

## **The Empirical Study of Factors Affecting Nutrition Label Use towards Consumption Intention of Health Food Product in Malaysia**

Norhidayah Azman, Albattat, Ahmad, Jacqueline Tham

Post Graduate Centre, Management and Science University, University Drive, Off Persiaran  
Olahraga, Section 13, 40100, Selangor, Malaysia  
Email: norhidayah\_azman@masu.edu.my

### **Abstract**

Unhealthy dietary habits have been attributed to the risks of several chronic diseases all over the world, including Malaysia. Nutritional label use is one of the factors that can influence the consumption of healthy food product. This paper will highlight that factors that can contribute the intention to use nutritional label. Moreover, previous review of literatures in this paper also will reveals that many empirical researches on nutritional label has mix finding regarding the positive and negative impact toward consumption of healthy food product. Nonetheless, this paper also highlighted the determinacies factor the reason why consumer is not using the nutritional label overthought they are aware the important of the use. In addition, this paper also rationalises relevant issue for future research undertaking.

**Keywords:** *nutritional label, consumer, consumption, healthy food product*

### **Introduction**

With growing populations in Lower- and Middle-Income Countries, global statistics indicate that an increasing number of Non-communicable diseases deaths are arising in these countries (Jáuregui et al., 2020; Smith& Floro, 2020; Patel et al., 2020 and Ncube et al., 2020). According to the WHO Global Status Survey on NCDs 2019 (WHO, 2019), although NCDs contributed for 70 per cent of all death worldwide, almost three-quarters of these were in Lower- and Middle-Income Countries. This is hardly unexpected given that the prevalence of leading NCDs such as diabetes has increased faster in Lower- and Middle-Income Countries than in high-income countries (HICs) over the last decade (WHO, 2019). Poor or unbalanced nutrition, coupled with a sedentary lifestyle, is the main cause of obesity and, consequently, leads to diet-related NCDs such as cardiovascular disease, diabetes, elevated blood pressure, and cancer (World Health Organization, 2018). In today's world, more people

are overweight than ever before, Polyzos and Mantzoros (2019) also consider it as the global crisis of the 21<sup>st</sup> century.

Overweight and obesity (severe overweight) are excessive concentration of fat that may impact the wellbeing of an individual (WHO, 2018). Global Obesity has nearly triple since 1975, with more than 1.9 billion people overweight in 2016 (WHO, 2018). Of certain 1.9 billion adults, 650 million suffer from obesity (WHO, 2018). Not only do adults suffer from overweight and obesity, but more than 41 million children under 5 years of age were overweight or obese in 2016 (WHO,2018). Nutritional labelling, which often occur food have seen to be capable of helping consumer to identify nutritious and healthy foods consumption while at the same time fostering safe food innovation and competitiveness in food and beverage industry (Deliza et al., 2020; Talati et al.,2019; Talati et al., 2018; Hieke et al., 2015 and Grebitus & Davis, 2017).This paper is prepared with the aim to review the previous researches to show factors that influence

## **Literature review**

### **2.1 Theory of planned behaviour**

The theory of planned action has also been applied in fields of health-related behaviour analysis (Close et al., 2018; Shin, Im, Jung, & Servert, 2018). Jun and Arendt (2016), for example, used an expanded TPB to analyse safe eating habits in casual restaurants. Based on a study of the literature, several research who utilised the TPB as an underpinning theory ended at behavioural intentions rather than moving on to the actual behaviour that the TPB paradigm contains. As a result, in order to address this void, there need a future research research investigated the impact of customers' intention to use nutritional labelling on their real consumption behaviour. Besides that, TPB has been used in a variety of contexts to model individuals' actions and behaviours, it only clarified a limited portion of the variation between purpose and behaviour. Based on meta-analytic analyses of 185 TPB experiments, researchers discovered that only 27 percent of the variation was clarified by actions and 39 percent by aim (Armitage & Conner, 2001). TPB's creator, Ajzen (1991), stated that researchers should apply extended predictors to the TPB model, raising the percentage of explained variance. As a result, several researchers have changed the model by incorporating additional structures into the TPB to forecast human actions and behaviour. In the future studies in this area, the researcher is encouraged to use extended TPB to increasing the explained variance of consumer behaviour.

## **2.2 Perceive behaviour control**

The degree to which an individual believes they have the capacity to execute a certain action is referred to as perceived behaviour regulation. People are more likely to engage in an activity whether they have the means or opportunity to do so. However, it is impossible to quantify the real resources and rewards that arise when engaging in a certain behaviour. Individuals' perceived behavioural regulation was influenced by a series of control values. Both views contribute to a person's understanding of the availability of resources and opportunities available to carry out specific behaviours, as well as an assessment of the degree of value of those resources and opportunities in achieving desired outcomes (Ajzen, 1998). When an individual's behaviour is not completely within his or her influence, perceived behavioural control has a significant impact on real behaviour. Common healthy food consumption obstacles are often correlated with the higher costs and limited supply that differentiate this type of commodity (Robinson and Smith, 2002). The intensity of perceive behavioural control on intention differs through trials, as it does in the attitude scenario. Dowd and Burke (2013), for example, discovered a  $r = 0.51$  correlation, while Yazdanpanah and Forouzani (2015) discovered a non-significant correlation. Notably, the elements used to assess the PBC in both studies relied on personal willingness and ease of purchasing organic food rather than concrete obstacles (example; a higher price). As a result, certain questions about the effect of perceived behavioural regulation on organic food purchasing intention remain unanswered.

## **2.3 Attitude**

According to the Theory of Planned Behavior (Ajzen and Fishbein, 1980; Ajzen, 1991), attitude can be defined as the degree to which an individual evaluates a certain action favourably or unfavourably. Individuals are more likely to engage in a given action if they have a favourable perception of it. Attitude emerges from a collection of behavioural values that justify expected consequences correlated with the specific actions under consideration. Behavioural expectations mean that a certain behaviour will result in a certain outcome. According to Arvola et al., (2008), multiple researches conducted in the United States and Europe demonstrated the importance of attitudes towards nutritious food behaviors such as flavour, healthiness, and perceived environmental benefits on consumption purpose. The frequency of the relationship between attitude and behavioural purpose in the case of health food consumption, on the other hand, differs greatly through research. For example, Al-Swidi Huque, Hafeez, & Shariff, (2014) discovered a powerful correlation ( $r = 0.80$ ) on a sample of University representatives and students from Pakistan, while Onwezen, Bartels, and

Antonides (2014) discovered a more modest correlation ( $r = 0.56$ ) on a Dutch sample. Guido et al. (2010) found a small association ( $r = 0.27$ ) using a randomised group of participants from France and Italy. Attitude has been shown to have strong correlational relationships with behaviour and behavioural intention in a variety of contexts (example; Sparks et al., 1995; Kalafatis et al., 1999; Shaw, Shiu, Clarke, 2000; Shaw and Shiu, 2002; Choo et al., 2004). As a result, although the majority of research that used the hypothesis of expected behaviour to study the intention to purchase and eat safe showed the importance of mindset in influencing purchasing intention, the extent of this relationship remains unknown.

