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Consumers Awareness of Nutritional Information in Food Labels in Benghazi/Libya

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Abstract: A nutritional label is a list of nutrient level of a product displayed on the food label. The current paper aims to study consumers' awareness of nutritional information in food labels in Benghazi, Libya. Study included four hundred participants; data were collected by questionnaires. Data were analysed by using descriptive statistics. Chi-Square test used to examine the significant differences in the sample. Findings showed that, most participants were aware that pre-packaged foods must carried nutritional label, while more than half of them had low awareness level of nutrition label information. Fat and total energy were the most sought for nutrient information among participants who used nutrition label. The use of "no preservatives" phrase for measuring consumer awareness level of nutritional label was the only parameter that give high consumer awareness level of nutritional label in comparison with other parameters such as brand name of products and the components of nutrition label. Statistically significant association were observed between nutrition label awareness and age, gender, job, marital status and education level of participants.
Keywords: Consumers' awareness, Nutritional Information, Food Labels, Benghazi.

INTRODUCTION

A nutritional label is a list of nutrient level of a product displayed on the food label (Azman, N., & Sahak, S., 2014). it supports the goal of healthy eating while retaining consumer freedom of choice, (Aygen, F., 2012). Nutrition labelling on food products has emerged as a prominent policy tool for promoting healthy eating. As a health education intervention, mandatory nutrition labels have broad reach and are present at the point of purchase, as well as when food is prepared or consumed (Campos, S., *et al*., 2011). It is the profiling of a product's content of nutrients (including protein, fat, carbohydrates, and vitamins) and energy value, through the medium of packaging (Oghojafor, B., *et al*., 2012). However, nutrition information on food labels could be a cost-effective method of communicating nutrition information to consumers because the information appears at the point of sale for most packaged foods (Goyal, R., & Deshmukh, N., 2018). It is important that the nutrition information provided be appropriate and understandable to the consumer and that it impacts food-choice behaviors (Wills, J., *et al*., 2009). There is an urgent need for a simple nutritional label that can summarize all the nutritional profiles to enable easy understanding. In recent years, the traditional nutrition information in table or grid form, usually found on the back of the food package, has been supplemented by a variety of simplified nutrition labels that appear on the front of the pack, often called Front-Of-Pack (FOP) signposting information (Grunert, K., *et al*., 2010). Therefore, several food manufactures are using signposts on the front of the packages to help consumers interpret the nutritional information. Signposts could probably change eating patterns by informing and supporting consumers to make healthy choices (Borgmeier, I., & Westenhoefer, J., 2009). Cheap, energy dense, and nutrient poor foods is called "Western diet". It is becoming more prevalent across the globe as more consumers eat pre-packaged foods and meals purchased outside of the home (Mandle, J., *et al*., 2015). Worldwide, the consumption of labelled pre-packaged foods most of which are laden with high levels of sugar, fat (saturated fat, trans-fat) and sodium has increased. The food or nutrition label has emerged as a prominent policy tool for promoting healthy eating in some countries. In US and Canada nutrition labeling is mandatory largely because of their population drift toward healthy and wellness foods and also reflect a response to consumers' right to know the content and nutrition of a food product (Aryee, P., *et al*., 2019). Nutritional labels provide the energetically and chemical content of processed foods for the consumer. Moreover, these labels are used to raise awareness and promote appropriate nutritional habits in people. This tool could

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be useful if the consumers understand and use the information for the purchase and consumption of the products (Teran, S., *et al*., 2019). In addition to, improved nutrition labelling would help to redress the growing incidence of chronic diseases such as heart disease, stroke, diabetes and cancer, which are now responsible for up to two-thirds of all deaths globally (Walkinshaw, E., 2011). In Australia, Grimes, C., and other (2009) studied the consumers' knowledge of health risks of high salt intake and frequency of use and understanding of labelled salt information. The authors found that most participants knew the relationship between salt intake and high blood. Kreuter, M., and others (1997) conclude that patients eating diets lower in fat were much more likely (51% versus 26%) than patients whose diets were higher in fat to report labels influencing their food purchase decisions. In America, a study conducted to determine the association between food nutrition labels use and lower fat intake. The result of study found that nutrition label use was significantly higher among women, residents younger than 35 years, and residents with more than a high school education. (Neuhouser, M., *et al*., 1999). Satia, J., and others (2005) revealed that 78% of respondents read nutrition labels when they purchased packaged foods. Nutrition label use was significantly higher among women, older, educated beyond high school and obese. Also, the study revealed that usual/often label users had higher fruit and vegetable consumption and lower fat intake. A cross sectional study was carried out by Buyuktuncer, Z., and others (2018) found that sub-group scores of HEI-2005 for total fruits, whole fruits, total vegetables, whole grains, milk, oils, saturated fat, and calories from solid fat, alcohol and added sugar were significantly higher in regular nutrition facts label users. In Brazilian study carried out by Verissimo, A., and others (2019) indicated that the habit of reading labels was reported by (72.3%) of the participants, who predominantly verified the product's expiration date (90.2%), followed by the amount of fat (18.4%) and sodium (16.7%) in it. In China, He, Y., and others (2018) investigated the awareness, understanding and use of sodium labelling information among the population. The study showed that (19.5%) were aware that sodium content is listed on the nutrition information panel (NIP), (5.5%) understood the meaning of Nutrient reference values (NRV%), and 12.6% reported they frequently read the label when shopping. In addition, Weaver, D., and Finke, M., (2003) found that there is a significant relationship between frequent uses of sugar information on the label and reduced added sugar density. A study conducted in Mexico by (Neito, C., *et al*., 2019) showed that participants with normal weight had a higher use of nutrition label than overweight or obese subjects. In Brazil, Sekiyama, F., and others (2019) demonstrated that no differences were found between teachers with and without hypertension with regard to frequent reading of nutritional labels. Another study conducted in USA, by Post, R., and others (2010) indicated that those who read food labels consumed less energy, saturated fat, carbohydrates, and sugar, and more

