Nutrition Label Knowledge and Attitude to Affect Healthy Food Choice among Young Consumers in Malaysia

Zuraidah Zainol\textsuperscript{1}, Rusliza Yahaya\textsuperscript{2}, Juliana Osman\textsuperscript{3}, Azila Abdul Razak\textsuperscript{4}, Ani Munirah Mohamad\textsuperscript{5}

\textsuperscript{1,2,3,4}Universiti Pendidikan Sultan Idris, Perak Malaysia
\textsuperscript{2}School of Law and Center for Testing, Measurement and Appraisal (CeTMA), Universiti Utara Malaysia, Kedah, Malaysia
E-mail: zuraidah@fpe.upsi.edu.my

Abstract: This research attempts to investigate the direct effect of nutrition label knowledge on attitude, and, nutrition label knowledge and attitude in choosing healthy food among Malaysian consumers as well as the role of nutrition label attitude as a mediator. This research applied the quantitative approach. A sample comprised 381 Malaysian consumers with minimum age of 18 years old. Data from a sample were obtained using a structured questionnaire and analysed using structural equation modelling (SEM). The findings reveal that nutrition label knowledge as a significant predictor of nutrition label attitude and, nutrition label knowledge and attitude as significant predictors of healthy food choice. In addition, the findings reveal the nutrition label attitude as a partial mediator in the relationship between nutrition label knowledge and healthy food choice. Although the findings provide fresh insights on the role of nutrition label knowledge and attitude in affecting healthy food choice, this research requires a replication in future research as to improve the explanatory power of the framework.

Keywords: Nutrition label attitude, nutrition label knowledge, healthy food choice, Structural Equation Modelling (SEM), young consumer

1. Introduction

Given a hectic life of today’s society, consuming healthy food is mandatory (E. S. Tee, 2011). Abundance of processed food are produced to cater the need, but often it has been associated with creating more harms than good to health. Realizing the critical need for quick and easy tips on healthy food, the significant role of nutrition label has been highlighted to not only provide the nutrition content of food products but also help the consumers to make informed decisions while buying a product (Campos, Doxey, & Hammond, 2011; Grunert, Wills, & Fernández-Celemín, 2010).

Despite the regulatory environment on food labelling may differ across countries, in which the nutrition label is mandatory in some countries such as Malaysia, Australia, Canada and South Korea, while optional in other countries (Koen, Blauw, & Wentzel-Viljoen, 2016), nutrition label has been accepted as one of the tools to help the customer make healthier food choices and encourage the industry to produce healthier products (Kanter, Vanderlee, & Vandeijver, 2018). Yet, it has been released that the use of a nutrition label is still low in developing compared to developed countries (Ambak et al., 2014; Grunert & Wills, 2007). Furthermore, it has been raised that even though the customer in the emerging countries are well aware of the importance of consuming healthy food, the use of nutritional label among consumers while making purchases is still at a low level (Darkwa, 2014; Norazlanshah et al., 2013; Rose, 2012). In Korea, it is also argued that though the awareness level of the nutrition label is high, the actual usage level of the nutrition label is still low (H.-S. Kim, Oh, & No, 2016). There is no exception for Malaysia in which the utilization level of the nutritional label is found poor although the awareness level of the importance of nutrition label is high among Malaysian consumers (Azman & Sahak, 2014; Darkwa, 2014; Kumar & Ali, 2011; Ministry of Health Malaysia, 2013; Norazlanshah, et al., 2013; Rose, 2012).

In order to encourage healthy food choice via the role of the nutrition label among the consumer, this research attempts to investigate the effect of nutrition label knowledge on nutrition label attitude, nutrition label knowledge and attitude on healthy food choice and the mediating effect of nutrition label attitude among Malaysian consumer. This is particularly important as a large number of the previous studies have been concentrating on examining the determinants of the nutrition label use (Bosman, Merwe, Ellis, Jerling, & Badham, 2014; Madhvapaty & Singh, 2014) and addressing the influence of nutrition label on the behaviours of the consumer, mainly on the intention to purchase (Burton, Howlett, & Tangari, 2009; Godwin, Speller-Henderson, & Thompson, 2006; Norazlanshah, et al., 2013; Prathiraja & Ariyawardana, 2003). Furthermore, little research has been directed to examine the relationship between consumers’ nutrition label knowledge, nutrition label attitude and healthy food choice in a single framework (Ng et al., 2015; Norazmir, Norazlanshah, Naqieyah, & Anuar, 2012).
2. Literature Review

