoking, and the majority reported moderate physical activity.

Seventy-nine percent of participants completed the FFQ on paper.

Dietary intake

Dietary intake according to language, disease status, sex, and smoking status is presented in **Table 2**.

No statistically significant differences were observed between French- and German-speaking participants. Cholesterol intake tended to be higher among German-speaking participants, likely reflecting slightly higher consumption of meat and cheese, but this difference was not statistically significant.

No significant differences were observed between newly diagnosed and recurrent cases. Non-significant trends suggested slightly lower meat consumption and marginally higher fruit and vegetable intake among recurrent cases.

Sex-based differences were more pronounced. Women reported significantly higher fruit intake (p=0.005) and lower alcohol consumption (p=0.001) than men.

Smoking status was associated with dietary differences. Current smokers had lower intake of fruits, vegetables, nuts, and fiber compared with former smokers. Fiber intake increased from 16 g/day in current smokers to approximately 20 g/day in former and never smokers (resp. 21g and 19g). Significant differences were primarily observed between current and former smokers – more fruit (p=0.020), vegetable (p=0.036), nuts (p=0.032) and fiber (p=0.009) – while non-smokers differ from current ones only in higher fruit consumption (p=0.010).

DISCUSSION

This study evaluated dietary intake in a cohort of patients with coronary artery disease (CAD) and compared them with national reference data. Overall, dietary intake were suboptimal and, in some respects, less favorable than those observed in the general Swiss population (10).

The dietary pattern was characterized by insufficient intake of fruits and vegetables and low fiber consumption, alongside with a high reliance on animal products such as red and processed meat and cheese. These findings are concerning given the well-established role of plant-based foods and dietary fiber in cardiovascular prevention (6, 17, 18). Fiber intake, in particular, is a key determinant of cardiovascular health through its effects on lipid metabolism, glycemic control, satiety, and the gut microbiota (17, 18). Conversely, high consumption of red and processed meats has been consistently associated with increased cardiovascular risk and other non-communicable diseases (19–21).

Bread consumption was substantial and contributed significantly to sodium intake. Although reported intake was comparable to national data (10, 15), the Swiss eFFQ is known to underestimate certain dietary components (15), suggesting that actual intake may be higher. In Switzerland, bread alone contributes approximately to 1.5–2 g of salt per day, representing a substantial proportion of the recommended maximum intake of 5 g/day (22). When considering additional sources of sodium—such as processed foods and discretionary salt use, which are not fully captured by FFQs—total intake likely exceeded recommended levels and aligned with national estimates of approximately 8 g/day (22, 23). Notably, this suggests that even patients aware of their disease do not achieve adequate salt reduction.

In contrast, consumption of protective foods such as nuts, seeds, and plant-based protein sources was insufficient. Fish intake was broadly consistent with recommendations, but alternative protein sources such as legumes and plant-based products were rarely consumed. Overall, the dietary pattern observed reflects an imbalance characterized by excessive intake of animal products and refined carbohydrates, and insufficient intake of cardioprotective foods.

Importantly, dietary intake in this cohort were not superior to those of the general population. In some respects, such as vegetable intake, they were even less favorable (7). This is particularly concerning, as patients with CAD might be expected to adopt healthier dietary behaviors following diagnosis. Similar

findings have been reported in other studies, including analyses from the CoLaus cohort, which showed limited dietary differences between coronary patients and controls (24).

Contrary to our initial hypothesis, no significant differences in dietary intake were observed between French- and German-speaking participants. While national data suggest regional variations in dietary patterns across linguistic areas (7), such differences were not observed within this bilingual canton. This may reflect a degree of regional homogenization or the influence of shared environmental and healthcare factors. It also suggests that, in this clinical population, dietary behaviors may be more strongly influenced by disease-related and sociodemographic factors than by linguistic or cultural identity.