fiber than those who did not. Kim, J., and others (2015) studied the association between nutrition labelling-based awareness and the risk of dyslipidaemia among individuals not yet diagnosed. The result of this study suggested that approximately (70%) of the respondents (n=11513) were familiar with nutrition labelling, of which (20%) (n=3172) decided what food to buy based on that information. This awareness yielded mostly positive results on outcome indicators, such as triglyceride and high-density lipoprotein cholesterol levels. In general, the study revealed that who used nutritional labels to make decisions regarding food purchases had a lower risk of dyslipidemia than individuals who did not. Benghazi is the second largest city in Libya and estimated to have a total population of 500,000 according to the national census in 2012 (Nouh F *et al*., 2021). In Libya especially in Benghazi city, the information available in regard to food label was very meagre. The aim of this paper to consumers' awareness of nutritional information in food labels in Benghazi/Libya.

METHODOLOGY

400 randomly selected Libyan adults aged 18 years and above were enrolled in the study. The subjects were purchasing pre-packaged foods from 21 supermarkets and malls in Benghazi city between March and September 2019. The study sample represents 63% of the total population in Benghazi city according to the national census in 2012. Five regions were excluded from the study because they were going through hard post- war times during the study period. The non-Libyan-citizens were excluded, since they may have different culture and attitude towards food labelling. Data were collected by using close ended questions questionnaire. The questionnaires were filled by one of the researchers. The questionnaire was based on the questions of previous studies with some modifications (Samson, G., 2012, Aryee, P., and others 2019, Dudhate, A. U 2011, and Kasapila, W., & Shawa, P 2011). Data entry and analysis were performed using the Statistical Package for Social Sciences (SPSS) version 20. Chi–square test was performed to assess statistical significance between the socio-demographic characteristics of respondents and awareness of food labelling information. If (P<0.05) was considered statistically significant. Ethical approval for conducting this study was obtained from the Directorate of Graduate Studies and Training of University of Benghazi. Permission to conduct the study in supermarkets and malls was obtained from the managers of each supermarket and mall. Informed consent was obtained from the participants.

RESULT

Table (1) shows the participants characteristics. The largest proportion of participants (45.8 %) was in the age group 29 to 39 years. (74.3%) of participants were males; 25.8 were females. In addition, (54.5%) of participants were married. (43%) of participants had college/university education, followed by (40.8%) had

secondary education. Furthermore, (38.8%) of participants earned a monthly income 550 to 749 Libyan Dinar (LYD). Moreover, employed, freelancers were account (69.5%), (20.5%) respectively.

Table 1: Scio-Demographic Characteristics

Variables	Number	Percentage
Age (Years)		
18-28	56	14
29-39	183	45.8
40-50	119	29.8
51-60	37	9.3
> 60	5	1.3
Gender		
Male	297	74.3
Female	103	25.8
Marital status		
Single	180	45
Married	218	54.5
Widowed	0	0
Divorced	0	0.5
Education		
Primary	64	16
Secondary	163	40.8
University Level	172	43
No formal education	1	0.3
Income (Libyan dinars)		
350-549	48	12
550-749	155	38.8
750-949	141	35.3
>950	56	14
Occupation		
Student	35	8.8
Employee	278	69.5
Retired	4	1
Unemployed	1	0.3
Freelancers	82	20.5