Nutrition label refers to a listing of the nutrition properties for a particular food product depicted on the label (Miller & Cassady, 2015; The Ministry of Health, 2013) that are used to guide the customer in purchase decision of food products (Azman & Sahak, 2014; Grunert & Wills, 2007). Nutrition label knowledge can be defined as individual’s ability to get, use and understand the health facts and materials on the food label (Aygen, 2012; Bosman, et al., 2014; Johnston, Lordan, Shields, & Suziedelyte, 2015; Pleasant, 2014) and positively react in making right health decision (Camerini, Schulz, & Nakamoto, 2012; Chin et al., 2011; Knight, 2017; Racey, Machmueller, Field, Kulak, & Newton, 2016) while nutrition label attitude can be described as the feelings, perception and evaluation towards nutrition label of an individual while purchasing food products (Cannoosamy, Pugo-Gunsam, & Jeewon, 2014; Graham & Laska, 2012; Samant, Crandall, & Seo, 2016; Zainol, Yahaya, Osman, & Omar, 2019b).

Even though Mogre, Aryee, Stevens and Scherpnier (2017) disclose that consumers knowledge on the nutrition is uncorrelated with the attitude, much research prove significant positive association between nutrition label knowledge and attitudes towards nutrition labels (Kigaru, Loechl, Moleah, Macharia-Mutie, & Ndungu, 2015; Marietta, Welshimer, & Anderson, 1999). Similarly, past research in Malaysia’s context also reveals that one’s knowledge associate positively with the attitude towards food consumption.

Not only association, extant studies also point out that knowledge, either objective or subjective, has a significant and positive influence on the attitude towards organic food, which implies that knowledge influence attitude positively (Aertssens, Mondelaers, Verbeke, Buysse, & Van Huylenbroeck, 2011). Furthermore, Acheampong and Haldeman (2013) emphasize that consumers tend to have favourable attitudes about healthy eating when they have high nutrition knowledge, while Baser, Ture, Abubakirova, Sanlier and Cil (2016) demonstrate that hotel staff are more likely to have a favourable attitude towards healthy food when they have safety knowledge. Even in the recent studies by Zainol, Yahaya, Osman, & Omar (2019a; 2019b), the positive effect of health knowledge on nutrition label attitudes is demonstrated.

Accordingly, it could be believed that knowledge and attitudes are significantly associated and, nutrition label knowledge may significantly and positively influence consumer attitude. Thus, the following hypotheses are proposed:

H$_1$: Nutrition label knowledge significantly affects the nutrition label attitude among young adults consumer.

Healthy food choice refers to individual’s inclinations to consider, choose and consume a food product with the right ratio of nutrients required by human body (M.-J. Kim, Lee, Gon Kim, & Kim, 2013; Mötteli, Keller, Siegrist, Barbey, & Bucher, 2016; Salmon, Fennis, de Ridder, Adriaanse, & De Vet, 2014). Past studies show that consumers can make way better choice of food when they effectively use nutrition label (Magistris, Gracia, & Barreiro-Hurlé, 2010; Miller & Cassady, 2015). Despite few studies has tackled the matter, it has been demonstrated that nutrition label attitude significantly affect healthy food choice (Barreiro-Hurlé, Gracia, & De-Magistris, 2010; Trendel & Werle, 2015). Accordingly, it raises the significance to examine the role of nutrition label in guiding the consumers to make healthy food choices (Norazlanshah et al., 2013).

Prior studies also establish that attitude of the consumers play an vital role in their food purchase decision (Harker, Gunson, & Jaeger, 2003; Magnusson & Hursti, 2002; Schifferstein, 2001) and food safety behaviour (Baser, et al., 2016). Furthermore, Costell, Tárrega, & Bayarrit(2010) indicate that the tendency for consumer to choose healthy food are largely determined by their attitude. Likewise, Trendel and Werle (2015) specify that attitude induces the consumer inclination to choose healthy food products. In Malaysia context, Ng et al. (2015) provide that unfavourable nutrition label attitude lead the consumer to act unreasonably and choose unhealthy food (Ng, et al., 2015). Along the similar line, Shah Alam and Mohamed Sayuti (2011) support the positive effect of attitude on consumer food purchase intentions.