Similarly, no differences were observed between patients with known CAD and those newly diagnosed. This finding indicates that awareness of disease alone is insufficient to induce meaningful dietary change. Although cardiovascular rehabilitation programs have been shown to improve outcomes and promote lifestyle modification (20), participation in such programs was not assessed in this study. These results highlight the challenges of achieving sustained behavioral change in clinical practice (25).

Sex-based differences were observed, with women reporting higher fruit intake and lower alcohol consumption than men, consistent with previous literature (26–28). However, these differences were modest and did not persist across all dietary components.

Smoking status emerged as the variable most strongly associated with dietary differences. Current smokers had poorer dietary intake, with lower intake of fruits, vegetables, nuts, and fiber compared with former smokers. Former smokers, in turn, exhibited dietary patterns more similar to non-smokers, suggesting that smoking cessation may be associated with broader improvements in lifestyle. While some studies have reported short-term compensatory increases in unhealthy food consumption following smoking cessation (29, 30), longer-term trends generally indicate improved diet quality (31, 32). These findings reinforce the central importance of smoking cessation in cardiovascular prevention, not only for its direct effects but also for its association with healthier behaviors.

The study population exhibited characteristics consistent with CAD cohorts, including a predominance of men, a high prevalence of overweight and smoking, and lower educational attainment compared with the general population (11, 33). These factors are well established determinants of cardiovascular risk and may partly explain the unfavorable dietary patterns observed (21, 34, 35).

This study has several limitations. First, comparisons with reference populations were descriptive, as statistical comparability was limited by differences in methodology and reporting. Second, the use of an FFQ introduces measurement error and potential reporting bias (36), particularly in populations with higher BMI, where underreporting is common (37, 38). Third, selection bias may be present, as only elective patients were included, resulting in a higher proportion of individuals with known disease. However, the absence of dietary differences between newly diagnosed and recurrent patients suggests that this bias may have had limited impact. Finally, the relatively small sample size may have limited the ability to detect subtle differences between linguistic groups.

These findings have important implications for clinical practice and public health. First, they highlight the need for more effective nutrition interventions in patients with CAD, as current strategies appear insufficient to achieve meaningful dietary change. Second, they suggest that smoking cessation may serve as an entry point for broader lifestyle modification, including improvements in diet. Third, they underscore the importance of addressing overweight and obesity, given their high prevalence and association with other risk factors. Finally, they reinforce the role of cardiovascular rehabilitation programs as key components of secondary prevention, promoting integrated lifestyle changes.

This study evaluated dietary intake in a cohort of patients with coronary artery disease and compared them with national reference data. Overall, dietary intake were suboptimal and, in some respects, less favorable than those observed in the general Swiss population.

The dietary pattern was characterized by insufficient intake of fruits, vegetables, and fiber, and a high reliance on animal products such as red and processed meat and cheese. Consumption of alternative protein sources, including plant-based proteins, was limited. Bread consumption was high and likely contributed to excessive salt intake. Intake of nuts, seeds, and healthy fats was also insufficient.

Contrary to our hypothesis, no significant differences in dietary intake were observed nor between French- and German-speaking participants, neither between patients with and without established CAD. This suggests that, within this clinical population, dietary behaviors may be more strongly influenced by disease-related and sociodemographic factors than by linguistic or cultural background. Interestingly, former smokers tended to adopt better dietary habits, highlighting the importance of promoting smoking cessation among CAD patients.

Declarations

AUTHORS' CONTRIBUTIONS

Aurélien Clerc led the study and wrote the article, under the supervision of Stéphane Cook. Serban Puricel assisted with the statistics. Yannick Faucherre helped for the data management. All authors commented the previous versions of the manuscript, read and approved the final manuscript.

Ethical approval. The study was conducted in accordance with the protocol approved by the ethics committee of the canton of Vaud (CER-VD), the Declaration of Helsinki, and Swiss human research legislation.

Consent to participate. Participants received study information and the informed consent form (ICF) by mail one week prior to the procedure. Every participant signed the ICF.