Figure (1): shows that sixty three percent of participants were aware that pre-packaged foods carried food labels with nutritional information, while only thirty seven percent do not interesting. Table (2) shows that fat (stated by 57.5% of respondents), calorie/energy (stated by 55% of respondents) and carbohydrates (stated by 36.5% of respondents) were the most frequently reading nutrient among all nutrients. Other key ones of interest were information on protein (9.5%), fiber (3.5%), while the least used nutrition information was moisture (2.8%). Figure (2): shows that seventy four point three percent of participants considered the phrase of "no preservatives" was very much important, while twenty three point eight percent of participants considered moderately important, and only one percent of participants for both minimally and not important. As shown in figure (3): the understanding of the nutrition information provided on nutritional labels, shows that fifty nine point five percent of participants had somehow understanding, while thirty seven point five percent of participants had very well understanding, and only three percent of participants not understanding the nutrition information. Figure (4):

shows that the majority of participants (eighty two point eight percent) do not read the nutrition information in purchasing brand names food products, and only seventeen point three percent do not give importance to brand names. Figure (5): shows that fifty three point eight percent of participants having low awareness level of nutrition label information, while forty six point three percent rated their awareness as high. The awareness level of nutritional label according to nutrition labels components as indicated in figure (6): shows that eighty eight point seventy five percent of participants had low level of nutrition label awareness, while ten point twenty five percent those who had medium, and only one percent of participants had high level of nutrition label awareness. As indicated in figure (7): the level of nutrition label awareness according to the importance of phrase "no preservatives", shows that ninety eight percent of participants had high level of nutrition label awareness, and those who had low level of nutrition label awareness constituted only two percent. Table (3) shows association between socio-demographic characteristics and nutritional label.
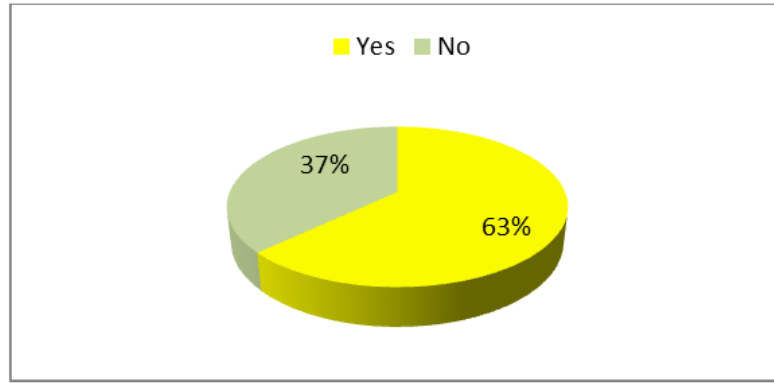
Figure 1: Distribution of participants according to the presence of the nutritional label

Table 2: Distribution of participants according to the interest nutritional information on

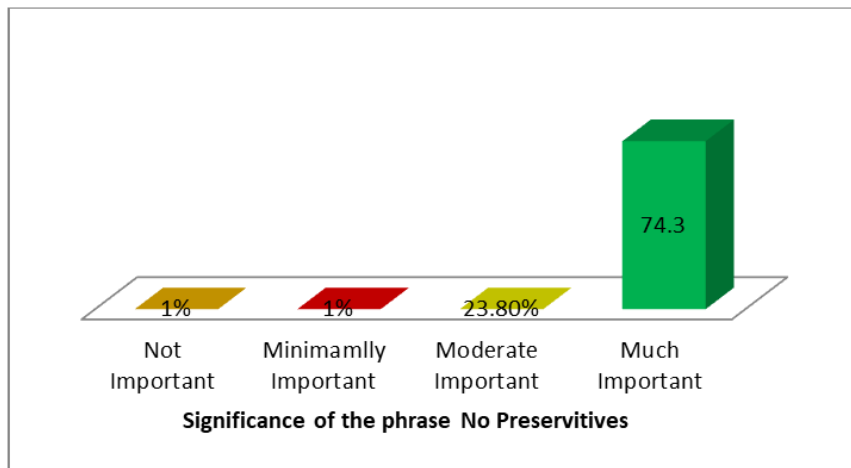| Food labelling requirements	No.	%
Protein	38	9.5
Fat	230	57.5
Carbohydrates	146	36.5
Fiber	14	3.5
Moisture	11	2.8
Calories/energy	220	55

Figure 2: Distribution of participants according to the importance of "no preservatives" phrase on the nutritional label
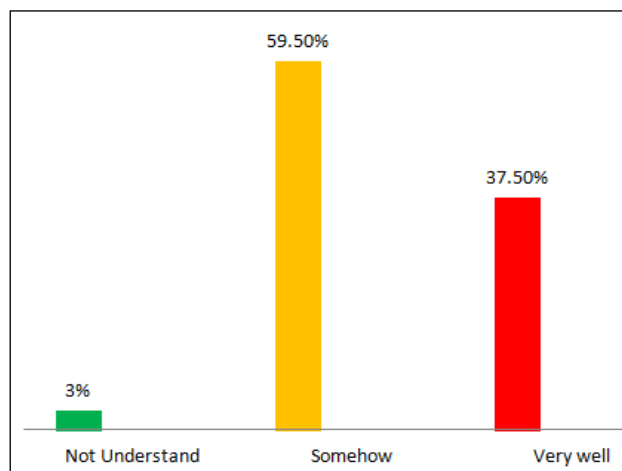

