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Evaluation of the impact of a hygiene warning label on the packaging of poultry

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ABSTRACT

Poultry meat is an important source of foodborne infections. Safe food-handling could lower the number of infections. Since 2001, a label containing safe food-handling instructions is required on the retail packages of raw poultry in the Netherlands. The aim was to determine the impact of this label on risk perception and food-handling behavior.

A random sample of 1235 adults from a representative Internet panel received an e-mail linking to the study questionnaire. Information was gathered about knowledge of safe food-handling regarding poultry, their current food-handling behavior and intention to change after reading the label, and influencing factors.

Median age of the 514 respondents was 51 years (18–87 years), and 53.9% was male. Seventy-nine respondents (15.4%) had never read the label. Respondents of households with person(s) aged 65 years or older, with safe food-handling practices, and who judge foodborne infections as severe were more prone to have read the label; respondents who find it a pity to throw away chicken after the expiration date were less likely to have read the label. After reading the label during the survey, the intention to change behavior did not differ between the readers and previous non-readers.

A label is a relatively easy and reasonable way of informing and educating consumers about safe food-handling. The majority of the respondents had read the label on poultry meat and scored it as important, useful and reassuring. Therefore, investigating the feasibility and possible benefits of a similar label on other meat products could be worthwhile.

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1. Introduction

Each year, approximately 1 in 30 Americans (9 million people) suffer from a foodborne disease caused by one of 31 known pathogens (Scallan et al., 2011). In the Netherlands, roughly 650,000–700,000 people (1 in 24) suffer from a foodborne infection each year based upon 14 known pathogens (Bouwknegt, Mangan, Friesema, & Van Pelt, 2017; Havelaar et al., 2012). In

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most cases, the consequences of a foodborne infection are limited to acute gastroenteritis, in which spontaneous recovery sets in within several days to weeks. In some cases however, foodborne infections can have severe consequences such as Guillain-Barré syndrome, hemolytic-uremic syndrome, and even death (Gezondheidsraad, 2000; World Health Organization, 2013).

In the Netherlands, as is the case in most European countries, poultry meat is an important source of foodborne infections, with *Campylobacter* spp. being responsible for the highest disease burden followed by *Salmonella* spp. (Bouwknegt et al., 2017; Gabriel et al., 2010; Moore et al., 2005; World Health Organization, 2013; Zomer et al., 2015). The incidence of campylobacteriosis in the Netherlands varied between 47.4 and 50.9 per 100,000 inhabitants in the years 2010–2014. This is lower than the average rate in Europe, which shows an overall rate of 59.8 cases per 100,000 inhabitants (European Centre for Disease Prevention and Control,

2016). The majority of cases is associated with domestic food preparation (Bearth, Cousin, & Siegrist, 2014; Fischer et al., 2007; Fulham & Mullan, 2011; Kennedy et al., 2005). In 2012–2014, Dutch citizens bought approximately 22 kilos of poultry per person per year (Terluin, Dagevos, Verhoog, & Wijnsman, 2016), compared to approximately 21 and 44 kilos of poultry per person per year in the European Union (28 countries) and the United States, respectively (OECD/FAO, 2015).

Several target points in the food chain can be influenced to reduce the risk of a foodborne infection through contaminated poultry. First, it is important to ensure that poultry is not contaminated with harmful bacteria during breeding, and slaughter and retail procedures. In addition, improper food-handling behavior contributes to 40–60% of foodborne infections (de Jong, Verhoeff-Bakkenes, Nauta, & de Jonge, 2008; van Asselt, Fischer, de Jong, Nauta, & de Jonge, 2009). Several studies emphasize the importance of safe food-handling behavior in the prevention of foodborne infections (Doyle et al., 2000; Redmond & Griffith, 2003). Educating consumers about measures they can take may contribute to the decline in the incidence of foodborne infections (Osaili, Obeidat, Hajeer, & Al-Nabulsi, 2017; Ovca, Jevšnik, Kavčič, & Raspor, 2018; Yu, Gibson, Wright, Neal, & Sirsat, 2017). Measures consumers can take to reduce the risk of a foodborne infection due to poultry are proper hand-washing prior to food preparation, using separate cutting boards for raw poultry, keeping poultry in the fridge, and cooking poultry through and through (Rijksinstituut voor Volksgezondheid en Milieu, 2013). Since 2001, a label containing safe food-handling instructions is required on the retail packages of raw poultry, as was recommended by the Dutch Health Council (Gezondheidsraad, 2000). This is also the case in some other countries, such as the United States (Food Safety and Inspection Service & U.S. Department of Agriculture, 1994). The mandatory requirements for the Dutch label are the need to have a contrasting frame and it should be easily readable. The minimum text on the label is set. It should read: 'Attention, give harmful bacteria no chance. Make sure these bacteria do not end up in your food through packages, your hands, or kitchen utensils. Make sure this meat is cooked thoroughly to eliminate these bacteria' (Gezondheidsraad, 2000).