In addition, Baser, et al. (2016) draw attention to the fact that attitude significantly affects food safety behaviour, but not knowledge. Further, they highlight that attitude serves as a significant mediator in a relationship between knowledge and behaviour. In relation to that, Cooke and Papadaki (2014) highlight that both nutrition label knowledge and attitude make a major contribution to motivate the consumer to practise a healthy diet. That is, greater nutrition label knowledge and a positive nutrition label attitude may prompt the consumer to choose healthier food. In a recent studies by Zainol, Yahaya, Osman, & Omar (2019a, 2019b) the
positive influence of both health knowledge and attitudes towards nutrition label on healthy food choice are revealed.

Hence, it could be assumed that being knowledgeable about nutrition label and positive nutrition label attitude may further have a significant impact on the intention to choose healthy food. Given the potential positive effect of knowledge on attitude, nutrition label attitude may also serve as a mediating variable in the effect of knowledge on healthy food choice. It is therefore, it may possibly be hypothesized that:

H1: Nutrition label knowledge significantly affects healthy food choice among young adults consumer.
H2: Nutrition label attitude significantly affects healthy food choice among young adults consumer.
H3: Nutrition label attitude mediates the nutrition label knowledge and healthy food choice relationship.

3. Methodology

This research employed a quantitative approach. The research was conducted in Putrajaya, Malaysia. This location was selected as it was recorded with highest overweight and obese residents (National Health and Morbidity, 2015) as well as household disbursement (Department of Statistics, 2015). The respondents comprised the individuals aged 18 years old and above. This age range is considered as significant age category for customers to make rational purchase decision (Euromonitor International, 2011). A sample was made up of 381 respondents (J. F. Hair, Black, Babin, & Anderson, 2010). The sample was selected using the systematic sampling.

Data were collected using a structured questionnaire. All the items were modified from reliable scale of various studies. Specifically, nutrition label knowledge (nine items) and on nutrition label attitude (10 items) derived from Aygen (2012) and Bosman, et. Al (2014), while healthy food choice (six items) from Han, Hsu, & Lee (2009). The Exploratory Factor Analysis (EFA) results on the pilot test data confirmed the items of the four factors, with Kaiser-Meyer-Olkin (KMO) value above 0.6, significant Bartlett's test, the total explained variance of 63.597 percent and loadings greater than 0.5 (J. F. Hair, et al., 2010; Huck, 2012; Pallant, 2015; Zainol, Yasin, Omar, & Hashim, 2014). Further, the reliability of the scale achieve the satisfactory level when the Cronbach’s alpha values for all constructs are well above the recommended value of 0.7 (Hair et al., 2010).

In conducting the ethical research, the actual data collection had taken several measures including anonymity, voluntary involvement and confidentiality (Bhattacherjee, 2012; Saunders, Lewis, & Thornhill, 2009; Sekaran & Bougie, 2009). Further, the proposed hypotheses were tested using structural equation modelling (SEM).

4. Results

Out of 381 questionnaires distributed, only 328 responses are valid and used in further analysis. The mean age of the respondents is 27 (SD=3.89). Based on Table 1, most of the respondents are female (57.9%), possess a Bachelor degree (56.7%), work as technical and support staff (39%), and report a monthly income of around RM2000 to RM2999.

<table>
<thead>
<tr>
<th>Table 1. Summary of the Respondents’ Profile</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>190</td>
<td>57.9</td>
</tr>
<tr>
<td>Male</td>
<td>138</td>
<td>42.1</td>
</tr>
<tr>
<td>Ethnic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>210</td>
<td>64.0</td>
</tr>
<tr>
<td>Chinese</td>
<td>58</td>
<td>17.7</td>
</tr>
<tr>
<td>Indian</td>
<td>37</td>
<td>11.3</td>
</tr>
<tr>
<td>Others</td>
<td>23</td>
<td>7.0</td>
</tr>
<tr>
<td>Highest education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td>33</td>
<td>10.1</td>
</tr>
<tr>
<td>Certificate / Diploma</td>
<td>91</td>
<td>27.7</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>186</td>
<td>56.7</td>
</tr>
<tr>
<td>Masters / PhD</td>
<td>16</td>
<td>4.9</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>.6</td>
</tr>
<tr>
<td>Occupation</td>
<td>88</td>
<td>26.8</td>
</tr>
</tbody>
</table>
5. Preliminary Analysis

Preceding the SEM analysis, three main assumptions are checked. After the removal of one item i.e. KNOW5, the value of the skewness and kurtosis are all within the recommended range of normality of ± 2, (Garson, 2012). Despite the initial Mardia’s coefficient of 133.163 (CR=38.797) is larger than the recommended value (Garson, 2012), the value drops from 133.16 to 69.25, that is by 48 percent with deletion of the outliers (Coakes & Steed, 2003; Kline, 2011). Hence, the deletion has lowered the multivariate non normality with significant percentage (Gao, Mokhtarian, & Johnston, 2008), indicating that the data is fit for subsequent analysis. Next, inspection on the inter-construct correlations and standardized regression weights reveals all values below 0.9, indicating no potential of multicollinearity problem (Hair, et al., 2010; Garson, 2012; Hair, et al., 2010). Since all the assumptions have been satisfied, SEM analysis are performed using two-stage approach.