#### **2.4 Subjective Norm**

The extent to which a person perceives social obligation to engage in the specific action in question is referred to as the subjective standard (Ajzen, 1991). People would generally follow a certain action if they are compelled to conform with their essential referents and feel external encouragement from them to do so (Ajzen and Fishbein 1980). Consumer perceived that family, friends and government advertising persuaded them to consume healthier food product more often (Chan et al. 2009; Ajzen and Fishbein, 1980; Ajzen, 1991). Subjective norms, in particular, are an indication of normative control, which is relevant to what the most important referent individuals (a specific topic) deem to be permissible or unacceptable behaviour (Scalco et al., 2017). According to Zagata (2012), the most influential factor of social impact in relation to organic food preference is family and friends, whereas work associates have a marginal impact. Several studies looked at the effect of Subjective Norm on healthy food intake. Nonetheless, Yadav and Pathak (2016) discovered no major impact of subjective norms on the decision to buy healthy food in a recent analysis. After all, Armitage and Conner (2001) argued that the subjective norm dimension may be the weakest of the model's constructs. Gotschi, Vogel, and Lindenthal (2007) discovered that standards and beliefs learned at home have a profound impact on the growth of a healthy outlook toward healthy food foods in Austrian young adults. Previously, researchers discovered that the supply of nutritious foods such as organic vegetables, fruits, breakfast foods, and low-fat milk items were strongly associated with the growth of healthy eating habits in children because the encouragement from the parents toward healthy food consumption (Pearson, Biddle & Gorely, 2009). However, several previous researchers, including Fotopoulos and Kryskallis (2002), Larue, West, Gendron, and Lambert (2004), Verdurme et al. (2002), and Wier & Calverly (2002), found insignificant relationship between subjective norms and healthy food product consumption among consumers.

## **2.5 Health consciousness**

Health-conscious customers are mindful of their health status and are able to take reasonable steps to enhance or preserve it (Michaelidou & Hassan, 2008). Previous study has included wellness awareness as an indicator of healthier habits (for example, healthful eating preference, intention to buy organic goods, and intention to use dietary details on pack foods). According to the results of a study conducted by Mai and Hoffmann (2017), health-conscious individuals found health-related factors when making food decisions. In a related research, Hanspal and Devayasagam (2017) investigated various consumers' self-images while purchasing goods with safe labels. They discovered that shoppers who consider themselves to be health-conscious chose more brands branded as organic than people who consider themselves to be brand-conscious. According to the results of a study conducted by Mai and Hoffmann (2017), health-conscious individuals found health-related factors when making food decisions. In a related research, Hanspal and Devayasagam (2017) investigated various consumers' self-images while purchasing goods with safe labels. They discovered that shoppers who consider themselves to be health-conscious chose more brands branded as organic than people who consider themselves to be brand-conscious.

## **Methodology**

This review identified and synthesised data from over 20 years of observational analysis regarding health and nutrition fields to find gaps in determine the factor that can influence the intention to use nutritional label on consumption of healthy food product. The following indexes are used to collect applicable materials from scholarly publications: Emerald, Science Direct, and Social Science Index. This paper highlighted the previous finding regarding the factor that influence the intention to use nutritional label, the positive and negative impact of nutritional label toward consumption of healthy food product. Moreover, this paper also highlights the factors that influence the consumer not to use nutritional label.

## **Discussion**

### **4.1 Positive the impact of using of nutritional label.**

Previous study did find the evidence where the use of nutritional label can influence the consumption of healthy food product. Research have been conducted in 2020 to assess whether the nutritional label have implication toward student's food consumption behaviour by defago et al., (2020). 100 students were randomly assigned products with nutritional label labels on them. The findings suggest that attention to food labelling dramatically raises the

likelihood of eliminating the least nutritious choices and selecting the healthiest foods from the alternatives offered. These results are important, and they seem to be mediated by women who report average or above-average dietary patterns but lack basic nutritional information (Defago et al., 2020).

A randomized control study has been used by a research in Brazil to investigate the effect of multiple forms of nutrient labelling formats on healthy food decisions for customers (Oliveira et al., 2018). This study is interesting because it was carried out in the restaurant itself. Each of these diet label formats was randomly allocated to a total of 233 university students: no label (control), a collection of ingredients with labels, or a traffic light label with a regular checklist. The results of this research found that the students assigned to the ingredient list with the highlighted nutritional labelling symbol format preferred healthier foods than those assigned to other nutritional labelling formats. Similar finding also have been found by Reale and Flint (2016), Ussher and et al., (2015), Ge et al., (2014), Morley et al., (2013), Wei and Miao (2013), Mathe and Higgins (2013), Pulos and Leng (2010), Roberto et al., (2010), Wisdom et al. (2010) and Chu, Frongillo, and Jones (2009), where they found that the use of nutritional labelling encourage the consumer to choose healthy food product in the market. Next section will discuss regarding insignificant the use of nutritional label toward healthy food consumption.

There need to establish research have clear understanding regarding the factor that can influence the intention to use nutritional label among the consumer. This is because, it from the future study, it will help to contribute the new finding regarding the factor that can influence the consumer intention to use nutritional label. Moreover, most of the study in nutritional label use mostly focus on the factors that can influence the intention to use nutritional label, but there has very limited research focusing the implication of the intention toward consumption of healthier food product (Temmerman, 2021; Sanusi, 2020; Zainol et al. 2019, Marina et al. in 2020, Marina,2020, Mamun, Hayat & Zainol 2020, Wang, Tao & Chu 2020; Torres et al., 2019; Mulders, Corneille & Klein, 2019; Close et al., 2018 and Shin et al 2018; Din et al., 2017; Delvarani et al., 2013). The finding from the research can provide the information either the use of nutritional label can lead to consumption of healthy food product. This is because past research also did find the evident that the use of nutritional label not necessarily can lead to consumption of healthy food product.

