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Conversation aids with absolute estimates and certainty of evidence to elicit people's perspectives on saturated fat reduction: a cross-sectional regional survey in seven countries

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What's new?

Incorporating people's perspectives, often referred to as values and preferences or patient preference information, is an essential component of modern health practice guidelines, particularly those that claim to be evidence-based. Based on regional sampling from seven countries (n=3663), after being presented with the estimated absolute risk reduction for a heart attack based on low certainty evidence from a Cochrane review, 50.2% of respondents reported being willing to lower their saturated fat intake, with females and non-omnivores showing the highest preferences for saturated fat reduction and those holding a university degree the lowest. In evidence-based practice, conditional recommendations that are typically based on low to moderate certainty evidence should be discussed with patients while taking into consideration their values and preferences, thus promoting informed and shared health care decisions. This study can be used to advance the methodological rigor of guideline recommendations addressing dietary fat interventions, guidelines that have lagged behind medicine with respect to collecting and incorporating patient and general public perspective in guideline development.

ABSTRACT

Introduction: Patients are increasingly recognized as key interest holders in healthcare decision-making. Integrating patient's perspective is crucial to patient-centered, evidence-based nutrition guideline recommendations.

Objectives: To examine individuals' willingness to decrease consumption of foods high in saturated fatty acids (SFA) after being informed about the estimated absolute risk reduction

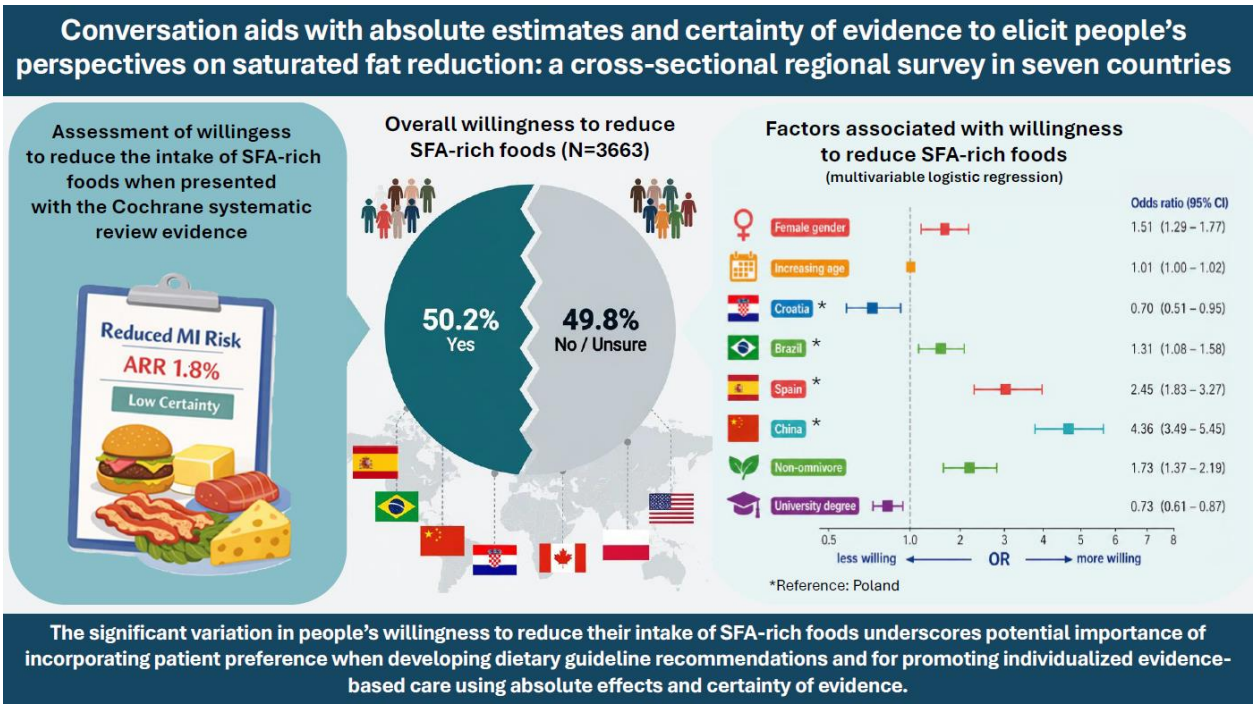
(ARR) in myocardial infarction (MI) together with the certainty of the supporting evidence based on a Cochrane systematic review.

Methods: Based on regional samples from seven countries, respondents were presented with a conversation aid with the ARR of MI together with the certainty of evidence and asked about their willingness to reduce their intake of SFA-rich foods. Using a multivariable logistic regression model we explored 12 variables to identify factors underlying respondents' willingness to introduce dietary fat changes.

Results: We analyzed 3663 respondents from regions of Brazil, China, Croatia, Canada, Poland, Spain and USA. Overall, 50.2% were willing to reduce their SFA intake. Females (odds ratio, OR=1.51, 95% confidence interval [CI]: 1.29-1.77), non-omnivores (OR=1.73, 95%CI: 1.37-2.19), respondents from Spain, China and Brazil (OR=2.45, 95%CI: 1.83-3.27; OR=4.36, 95%CI: 3.49–5.45; OR=1.31, 95%CI: 1.08–1.58, respectively) showed greater willingness, whereas those from Croatia or holding a university degree showed lower willingness (OR=0.70, 95%CI: 0.51–0.95; OR=0.73, 95%CI: 0.61-0.87, respectively).

Conclusions: The significant variation in people's willingness (e.g. gender, education levels, dietary pattern) to reduce their intake of SFA-rich foods underscores potential importance of incorporating patient preference when developing dietary guideline recommendations, and for promoting individualized evidence-based care using absolute effects and certainty of evidence.