Consent for publication. All authors consent to the publication of this manuscript.

Data Availability. All data were anonymized, and only the PI had access to the linkage between participant identity and study data. In case of interest for the anonymized data, please contact the corresponding author.

Competing interests. The authors declare no financial or non-financial competing interests that could influence the results.

Funding. This study was funded by The Fonds Scientifique Cardiovasculaire Fribourg.

Acknowledgements. The main author wishes to thank Prof Angeline Chatelan, RD, PhD, for her insightful and precise advice, Serban Puricel for his assistance with the statistics, Yannick Faucherre for his help for the data management and Roland Gassmann for his efficiency in managing the Swiss eFFQ. Artificial intelligence tools such as DeepL, Google Translate and ChatGPT were used as aids for translating and rephrasing. Consensus was used for the literature review.

References

1. Roth GA, Johnson C, Abajobir A, Abd-Allah F, Abera SF, Abyu G, et al. Global, Regional, and National Burden of Cardiovascular Diseases for 10 Causes, 1990 to 2015. J Am Coll Cardiol. 2017 Jul;70(1):1–25. doi:10.1016/j.jacc.2017.04.052
2. Chammartin F, Probst-Hensch N, Utzinger J, Vounatsou P. Mortality atlas of the main causes of death in Switzerland, 2008–2012. Swiss Med Wkly. 2016 Feb 22. doi:10.4414/smw.2016.14280
3. Surveillance of noncommunicable diseases [Internet]. [cited 2026 May 1]. Available from: https://www.who.int/teams/noncommunicable-diseases/surveillance
4. The Global Cardiovascular Risk Consortium. Global Effect of Cardiovascular Risk Factors on Lifetime Estimates. N Engl J Med. 2025 Jul 10;393(2):125–38. doi:10.1056/NEJMoa2415879
5. Branca F, Lartey A, Oenema S, Aguayo V, Stordalen GA, Richardson R, et al. Transforming the food system to fight non-communicable diseases. BMJ. 2019 Jan 28;l296. doi:10.1136/bmj.l296
6. Aune D, Giovannucci E, Boffetta P, Fadnes LT, Keum N, Norat T, et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. Int J Epidemiol. 2017 Jun 1;46(3):1029–56. doi:10.1093/ije/dyw319
7. Bo S, Ponzo V, Goitre I, Fadda M, Pezzana A, Beccuti G, et al. Predictive role of the Mediterranean diet on mortality in individuals at low cardiovascular risk: a 12-year follow-up population-based cohort study. J Transl Med. 2016 Dec;14(1):91. doi:10.1186/s12967-016-0851-7
8. Delgado-Lista J, Alcala-Diaz JF, Torres-Peña JD, Quintana-Navarro GM, Fuentes F, Garcia-Rios A, et al. Long-term secondary prevention of cardiovascular disease with a Mediterranean diet and a low-fat diet (CORDIOPREV): a randomised controlled trial. The Lancet. 2022 May;399(10338):1876–85. doi:10.1016/S0140-6736(22)00122-2