Figure 3: Distribution of participants according to the effect of understanding of the nutrition information on nutrition label
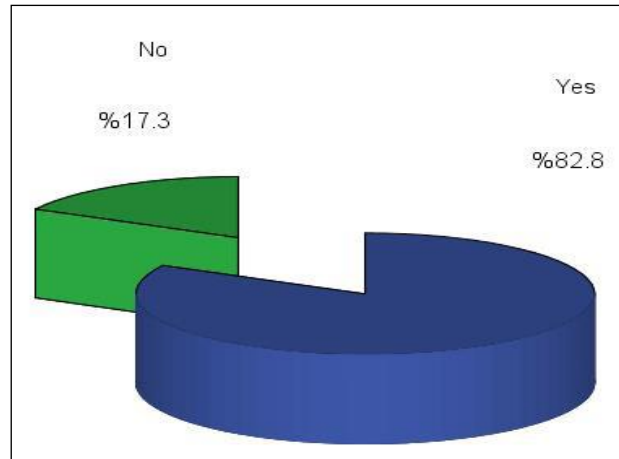
Figure 4: Distribution of participants according to the negative effect of food brand name in use of nutritional label
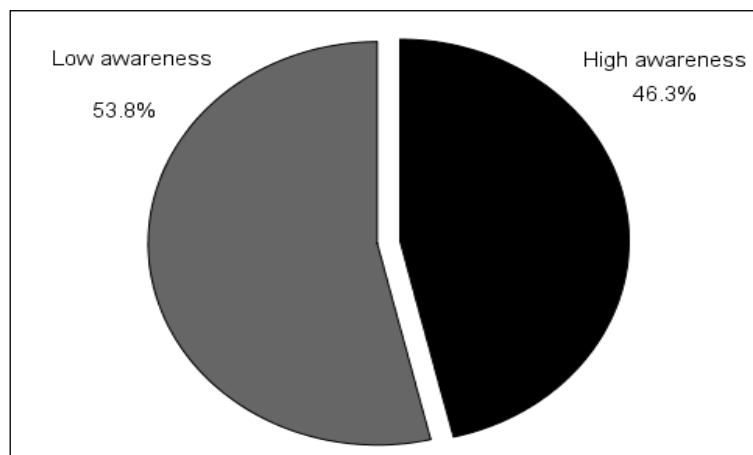

Figure 5: Participants awareness level of nutritional labels according to presence of labels and brand name of products
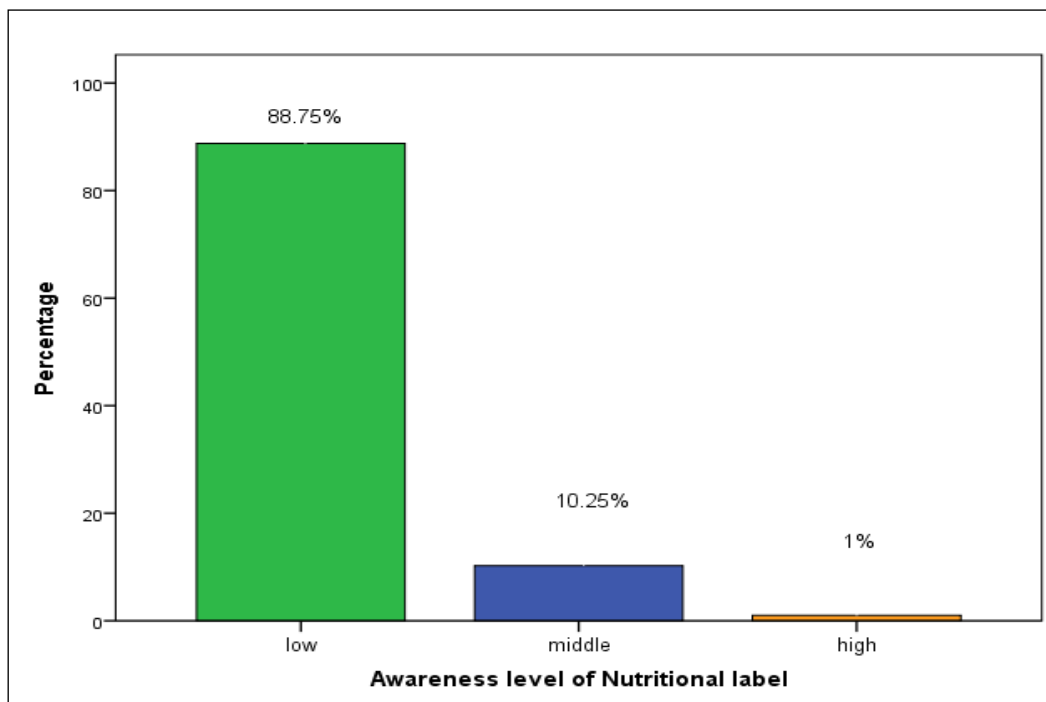