#### **4.2 Negative the impact of using of nutritional label.**

Even though the use of nutritional label can influence the consumption of healthy food product, there has some of the evidence show that the use of nutritional label did not give

positive implication toward consumption of healthy food product. A laboratory research was undertaken in 2020 to determine the effect on Sugar-sweetened drinks (SSBs) collection of 'on-pack' labels put explicitly on physical products: i.a pictorial health alert label showing an undesirable health outcome of unnecessary sugar consumption; and ii.calorie information labels. The possible moderating influence of socioeconomic status (SEP) were also studied. The percentage of participants who choose an SSB was the primary outcome. In comparison to not using any additional labels (39%), neither the pictorial health alert label (40%) nor the calorie details label (43% ) affected the proportion of participants who choose an SSB. Lower SEP participants (45%) were more likely to prefer an SSB than higher SEP participants (35%), however SEP did not moderate the effect of labels on drink selection. In conclusion, pictorial health alert labels could be less successful in minimising SSB availability in laboratory settings than in online settings, or based on label design and placement. The results indicate that effects could be missing when selecting from real goods with genuine 'on-pack' marks that are placed in a'realistic' manner (Mantzari et al.,2020).

Pabst, Szolnoki & Simone (2019) performs studies about how wine customers respond to the labelling of ingredients and nutrition. It discusses how relevant this information is to customers, how it impacts their views towards wine as a natural commodity and whether it drives market appetite for wine through a qualitative analysis of focus group conversations, and an observation of the use of back labels has been used to measure consumer reactions to this new information. The result indicates that about one third of consumers looking at the back label have detected new information on nutrition and ingredients. Most customers overestimated the caloric content of wine, and dietary knowledge was not widely considered as valuable information to them that lead and influence them to choose a healthy wine. Similar result also shares by Toni, Eberle, Larentis, & Milan (2018), Patterson, Bhargava, & Loewenstein, (2017); Rendell and Swencionis (2014), Elbel et al. (2013), Brissette, Lowenfels, Noble, & Spicer (2013), Holmes & Bhuvanendrah, (2013), Finkelstein, Strombotne, Chan, & Krieger, (2011), Vadiveloo, Dixon, & Elbel, (2011), Elbel, Kersh, Brescoll, & Dixon, (2009)and Harnack et al., (2008), where they found that the use of nutritional label are not significant in encourage the consumer toward consumption of healthy food product. The next section will discuss some of the reason that encourage consumer not to use nutritional label when buying food product in the market.

### **Issue Regarding Nutritional Label Use and Awareness**

### **5.1. Numeracy**

The most popular explanations for not utilising diet labels include a lack of time, the size of the document, a lack of comprehension of words, and reservations regarding the quality of the details (Klinovszky, Papp-Zipernovszky, & Buzás, 2021 and Logendran, 2020). More importantly for this study, the difficulty of nutrition labelling and difficulties with technical terminology, numerical measurements, and percentages seem to be linked to difficulties interpreting nutrition knowledge (Lee et al., 2020). In this case, numeracy is especially important. Yamashita, Bardo, Millar, and Liu (2020) demonstrated that individuals with poor numeracy skills make different food decisions than those with strong numeracy skills, based on role difficulty. Numeracy is favourably correlated with nutritional label use, according to Hess, Visschers, and Siegrist (2012), although this was only measured using a self-report questionnaire. Second, Visschers, Hess and Siegrist (2010) demonstrated that, based on job difficulty, persons with poor numeracy skills make different food decisions than those with strong numeracy skills. These findings, though, are focused on a challenge that requires choosing between similar items with different properties (e.g., non-fat vs. low fat yoghurt). This assignment should not include measuring various items (for example, bread vs. croissants) or calculations relevant to other food measurements (example; sugar or calorie content). Finally, Miller, Applegate, Beckett, Wilson, and Gibson (2016) discovered a connection between numeracy and nutrition label use: greater nutrition literacy and higher numeracy abilities were correlated with greater precision in utilising nutrition labels regardless of age. Malloy-Weir and Cooper (2017) concluded in their recent study that observational associations between, among other things, numeracy and nutrition label comprehension and usage have been understudied and are often constrained by the use of self-report evidence. The aim of this study is to investigate the impact of numeracy on empirical rather than self-reported success in reading nutrition labels. We predicted that moderate numeracy individuals with low numeracy abilities would do worse on food label-related issues, which was consistent with previous research.

### **5.2. Nutritional knowledge**

Furthermore, it has been shown that consumers with higher nutrition knowledge seem to be more likely to use nutrition label than those with lower nutrition knowledge ( Ng, 2020; Evelyn, Aziz, & Sariman, 2020; Kundu et al., 2020 and Olatona et al., 2020). However, previous study has yielded no definitive response about nutrition knowledge and analytical accuracy with nutrition labels. Some studies, Prada (2020), Monye (2020), Yücel (2020), and Rivera (2020) discovered that increased nutritional knowledge is correlated with increased

nutrition label usage and improved results, while other studies (Sy & Bullecer, 2020) did not find an effect of nutrition knowledge on nutrition label use. According to Miller and Cassady (2015), the spectrum of nutrition knowledge assessments, as well as the measurements used, varies greatly. The majority of research indicates that nutrition knowledge has a significant effect on how customers utilise nutrition labelling (Drichoutis, Lazaridis, & Nayga, 2005), as well as how consumers evaluate/choose food (Droms, 2006 and Kozup, Burton & Creyer, 2006). Furthermore, it has been shown that consumers with higher nutrition knowledge are more likely to use nutrition information than consumers with lower nutrition knowledge (Barreiro-Hurlé, Barreiro Hurlé, Gracia Royo & Magistris, (2009).; Drichoutis, Lazaridis, & Nayga, 2005; Drichoutis, Lazaridis, & Nayga, 2006), and that nutritional knowledge interacts with motivation (example; the use of nutritional information is more effective when consumers had high motivation) (Yoon & George, 2012). However, previous study has shown no definitive results in terms of diet information and objective success of nutrition labels. Some studies (Levy & Fein, 1998 and Norazmir, Norazlanshah, Naqieyah, & Anuar, 2012) showed that increased nutrition knowledge is correlated with increased nutrition label usage and improved results, while other studies (Nayga, 2000) found no effect of nutrition knowledge on nutrition label use.