Keywords: absolute risk reduction; discrete choice experiment; myocardial infarction; saturated fat; values and preferences



INTRODUCTION

For health-conscious members of society it is often difficult to decide what food products to choose to optimize health and contribute to overall well-being. With respect to fat consumption, dietary guidelines have produced changing, inconsistent and often controversial recommendations [1,2]. While debated [3], many studies have addressed a possible causal relationship between patterns in dietary fat intake and cardiovascular risk [4–7] and numerous systematic reviews and meta-analyses have examined the potential association of fat consumption, particularly saturated fatty acids (SFA) with various cardiovascular events including stroke and myocardial infarction [8–11]. A dose-response meta-analysis of cohort studies, however, showed that higher intake of SFA may not be associated with increased risk of cardiovascular disease (CVD) [8], while in an overview of 17 systematic reviews, the summary findings were based primarily on low and very low certainty of evidence [11]. Despite the varying results and interpretation of results, reducing the consumption of foods high in SFA has been recommended by most governmental and health-related organizations [1]. The latest

World Health Organization (WHO) recommendation [12] states that adults and children should reduce their SFA intake to 10% of total daily energy intake (%E), a strong recommendation regardless of baseline cardiovascular risk. According to the National Lipid Association and European Society for Cardiology, people with dyslipidemia are advised to further reduce their SFA intake to no more than 7%E [13,14].

The above guideline recommendations may be more easily accepted, implemented and adhered to when aligned with patient and public perspectives. Moreover, incorporating people's perspectives, often referred to as patient preference information [15] or, based on the GRADE approach, patient values and preferences [16], is an essential component of modern health guidelines, particularly those that claim to be evidence-based. Meanwhile, the quality of nutrition guidelines has been shown to vary substantially, with many scoring low on key methodological criteria such as rigor of development, interest holder involvement (e.g. incorporation of values and preferences of guideline end-users), and applicability, indicating room for significant improvement [17]. The first studies to investigate people's preferences (willingness) specific to individualized dietary change interventions relevant to guideline recommendations focused on processed and unprocessed meat intake and the lifetime risk of cancer incidence and mortality [18–22]. To extend these methods to people's preferences related to dietary fat, in this cross-sectional study from seven countries, we aimed to investigate people's willingness to reduce their intake of foods high in SFA based on their understanding of summaries of the available systematic review evidence about the potential reduction in myocardial infarction (MI) risk. As secondary aim, we explored the associations between people's declared willingness to reduce their intake of SFA-rich foods and their sociodemographic or health-related characteristics.

METHODS

***Study design and setting*:** Based on our protocol previously published on the OSF website [23], to understand people's values and preferences related to dietary fat changes, we conducted a cross-sectional survey in multiple countries. In line with the GRADE approach, we defined 'values' as individuals' perspectives on the personal significance of various health outcomes and indicators (e.g., mortality, MI, LDL-C reduction), while 'preferences' refer to individuals' willingness to follow a recommendation for dietary changes when provided with the available systematic review evidence to manage outcomes they value [24,25]. In particular, we surveyed people about their preferences (willingness) to reduce foods high in SFA related to the absolute risk reduction and certainty of reduction of a valued outcome (i.e. myocardial infarction), based on the most up-to-date Cochrane systematic review [10].

***Study population*:** The study population included adults between 18-80 years of age using regional samples from China, Brazil, Canada, Croatia, Poland, Spain and the USA. We used non-probabilistic sampling techniques (convenience or purposive depending on the study site) to recruit respondents via university mailing lists and social media postings. Based on the university mailing lists and social media posts linked to university affiliations, the respondents were mainly from academic populations, a sample likely to have higher health literacy necessary to understand science-based information. The details on our regional sampling strategy for each country can be found within the **Supplementary material, Appendix A**. We excluded respondents if they reported any of the following: pregnancy, familial hypercholesterolemia or eating disorders such as anorexia, bulimia, orthorexia, as these were considered to substantially impact people's eating habits related to dietary fat intake.

Ethical statement: Each participating country obtained an approval from their local Ethics Board (Brazil – Brazilian Ethic Committee approval (CAAE do NutriRECS: 57412522.5.0000.5500), Canada – Research Ethics Board for Health Sciences at Dalhousie University (REB # 2021-5578), China – Medical Research Ethics Board at School of Public Health, Lanzhou University (IRB21031201), Croatia – Etičko Povjerenstvo, University of Split School of Medicine (no. 2181-198-03-04-21-00300), Poland – Komisja Bioetyczna UJ (no. 1072.6120.141.2019), Spain (21/186 (R-OBS)), U.S. – the Texas A&M Institutional Review Board (IRB2023-0440M)). Participation in the study was voluntary and participants could withdraw from the study at any time without penalty.

Sample size: To inform our sample size we used a sample size calculator [26]. Based on previous value and preference studies related to dietary changes based on low certainty evidence [27], which yielded different results depending on the country, we assumed 0.20 (20%) would be willing to change their SFA intake based on a 5% margin of error, indicating an estimated sample of 246 participants.

Questionnaire: We developed a common questionnaire in English [**Supplementary material, Appendix C**], which was culturally adapted and translated to Portuguese, Chinese, Croatian, Polish and Spanish, then back-translated to ensure accuracy. Subsequently, we piloted the questionnaire using small convenience samples in each participating country. Revisions were considered based on pilot feedback to improve the clarity of questions and the time required to complete the questionnaire. Survey techniques applied in each countries regional sample are listed in **Supplementary material, Appendix A**.

The first section collected sociodemographic characteristics (age, gender, education level, professional and marital status) and lifestyle characteristics (smoking history, physical activity level, general dietary pattern, i.e. omnivore, pesco-vegetarian, pesco-ovo-vegetarian or vegan). We also inquired about participants medical history including the presence of diabetes mellitus (DM), use of blood pressure (HBP) lowering medication and CVD history (e.g. MI, stroke, atherosclerosis, cardiovascular surgery).

In the second section of the questionnaire, based on four easily recallable risk factors (i.e. smoking habits, DM, the use of HBP lowering medication and CVD history) each participant was assigned to one of four (low to very high) baseline CVD risk groups and presented with a discrete choice experiment [28] scenario together with a conversation aid tailored to their baseline CVD risk (details on risk stratification assumptions can be found in **Supplementary material, Appendix B**). The conversation aids were based on a Cochrane 2020 systematic review and meta-analysis [10] with the estimated ARR for a fatal or non-fatal MI associated with lower SFA intake over 4.5 years of follow-up, together with the corresponding certainty based on the GRADE certainty of evidence approach (**Figure 1**). To ensure a similar understanding of the health state for MI [28], we provided either a short video (online) or explanation (face-to-face) on MI symptoms, its treatment and health consequences. We used the program *Doodly* to create videos with accompanying audio recorded in six languages.

