



Research report

Registered dietitian's personal beliefs and characteristics predict their teaching or intention to teach fresh vegetable food safety[☆]Gina Casagrande^{a,e}, Jeffery LeJeune^b, Martha A. Belury^c, Lydia C. Medeiros^{d,*}^a Department of Human Nutrition, 1787 Neil Ave, Room 317 Campbell Hall, The Ohio State University, Columbus, OH 43210-1295, USA^b Food Animal Research Program, 1680 Madison Ave, Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH 44691, USA^c Department of Human Nutrition, 1787 Neil Ave, Room 302 Campbell Hall, The Ohio State University, Columbus, OH 43210-1295, USA^d Department of Human Nutrition, 1787 Neil Ave, Room 313 Campbell Hall, The Ohio State University, Columbus, OH 43210-1295, USA^e Gina Casagrande, MS, RD, LD, Giant Eagle Market District, Kingsdale Center, Upper Arlington, OH 43212, USA

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ABSTRACT

The Theory of Planned Behavior was used to determine if dietitians personal characteristics and beliefs about fresh vegetable food safety predict whether they currently teach, intend to teach, or neither currently teach nor intend to teach food safety information to their clients. Dietitians who participated in direct client education responded to this web-based survey ($n = 327$). The survey evaluated three independent belief variables: Subjective Norm, Attitudes, and Perceived Behavioral Control. Spearman rho correlations were completed to determine variables that correlated best with current teaching behavior. Multinomial logistical regression was conducted to determine if the belief variables significantly predicted dietitians teaching behavior. Binary logistic regression was used to determine which independent variable was the better predictor of whether dietitians currently taught. Controlling for age, income, education, and gender, the multinomial logistical regression was significant. Perceived behavioral control was the best predictor of whether a dietitian currently taught fresh vegetable food safety. Factors affecting whether dietitians currently taught were confidence in fresh vegetable food safety knowledge, being socially influenced, and a positive attitude toward the teaching behavior. These results validate the importance of teaching food safety effectively and may be used to create more informed food safety curriculum for dietitians.

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Introduction

Most people associate foodborne illnesses with meat, poultry or dairy products, but the Centers for Disease Control and Prevention (2009) reports an increased proportion of bacterial outbreaks caused by contaminated fresh vegetables. Yet, vegetables are nutritionally desirable foods promoted for positive association with long-term health. Among the most popular fresh produce in the United States is fresh-cut salads, with sales of \$2.7 billion per year (Palumbo, Gorny, & Gombas, 2007). Registered dietitians (RDs) are reliable sources for information on the nutritional benefits of vegetables, often giving advice to consume fresh vegetables; therefore, they should also be a knowledgeable about

fresh vegetable food safety since failure to provide this information may adversely affect the health outcomes of clients (Palmer, 2007).

Dietitians learn food safety as part of their didactic curriculum and are required to have the ability to “apply safety principles related to food, personnel and consumers” and “develop and deliver products, programs or services that promote consumer health, wellness and lifestyle management merging consumer desire for taste, convenience and economy with nutrition, food safety and health messages interventions” (ADA, 2010). Strategies such as removing the most damaged and likely contaminated outermost leaves from lettuce, removing brown or bruised areas before consuming, drying fresh vegetables before putting them in storage, and properly covering the surface of fresh vegetables after they have been cut will reduce pathogen load or deny nutrients and moisture needed to support bacterial growth on plant surfaces (CDC, 2009; Palumbo et al., 2007).

Risk perception researchers have concluded that risk communication works best if there is a greater focus on processes that ultimately lead people to adopt behaviors, rather than assuming that knowledge per se is the causative factor in changed behavior (Griffin, Dunwoody, Neuwirth, & Giese, 2002). If the RD has an understanding of food safety and a personal belief that safe

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* Corresponding author.

E-mail addresses: gina.casagrande@gianteagle.com (G. Casagrande), LeJeune.3@osu.edu (J. LeJeune), Belury.3@osu.edu (M.A. Belury), Medeiros.1@osu.edu (L.C. Medeiros).

handling of vegetables is important for clients to know, they may be more likely to teach their clients about the safety of fresh vegetables. This study probes this idea, basing the survey on Icek Ajzen's Theory of Planned Behavior (TPB) (Ajzen, 1988, 1991; Fishbein & Ajzen, 1975) with specific focus on the studies of Griffin, Dunwoody, and Neuwirth (1999) and Griffin, Neuwirth, Dunwoody, and Giese (2004). The TPB was used to identify RD's personal characteristics and beliefs about food safety to determine if these factors are predictive of whether or not they teach their clients about fresh vegetable food safety. Beliefs were captured in three independent belief variables; Perceived Behavioral Control (PBC), Attitudes (Atd), and Subjective norm (SN) (Ajzen, 1988, 1991; Fishbein & Ajzen, 1975). We hypothesized that willingness to teach, intent to teach, or to neither teach nor intend to teach about fresh vegetable food safety is a function of RD's personal beliefs regarding teaching fresh vegetable food safety, and/or their personal characteristics. The first hypothesis was that PBC, Atd, and SN would significantly predict the multinomial dependent variable (behavior, behavior intention, or neither). The second hypothesis was that PBC would be the better predictor of behavior, as a binary dependent variable (currently teach or not).