### **5.3. Customer level of understanding**

Moreover, a lack of nutritional knowledge could impair the consumer's ability to comprehend the nutrition information given in the first place. However, in practice, nutrition information often is the only source of objective information about the food available to the consumer (Chandra, 2020 and Zhang, Zhai, Osewe & Liu, 2020).), which highlights why it is so important to understand how the average consumer uses this information. According to the meta-analysis by Cowburn and Stockley (2004), 19 studies from the previous research found that some customers might understand some of the details on nutrition labelling, in general, they considered nutrition labelling confusing, including the use of certain technological and numerical information. Consumers recorded understanding the words 'fat,' 'calories/kilocalories, "sugar,' 'vitamins,' and 'salt.' The relationship between calories and electricity, sodium and salt, sugar and carbohydrate, and the words cholesterol and fatty acids were identified as the least well understood concepts and terms. Consumers struggled to recognise the position that various nutrients listed on labels played in their diet. They often had trouble translating details from g per 100 g to g per serving, and serving size data was difficult to read. The concept of percentage energy was not well known. In general, older

customers and those with lower levels of knowledge or income have the greatest difficulties understanding the words used on food labelling (Cowburn and Stockley, 2004).

#### **5.4. Time spends**

The time that consumer spend during buying food product also can contribute to the non use of nutritional label. Consumer who has enough time or spend more time during buying food label most likely to use nutritional label compare to the consumer who do not have enough time or rushing during buying food product (Jáuregui et al., 2020). People who are under a lot of time strain, as measured by how much time they spend shopping, are more inclined to read food labels (Nayga, Lipinski, and Savur, 1998). Low levels of time constraint, in particular, are positively linked to the use of cholesterol information and negatively related to the use of vitamins/minerals information (Drichoutis, Lazaridis, and Nayga, 2005). Time constraints on label usage were also observed in Kim, Nayga, and Capps (2001) and Lin, Lee, & Yen, (2004). where respondents who agreed with the argument "reading labels takes more time than I can invest" were less likely to use nutritional labels and fat content details, respectively.

#### **5.5. Motivation**

Consumer desire to read the nutritional label may often affect the reason not to use the nutritional label. Consumers who may not have any incentive to use nutritional labels are less inclined to do so than consumers who have a motivation to use nutritional labels (Lemos et al., 2020 and Nguyen, Umberger & Zeng,2020). A broad body of literature has established many aspects in which motivation affects cognition and consumption decisions. On the one side, individuals who are motivate to remain healthy should be less involved in indulgent diets. People who are able to adhere to long-term targets in the face of temptation have a range of self-regulatory controls (Fishbach and Trope 2005; Myrseth, Fishbach, and Trope 2009; Trope and Fishbach 2000). For example, when faced with chocolate bar choices, gym goers lower their ratings of the chocolate's perceived attractiveness and expected enjoyment (Myrseth, Fishbach, and Trope 2009). Furthermore, in the absence of dietary facts, people with higher dieting targets overestimate the calories in a treat (Zhang, Huang, and Broniarczyk 2010) and foresee feeling bad if they indulge (Mohr, Lichtenstein, and Janiszewski 2012), which has been shown to reduce intake (Giner-Sorolla 2001). Simultaneously, optimism affects sensory awareness and meaning, causing consumer to perceive objects in a goal-consistent way (Balcetis and Dunning 2006). Since health-conscious shoppers are more inclined to choose lower-calorie food options (Chernev, 2011; Koenigstorfer and Baumgartner 2016; Papies and Veling 2013 and Versluis and Papies,

2016), they might also be more likely to use tactics that allow them to view calorie levels as smaller in magnitude, such as relying on the leftmost digit. In favour of this inspired interpretation claim, study has shown that weight-conscious people are more prone to overlook the calorie content of meals containing both balanced and unhealthy items (Chernev, 2011).

In addition, study regarding the factors that influence the consumer not to use nutritional label are highly needed. This is because, previous study always mentioning and determine the factors that influence the intention to use nutritional label (Temmerman, 2021; Sanusi, 2020; Zainol et al. 2019, Marina et al. in 2020, Marina,2020, Mamun, Hayat & Zainol 2020, Wang, Tao & Chu 2020; Torres et al., 2019; Mulders, Corneille & Klein, 2019; Close et al., 2018 and Shin et al 2018; Din et al., 2017; Delvarani et al., 2013). By understanding the reason why the consumer did not want to use nutritional label can encourage the policy maker, food producer, nutrition educator and health educator to find a suitable solution for it.

Beside that since the present study of the use nutritional label usually focus on certain type of respondent, it will help to establish which population subgroup may be more prone to use nutritional label during shopping food product, and will provide some evidence either the use of nutritional label can influence the consumption of healthy food product for certain consumer segment in the market (Phang et al., 2020; Sanusi, 2020a; Sanusi, 2020b; Flaviana & Annuar, 2021; Mamun, hayat and zainol,2020; Ismail et al., 2020 and Yulita et al., 2020). Moreover, future research should examine the various other types of nutritional labelling that may improve consumer uptake and understanding of this information, which has been suggested to improve consumer use of nutritional labelling information. This is because part research has shown that type of nutritional label format can influence the use of nutritional label. The need to introduce the new type of nutritional label format that can influence the intention to use of nutritional label is highly needed (Andrews, Netemeyer, Burton, & Kees, 2021; Packer, 2021; Kalia, Mugore, & Segura, 2021; Hamlin & Hamlin, 2020 and Kim, Ellison, Prescott & Nayga 2020).

Future research would also help to recognise and improve wellness strategies and services targeted at combating obesity by encouraging healthy food intake choices. The findings of these studies can provide insight into areas that need to be prioritised. For example, since nutritional awareness was linked to healthy eating patterns, there might be a push for more nutrition public education campaigns to teach consumers how to utilise and enhance their comprehension of nutritional label content. The findings may also lead to further government health policies informing the public about the food they consume, as well as aid in the

development of a more comprehensive education programme designed to teach people about the importance of nutrition, as well as how to read and decipher nutrition labels and incorporate them into daily life (Clarke, Kwon, Swinburn, & Sacks, 2021; Lima, Costa, & Sacks, 2021).