For low cardiovascular risk participants, the conversation aid showed that without making any changes 20 people per 1000 would experience a heart attack, while with SFA reduction there will be 2 fewer MI cases per 1000; for moderate risk – 70 people per 1000 would experience a heart attack without making any changes, while with SFA reduction there will be 7 fewer MI cases per 1000; for high risk – the numbers were 180 people per 1000 and 18 fewer cases per

1000 respectively; and for very high risk – the numbers were 240 people per 1000 and 24 fewer MI cases per 1000 respectively. Based on GRADE guidance the certainty of the presented evidence was low, which was clarified to lay audience in the accompanying materials to indicate that "the results come from studies with some methodological limitations" and that "there is the possibility that a reduction in the consumption of foods high in saturated fat may not result in a reduction of the risk of experiencing a heart attack". In all the scenarios we followed a food-based approach and we included images of SFA-rich foods selected according to what was culturally appropriate in each country or region based on typical consumption habits and availability. The online respondents were also encouraged to use a link providing access to a more comprehensive panel of photographs with other examples of SFA-rich foods. In the **Supplementary material, Appendix D** we include details on the development of the conversation aids tailored to the given country region as well as the panel of SFA-rich foods. Each participant was asked how willing, given their potential MI risk reduction over the next 4.5 years, they were to reduce their intake of the presented foods. The only difference between the presented scenarios was the estimated ARR (e.g. higher ARR for those assessed as higher baseline CVD risk). A 7-point Likert scale was used to measure participants' willingness with 1 representing *definitely not willing* (not being convinced by the presented ARR and certainty), and 7 - *definitely willing* (being convinced that ARR and certainty of reduction would be personally beneficial).

***Statistical analysis*:** We presented the sociodemographic characteristics of all participants in total and for each regional sample from each country separately followed by health-related characteristics. Descriptive summary statistics for categorical variables were reported using absolute numbers and percentages. A continuous variable that was not normally distributed was described using median and IQR. We dichotomized the variable willingness to reduce SFA

intake into two categories: limited *to unwilling to reduce* covering response options 1 to 4 on a Likert scale, and *willing to reduce* covering response options 5 to 7.

We used multivariable binomial logistic regression to assess the associations between the willingness to reduce intake of products high in SFA and five sociodemographic variables including gender, age, country, education level, marital status, as well as seven health-related variables: dietary pattern, smoking, DM diagnosis, HBP treatment, prior CVD event, BMI category and physical activity level. For the identification and exclusion of potential multicollinearity between predictors, the Variance Inflation Factor (VIF) was calculated. The results were presented as odds ratios (OR) with 95% confidence intervals (CI).

Figure 3 shows the study samples used in our descriptive and multivariable regression analyses. We included only complete cases excluding participants with missing outcome data. To assess the robustness of our complete case analysis, we performed multiple imputation followed by a sensitivity analysis on this dataset to evaluate whether missing data influenced our findings. Multiple imputation addresses potential bias by using observed data to estimate missing values under the Missing at Random (MAR) assumption, which allowed us to compare results from the imputed datasets with those from the complete case analysis [29]. The criterion for statistical significance was set at alpha = 0.05. We utilized IBM SPSS Statistics for Windows, version 29 (IBM Corp., Armonk, N.Y., U.S.) to perform all statistical analyses.

RESULTS

Participant demographics: We collected data from 3,663 respondents (65.9% females, median age: 33 years, Q1;Q3: 24;44). Most respondents (61.2%) had a BMI within the normal range, while 33.9% were classified as overweight or obese. Over 70% of respondents held a higher education degree. Nearly two-thirds (65.6%) were employed and 34.3% were students (**Table**

1). The study sample predominantly comprised individuals reporting a healthy lifestyle, with nearly 70% engaging in moderate or high levels of physical activity and 88.5% identifying as non-smokers. Most respondents (89.5%) followed an omnivorous diet and about 10% reported avoiding specific food groups, primarily animal-based products (**Table 1**). Most participants (80.8%) did not report any of the cardiovascular risk factors. Among those with cardiovascular risk, 16% were categorized as moderate risk (e.g., 7% were on HBP medication), 1.3% as high risk, and 1.9% as very high risk due to a history of CVD such as MI, atherosclerosis, stroke, or heart surgery (**Table 1**).

Willingness to reduce SFA-rich foods: Over half of the respondents (50.2%) expressed their willingness to reduce SFA intake, with data for all regional samples from seven countries presented in total and for each country separately (**Figure 2**). Willingness varied by country regional sample: the highest rates were observed in China (72.4%), followed by Spain (65.7%), Canada (52.8%), Brazil (50.9%), Poland (41.1%), with the lowest willingness in the U.S. and Croatia (each 33.3%) (**Figure 2**).

Based on multivariable logistic regression analysis, respondents from Spain, China and Brazil were significantly more willing to reduce SFA intake compared to those in Poland (OR=2.45, 95%CI: 1.83-3.27; OR=4.36, 95%CI: 3.49–5.45; OR=1.31, 95%CI: 1.08–1.58, respectively), whereas Croatia was significantly less willing to reduce SFA intake (OR= 0.70, 95%CI: 0.51–0.95). Also, females were more willing than males (OR=1.51, 95%CI: 1.29-1.77), and willingness slightly increased with increasing age (OR=1.01, 95%CI: 1.00-1.02). Being widowed was associated with higher willingness when compared with single participants (OR=2.68, 95%CI: 1.01-7.13) (**Table 2**). Non-omnivores (pesco-ovo-vegetarians, pesco-vegetarians, vegans) were more willing to reduce SFA intake than omnivores (OR=1.73,

95%CI: 1.37-2.19) (**Table 2)**, while respondents with a university degree expressed over 25% lower willingness to reduce intake of SFA as compared to those without a university degree (OR=0.73, 95%CI: 0.61-0.87) (**Table 2)**. There was no significant association between the willingness and cardiovascular risk factors such as smoking, DM diagnosis, HBP treatment or a history of a cardiovascular event (MI, stroke) or CVD (atherosclerosis, or cardiovascular surgery) (**Table 2**).