9. de Lorgeril M, Salen P, Martin JL, Monjaud I, Delaye J, Mamelle N. Mediterranean Diet, Traditional Risk Factors, and the Rate of Cardiovascular Complications After Myocardial Infarction: Final Report of the Lyon Diet Heart Study. Circulation. 1999 Feb 16;99(6):779–85. doi:10.1161/01.CIR.99.6.779
10. Chatelan A, Beer-Borst S, Randriamiharisoa A, Pasquier J, Blanco J, Siegenthaler S, et al. Major Differences in Diet across Three Linguistic Regions of Switzerland: Results from the First National Nutrition Survey menuCH. Nutrients. 2017 Oct 25;9(11):1163. doi:10.3390/nu9111163
11. Vonbank A, Saely CH, Rein P, Drexel H. Lipid parameters in patients with acute coronary syndromes versus stable coronary artery disease. Eur J Clin Invest. 2015 Oct;45(10):1092–7. doi:10.1111/eci.12513
12. Sun T, Chen M, Shen H, PingYin, Fan L, Chen X, et al. Predictive value of LDL/HDL ratio in coronary atherosclerotic heart disease. BMC Cardiovasc Disord. 2022 Dec;22(1):273. doi:10.1186/s12872-022-02706-6
13. Li C, Chen Q, Zhang M, Liu Y, Chu Y, Meng F, et al. The correlation between lipoprotein(a) and coronary atherosclerotic lesion is stronger than LDL-C, when LDL-C is less than 104 mg/dL. BMC Cardiovasc Disord. 2021 Dec;21(1):41. doi:10.1186/s12872-021-01861-6
14. Gilard M. L'analyse des sténoses coronaires : au-delà de la coronarographie. Bull Académie Natl Médecine. 2022 Feb;206(2):250–5. doi:10.1016/j.banm.2021.11.019
15. Pannen ST, Chevillard E, Chatelan A, Marques-Vidal P, Stringhini S, Vorburger R, et al. Relative Validity and Reproducibility of a Semi-Quantitative Web-Based Food Frequency Questionnaire for Swiss Adults. Nutrients. 2025 Apr 30;17(9):1555. doi:10.3390/nu17091555
16. A healthy lifestyle - WHO recommendations [Internet]. [cited 2024 Jul 16]. Available from: https://www.who.int/europe/news-room/fact-sheets/item/a-healthy-lifestyle---who-recommendations
17. Veronese N, Solmi M, Caruso MG, Giannelli G, Osella AR, Evangelou E, et al. Dietary fiber and health outcomes: an umbrella review of systematic reviews and meta-analyses. Am J Clin Nutr. 2018 Mar 1;107(3):436–44. doi:10.1093/ajcn/nqx082
18. Kim Y, Je Y. Dietary fibre intake and mortality from cardiovascular disease and all cancers: A meta-analysis of prospective cohort studies. Arch Cardiovasc Dis. 2016 Jan;109(1):39–54. doi:10.1016/j.acvd.2015.09.005
19. Yip CSC, Lam W, Fielding R. A summary of meat intakes and health burdens. Eur J Clin Nutr. 2018 Jan;72(1):18–29. doi:10.1038/ejcn.2017.117
20. Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Bäck M, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. 2021 Sep 7;42(34):3227–337. doi:10.1093/eurheartj/ehab484
21. Widmer RJ, Flammer AJ, Lerman LO, Lerman A. The Mediterranean Diet, its Components, and Cardiovascular Disease. Am J Med. 2015 Mar;128(3):229–38. doi:10.1016/j.amjmed.2014.10.014