### **Conclusion**

Food preference is a person's unconscious process and practise of choosing whether to approve or reject food items (Wood, Mazar, & Neal, 2021; Chen & Antonelli, 2020; Ogden, & Roy-Stanley, 2020; Han, Back, & Barrett, 2009 and Jacquier et al., 2012). Food choice, according to Ooi et al. (2015), is a psychological reaction, physiological and individual's sensory to the food industry's social, economic, environmental and promotional activities. Although the use of nutritional labels can encourage healthy food consumption, it is also clear that the use of nutritional labels in some situations does not have a positive impact on the consumption of healthy food products. The need for a potential research that will lead to determining if the usage of nutritional labels can affect customer use of nutritious food products. In conclusion, even though the use of nutritional label can influence the consumption of healthier food product, the use of nutritional label during buying a food product is still low among the consumer. The highly need for future research in this area will provide the valuable information that can improve the consumption of healthy food product among the consumer. It also can improve the dietary intake among the consumer that lead to decreasing number of non-communicable diseases that are related to unhealthy dietary intake.

### **References**

- [1] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- [2] Andrews, J. C., Netemeyer, R., Burton, S., & Kees, J. (2021). What consumers actually know: The role of objective nutrition knowledge in processing stop sign and traffic light front-of-pack nutrition labels. *Journal of Business Research*, 128, 140-155.
- [3] Al-Swidi, A., Huque, S. M. R., Hafeez, M. H., & Shariff, M. N. M. (2014). The role of subjective norms in theory of planned behavior in the context of organic food consumption. *British Food Journal*.
- [4] Armitage, C. J., & Conner, M. (2001). Efficacy of a minimal intervention to reduce fat intake. *Social science & medicine*, 52(10), 1517-1524.
- [5] Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lähteenmäki, L., & Shepherd, R. (2008). Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite*, 50(2-3), 443-454.

- [6] Balcetis, E., & Dunning, D. (2006). See what you want to see: motivational influences on visual perception. *Journal of personality and social psychology*, 91(4), 612.
- [7] Barreiro Hurlé, J., Gracia Royo, A., & de-Magistris, T. (2009). Market implications of new regulations: impact of health and nutrition information on consumer choice.
- [8] Brissette, I., Lowenfels, A., Noble, C., & Spicer, D. (2013). Predictors of total calories purchased at fast-food restaurants: restaurant characteristics, calorie awareness, and use of calorie information. *Journal of nutrition education and behavior*, 45(5), 404-411.
- [9] Carins, J., & Bogomolova, S. (2021). Co-designing a community-wide approach to encouraging healthier food choices. *Appetite*, 162, 105167.
- [10] Chandra, B. (2020). Do customers pay attention to nutrition labels when they buy an online food product?. *TRANS Asian Journal of Marketing & Management Research (TAJMMR)*, 9(10), 33-38.
- [11] Chen, P. J., & Antonelli, M. (2020). Conceptual Models of Food Choice: Influential Factors Related to Foods, Individual Differences, and Society. *Foods*, 9(12), 1898.
- [12] Chernev, A. (2011). The dieter's paradox. *Journal of Consumer Psychology*, 21(2), 178-183.
- [13] Choo, H., Chung, J.-E., Pysarchik, D., 2004. Antecedents to new food product purchasing behavior among innovator groups in India. *European Journal of Marketing* 38 (5/6), 608–625
- [14] Clarke, B., Kwon, J., Swinburn, B., & Sacks, G. (2021). Understanding the dynamics of obesity prevention policy decision-making using a systems perspective: A case study of Healthy Together Victoria. *PloS one*, 16(1), e0245535.
- [15] Cowburn, G., & Stockley, L. (2004). Consumer understanding of nutrition labelling: a systematic review *Public Health Nutrition*.
- [16] Deliza, R., de Alcantara, M., Pereira, R., & Ares, G. (2020). How do different warning signs compare with the guideline daily amount and traffic-light system?. *Food Quality and Preference*, 80, 103821.
- [17] De Toni, D., Eberle, L., Larentis, F., & Milan, G. S. (2018). Antecedents of perceived value and repurchase intention of organic food. *Journal of Food Products Marketing*, 24(4), 456-475.
- [18] Drichoutis, A. C., Lazaridis, P., & Nayga, R. M. (2005). Nutrition knowledge and consumer use of nutritional food labels. *European Review of Agricultural Economics*, 32(1), 93-118.
- [19] Drichoutis, A. C., Lazaridis, P., & Nayga, R. M. (2006). Consumers' use of nutritional labels: a review of research studies and issues. *Academy of marketing science review*, 9(9), 1-22.
- [20] Droms, C. (2006). When I go out to eat I want to enjoy myself: an investigation into consumers' use of nutrition information. *ACR north American advances*.
- [21] Dowd, K., & Burke, K. J. (2013). The influence of ethical values and food choice motivations on intentions to purchase sustainably sourced foods. *Appetite*, 69, 137-144
- Elbel, B., Kersh, R., Brescoll, V. L., & Dixon, L. B. (2009). Calorie Labeling And Food Choices: A First Look At The Effects On Low-Income People In New York City: Calorie information on menus appears to increase awareness of calorie content, but not necessarily the number of calories people purchase. *Health affairs*, 28(Suppl1), w1110-w1121.