Among 3,663 respondents, 261 had incomplete records. Specifically, missing data was 7.1% overall with 43 having missing outcome data (willingness) while 218 had missing data for at least one predictor variable of interest. Sensitivity analysis using dataset with multiple imputation for missing data [**Supplementary material, Appendix E**] showed minor shifts in *P*-values, with being widowed shifting from significant (P = 0.048) to non-significant (P = 0.21). All other significant variables (i.e., female gender, age, Spanish, Chinese, Brazilian and Croatian regional samples, university degree) remained unchanged.

DISCUSSION

Based on regional samples from over 3,600 participants from seven countries, approximately half (50.2%) of participants were willing to reduce their SFA intake when faced with low certainty evidence for an ARR of fatal and non-fatal MI over the next 4.5 years. Our binary regression model showed that females were more willing than men to modify their dietary habits, and willingness slightly increased with increasing age. Respondents from regional samples in Spain, China and Brazil were more willing to reduce their SFA intake as compared to Poland, as were non-omnivores when compared with omnivores. By contrast, respondents from Croatia as well as those with a university degree were less willing to modify their SFA-rich foods intake. Given our study is the first to collect preferences specific to willingness to

reduce dietary SFA intake using the best available systematic review evidence, our findings may be useful to those developing dietary fat guideline recommendations. Further, with respect to an approximate equal proportion of participants willing and unwilling to reduce their saturated fat intake, our findings suggest that dietary guidelines using the GRADE approach make a conditional recommendation, a recommendation that would support individualized, shared decision-making.

The willingness to reduce dietary SFA intake across samples from seven countries may reflect various socio-cultural factors, many that we could not specifically explore such as prevailing dietary patterns that vary in both the proportion and sources of fat as well as the culturally-defined meanings that shape how specific fat-rich foods are perceived. Furthermore, additional country- or region-specific influences may include food availability, economic conditions, variations in health literacy, and differing levels of willingness to adhere to medical or dietary guidance, as well as trust in scientific information.

The clearest and arguably the most predictive factors for willingness were respondents' gender, education level and dietary pattern (omnivorous vs non-omnivorous). Our findings on gender can be likely explained by a supporting body of evidence that suggests that women tend to be more health conscious and are more likely to engage in health behaviors associated with primary prevention [30,31]. With respect to education level, respondents with a university degree were less willing to modify their dietary fat, perhaps related to increased critical thinking skills or higher health/nutrition literacy [32,33] and possibly ongoing debates on SFA and CVD risk [3]. It may be that participants found the small ARR accompanied by low certainty evidence generally unconvincing to justify dietary SFA changes. Willingness to reduce SFA foods intake

was also lower among omnivores, who arguably may have increased attachment to animal-based foods such as diary and meat, foods that are generally an abundant source of SFA [34].

Despite the fact that limiting SFA has been particularly emphasized in people with increased cardiovascular risk, the analysis of risk factors indicated no significant association between the presence of DM, smoking or taking HBP reducing medication and willingness to reduce SFA intake. Similarly, CVD history, such as MI, stroke, atherosclerosis, or cardiovascular surgery, did not significantly predict participants willingness to modify dietary SFA intake. Perhaps the high cardiovascular risk group respondents are also those who use statins, medications shown to be effective for lowering cholesterol levels and the risk of mortality and major cardiovascular events [35]. By contrast, it may be that behavior and dietary changes are perceived as more demanding to implement, particularly over longer periods of time [36].

Strengths: A key strength of our study is the broad geographical representation from seven countries, data collection that reflects preferences on SFA-rich food reduction from diverse regions and cultural settings. Second, our study is the first to collect preference data on dietary fat using systematic review data, work that should be used to inform future clinical and public health practice guidelines. For example, none of the studies identified in a recent systematic review of values and preferences on fat [37] collected willingness data linked to the best available evidence on reducing SFA intake [10], making our findings highly relevant to guideline developers who wish to follow the GRADE approach and implement value and preference data. Third, we tailored the discrete choice experiment to the estimated baseline cardiovascular risk of the participant based on a series of questions to help determine their estimated ARR of a MI over the next 4.5 years based on a Cochrane review [10]. We also presented participants with information on health states so that all respondents had a similar

understanding of the outcome of interest (fatal and non-fatal MI). A fourth strength of our study is the translation of SFA data into a food-based approach, including the adaptation of pictures of various foods high in SFA according to the country and cultural context (**Supplementary material, Appendix D**). Finally, consistency between the complete case and analyses based on imputed dataset would suggest that missing data did not substantially impact our conclusions, with key variables (gender, age, country, dietary habits and university degree) remaining stable, reinforcing model reliability.

Limitations: Our study is not without limitations. First, we sampled respondents predominately affiliated with universities and used a non-probabilistic sampling technique, therefore the results cannot be considered representative of the general population in the individual countries. Second, we developed a pragmatic and simplified approach to determine respondents' baseline risk of a cardiovascular event, which did not account for age, gender, weight or ethnicity, each of which have been shown to be important cardiovascular risk factors [38,39], and as a result we may have misclassified some participants' baseline risk. Despite the possibility of a misclassification bias, our analysis of willingness by participants' baseline cardiovascular risk did not significantly differ between low to very high risk groups. Also, it must be noted that, due to the characteristics of the applied method of data collection, our results on willingness to reduce SFA intake are of declarative nature, which may not always translate to actual short or long-term changes in dietary behaviours. For example, in our previous study on the willingness to reduce meat intake the 6-month follow-up showed that only 42% changed their eating habits [21]. To understand what proportion of participants would actually reduce their saturated fat intake, follow-up survey data is required. While we presented participants with low certainty evidence for a risk reduction in MI (fatal and non-fatal) when reducing SFA-rich foods, the most recent high-quality systematic review on the topic suggests moderate certainty of evidence

when replacing SFA rich foods with polyunsaturated fat rich foods [40], evidence that may further increase the proportion of people willing to modify their fat intake. Finally, our study investigates people's willingness to simply reduce SFA-rich foods, without reference to what people's SFA calories be replaced with (i.e. a reduction of one nutrient typically entails increase in another).