By identifying and understanding dietitian's personal beliefs and characteristics that predict fresh vegetable food safety teaching behavior, food safety curricula may be designed to impart more valuable and effective messages to RDs about the importance of understanding and teaching fresh vegetable food safety. Perhaps this will lead to more RDs teaching fresh vegetable food safety, ultimately protecting clients from serious illness or possible death from foodborne illnesses.

Methods

Subjects

A sample of RDs was recruited from a conveniently selected group of nine American Dietetic Association (ADA) state affiliates from across the United States. Filter questions were asked at the beginning of the survey to exclude any non-registered dietitians, anyone under the age of eighteen, and/or any RDs who did not directly consult with clients as part of their job responsibilities. Academic instruction was not considered to be direct client education and was an exclusion criterion if the respondent was solely a faculty to dietetic students. The survey and all forms that were viewed by potential respondents were approved by the Behavioral and Social Sciences Institutional Review Board for The Ohio State University (protocol #2008B0345). An online waiver of informed consent was obtained from all respondents prior to beginning the survey.

Survey design

The survey was constructed according to guidelines published by Griffin et al. (1999, 2002, 2004), Ajzen (1988, 1991), and Fishbein and Ajzen (1975). Griffin et al. (2002) utilized the Risk Information Seeking and Processing (RISP) model, which was derived from two separate models, one of which was the TPB. The survey included items that were based on the complete RISP model, but the current study presents results of the TPB belief variables.

Items were constructed as five-point Likert or semantic differential scales. Responses to the PBC (control belief) and SN (normative belief and motivation to comply) items were scored from 1 and 5, with 5 representing the most positive score, and 1 representing the least positive score. Responses to the Atd (behavioral belief and outcome evaluation) items were scored

so positive values were obtained for positive attitudes, and negative values for negative attitudes. Endpoints were 2 and -2, with 2 representing the most positive score and -2 representing the most negative score.

For this study, the PBC belief variable indicated the subjective degree of control RDs had over whether or not he/she taught fresh vegetable food safety to clients, currently or in the future. The Atd belief variable indicated the belief perceptions of each RD with regard to teaching fresh vegetable food safety, and whether or not they felt either a positive or negative view of that belief. The SN belief variable indicated whether the RD felt that their referent others, defined as clients or other people who are personally important to them, would expect them to teach, or remain competent and current in, vegetable food safety information. Additionally, SN indicated the RDs motivation to comply with the expectation of their referent others.

The dependent variable determined the participant's teaching behavior; "I currently teach my clients about fresh vegetable food safety", or "Even though I don't currently teach my clients about fresh vegetable food safety I plan to in the future", or "I don't and never plan to teach my clients about fresh vegetable food safety". The multinomial dependent variable included each of the three options and was analyzed against a reference category, either "neither" for most of the analysis, or "currently teach" for the remainder of the analysis. The binary dependent variable included only those who reported they "currently teach", which was then analyzed against the sum of those who chose the alternative options; "I intend to teach" and "I do neither".

A field test was completed with five key informant RDs from the local metropolitan area to determine respondent burden and face validity of the draft survey. Each key informant was provided a hard copy of the survey to read and on which to write comments. Each item was reviewed and modified by the key informants to ensure that a variety of both positive and negative salient beliefs were included regarding teaching fresh vegetable food safety. After revision, key informants were asked to once again review the survey instrument for final thoughts and suggestions.

Conversion of the revised instrument to online format was followed by a pilot study, which was conducted with a convenience sample of 16 RDs from the local metropolitan area. None of the dietitians had been involved in the field test. The pilot study was completed to beta test the website and to calculate psychometric properties of the survey items. Sample size statistics were completed using the data from the pilot study to determine the desired sample size of 300 RDs.

Personal characteristics were included in the model as control variables (Table 1). Self-reported gender, age category, household income category, and education level achieved were assessed (Griffin et al., 1999). Age and income categories were constructed to be consistent with those used by the US Bureau of Census (2010). The final survey included 152 items, 41 of which related to the TPB and thus were used in the current study. The survey took approximately 1 h to complete. To preserve the voluntary nature of the forced response style of a web-based survey, the option "I choose not to answer this question" was added as per IRB instruction to allow respondents to omit questions they did not want to answer. For analysis purposes this option was coded as "missing value". A working definition of "fresh vegetables", which specifically referred to tomatoes and green leafy vegetables, was presented on each page of the web site to preserve consistency of responses as related to the foods of food safety concern to this survey.

Advertisements to complete the study, which included a link to the survey, were sent to listserves and posted on websites of state affiliates of the ADA. Compensation (gift card) was offered to those who completed the survey. Attempts were made to advertise

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