Figure 6: Participants' awareness level of nutrition labels according to the components of nutrition labels
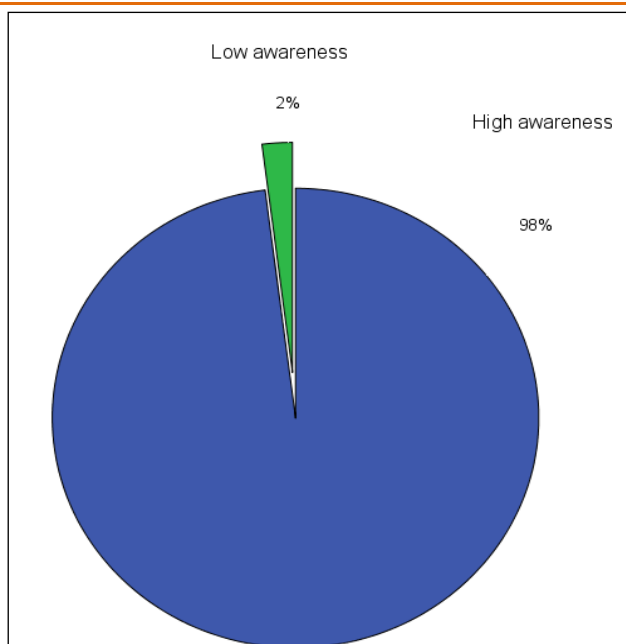
Figure 7: Participants' awareness level of nutrition labels according to the importance of phrase "no preservatives"

Table 3: Association between socio-demographic characteristics and nutritional labelling

Socio-demographic variables	$\chi 2$	P
Presence of Nutritional label		
Age	18.235	0.001
Gender	24.998	0.00
Marital status	18.463	0.000
Education	140.275	0.000
Income	44.249	0.000
occupation	46.104	0.000
Awareness level of nutritional label according to components of nutrition labels		
	10.135	0.038
Age	24.004	0.000
Gender	9.352	0.009
Marital status	45.503	0.000
Education	7.398	0.060
Income	18335	0.001
occupation		
Awareness level of nutritional label according to importance of phrase "no preservatives"		
Age	3.237	0.519
Gender	0.75	0.387
Marital status	3.588	0.166
Education	4.315	0.166
Income	2.262	0.353
occupation	2.025	0.731

DISCUSSION

As indicated in (Table 1), most of participants were aged from twenty nine years old to fifty years old with (75.6%) of the total participants. The majority of participants were male with (74.3%). The majority of the study participants were middle-income earners. Accordingly, individuals who purchase pre-packaged food products in Benghazi city were male, young or middle ages and most of them were married. As shown in figure (1), the majority of participants (63%) were aware that food labels contain nutrition information about the food. The study indicated that a large number of participants who said they were aware of nutrition labels had high education level. Where the statistical analysis shown that there is statistically significant relationship between the nutrition label awareness and age (*P*=0.001) ($\chi 2$=18.235), gender (*P*=0.000) ($\chi 2$=24.998), occupation (*P*=0.000) ($\chi 2$=46.104), marital

status (P=0.000) (χ2=18.463), education level (P=0.000) (χ2=140.275) and income (P=0.000) (χ2=44.249) as in indicated in table (3). The results of present study were similar to the findings of a study done in Ghana, involved 400 individuals. It was reported that the majority of the participants (87.8%) were aware that food labels contain nutrition information about the food (Wazza, A., 2018). In comparable study conducted in Turkey, which aimed to investigate Turkish consumers' understanding and use of nutrition labels on pre-packaged food products, which data were collected from a total of 500 consumers living in Istanbul through the use of a structured and undisguised questionnaire. The study found that (18%) of the respondents "always", (25%) "usually", (32%) "sometimes" and (14%) "seldom" read nutrition facts labels (Aygen, F., 2012). On the another hand, the results of present study was in contrast with the findings of a study done in Ethiopia, which investigated the level of awareness and practice of using nutrition labels on packed foods among consumers in selected supermarkets in Addis Ababa. The proportion of consumers who were aware and practiced on the basic packaged food labelling information was (33.3%) (Tadees, L., *et al*., 2019). The disagreement between this study and the findings of the present study could be due to the demographic and cultural differences. In this study, the consumers were also asked about the most important nutritional items that they will look at when buying the food. The result in table (2) showed that, more than half (57.5%) of participants were checking the fat content of the food, (55%) of participants were checking the calorie/energy content of the food, (36.5%) of participants were checking the carbohydrates. While protein (9.5%), fiber (3.5%) and moisture (2.8%) of participants. These results revealed that participants used fat and total calorie information may be to avoid excess fat, total calorie consume and weight gain. This result was agreed with the finding of a similar study done in Bahrain, which revealed that the majority of participants (61.4%) were checking fat content of the food, the sugar content of the food (55.8%) and the food total calories (53%), protein (42.1%), vitamins (40%) and only (30.2%) of participants were checking mineral content of pre-packaged foods (Wahab, R., 2018). Another study was carried out in Ghana, is close to our findings. The study revealed that commonly used nutrition information was fat (16.4%). Other key ones of interest were information on sugar content (16.1%), cholesterol (13.7%), sodium (7.2%), total energy (5.7%) and only (5.7%) of participants used fiber information (Aryee, G., 2013). According to transversal exploratory quantitative investigation, carried out in Curitiba, Brazil. A total of 536 students from a public institution participated in the survey answering a structured questionnaire. The findings of this study were agreed with our findings. The study showed that most commonly used nutrition information was "trans-fat-free" (42.5%) (Sousa, L., *et al*., 2020). Therefore, it can be seen that the results of this study was in line with the observations made by the above research works, because of the high interest of