Implications for practice: Presenting the patient with ARR has been increasingly used in medical practice with numerous conversation aid tools used to support guideline implementation [41] and various presentation formats emphasizing absolute effects and certainty of effects have been tested [42,43]. In dietary guidelines, however, this approach has not been implemented. We hope that our study findings will trigger discussion on the format of developing and presenting recommendations addressing nutrition practice [44].

The results of our study have practical implications to cardiovascular prevention guidelines since adherence to lifestyle changes remains a challenge both to patients and professionals. Since perceived susceptibility to cardiovascular events and the anticipated severity of the consequences are important components of patients' motivation [45], clinicians should provide a personalized presentation of evidence-based information (e.g. absolute estimates and certainty of estimates) to improve individual understanding of the evidence-base and encourage dietary change. Applying this in daily clinical practice, however, is likely to have a number of barriers [46]. For example, patients' ability to adopt a healthy lifestyle depends on cultural, cognitive and emotional factors, the impact of a diagnosis or symptoms, socioeconomic factors, educational level, and mental health [47]. In reality, the pros and cons of a specific dietary change may include more complex factors other than health rationales such as an attachment to certain food products, the sensory appeal of fat-rich foods, tradition and the availability and

price of food [48]. Since providing the patient with science-based arguments may not be sufficient to trigger dietary change, learning about individual willingness to introduce a change may enhance adherence strategies for dietary recommendations.

Implications for research: Our sample of predominantly health-literate, younger female respondents with mainly low CVD risk and with high socioeconomic status implies that values and preference research in a more diverse sample is needed (i.e. lower socio-economic settings, including rural participants). Similarly, research in cardiovascular clinics with patients at intermediate to high CVD risk (e.g. post non-fatal MI, stroke) would be useful for clinical practice guidelines, including values and preference data on SFA modification with polyunsaturated fat rich foods, lifestyle and pharmacological management (e.g. willingness related to statins vs dietary changes to manage CVD risk).

Implications for nutrition guidelines and public health: In 2011, the Institute of Medicine (now the National Academy of Medicine) highlighted the importance of incorporating the perspectives of people who will use guidelines [49]. Given the aforementioned limitations with respect to socioeconomic status and cardiovascular risk, this multi-national cross-sectional study primarily addresses value and preferences among those who are generally health literate and low CVD risk. Based on low to moderate certainty evidence [10, 40] for MI risk reduction, particularly among those at intermediate-high and high CVD risk [40], guideline panelists should consider if clinical and public health guidelines are best framed as strong (e.g. class 1 or 2a) or conditional recommendations (e.g. class 2b). The GRADE approach suggests that value and preference data should indicate that all or almost all target patients or members of the public should be willing to take an intervention to support a strong recommendation, otherwise a conditional recommendation (i.e. shared decision-making) is suggested, particularly if the

evidence is not high certainty or at minimum moderate certainty [50,51]. Based on our findings, the statistically significant variation in willingness between gender, education levels and usual dietary pattern further underscores the potential for a conditional recommendation and as a result, the need for shared decision-making.

CONCLUSION

When presented with summary research evidence from a Cochrane review on the risk of undesirable cardiovascular events, half of the population were willing to reduce their SFA intake. Female gender, Chinese, Spanish or Brazilian regional samples, non-omnivore dietary pattern or older age predicted willingness, while participants from Croatia or holding a university degree were generally unwilling to reduce SFA rich-foods. Our findings are likely to support the need for shared decision-making in future guidelines developed using GRADE methods or equivalent.

Article information

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Conflict of Interest: GHG, PAC, BCJ and MMB are GRADE working group members. In the last five years, BCJ has received a start-up grant from Texas A&M AgriLife Research to fund investigator-initiated research related to saturated and polyunsaturated fats. The grant was from Texas A&M AgriLife institutional funds from interest and investment earnings, not a sponsoring organization, industry, or company. In the last three years, BCJ has also received funds from the National Institute of Diabetes, Digestive and Kidney Diseases (NIDDK) R25 to support training in evidence-based nutrition practice. MMB received funds for lectures on

research methods to Formedis – HTA consulting company. No further competing interests were disclosed.

Contribution statement: MM, APD, CV, LG, TPP, LCL, PAC, BCJ, GG and MMB conceived the idea; MM, APD, CV, BCR, CPB, JGF, QW, MFŽ, DMSSS, SW, HT, LPN, NRG, HT collected the data; KM, KZ, AS, GG, LT provided guidance on statistical analysis, KM, MM, APD, AS analyzed the data; MM interpreted the results and drafted the first version of the manuscript; DMSSS, NRJ, BCJ, LCL, MMB, JZ, PAC, GG, TPP revised for important intellectual content. All authors approved the final version of the article.

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Table 1. Baseline characteristics of the studied population