- [22] Elbel, B., Mijanovich, T., Dixon, L. B., Abrams, C., Weitzman, B., Kersh, R., ... & Ogedegbe, G. (2013). Calorie labeling, fast food purchasing and restaurant visits. *Obesity*, 21(11), 2172-2179.
- [23] El-Abbadi, N. H., Taylor, S. F., Micha, R., & Blumberg, J. B. (2020). Nutrient Profiling Systems, Front of Pack Labeling, and Consumer Behavior. *Current atherosclerosis reports*, 22(8), 1-10.
- [24] Evelyn, H., Aziz, A. F., & Sariman, S. (2020). Associations of Knowledge, Attitude and Practices of Food Label on Cardiovascular Diseases (CVD) Risk amongst University Students in Selangor, Malaysia. *Journal of nutritional science and vitaminology*, 66(Supplement), S275-S282.
- [25] Fishbach, A., & Trope, Y. (2005). The substitutability of external control and self control. *Journal of Experimental Social Psychology*, 41(3), 256-270.
- [26] Finkelstein, E. A., Strombotne, K. L., Chan, N. L., & Krieger, J. (2011). Mandatory menu labeling in one fast-food chain in King County, Washington. *American journal of preventive medicine*, 40(2), 122-127.
- [27] Fotopoulos, C. and Krystallis, A. (2002), "Purchasing motives and profile of Greek organic consumer: a countrywide survey", *British Food Journal*, Vol. 104 No. 9, pp. 730-64.
- [28] Franco-Arellano, B., Vanderlee, L., Ahmed, M., Oh, A., & L'Abbé, M. (2020). Influence of front-of-pack labelling and regulated nutrition claims on consumers' perceptions of product healthfulness and purchase intentions: A randomized controlled trial. *Appetite*, 149, 104629.
- [29] Giner-Sorolla, R. (2001). Guilty pleasures and grim necessities: affective attitudes in dilemmas of self-control. *Journal of personality and social psychology*, 80(2), 206.
- [30] Grebitus, C., & Davis, G. C. (2017). Change is good!? Analyzing the relationship between attention and nutrition facts panel modifications. *Food Policy*, 73, 119-130.
- [31] Gotschi, E., Vogel, S., & Lindenthal, T. (2007). High school students' attitudes and behaviour towards organic products: survey results from Vienna (pp. 1-23). Univ. für Bodenkultur, Department für Wirtschafts-und Sozialwiss., Inst. für Nachhaltige Wirtschaftsentwicklung.
- [32] Guido, G., Prete, M. I., Peluso, A. M., Maloumy-Baka, R. C. and Buffa, C. (2010), "", *International Review of Economics*, Vol. 57 No.1, pp. 79-102.
- [33] Hasan, H. N., & Suciarto, S. (2020). The influence of attitude, subjective norm and perceived behavioral control towards organic food purchase intention. *Journal of Management and Business Environment*, 1(2), 132-153.
- [34] Harnack, L. J., French, S. A., Oakes, J. M., Story, M. T., Jeffery, R. W., & Rydell, S. A. (2008). Effects of calorie labeling and value size pricing on fast food meal choices: results from an experimental trial. *International Journal of Behavioral Nutrition and Physical Activity*, 5(1), 1-13.
- [35] Hamlin, R., & Hamlin, B. (2020). An Experimental Comparison of the Impact of 'Warning' and 'Health Star Rating' FoP Labels on Adolescents' Choice of Breakfast Cereals in New Zealand. *Nutrients*, 12(6), 1545.
- [36] Hieke, S., & Grunert, K. G. (2018). Consumers and health claims. In *Foods, nutrients and food ingredients with authorised EU health claims* (pp. 19-32). Woodhead Publishing.
- [37] Hess, R., Visschers, V. H., & Siegrist, M. (2012). Effectiveness and efficiency of different shapes of food guides. *Journal of nutrition education and behavior*, 44(5), 442-447.

- [38] Holmes, R., & Bhuvanendrah, D. (2013). Social protection and resilient food systems: The role of cash transfers. London, UK: Annual Report, Overseas Development Institute.
- [39] Jáuregui, A., Vargas-Meza, J., Nieto, C., Contreras-Manzano, A., Alejandro, N. Z., Tolentino-Mayo, L., ... & Barquera, S. (2020). Impact of front-of-pack nutrition labels on consumer purchasing intentions: a randomized experiment in low-and middle-income Mexican adults. *BMC public health*, 20, 1-13.
- [40] Kalia, V., Mugore, M., & Segura, L. E. (2021). Barriers to Understanding and Using Food Labels in Mexico. *American Journal of Public Health*, 111(1), 7-7.
- [41] Kalafatis, S. P., Pollard, M., East, R., & Tsogas, M. H. (1999). Green marketing and Ajzen's theory of planned behaviour: a cross-market examination. *Journal of consumer marketing*.
- [42] Klinovszky, A., Papp-Zipernovszky, O., & Buzás, N. (2021). Building a House of Skills—A Study of Functional Health Literacy and Numeracy among Patients with Type 2 Diabetes in Hungary. *International Journal of Environmental Research and Public Health*, 18(4), 1547.
- [43] Kim, E. J., Ellison, B., Prescott, M. P., & Nayga Jr, R. M. (2020). Consumer Comprehension of the Nutrition Facts Label: A Comparison of the Original and Updated Labels. *American Journal of Health Promotion*, 0890117120983128.
- [44] Koenigstorfer, J., & Baumgartner, H. (2016). The effect of fitness branding on restrained eaters' food consumption and postconsumption physical activity. *Journal of Marketing Research*, 53(1), 124-138.
- [45] Kozup, J., Burton, S., & Creyer, E. H. (2006). The provision of trans fat information and its interaction with consumer knowledge. *Journal of Consumer Affairs*, 40(1), 163-176.
- [46] Kundu, S., Khan, M. S. I., Bakchi, J., Sayeed, A., Al Banna, M. H., Begum, M. R., & Hassan, M. N. (2020). Sources of nutrition information and nutritional knowledge among school-going adolescents in Bangladesh. *Public Health in Practice*, 1, 100030.
- [47] La Barbera, F., & Ajzen, I. (2020). Control interactions in the theory of planned behavior: Rethinking the role of subjective norm. *Europe's Journal of Psychology*, 16(3), 401-417.
- [48] Lee, E. H., Lee, Y. W., Lee, K. W., Hong, S., & Kim, S. H. (2020). A new objective health numeracy test for patients with type 2 diabetes: Development and evaluation of psychometric properties. *Asian nursing research*, 14(2), 66-72.
- [49] Lemos, T. C., Almo, A., Campagnoli, R. R., Pereira, M. G., Oliveira, L., Volchan, E., ... & David, I. A. (2020). A red code triggers an unintended approach motivation toward sweet ultra-processed foods: Possible implications for front-of-pack labels. *Food Quality and Preference*, 79, 103784.
- [50] Levy, A. S., & Fein, S. B. (1998). Consumers' ability to perform tasks using nutrition labels. *Journal of Nutrition Education*, 30(4), 210-217.
- [51] Larue, B., West, G. E., Gendron, C., & Lambert, R. (2004). Consumer response to functional foods produced by conventional, organic, or genetic manipulation. *Agribusiness: An International Journal*, 20(2), 155-166.
- [52] Li, L., Long, X., Laubayeva, A., Cai, X., & Zhu, B. (2020). Behavioral intention of environmentally friendly agricultural food: the role of policy, perceived value, subjective norm. *Environmental Science and Pollution Research*, 1-13.
- [53] Lima, J. P., Costa, S. A., Brandão, T. R., & Rocha, A. (2021). Food Consumption Determinants and Barriers for Healthy Eating at the Workplace—A University Setting. *Foods*, 10(4), 695.