22. OSAV O fédéral de la sécurité alimentaire et des affaires vétérinaires. Bulletin nutritionnel suisse 2021 [Internet]. 2023 [cited 2023 Dec 15]. Available from: https://www.blv.admin.ch/blv/fr/home/lebensmittel-und-ernaehrung/ernaehrung/schweizer-ernaehrungsbulletin/schweizer-ernaehrungsbulletin-2021.html
23. Chappuis A, Bochud M, Glatz N, Vuistiner P, Paccaud F, Burnier M. UNIL [Internet]. Swiss survey on salt intake: main results. Available from: http://www.bag.admin.ch/themen/ernaehrung_bewegung/05207/05216/12335/index.html?lang=fr&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln1ae2IZn4Z2qZpnO2Yuq2Z6gpJCKdoN3fWym162epYbg2c_JjKbNoKSn6A--
24. Marques-Vidal P, Quinteiros Fidalgo AS, Schneid Schuh D, Voortman T, Guessous I, Franco OH. Lessons learned? Changes in dietary behavior after a coronary event. Clin Nutr ESPEN. 2019 Feb;29:112–8. doi:10.1016/j.clnesp.2018.11.010
25. Scotto CJ, Waechter DJ, Rosneck J. Adherence to prescribed exercise and diet regimens two months post-cardiac rehabilitation. Can J Cardiovasc Nurs J Can En Soins Infirm Cardio-Vasc. 2011;21(4):11–7. PubMed PMID: 22165501.
26. Vitale M, Masulli M, Cocozza S, Anichini R, Babini AC, Boemi M, et al. Sex differences in food choices, adherence to dietary recommendations and plasma lipid profile in type 2 diabetes – The TOSCA.IT study. Nutr Metab Cardiovasc Dis. 2016 Oct;26(10):879–85. doi:10.1016/j.numecd.2016.04.006
27. Malara M, Widłak P, Tomczyk Ł. Gender differences in diet and health promoting nutrition among university students. Sci Rep. 2025 Nov 19;15(1):40778. doi:10.1038/s41598-025-24604-5
28. Iizuka K, Yanagi K, Deguchi K, Ushiroda C, Yamamoto-Wada R, Kobae K, et al. Sex and Age Differences in the Effects of Food Frequency on Metabolic Parameters in Japanese Adults. Nutrients. 2024 Sep 2;16(17):2931. doi:10.3390/nu16172931
29. Pistelli F, Aquilini F, Carrozzi L. Weight Gain after Smoking Cessation. Monaldi Arch Chest Dis. 2016 Jan 22;71(2). doi:10.4081/monaldi.2009.367
30. Ward KD, Klesges RC, Vander Weg MW. Cessation of Smoking and Body Weight. In: Björntorp P, editor. International Textbook of Obesity [Internet]. 1st ed. Wiley; 2001 [cited 2026 Apr 18]. p. 323–36. Available from: https://onlinelibrary.wiley.com/doi/10.1002/0470846739.ch22 doi:10.1002/0470846739.ch22
31. Leslie WS, Koshy PR, Mackenzie M, Murray HM, Boyle S, Lean ME, et al. Changes in body weight and food choice in those attempting smoking cessation: a cluster randomised controlled trial. BMC Public Health. 2012 Dec;12(1):389. doi:10.1186/1471-2458-12-389
32. Luo T, Tseng TS. Diet quality as assessed by the healthy eating index-2020 among different smoking status: an analysis of national health and nutrition examination survey (NHANES) data from 2005 to 2018. BMC Public Health. 2024 May 2;24(1):1212. doi:10.1186/s12889-024-18630-7
33. Lampka M, Olszewska-Słonina D, Hołyńska-Iwan I, Grąbczewska Z, Obońska K, Cwynar A, et al. Effect of Low High-Density Lipoprotein Level on Endothelial Activation and Prothrombotic Processes in Coronary Artery Disease—A Pilot Study. Int J Environ Res Public Health. 2022 Jul 15;19(14):8637. doi:10.3390/ijerph19148637
34. Carter AR, Gill D, Davies NM, Taylor AE, Tillmann T, Vaucher J, et al. Understanding the consequences of education inequality on cardiovascular disease: mendelian randomisation study. BMJ. 2019 May 22;l1855. doi:10.1136/bmj.l1855
35. Kim MS, Kim WJ, Khera AV, Kim JY, Yon DK, Lee SW, et al. Association between adiposity and cardiovascular outcomes: an umbrella review and meta-analysis of observational and Mendelian randomization studies. Eur Heart J. 2021 Sep 7;42(34):3388–403. doi:10.1093/eurheartj/ehab454
36. Naska A, Lagiou A, Lagiou P. Dietary assessment methods in epidemiological research: current state of the art and future prospects. F1000Research. 2017 Jun 16;6:926. doi:10.12688/f1000research.10703.1
37. Rasmussen LB, Matthiessen J, Biltoft-Jensen A, Tetens I. Characteristics of misreporters of dietary intake and physical activity. Public Health Nutr. 2007 Mar;10(3):230–7. doi:10.1017/S136898000724666X
38. Ravelli MN, Schoeller DA. Traditional Self-Reported Dietary Instruments Are Prone to Inaccuracies and New Approaches Are Needed. Front Nutr. 2020 Jul 3;7:90. doi:10.3389/fnut.2020.00090