	Regional Sample by Country							
	Total (n = 3663)	**Brasil (n = 798)**	**Canada (n = 36)**	**China (n = 642)**	**Croatia (n = 257)**	**Poland (n = 1594)**	**Spain (n = 305)**	**U.S. (n = 31)**
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Sociodemographic Variables								
Gender								
Female	2411 (65.9)	608 (76.4)	23 (63.9)	405 (63.1)	180 (70.0)	968 (60.7)	207 (67.9)	20 (64.5)
Male	1250 (34.1)	188 (23.6)	13 (36.1)	237 (36.9)	77 (30.0)	626 (39.3)	98 (32.1)	11 (35.5)
Age (years) Median [Q1;Q3]	33.00 [24.00;44.00]	36.00 [27.00;46.00]	40.00 [26.25;60.00	32.00 [25.00;40.75]	42.00 [34.00;48.00]	26.00 [22.00;41.00]	44.00 [33.00;53.00]	29.50 [26.00;37.75]
Age category								
18-29 years	1515 (41.4)	258 (32.3)	14 (38.9)	244 (38.4)	37 (14.4)	893 (56.0)	54 (17.7)	15 (48.4)
30-45 years	1304 (35.7)	340 (42.6)	7 (19.4)	281 (44.2)	140 (54.5)	420 (26.3)	106 (34.8)	10 (32.3)
46-80 years	838 (22.9)	200 (25.1)	15 (41.7)	111 (17.5)	80 (31.1)	281 (17.6)	145 (47.5)	6 (19.4)
University degree	2662 (72.7)	580 (72.8)	26 (72.2)	508 (79.1)	246 (95.7)	1036 (65.0)	238 (78.5)	28 (90.3)
Employment status (multiple choice in Poland and Spain)								
Employed	2403 (65.6)	529 (66.4)	26 (72.2)	391 (60.9)	235 (91.4)	966 (60.6)	248 (81.3)	8 (25.8)
Unemployed	184 (5.0)	33 (4.1)	1 (2.8)	24 (3.7)	2 (0.8)	66 (4.1)	57 (18.7)	1 (3.2)
Student	1257 (34.3)	158 (19.8)	3 (8.3)	186 (29.0)	19 (7.4)	853 (53.5)	20 (6.6)	18 (58.1)
Retired	108 (2.9)	26 (3.3)	6 (16.7)	41 (6.4)	1 (0.4)	10 (0.6)	20 (6.6)	4 (12.9)
Marital status								
Single	1870 (51.2)	352 (44.6)	11 (30.6)	265 (41.3)	73 (28.4)	1029 (64.6)	131 (43.0)	9 (29.0)
Married	1594 (43.6)	377 (47.7)	22 (61.1)	363 (56.5)	162 (63.0)	497 (31.2)	154 (50.5)	19 (61.3)
Divorced	160 (4.4)	56 (7.1)	1 (2.8)	11 (1.7)	19 (7.4)	57 (3.6)	14 (4.6)	2 (6.5)
Widowed	31 (0.8)	5 (0.6)	2 (5.6)	3 (0.5)	3 (1.2)	11 (0.7)	6 (2.0)	1 (3.2)
Health-related variables								
Smoking	421 (11.5)	49 (6.1)	6 (16.7)	75 (11.7)	65 (25.3)	182 (11.4)	41 (13.4)	3 (9.7)
Exercise level								
High	885 (24.5)	155 (20.1)	21 (58.3)	50 (7.8)	139 (54.5)	421 (26.6)	85 (28.2)	14 (45.2)
Moderate	1626 (45.0)	474 (61.3)	11 (30.6)	269 (42.2)	61 (23.9)	627 (39.6)	175 (58.1)	9 (29.0)
Low	1105 (30.6)	144 (18.6)	4 (11.1)	319 (50.0)	55 (21.6)	534 (33.8)	41 (13.6)	8 (25.8)

BMI (kg/m^2) Median [Q1;Q3]		23.36 [21.00;26.29]	24.77 [22.22;28.09	24.21 [21.64;27.72]	22.31 [20.08;24.90	23.51 [21.60;26.17	23.03 [20.69;26.03	23.15 [20.90;25.76]	24.70 [21.10;27.70]
BMI category									
	Underweight	175 (4.8)	15 (1.9)	0 (0)	57 (9.0)	3 (1.2)	92 (5.8)	5 (1.8)	3 (9.7)
	Normal weight	2209 (61.2)	402 (50.6)	19 (57.6)	426 (67.3)	165 (64.7)	997 (63.0)	186 (66.7)	14 (45.2)
	Overweight	870 (24.1)	247 (31.1)	8 (24.2)	118 (18.6)	70 (27.5)	346 (21.9)	73 (26.2)	8 (25.8)
	Obesity	355 (9.8)	131 (16.5)	6 (18.2)	32 (5.1)	17 (6.7)	148 (9.3)	15 (5.4)	6 (19.4)
Dietary pattern									
	Omnivore	3175 (89.5)	726 (93.0)	27 (75.0)	613 (97.9)	238 (95.2)	1265 (83.0)	275 (91.4)	31 (100)
Non-omnivore	Pesco-vegetarian	175 (4.9)	21 (2.7)	5 (13.9)	9 (1.4)	7 (2.8)	118 (7.7)	15 (5.0)	0 (0)
	Ovo-lacto-vegetarian	149 (4.2)	29 (3.7)	2 (5.6)	3 (0.5)	2 (0.8)	106 (7.0)	7 (2.3)	0 (0)
	Vegan	50 (1.4)	5 (0.6)	2 (5.6)	1 (0.2)	3 (1.2)	35 (2.3)	4 (1.3)	0 (0)
Chronic disease		999 (27.3)	350 (43.9)	7 (19.4)	126 (19.6)	96 (37.4)	324 (20.3)	83 (27.2)	13 (41.9)
Chronic disease diagnosed (multiple choice)									
	Diabetes	80 (2.2)	32 (4.0)	1 (2.8)	16 (2.5)	5 (1.9)	21 (1.3)	5 (1.6)	0 (0)
	Cancer	66 (1.8)	20 (2.5)	1 (2.8)	3 (0.5)	8 (3.1)	21 (1.3)	13 (4.3)	-
	Gastrointestinal	330 (9.1)	144 (18.0)	-	36 (5.6)	35 (13.6)	79 (5.0)	32 (10.5)	4 (12.9)
	Inflammatory	138 (3.8)	24 (3.0)	-	43 (6.7)	14 (5.4)	40 (2.5)	17 (5.6)	0 (0)
	Other	497 (13.6)	170 (21.3)	6 (16.7)	40 (6.2)	45 (17.5)	197 (12.4)	27 (8.9)	12 (38.7)
HBP treatment		247 (6.7)	77 (9.6)	3 (8.3)	29 (4.5)	10 (3.9)	101 (6.3)	24 (7.9)	3 (9.7)
Prior CVD event		72 (2.0)	14 (1.8)	0 (0)	17 (2.6)	4 (1.6)	29 (1.8)	8 (2.6)	0 (0)
Baseline CVD risk									
	Low (no risk factors*)	2925 (80.8)	650 (81.5)	27 (75.0)	531 (84.3)	172 (69.9)	1298 (81.4)	226 (79.0)	21 (67.7)
	Moderate (1 risk factor*)	580 (16.0)	119 (14.9)	8 (22.2)	77 (12.2)	65 (26.4)	248 (15.6)	53 (18.5)	10 (32.3)
	High (2-3 risk factors*)	46 (1.3)	15 (1.9)	1 (2.8)	5 (0.8)	5 (2.0)	19 (1.2)	1 (0.3)	0 (0)
	Very high (CVD	70 (1.9)	14 (1.8)	0 (0)	17 (2.7)	4 (1.6)	29 (1.8)	6 (2.1)	0 (0)
Outcome									
Willingness to reduce									
	Limited to unwilling	1804 (49.8)	392 (49.1)	17 (47.2)	174 (27.6)	164 (66.7)	939 (58.9)	98 (34.3)	20 (66.7)
	Willing to reduce	1816 (50.2)	406 (50.9)	19 (52.8)	456 (72.4)	82 (33.3)	655 (41.1)	188 (65.7)	10 (33.3)