- [54] Lin, C. T. J., Lee, J. Y., & Yen, S. T. (2004). Do dietary intakes affect search for nutrient information on food labels?. *Social Science & Medicine*, 59(9), 1955-1967.
- [55] Logendran, R. (2020a). Glycemic Control Differences between Individuals with Accurately and Inaccurately Provider-Perceived Literacy and Numeracy.
- [56] Malloy-Weir, L., & Cooper, M. (2017). Health literacy, literacy, numeracy and nutrition label understanding and use: a scoping review of the literature. *Journal of Human Nutrition and Dietetics*, 30(3), 309-325.
- [57] Mantzari, E., Pechey, R., Codling, S., Sexton, O., Hollands, G. J., & Marteau, T. M. (2020). The impact of 'on-pack' pictorial health warning labels and calorie information labels on drink choice: a laboratory experiment. *Appetite*, 145, 104484.
- [58] Mazzù, M. F., Romani, S., & Gambicorti, A. (2020). Effects on consumers' subjective understanding of a new front-of-pack nutritional label: a study on Italian consumers. *International Journal of Food Sciences and Nutrition*, 1-10.
- [59] Miller, L. S., Sutter, C., Applegate, E., Wilson, M., Beckett, L., & Gibson, T. (2016). Nutrition Label Training among College Students: A Novel Approach. *The FASEB Journal*, 30, lb317-lb317.
- [60] Miller, L. M. S., & Cassady, D. L. (2015). The effects of nutrition knowledge on food label use. A review of the literature. *Appetite*, 92, 207-216.
- [61] Mohr, G. S., Lichtenstein, D. R., & Janiszewski, C. (2012). The effect of marketer-suggested serving size on consumer responses: the unintended consequences of consumer attention to calorie information. *Journal of Marketing*, 76(1), 59-75.
- [62] Monye, F. N., Ezumah, N. N., Ani, J., Umezuruike, H., Ukwueze, F. O., & Okiche, E. L. (2020). Examining Knowledge, Attitude and Practice Towards Food Labels Among Consumers in Enugu State, Nigeria—A Baseline Survey. *International Journal of Law and Society*, 3(4), 221.
- [63] Myrseth, K. O. R., Fishbach, A., & Trope, Y. (2009). Counteractive self-control: When making temptation available makes temptation less tempting. *Psychological Science*, 20(2), 159-163.
- [64] Nayga Jr, R. M., Lipinski, D., & Savur, N. (1998). Consumers' use of nutritional labels while food shopping and at home. *Journal of Consumer Affairs*, 32(1), 106-120.
- [65] Nayga Jr, R. M. (2000). Nutrition knowledge, gender, and food label use. *Journal of Consumer Affairs*, 34(1), 97-112.
- [66] Ncube, F., Kanda, A., Chijokwe, M., Mabaya, G., & Nyamugure, T. (2020). Food safety knowledge, attitudes and practices of restaurant food handlers in a lower-middle-income country. *Food science & nutrition*, 8(3), 1677-1687.
- [67] Nguyen-Anh, D., Umberger, W. J., & Zeng, D. (2020). Understanding Vietnamese Urban Consumers' Nutrition Label Use, Health Concerns, and Consumption of Food and Beverages with Added Sugars. *Nutrients*, 12(11), 3335.
- [68] Ng, H. X. (2020). Relationship Between Nutritional Label and Purchasing Decision on Adults in Setapak, Kuala Lumpur (Doctoral dissertation, Tunku Abdul Rahman University College).
- [69] Norazmir, M. N., Norazlanshah, H., Naqieyah, N., & Anuar, M. K. (2012). Understanding and use of food package nutrition label among educated young adults. *Pakistan Journal of Nutrition*, 11(10), 836.
- [70] Onwezen, M. C., Bartels, J., & Antonides, G. (2014). The self-regulatory function of anticipated pride and guilt in a sustainable and healthy consumption context. *European Journal of Social Psychology*, 44(1), 53-68.