Tables

Table 1 Characteristics of the population of the coronahrung study

Number	186
Age (years, mean ± SD)	63.5 ± 7.9
Age groups (number, %)	
18-34 years	0
35-49 years	9 (4.8%)
50-64 years	89 (47.9%)
65-75 years	88 (47.3%)
Language (number, %)	
French	134 (72.0%)
German	52 (28.0%)
Sex (number, %)	
Female	51 (27.4%)
Male	135 (72.6%)
Recurrence (number, %)	
No	81 (43.6%)
Yes	105 (56.4%)
BMI (kg/m^2, mean ± SD)	27.4 ± 4.5
BMI categories (number, %)	
Underweight	1 (0.5%)
Normal	61 (32.8%)
Overweight	83 (44.6%)
Obesity	41 (22.1%)
Education level (number, %)	
Primary	25 (13.4%)
Secondary	108 (58.1%)
Tertiary	53 (28.5%)
Smoking (number, %)	
Never	72 (38.7%)
Former	48 (25.8%)
Current	66 (35.5%)
Physical activity level (number, %)	
Low	28 (15.1%)
Moderate	125 (67.2%)
High	33 (17.7%)

Collected variables expressed in mean ± standard deviation (SD) for age and BMI (body mass index), or in absolute and relative frequencies for the others

Table 2 Dietary intake, energy and macronutrients intake of the coronahrung population, according to language, recurrence, sex and smoking status

