



Vegetarianism and meat consumption: A comparison of attitudes and beliefs between vegetarian, semi-vegetarian, and omnivorous subjects in Belgium



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ARTICLE INFO

Article history:

Received 15 December 2016

Received in revised form

13 March 2017

Accepted 31 March 2017

Available online 6 April 2017

Keywords:

Vegetarianism

Attitudes

Beliefs

Diet

Omnivores

ABSTRACT

High levels of meat consumption in Belgium may be contributing to increased risk of non-communicable diseases in this population. The objective of this study is to investigate the attitudes and beliefs about vegetarianism and meat consumption among the Belgian population, ultimately to better understand the motivations underlying these dietary behaviours.

This cross-sectional study was initiated in March 2011. A total of 2436 individuals from a representative consumer panel from the Flemish and Brussels communities participated. The study sample was evenly distributed by education level and sex (1238 men and 1198 women). An online questionnaire with multiple-choice questions about vegetarianism and meat consumption was completed by all participants.

Although representative of the prevalence of vegetarians in the population, the number of vegetarians in the study was low ($n = 38$); the number of semi-vegetarians ($n = 288$) and omnivores was high ($n = 2031$). Vegetarians were more likely than semi-vegetarians to agree that meat production is bad for the environment and that meat consumption is unhealthy. Important reasons for not being vegetarian included lack of interest and awareness, taste, and limited cooking skills. Encouragingly, health and discovering new tastes were seen as the most important motives for considering eating a more vegetarian-based diet.

The results of this study highlight the motivations that can be used for encouraging the general public to reduce their meat consumption in favour of a plant-rich diet, and will help to inform more targeted health campaigns for reducing meat consumption in Belgium.

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Abbreviations: FAO, Food and Agriculture Organization of the United Nations; IARC, International Agency for Research on Cancer; IFPRI, International Food Policy Research Institute; SD, Standard Deviation; WHO, World Health Organization.

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<http://dx.doi.org/10.1016/j.appet.2017.03.052>

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1. Introduction

Meat and meat products represent an important source of protein, vitamins, minerals and micronutrients, however, in developed countries meat consumption is high (Daniel, Cross, Koebnick, & Sinha, 2011; Linseisen et al., 2002; OECD, 2017). At a global level, it has been estimated that moving towards a plant-based diet could reduce mortality by 6–10%, significantly reduce food-related greenhouse gas emissions, and could have substantial economic benefits (Springmann, Godfray, Rayner, & Scarborough,

2016). Health benefits have also been shown for low (zero or less than once per week; or less than 23 g per day) meat intake (Babio et al., 2012; Singh, Sabate, & Fraser, 2003). Individuals who have low or occasional meat intake are often referred to as semi-vegetarians or flexitarian (Derbyshire, 2016; Rothgerber, 2014).

A recent evaluation by the Monographs Programme of the International Agency for Research on Cancer (IARC)/World Health Organization (WHO) concluded that there is a positive association between the consumption of processed meat and the risk of colorectal cancer (Bouvard et al., 2015). A positive association was also seen for consumption of red meat and cancers such as colorectal cancer; however, there was limited evidence for its carcinogenicity. Current public health recommendations are for the average consumption of red meat to be lower than 300 g per week and for very little, if any, processed meat to be consumed (World Cancer Research Fund International, 2016).

With the increased interest in sustainable diets (Food and Agriculture Organization of the United Nations (FAO), 2012), recommendations for lower meat intakes have now been incorporated by national authorities into population dietary guidelines in Sweden, the United Kingdom, the Netherlands and the United States of America (Health Council of the Netherlands, 2015; Public Health England, 2016; Swedish National Food Agency (Livsmedelsverket) (2015); United States Department of Health and Human Services & United States Department of Agriculture, 2015). Furthermore, the 2015 Global Nutrition Report recommended that governments should incorporate climate change considerations into new and existing nutritional strategies (International Food Policy Research Institute (IFPRI) (2015).