The purpose of this study was to assess the impact of a label (Fig. 1) on the packaging of poultry containing safe food-handling instructions on risk perception and food-handling behavior of adult Dutch consumers.

2. Material and methods

2.1. Study population and design

For this study, a representative Internet panel was used, named the Flycatcher panel (<http://www.flycatcher.eu>). This panel consists of members from the Dutch general public who volunteer to participate in online questionnaire surveys. The panel consists of 16,000 members with a representative distribution of demographic variables (gender, age, region, and level of education) for the Dutch population. The panel meets high quality requirements and is ISO-

certified. A random sample of 1235 panel members aged 18 years or older was drawn. The sampled panel members were invited to participate in this study by sending an e-mail linking to an online questionnaire. Participation in the study consisted of completing this questionnaire. The survey remained online from 3 to 10 November 2014. To motivate enrollment, participants received credits for completion of the survey, which could be exchanged for gift vouchers. The nature of this general internet-based survey among healthy volunteers from the general population does not require formal medical ethical approval according to Dutch law.

2.2. Questionnaire

A questionnaire was developed to gain insight in knowledge of safe food-handling behavior regarding poultry among Dutch consumers and their current food-handling behavior. Furthermore, consumers' intention to change their food-handling behavior after the label was shown to them, was investigated. Finally, factors influencing knowledge, current food-handling behavior and intention to change food-handling behavior were investigated. The content of the questionnaire was based on (parts of) the Health Belief model (HBM) (Strecher, Champion, & Rosenstock, 1997). The HBM assumes human social behavior follows from attitudes and beliefs of individuals. It contains six different concepts which can be adapted based on the studied behavior: perceived susceptibility (a person's belief of chances of getting an illness), perceived severity (a person's belief of how serious an illness and its consequences are), perceived benefits (a person's belief of the efficacy of the advised action to reduce risk or seriousness), perceived barriers (a person's belief barriers to take the advised action), cues to action (strategies to activate 'readiness' to perform the behavior), and self-efficacy (confidence in a person's ability to take action) (Hanson & Benedict, 2002). The HBM has been used to study safe food-handling before (Hanson & Benedict, 2002).

Furthermore, relevant existing questionnaires and expert input was used (Bearth, Cousin, & Siegrist, 2013; Bearth et al., 2014; Gardner, Abraham, Lally, & de Bruijn, 2012; Meysenburg, Albrecht, Litchfield, & Ritter-Gooder, 2014). Questions regarding food-handling behavior were based on concepts that are used by the Netherlands Nutrition Centre in their educational materials regarding food safety. These are 'buying', 'washing', 'separating', 'heating', and 'cooling'. The content of the questionnaire was reviewed by a project team to make sure each question was understandable and the questions covered all determinants of the HBM. The online questionnaire was subdivided into six parts: 1. Food-handling of chicken; 2. Perceived severity of a foodborne infection and chance of contracting one; 3. Knowledge; 4. Barriers to carry out safe food-handling; 5. Warning label; 6. Demographic questions.

2.3. Statistical analyses

The questions about food-handling, perceived severity of foodborne infections, chance of contracting a foodborne infection, barriers to carry out safe food-handling and intention to change had to be answered on a five-point scale (e.g. never - rarely - sometimes - often - always or very little chance - little chance - neutral - high chance - very high chance). When a score was calculated, the categories were recoded to scores 1 to 5. Food-handling consists of 15 questions, which was summarized into safe food-handling (mean score 4.0 or higher) and unsafe food-handling (mean score lower than 4.0). Perceived severity of foodborne infections was measured with three questions and summarized into non-severe (mean score 3.0 or lower) and severe (mean score higher than 3.0). Seven questions formed an estimation of chance of contracting foodborne

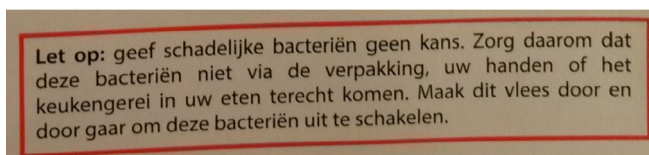


Fig. 1. The warning label on the packaging of poultry in the Netherlands.

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