participants in fat and total energy contents, this might be due to weight- and diet-related disease concerns. Another variable affecting in awareness of nutritional label was the presence of the phrase "no preservatives". Figure (2); showed that majority (74.3%) of participants considered the phrase of "no preservatives "was very much important, while (23.8%) of participants considered moderately important, and only (1%) of participants for both minimally and not important. As shown in figure (3); the another variable affecting in awareness of nutritional label was the understanding of nutrition information; the majority of participants (97%) said they understood the information they read, while (3%) did not understand what even they read being it the terminology or technical terms used. Among the label users; (59.5%) said they understood the information somehow, while (37.5%) understand it very well. These results hypothesized that a higher educational level leads to greater understanding of nutritional principles, which tends to improve consumer's ability to comprehend nutritional information on food labels. The findings of this study were similar to the answers of study conducted by Osie, M., and others (2012) in Ghana, they found that (93.3%) of participants were found to be understanding the information they read, while (6.5%) do not understand what even they read. Among participants who reported understanding the nutrition information; (54.8%) said they understood the information somehow, while (38.7%) understand it very well. In addition, another study conducted in Ghana was agreed with result of present study. The study aimed to assessing consumer knowledge and understanding and its influence on food label usage. The study found that most of participants (94.8%) claim to have some understanding of these labels. Of these, two-thirds (66.7%) claim they understand quite well the information on food labels, whilst (28.1%) said they only partly understand with a few (3.6%) admitting they did not (Aryee, P., *et al*., 2019). Another study conducted in Zimbabwe of the label readers, less than half of the respondents (40.9%) claimed to „mostly understand" nutrition labels, while (51%) of participants were reported to had partial understanding (Chopera, P., *et al*., 2014). The negative effect of brand name of food products on participant's awareness of nutrition label was used as a factor. The present study showed that more than three-quarters of participants (82.8%) considered that brand name as important factors in determining their choice of food without use of nutritional label (Figure 4). This result could be as a result of several possible reasons, including that people may also buy out of habit, and majority of them look for brand names regardless of the nutritional value of food products. A study conducted in Sri Lanka, to assess the awareness on food labels and the effect of the level of awareness on the buying behaviour of consumers in Jaffna district. They found that (43.1%) of respondents were mentioned that brand of the food products as the major factor that influence most consumers' decision to purchase of food products (Simmaky, S., *et al*., 2015). As a result, the behavior of

those respondents who do not pay attention to nutritional food label, might either due to repeat purchases of same product or their inability to comprehend the label. Among those who were aware of the presence of nutrition labels on pre-packaged foods, more than half (53.8%) of participants possessed a low awareness level of nutrition labels where use the presence of labels and brand name of products as measurement of awareness level (Figure 5). As shown in Table (3); the social demographic characteristics of respondents reflected statistically significant effect of age (*P*=0.038) (χ2=10.135), gender (*P*=0.000) (χ2=24.004), job (*P*=0.001) (χ2=18.335), marital status (*P*=0.009) (χ2=9.352) and education level (*P*=0.000) (χ2=45.503) on awareness level of nutrition labels. As shown before during study the distribution of participants according to the presence of nutritional labels, the results of the present study indicated that 63% of participants were aware that pre-packaged foods carried food label with nutritional information, while only 46.3% of participants had high awareness level of nutrition label information. This rather strange finding may be due to the negative effect of food brand name in use of nutritional label where that the majority of participants (82.8%) did not read the nutrition information during purchasing brand name of food products. Also the use of "components of nutrition label" as a measurement of awareness level of nutrition label indicated that (88.75%) of participants possessed a low awareness level (Figure 6). Statistical analysis of data indicated that only gender (*P*=0.029) (χ2=7.114), education level (*P*=0.000) (χ2=39.372) and income (*P*=0.000) (χ2=26.839) significantly associated with awareness level of nutrition labels according to nutrition label components. On the other hand, as indicated in (figure 7), the study documented that the participants awareness level of nutrition label according to the importance of phrase "no preservatives" was relatively high (98%). Among the social-demographic characteristics of respondents, results did not reflected any statistically significant effect of sex type (*P*=0.387), age group (*P*=0.519), marital status (*P*=0.166), education level (*P*=0.116) and job category (*P*=0.731) on the awareness level of nutrition labels. This result suggested that nearly all consumers use such phrase "no preservatives" to inform their purchases. The use of "no preservatives" phrase as a parameter for measuring consumer awareness level of nutrition label was the only index that give high awareness level of participants in comparison to another indices such as the brand name of food product, and the components of nutrition label. These results suggested that the awareness level of nutrition labels would differ among consumers following their discrepancies in socio-demographic factors and interest in healthy eating. The cross-sectional study conducted in two selected supermarkets in the Accra Metropolis in Ghana, which included 403 adult shoppers, aimed to assess awareness and use of nutrition labels on pre-packaged food. The study reported that majority (82%) of the respondents showed high awareness level of nutrition labels on pre-packaged foods compared to