Despite the increasing evidence of the positive health effects of reduced meat intake and a plant based diet, meat consumption in Belgium is still much higher than the intake recommended in the Belgian food-based dietary guidelines (De Vriese, Huybrechts, Moreau, & Van Oyen, 2006), and the percentage of vegetarians in Belgium is low (<1.5%) (De Vriese et al., 2006) in comparison to some other European countries (Leitzmann, 2014). The mean daily intake of meat and meat substitutes among the Belgian adult population was 161 g (standard deviation [SD], 56 g) (Vandevijvere et al., 2008), whereas the Belgian guidelines recommend not eating more than 75–100 g of meat and meat substitutes (such as legumes) per day (Vigez, 2012). Of the 161 g of protein products consumed, 120 g (SD, 44 g) was meat intake only, meaning that meat consumption is the main contributor to the excessive intake in this protein food group (De Vriese et al., 2006). Knowledge on the motivations that influence the choice of a vegetarian, semi-vegetarian or an omnivorous dietary pattern is essential to design public health programmes that can support individuals in reducing their meat consumption. Research on attitudes and beliefs about vegetarianism is still scarce in Europe compared with other continents, such as north and south America and Australia. Since meat consumption in Belgium is much higher than recommended, the objective of this study is to investigate the attitudes and beliefs about vegetarianism and meat consumption among the Belgian population, in order to inform more targeted health campaigns for reducing meat consumption.

2. Methods

2.1. Study population and questionnaires

This cross-sectional survey was initiated in March 2011 and was conducted among Belgian men and women aged 18 years or older. Respondents were drawn from representative consumer panels of the market research company iVOX (<http://ivoxpanel.be/>), which has access to a panel of more than 110,000 Belgians who are

available to participate in surveys. Only a subsample of these 110,000 available panels are invited in a survey. The panel members that were invited to participate in this survey were selected via a multiple stage sampling procedure that aimed at representativeness for the general population regarding sex, age, educational level and urbanisation level. All panel members registered via a web-based form, and although participation in individual surveys was unpaid, iVOX provided incentives at random (e.g. participants can win a prize) and guaranteed respondents' anonymity and privacy. This policy was formalized by means of a privacy declaration and through registering the panel database with the Privacy Commission. The selected panel members were not obligated to participate in this survey; however, two reminders were sent via e-mail if no answer was received. This study was conducted according to the guidelines in the Declaration of Helsinki. Written informed consent was obtained by iVOX from all panel members at registration. Institutionalized subjects and those who did not speak Dutch or French were not eligible to participate in the study.

In addition to age and sex, information on the highest level of education was collected by online questionnaires. The education level was classified into three categories: low (primary school, lower vocational, low or intermediate general education), middle (intermediate vocational education and higher general education), and high (higher vocational education and university). Additional data on the dietary habits of the respondent, members of their household, and their friends were collected by a structured multiple-choice questionnaire developed by the non-profit organization EVA vzw (Ethical Vegetarian Alternative), C-Change, iVOX, and the environmental department of the city of Ghent. The online questionnaires included questions aimed at measuring the levels of agreement or disagreement with statements on vegetarianism and meat consumption, reasons for eating meat or vegetarian diets and a food frequency questionnaire (FFQ). The following response alternatives were available: "strongly disagree", "disagree", "tend to disagree", "tend to agree", "agree", and "strongly agree". In this study, "strongly disagree" and "disagree" were combined as "disagree", and "agree" and "strongly agree" were combined as "agree". This resulted in four response alternatives. Respondents were asked to report their own dietary pattern by selecting one of the following categories: vegan (no animal products), vegetarian (no meat or fish), almost vegetarian (eating meat or fish only on exceptional occasions), part-time vegetarian (eating meat or fish a few times a week), pesco-vegetarian (no meat but eating fish), or omnivore (eating meat or fish on a daily basis or not intentionally abstaining from meat or fish). Respondents were also asked to select all applicable reasons for eating meat or vegetarian diets. For further analysis, these six categories were regrouped into three distinctive dietary pattern groups: vegetarians (including vegans and vegetarians), semi-vegetarians (including almost vegetarians, part-time vegetarians, and pesco-vegetarians), and omnivores. The FFQ was used as a quality control for the self-reported dietary pattern category that the respondent had selected. Semi-vegetarians did not consume meat or fish at least four days a week; this is in line with previous research (De Backer & Hudders, 2014).

2.2. Statistical analyses

All statistical analyses were performed using the IBM SPSS Statistics for Windows (Version 19.0. Armonk, NY: IBM Corp). *P*-values below 0.05 were considered statistically significant. Comparisons between sex and dietary pattern groups were investigated via chi-squared tests. Data from the questionnaires were checked for impossible values, inconsistencies, and missing values.

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