Number	*186*	*134*	*52*		*81*	*105*		*135*	*51*		*72*	*66*	*48*	
Intake (mean ± SD)	All	French	German	Diff.	New case	Recurrence	Diff.	Men	Women	Diff.	Never smoker	Current smoker	Former smoker	Diff.
Fruit (g)	195 ± 144	203 ± 150	173 ± 126	0.217	188 ± 147	199 ± 143	0.607	176 ± 132	242 ± 164	0.005*	216 ± 138	139 ± 118	212 ± 159	0.007*
Vegetable (g)	143 ± 77	142 ± 75	146 ± 83	0.726	134 ± 71	150 ± 81	0.181	139 ± 76	153 ± 80	0.271	148 ± 73	119 ± 69	155 ± 84	0.037*
Bread (g)	96 ± 63	97 ± 66	93 ± 55	0.673	98 ± 65	95 ± 61	0.752	101 ± 65	84 ± 54	0.106	85 ± 56	99 ± 60	107 ± 70	0.115
Eggs (g)	14 ± 12	13 ± 12	15 ± 12	0.196	14 ± 13	13 ± 11	0.462	14 ± 12	13 ± 12	0.892	14 +-/ 11	13 ± 11	14 ± 13	0.871
Cheese (g)	34 ± 23	32 ± 24	37 ± 22	0.263	34 ± 24	33 ± 22	0.989	33 ± 23	34 ± 24	0.878	36 ± 24	32 ± 22	32 ± 23	0.495
Meat total (g)	103 ± 54	102 ± 55	106 ± 52	0.622	109 ± 57	99 ± 51	0.226	100 ± 49	113 ± 65	0.272	104 ± 57	95 ± 44	109 ± 57	0.375
Processed meat (g)	18 ± 18	18 ± 18	19 ± 16	0.597	18 ± 14	18 ± 20	0.841	18 ± 18	19 ± 18	0.669	17 ± 19	18 ± 15	19 ± 18	0.835
Raw meat (g)	58 ± 38	56 ± 38	63 ± 37	0.242	63 ± 42	54 ± 35	0.102	56 ± 34	63 ± 48	0.707	57 ± 46	53 ± 26	62 ± 36	0.447
Poultry (g)	27 ± 22	28 ± 23	24 ± 17	0.378	28 ± 23	26 ± 21	0.691	25 ± 20	31 ± 27	0.219	29 ± 20	23 ± 21	28 ± 24	0.381
Fish (g)	20 ± 16	21 ± 17	17 ± 13	0.281	20 ± 15	20 ± 17	0.747	20 ± 17	19 ± 16	0.678	23 ± 17	16 ± 14	20 ± 17	0.073
Tofu (g)	2 ± 7	2 ± 7	2 ± 4	0.955	1 ± 4	3 ± 8	0.210	3 ± 8	1 ± 2	0.011*	2 ± 6	1 ± 4	3 ± 9	0.502
Nuts (g)	9 ± 12	9 ± 13	7 ± 8	0.282	9 ± 15	8 ± 9	0.930	8 ± 9	10 ± 17	0.827	8 ± 9	6 ± 7	12 ± 17	0.036*
Oil (g)	14 ± 8	14 ± 9	13 ± 6	0.536	14 ± 9	13 ± 7	0.672	13 ± 8	15 ± 8	0.070	14 ± 8	14 ± 9	13 ± 7	0.844
Energy (kcal)	1731 ± 517	1716 ± 509	1774 ± 76	0.499	1745 ± 518	1721 ± 518	0.754	1735 ± 531	1723 ± 482	0.888	1709 ± 524	1669 ± 482	1802 ± 533	0.355
Carbs (g)	181 ± 53	182 ± 6	179 ± 9	0.712	180 ± 63	183 ± 64	0.766	182 ± 61	180 ± 63	0.873	180 +-/ 68	178 ± 62	185 ± 59	0.814
Fiber (g)	19 ± 8	19 ± 8	19 ± 8	0.818	19 ± 9	19 ± 7	0.552	19 ± 8	19 ± 8	0.622	19 ± 7	16 ± 7	21 ± 9	0.013*
Proteins (g)	72 ± 23	71 ± 24	74 ± 23	0.375	74 ± 25	70 ± 22	0.292	71 ± 24	73 ± 23	0.661	72 ± 22	68 ± 21	74 ± 27	0.324
Fat (g)	69 ± 25	67 ± 24	72 ± 26	0.209	69 ± 25	68 ± 24	0.671	68 ± 26	71 ± 22	0.435	70 ± 25	65 ± 23	70 ± 26	0.410
Salt (g)	5 ± 2	5 ± 2	5 ± 2	0.624	5 ± 2	5 ± 2	0.933	5 ± 2	4 ± 2	0.334	5 ± 2	5 ± 2	5 ± 2	0.762
Cholesterol (mg)	263 ± 102	255 ± 102	286 ± 101	0.063	269 ± 109	259 ± 97	0.505	262 ± 105	266 ± 96	0.809	268 ± 101	248 ± 89	270 ± 113	0.489
Sugar (g)	88 ± 43	89 ± 33	85 ± 33	0.906	84 ± 36	90 ± 48	0.376	85 ± 39	93 ± 53	0.323	89 ± 50	86 ± 42	88 ± 35	0.949
Alcohol (g)	9 ± 14	9 ± 16	9 ± 11	0.214	9 ± 15	9 ± 14	0.929	11 ± 16	5 ± 10	0.001*	6 ± 6	10 ± 15	12 ± 19	0.052

Differences (Diff.) expressed with p-value in food, energy and nutrients intakes exposed in grams (g) or milligrams (mg) per day with t-test or Wilcoxon-Mann-Whitney test for language, recurrence and sex, and with analysis of variances (ANOVA) for smoking use ; SD = standard deviation