(18%) who showed low awareness level (Aryee, G., 2013). The similar study done in Ghana, which the goal of study was to assess consumer level of awareness and use of nutrition labels on pre-packaged food products, involved 400 individuals. It was revealed that the majority of the participants (77.2%) of participants had a high awareness level of nutrition labels (Wazza, A., 2018). Moreover, a considerably comparable similar study was conducted in Botswana, they found that majority (78%) of the respondents demonstrated a high level of awareness of nutritional information on food products (Themba, G., & Tanjo, J., 2013). In China, a survey conducted to study the understanding, attitude and use of nutrition label among consumers. The study findings indicated that (12.1%) of the respondents indicated they "poor" read labels, whereas (59.2%) of the respondents "sometimes" read labels, with (28.7%) of the respondents reported that they "always" read nutritional information on food labels (Song, J., *et al.*, 2015). According to Brazilian study carried out by Sousa, L., and others (2020), which aimed to study the use of nutritional food labels and consumers' confidence in label information. The findings noticed that (41.6%) of consumers used the nutritional information sometimes and (14.7%) always. In Malaysia, study achieved to determine the relationship between gender, attitude and knowledge of the tertiary students with the use of nutrition labeling. They found majority of the respondents (57.6%) moderately made use of the nutrition label, whereas (75%) of the respondents were moderate and excellent nutrition label users (Norazlanshah, H., *et al.*, 2013).

CONCLUSION

Individuals who purchase pre-packaged food products in Benghazi city were male, young or middle ages and most of them were married. Employers with high education level and middle-income were the predominate categories. Findings showed that, the majority of participants were aware that pre-packaged foods must carried nutritional label, while more than half of them had low awareness level of nutrition label information. Fat and total energy were the most sought for nutrient information among participants who used nutrition label. The use of "no preservatives" phrase for measuring consumer awareness level of nutritional label was the only parameter that give high consumer awareness level of nutritional label in comparison with another parameters such as brand name of products and the components of nutrition label. Statistically significant association were observed between nutrition label awareness and age, gender, job, marital status and education level of participants.