- [71] Olatona, F. A., Ogide, P. I., Abikoye, E. T., Ilesanmi, O. T., & Nnoaham, K. E. (2020). Dietary Patterns, Nutritional Knowledge and Status of Adolescents in Lagos, Nigeria.
- [72] Ogden, J., & Roy-Stanley, C. (2020). How do children make food choices? Using a think-aloud method to explore the role of internal and external factors on eating behaviour. *Appetite*, 147, 104551.
- [73] Patel, A. B., Bann, C. M., Garces, A. L., Krebs, N. F., Lokangaka, A., Tshefu, A., ... & Hibberd, P. L. (2020). Development of the Global Network for Women's and Children's Health Research's socioeconomic status index for use in the network's sites in low and lower middle-income countries. *Reproductive health*, 17(3), 1-10.
- [74] Papias, E. K., & Veling, H. (2013). Healthy dining. Subtle diet reminders at the point of purchase increase low-calorie food choices among both chronic and current dieters. *Appetite*, 61, 1-7.
- [75] Patterson, M., Bhargava, S., & Loewenstein, G. (2017). An unhealthy attitude? New insight into the modest effects of the NLEA. *Journal of Behavioral Economics for Policy*, 1(1), 15-26.
- [76] Pabst, E., Szolnoki, G., & Loose, S. M. (2019). The effects of mandatory ingredient and nutrition labelling for wine consumers—A qualitative study. *Wine economics and policy*, 8(1), 5-15.
- [77] Prada, M., Saraiva, M., Garrido, M. V., Rodrigues, D. L., & Lopes, D. (2020). Knowledge about Sugar Sources and Sugar Intake Guidelines in Portuguese Consumers. *Nutrients*, 12(12), 3888.
- [78] Packer, J., Russell, S. J., Ridout, D., Hope, S., Conolly, A., Jessop, C., ... & Croker, H. (2021). Assessing the Effectiveness of Front of Pack Labels: Findings from an Online Randomised-Controlled Experiment in a Representative British Sample. *Nutrients*, 13(3), 900.
- [79] Rendell, S. L., & Swencionis, C. (2014). Point-of-purchase calorie labeling has little influence on calories ordered regardless of body mass index. *Current obesity reports*, 3(3), 368-375.
- [80] Robinson, R., & Smith, C. (2002). Psychosocial and demographic variables associated with consumer intention to purchase sustainably produced foods as defined by the Midwest Food Alliance. *Journal of nutrition education and behavior*, 34(6), 316-325.
- [81] Rivera Medina, C., Briones Urbano, M., de Jesús Espinosa, A., & Toledo López, Á. (2020). Eating habits associated with nutrition-related knowledge among university students enrolled in academic programs related to nutrition and culinary arts in Puerto Rico. *Nutrients*, 12(5), 1408.
- [82] Scalco, A., Noventa, S., Sartori, R., & Ceschi, A. (2017). Predicting organic food consumption: A meta-analytic structural equation model based on the theory of planned behavior. *Appetite*, 112, 235-248.
- [83] Shaw, D., & Shiu, E. (2002). The role of ethical obligation and self-identity in ethical consumer choice. *International Journal of Consumer Studies*, 26(2), 109-116.
- [84] Shin, Y. H., Jung, S. E., Im, J., & Severt, K. (2020). Applying an extended theory of planned behavior to examine state-branded food product purchase behavior: The moderating effect of gender. *Journal of Foodservice Business Research*, 23(4), 358-375.
- [85] Shaw, D., Shiu, E., & Clarke, I. (2000). The contribution of ethical obligation and self-identity to the theory of planned behaviour: An exploration of ethical consumers. *Journal of Marketing Management*, 16(8), 879-894.

- [86] Sparks, P., Shepherd, R., & Frewer, L. J. (1995). Assessing and structuring attitudes toward the use of gene technology in food production: The role of perceived ethical obligation. *Basic and applied social psychology*, 16(3), 267-285.
- [87] Smith, M. D., & Floro, M. S. (2020). The Effects of Domestic and International Remittances on Food Insecurity in Low-and Middle-Income Countries. *The Journal of Development Studies*, 1-23.
- [88] Smith, M. D., & Floro, M. S. (2020). Food insecurity, gender, and international migration in low-and middle-income countries. *Food Policy*, 91, 101837.
- [89] Smit, E. S., Meijers, M. H. C., & van der Laan, L. N. (2021). Using virtual reality to stimulate healthy and environmentally friendly food consumption among children: An interview study. *International Journal of Environmental Research and Public Health*, 18(3), 1088.
- [90] Sy, D., & Bullecer, E. (2020). Factors affecting the intention of nutrition label use among selected adults in the Philippines. *European Journal of Public Health*, 30(Supplement\_5), ckaa166-242.
- [91] Vadiveloo, M. K., Dixon, L. B., & Elbel, B. (2011). Consumer purchasing patterns in response to calorie labeling legislation in New York City. *International Journal of Behavioral Nutrition and Physical Activity*, 8(1), 1-9.
- [92] Verdurme, A., Gellynck, X., & Viaene, J. (2002). Are organic food consumers opposed to GM food consumers?. *British Food Journal*.
- [93] Talati, Z., Egnell, M., Hercberg, S., Julia, C., & Pettigrew, S. (2019). Consumers' perceptions of five front-of-package nutrition labels: An experimental study across 12 countries. *Nutrients*, 11(8), 1934.
- [94] Talati, Z., Norman, R., Kelly, B., Dixon, H., Neal, B., Miller, C., & Pettigrew, S. (2018). A randomized trial assessing the effects of health claims on choice of foods in the presence of front-of-pack labels. *The American journal of clinical nutrition*, 108(6), 1275-1282.
- [95] Versluis, I., & Papiés, E. K. (2016). The role of social norms in the portion size effect: reducing normative relevance reduces the effect of portion size on consumption decisions. *Frontiers in psychology*, 7, 756.
- [96] Visschers, V. H., Hess, R., & Siegrist, M. (2010). Health motivation and product design determine consumers' visual attention to nutrition information on food products. *Public health nutrition*, 13(7), 1099-1106.
- [97] World Health Organization, 2019
- [98] World Health Organization, 2018
- [99] Wier, M., & Calverly, C. (2002). Market penetration for organic food products in Europe. *British Food Journal*, 104(1), 45-62.
- [100] Wood, W., Mazar, A., & Neal, D. (2021). Habits and Goals in Human Behavior: Separate but Interacting Systems.
- [101] Yazdanpanah, M., & Forouzani, M. (2015). Application of the Theory of Planned Behaviour to predict Iranian students' intention to purchase organic food. *Journal of Cleaner Production*, 107, 342-352.
- [102] Yamashita, T., Bardo, A. R., Millar, R. J., & Liu, D. (2020). Numeracy and preventive health care service utilization among middle-aged and older adults in the US. *Clinical gerontologist*, 43(2), 221-232.
- [103] Yadav, R., & Pathak, G. S. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of Cleaner Production*, 135, 732-739.

- [104] Yoon, H. J., & George, T. (2012). Nutritional information disclosure on the menu: Focusing on the roles of menu context, nutritional knowledge and motivation. *International Journal of Hospitality Management*, 31(4), 1187-1194.
- [105] Yücel, K. (2020). Evaluation of University Students' Nutritional Knowledge Attitudes and Behaviors. *Journal of Basic and Clinical Health Sciences*, 4(2), 133-139.
- [106] Zagata, L. (2012). Consumers' beliefs and behavioural intentions towards organic food. Evidence from the Czech Republic. *Appetite*, 59(1), 81-89.
- [107] Zhang, Y., Huang, S. C., & Broniarczyk, S. M. (2010). Counteractive construal in consumer goal pursuit. *Journal of Consumer Research*, 37(1), 129-142.
- [108] Zhang, J., Zhai, L., Osewe, M., & Liu, A. (2020). Analysis of Factors Influencing Food Nutritional Labels Use in Nanjing, China. *Foods*, 9(12), 1796.