Note: Percentages were calculated using data available for each country

BMI: body mass index; HBP: high blood pressure; CVD: cardiovascular disease

* Risk factors: smoking, diabetes mellitus, high blood pressure lowering medication

** Reported CV history (e.g., myocardial infraction, stroke, atherosclerosis, cardiovascular surgery)

Table 2. Multivariable binomial logistic regression analysis of factors associated with willingness to reduce SFA intake.

Predictors		Willing to reduce SFA intake (dichotomized)	
		OR (95% CI)	**P-value**
Gender			
	Female	1.51 (1.29 – 1.77)	<0.001
	Male	Reference	
Age (years)		1.01 (1.00 – 1.02)	0.02
Country			
	Poland	Reference	
	Croatia	0.70 (0.51 – 0.95)	0.02
	Spain	2.45 (1.83 – 3.27)	<0.001
	China	4.36 (3.49 – 5.45)	<0.001
	Brazil	1.31 (1.08 – 1.58)	0.006
	Canada	1.23 (0.60 – 2.32)	0.58
	U.S.	0.67 (0.30 – 1.50)	0.33
Dietary pattern			
	Omnivore	Reference	
	Non-omnivore	1.73 (1.37 – 2.19)	<0.001
Smoking		0.96 (0.76 – 1.20)	0.71
DM diagnosis		1.08 (0.63 – 1.84)	0.78
HBP treatment		1.23 (0.90 – 1.68)	0.20
Prior CVD event		0.85 (0.50 – 1.44)	0.54
University degree			
	No	Reference	
	Yes	0.73 (0.61 – 0.87)	<0.001
BMI category			
	Underweight	0.86 (0.61 – 1.20)	0.37
	Normal weight	Reference	
	Overweight	1.19 (0.99 – 1.42)	0.06
	Obesity	1.03 (0.80 – 1.33)	0.80
Marital status			
	Single	Reference	
	Married	1.12 (0.92 – 1.35)	0.27
	Divorced	1.36 (0.92 – 2.00)	0.12
	Widowed	2.68 (1.01 – 7.13)	0.048
Exercise level[1]			
	High	Reference	
	Moderate	0.97 (0.80 – 1.16)	0.70
	Low	0.98 (0.80 – 1.20)	0.84
Model summary		$\chi^2(22)=316.31$	
		Nagelkerke pseudo	
		$R^2=11.8\%$	

OR: odds ratio; CI: confidence interval; BMI: body mass index; HBP: high blood pressure; CVD: cardiovascular disease

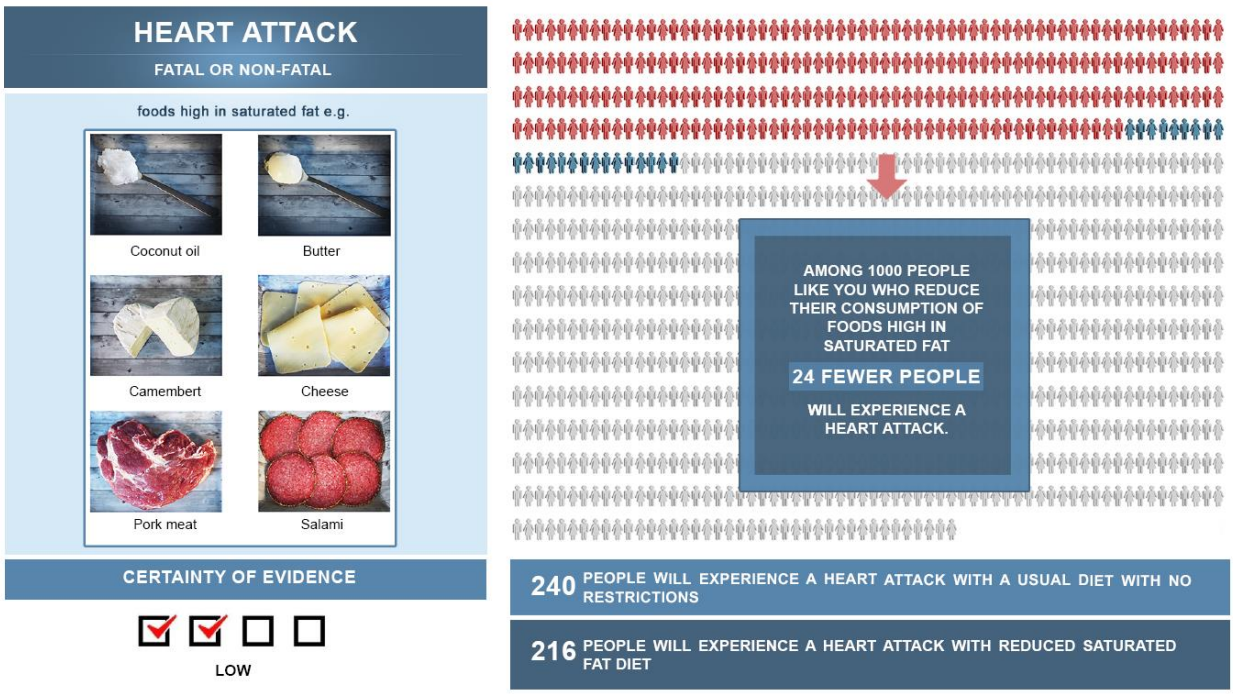

Figure 1. Conversation aid for the very high baseline cardiovascular risk group.