6. Validating the Measurement Model

The confirmatory factor analyses (CFA) results depicted in Table 2 indicate the measurement model adequately fit the data. However, inspection of the standardized factor loadings reveals four items (i.e. HK6, ATT1, ATT2 and ATT9) with loading below the acceptable factor loading of 0.5 (Hair, et al., 2010). Hence, those items were removed from the measurement model and respecified.

Table 2. Goodness-of-fit (GOF) Results

<table>
<thead>
<tr>
<th>GOF statistics</th>
<th>$\chi^2$ (df, p)</th>
<th>$\chi^2$/df</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial GOF results</td>
<td>443.63 (186, 0.000)</td>
<td>2.385</td>
<td>0.914</td>
<td>0.067</td>
</tr>
<tr>
<td>GOF after 1st modification</td>
<td>293.41 (116, 0.000)</td>
<td>2.529</td>
<td>0.935</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Acceptable value* $\chi^2$/df Significant at $\alpha = 0.05$ 1-5 > 0.9 < 0.08


To achieve reliability and convergent validity, the AVE value for each construct and the standardized regression weights should be above 0.5 with CR value above 0.7 (Hair, et al., 2010). As long as the CR value above 0.6, any AVE value that within 0.4 to 0.5 should also be accepted (Fornell & Larcker, 1981). As depicted in Table 3, the AVE, CR and standardized factor loadings values are all exceed the rule of Thumb (Hair, et al., 2010), satisfying the reliability and convergent validity. Further, the square root of the AVE for each construct are greater than its corresponding inter-construct correlations (IC), supporting the discriminant validity (Chiu & Wang, 2008; Fornell & Larcker, 1981; Ramayah, Lee, & Mohamad, 2010). Having achieved the model fit, reliability and validity, the model is suitable to proceed with hypotheses testing.

Table 3. Measurement Model Validation

<table>
<thead>
<tr>
<th>Construct (Loadings)</th>
<th>Inter-construct Correlations (IC)</th>
<th>AVE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition label knowledge (KNOW) - (0.576, 0.82, 0.855, 0.702)</td>
<td>0.746*</td>
<td>0.557</td>
<td>0.831</td>
</tr>
<tr>
<td>Nutrition label attitude (ATT) - (0.559, 0.748, 0.81, 0.77, 0.77, 0.725, 0.504)</td>
<td>0.253</td>
<td>0.704</td>
<td>0.496</td>
</tr>
<tr>
<td>Healthy Food Choice (HFC) - (0.834, 0.84, 0.848, 0.808, 0.703, 0.662)</td>
<td>0.314</td>
<td>0.476</td>
<td>0.786</td>
</tr>
</tbody>
</table>

Note: * square root of AVE (diagonal elements in bold)
The findings disclose that nutrition label knowledge as significant determinant of nutrition label attitude. Accordingly, the findings provide a support to the findings of many of previous studies including Acheampong and Haldeman (2013), Baser et al. (2016), Kigaru, Loechl, Moleah, Macharia-Mutie and Ndungu (2015) and Zhu and Xie (2015) which point out that consumer nutrition label knowledge will influence their nutrition label attitude. That is, being more knowledgeable about nutrition label, the higher the tendency of the consumer to have favourable nutrition label attitude. Thus, to stimulate the positive nutrition label attitudes, it is of paramount importance to increase the knowledge about the nutrition label first.