Figures

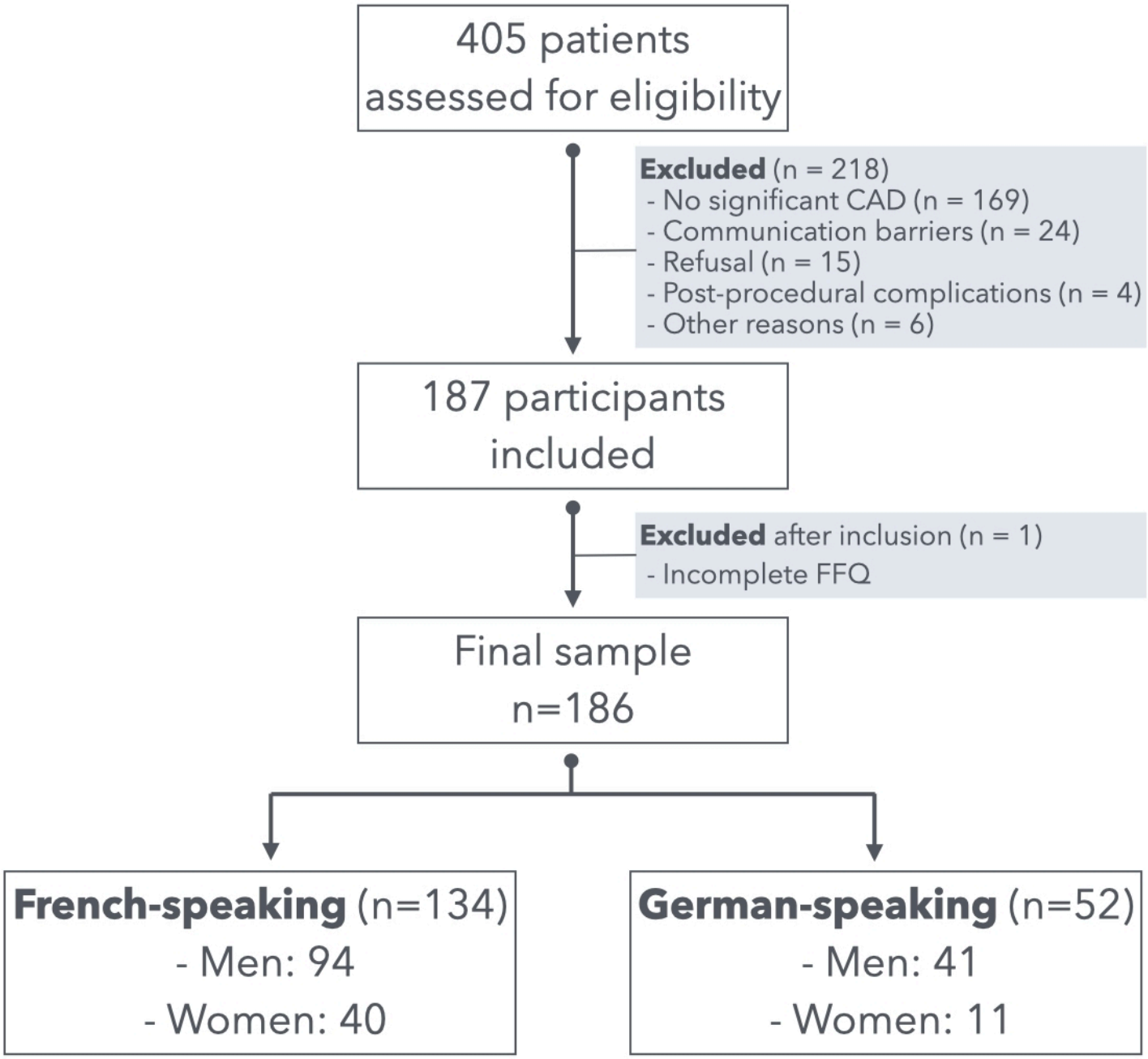


Figure 1

Flow chart of inclusion process ; FR = French-speaking, GE = German-speaking ; FFQ = food frequency questionnaire