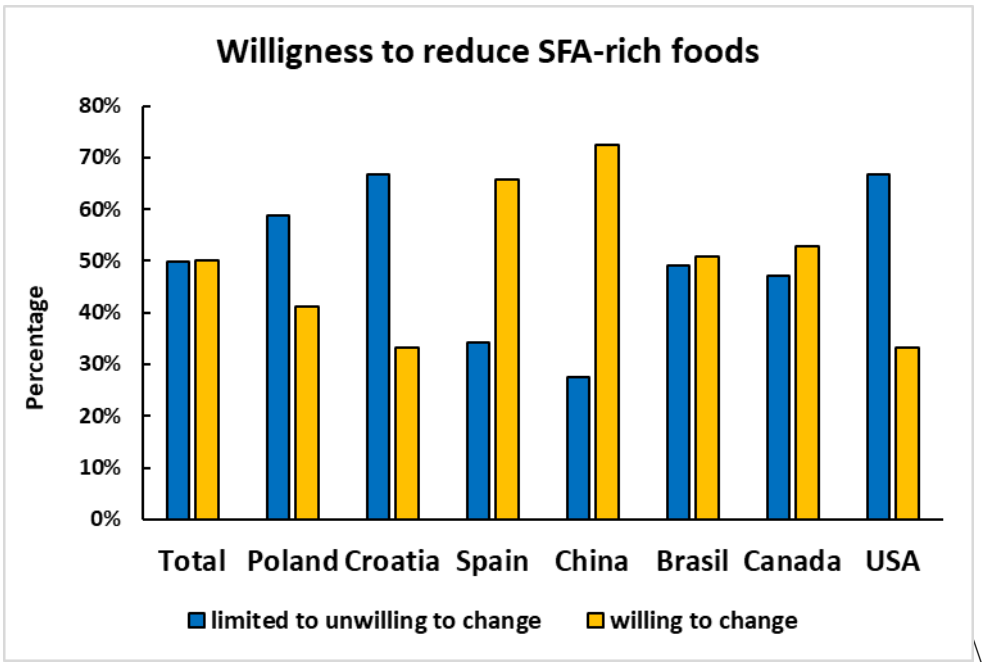

Figure 2. Percentage of people willing to reduce SFA-rich foods across regional samples from 7 countries presented separately and in total. The willingness variable is divided into two categories: “limited to unwilling to reduce” covering responses 1-4 and “willing to reduce” covering responses 5-7.

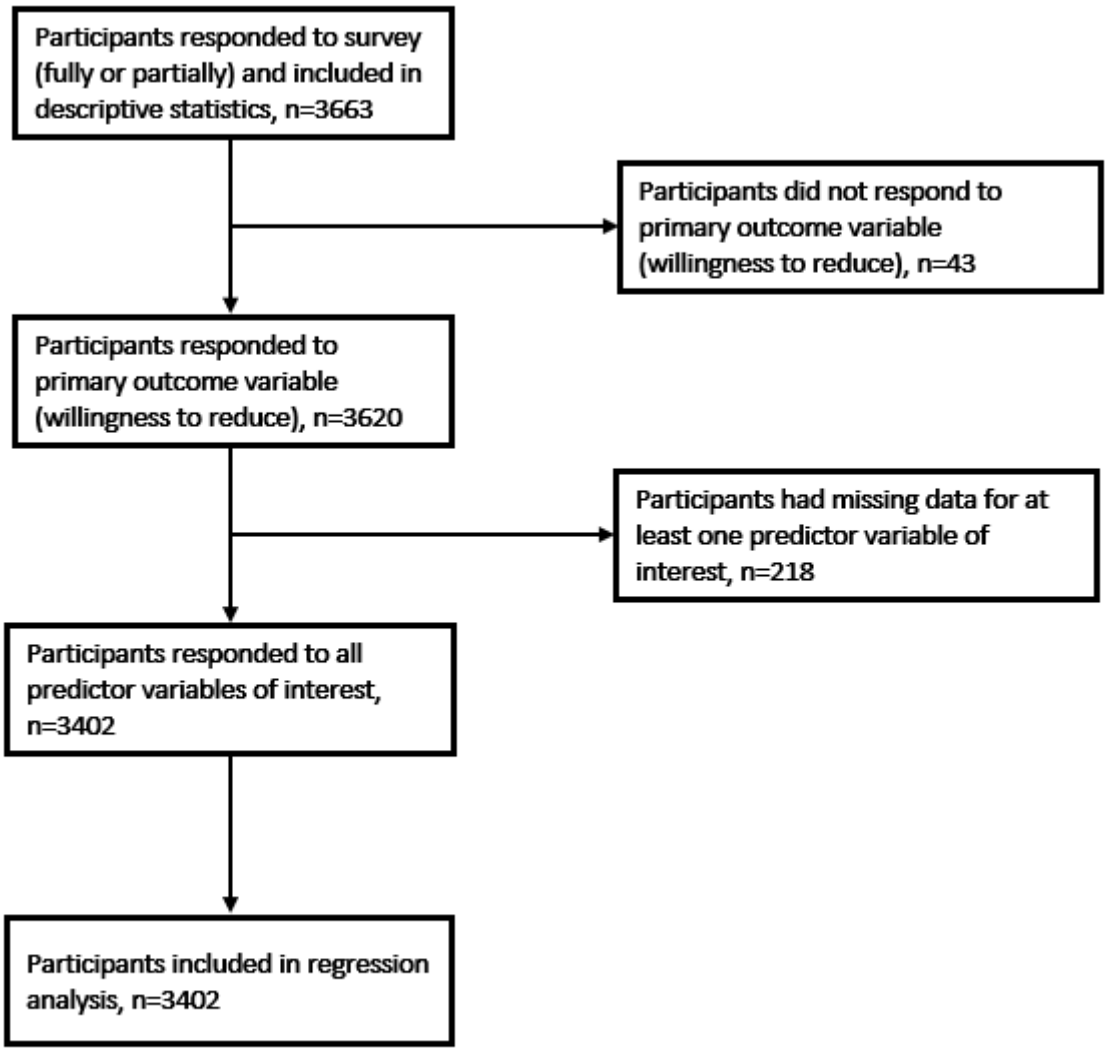

Figure 3. Flow diagram of participant sample used in descriptive and regression analyses.

Short title: People's willingness to reduce saturated fat