In addition, the findings show that nutrition label knowledge and nutrition label attitude significantly affect healthy food choice. The findings comply well with the findings of Cooke and Papadaki (2014), which

### Table 5. Hypotheses Testing Results on Mediating Effect

<table>
<thead>
<tr>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOW → HFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LB (95% CI)</td>
<td>UB (95% CI)</td>
<td></td>
</tr>
<tr>
<td>KNOW → ATT → HFC</td>
<td>0.207***</td>
<td>0.054 0.178 0.107**</td>
</tr>
<tr>
<td>Partial mediation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
emphasize that both nutrition label knowledge and attitude play a significant role in affecting the consumer to
practise a healthy diet. That is, greater nutrition label knowledge and a positive nutrition label attitude may
prompt the consumer to purchase healthy food. The findings also in favour of previous findings on the
importance of consumers’ attitude in making healthy food purchase decision (Baser, et al., 2016; Harker, et al.,
2003; Magnusson & Hursti, 2002; Schifferstein, 2001). Besides, the findings appear to correspond with Ng et al.
(2015) and; Shah Alam and Mohamed Sayuti (2011), which stress that attitude plays a significant part in
customers’ purchase decision of food products. Similarly, Graham and Laska (2012), Costell, Tárrega, and
Bayarri (2010), and Trendel and Werle (2015) suggest that the consumer attitude affects their choices of healthy
food. Apparently, a favourable nutrition label attitude is more likely to foster the customer to choose healthier
food products. That is, the more favourable the nutrition labels attitudes, the higher the intention for the
consumer to choose healthy food products.

Finally, the findings reveal that the nutrition label attitude partially mediates the relationship between
nutrition label knowledge and healthy food choice. Hence, the findings are consistent with Cooke and Papadaki
(2014), which provide that attitude has a mediating effect in a relationship between knowledge and behaviour
and, both nutrition label knowledge and attitude play a significant role in affecting the consumer to practise
a healthy diet. Thus, the results indicate that greater nutrition label knowledge would improve the customer
perception of the nutrition label to the extent that they are more willing to choose healthy food products. That is,
when the customers are more informed about the health information, they are more likely to have a favourable
perception towards nutrition label that they would feel obligated to only choose healthy food products.

Accordingly, nutrition label can help to educate and promote healthy food choice among the Malaysian
consumers. Though the usage level of the nutrition label is still low Malaysian consumer (Norazlanshah, et al.,
2013), their knowledge and nutrition label attitude are positive to the extent that it may induce the customer to
choose healthier food product. Hence, to promote healthy food consumption, the consumer should be educated
about the health as well as the concept and application of the nutrition label and have a favourable nutrition label
attitude.

9. Implications

In implication, the findings enhance the understanding of the significant roles of nutrition label in
encouraging smart purchases over food products among consumers, particularly how nutrition label serve as
effective tool in helping the consumer to choose healthier food. Specifically, consumers need to increase their
knowledge of the nutrition label and have a more favourable attitude towards nutrition label. Consumers may
increase the nutrition label knowledge by reading books, brochures or magazines related to nutrition label or
attending nutrition label educational campaigns (Hawkes, 2013; Kimura, 2011). Besides, the consumer also
needs to occupy a little time to read nutrition labels before making a purchase decision (Norazmir, et al., 2012).
They must always bear in their mind that great health is more important than cheaper price.

In addition, the findings highlight the need for more educational campaigns on the importance of nutrition
label, how to read nutrition label and healthy food cooking. In relation to that, all the relevant parties, such as the
consumer ministry or association, should take part in designing effective programs to promote the use of the
nutrition labels including to make it compulsory for nutrition label to be written in the local language (Azani,
2017; Noor, 2017).

Furthermore, clear and coloured fonts used on the nutrition label could be more appealing to consumers to
read the nutrition label (Graham & Laska, 2012). Accordingly, the attractive nutrition labels could enhance
nutrition label knowledge in protecting consumers right and helping them choosing healthy food. The ministry of
Education and its agencies should also take part in organizing educational programmes pertaining to nutrition
label (National Health and Morbidity, 2015; E.-S. Tee, 2011) such as producing modules or reading materials on
a balanced diet which can be used during teaching and learning session.

10. Limitations and Future Research Directions

This research is limited to several factors. In generalizing the findings, it must be done with cautious as this
research only involves the residents in Putrajaya, a small part of Malaysia. Hence, replication or extension of this
research should cover a broader area and include larger size of sample. Besides, this research only examines two
constructs i.e. nutrition label knowledge and nutrition label attitudes as antecedents of healthy food choice, while
many other variables might have significant impact on healthy food choice such as demographic factors,
nutrition label use and motivation (Barreiro-Hurlé, et al., 2010; Cooke & Papadaki, 2014). Hence, these variables

should be included in the future research to increase the explanatory power of the framework. Further, it would be interesting to determine the potential moderator in the relationship such as gender, age, income level and obesity level.

References