REFERENCES

- Aryee, G. A. (2013). Awareness and use of nutrition labels on pre-packaged foods among consumers in Accra. Master thesis, University of Ghana, Ghana
- Aryee, P. A., Helegbe, G. K., Agordoh, P. D., Mohammed, A. J., Muntala, J., Koblaji, F. A., & Kumoji, H. N. (2019). Exploring consumer knowledge, understanding and use of food and nutrition label information in the tamale metropolis of Ghana. *African Journal of Food, Agriculture, Nutrition and Development, 19*(2), 14415-1443.
- Aygen, F. G., (2012). Turkish consumers' Understanding and Use of Nutrition Labels on Packaged Food Products. *International Journal of Business and Social Science, 3*(6), 171-183.
- Azman, N., & Sahak, S. Z. (2014). Nutritional label and consumer buying decision: A preliminary review. *Procedia-Social and Behavioral Sciences, 130*, 490-498.
- Borgmeier, I., & Westenhoefer, J. (2009). Impact of different food label formats on healthiness evaluation and food choice of consumers: A randomized-controlled study. *BMC public health, 9*(1), 184.
- Buyuktuncer, Z., Ayaz, A., Dedebayraktar, D., Inan-Eroglu, E., Ellahi, B., & Besler, H. (2018). Promoting a healthy diet in young adults: The role of nutrition labelling. *Nutrients, 10*(10), 1335.
- Campos, S., Doxey, J., & Hammond, D. (2011). Nutrition labels on pre-packaged foods: A systematic review. *Public health nutrition, 14*(8), 1496-1506.
- Chopera, P., Chagwena, D. T., & Mushonga, N. G. T. (2014). Food label reading and understanding in parts of rural and urban Zimbabwe. *African health sciences, 14*(3), 576-584.
- Dudhate, A. U. (2017). Study on Consumer Awareness Regarding Food Label. Master thesis, Vasantrao Naik Marathwada Agricultural University, India.
- Grimes, C. A., Riddell, L. J., & Nowson, C. A. (2009). Consumer knowledge and attitudes to salt intake and labelled salt information. *Appetite, 53*(2), 189-194.
- Goyal, R., & Deshmukh, N. (2018). Food label reading: Read before you eat. *Journal of education and health promotion*, 7, 56.
- Grunert, K. G., Wills, J. M., & Fernández-Celemín, L. (2010). Nutrition knowledge, and use and understanding of nutrition information on food labels among consumers in the UK. *Appetite, 55*(2), 177-189.
- He, Y., Huang, L., Yan, S., Li, Y., Lu, L., Wang, H., ... & Zhang, P. (2018). Awareness, understanding and use of sodium information labelled on pre-packaged food in Beijing: A cross-sectional study. *BMC public health, 18*(1), 509.
- Kasapila, W., & Shawa, P. (2011). Use and understanding of nutrition labels among consumers in Lilongwe (Malawi). *African Journal of Food, Agriculture, Nutrition and Development*, 11(5), 5171-5186.
- Kim, J. Y., Kweon, K. H., Kim, M. J., Park, E. C., Jang, S. Y., Kim, W., & Han, K. T. (2015). Is nutritional labeling associated with individual health? The effects of labeling-based awareness on dyslipidemia risk in a South Korean population. *Nutrition journal, 15*(1), 81.
- Kreuter, M. W., Brennan, L. K., Scharff, D. P., & Lukwago, S. N. (1997). Do nutrition label readers eat healthier diets? Behavioral correlates of adults' use of food labels. *American journal of preventive medicine, 13*(4), 277-283.
- Mandle, J., Tugendhaft, A., Michalow, J., & Hofman, K. (2015). Nutrition labelling: A review of research on consumer and industry response in the global South. *Global health action, 8*(1), 1-10.
- Neuhouser, M. L., Kristal, A. R., & Patterson, R. E., (1999). Use of food nutrition labels is associated with lower fat intake. *Journal of the American dietetic Association, 99*(1), 45-53.
- Nieto, C., Tolentino-Mayo, L., Monterrubio-Flores, E., Medina, C., Patiño, S. R. G., Aguirre-Hernández, R., & Barquera, S. (2019). Nutrition label use is related to chronic conditions among Mexicans: Data from the Mexican National Health and Nutrition Survey 2016. *Journal of the Academy of Nutrition and Dietetics, 120*(5), 804-814.
- Norazlanshah, H., Muhammad, I., Hasmira, M. D., Mashita, M., Norfazilah, M. R., & Fazlyla Nadya, M. (2013). The use of nutrition label on food purchasing decision among university students in Kuantan, Malaysia. *Health and The Environment Journal, 4*(4), 1-10.
- Nouh, F. (2021). Prevalence of Food Insecurity in Eastern Part of Libya: A Study of Associated Factors. *Sch Acad J Biosci*, 8, 192-198.
- Oghojafor, B. E., Ladipo, P. K., & Nwagwu, K. O. (2012). An empirical determination of consumers' reaction to nutritional labeling of prepackaged food products in Lagos, *International Journal of Development and Sustainability, 1*(2). 171-185.
- Osei, M. J., Lawer, D. R., & Aidoo, R. (2012). Consumers' use and understanding of food label information and effect on their purchasing decision in Ghana; A case study of Kumasi Metropolis. *Asian Journal of Agriculture and Rural Development, 2*(3), 351-365.
- Post, R. E., Mainous III, A. G., Diaz, V. A., Matheson, E. M., & Everett, C. J. (2010). Use of the nutrition facts label in chronic disease management: Results from the National Health and Nutrition Examination Survey. *Journal of the American Dietetic Association, 110*(4), 628-632.
- Samson, G., (2012). Awareness of food labelling and use of the information in purchasing pre-packaged food products among consumers in Ilala

municipality Dar es Salaam. Master thesis, Muhimbili University, Tanzania.

- Satia, J. A., Galanko, J. A., & Neuhouser, M. L. (2005). Food nutrition label use is associated with demographic, behavioral, and psychosocial factors and dietary intake among African Americans in North Carolina. *Journal of the American Dietetic Association, 105*(3), 392-402.
- Sekiyama, F. M., Rodrigues, R., Mesas, A. E., González, A. D., & de Andrade, S. M. (2019). Reading the nutritional information on food labels among teachers with and without hypertension in Brazil. *International journal of preventive medicine, 10*(1), 1-6.
- Simmaky, S., Madhujith, T., & Vasantharuba, S. (2015). Assessment of consumer awareness on food labels and the effect of the level of awareness on buying behaviour of consumers in Jaffna District. Proceedings of 8th International Research Conference.
- Song, J., Huang, J., Chen, Y., Zhu, Y., Li, H., Wen, Y., ... & Liang, Y. (2015). The understanding, attitude and use of nutrition label among consumers (China). *Nutricion hospitalaria, 31*(6), 2703-2710.
- Sousa, L. M. L., Stangarlin-Fiori, L., Costa, E. H. S., Furtado, F., & Medeiros, C. O. (2020). Use of nutritional food labels and consumers' confidence in label information. *Revista de Nutrição, 3,* 190-199.
- Tadees, L., Hayder, J., & Kefale, H. (2019). Awareness and practice of reading packed food labels and its associated factors among consumers in Addis Ababa, Ethiopia. *EC Nutrition, 14*(4), 377-385.
- Teran, S., Hernandez, I., Freire, W., Leon, B., & Teran, E., (2019). Use, knowledge, and effectiveness of nutritional traffic light label in an urban population from Ecuador: A pilot study. *Globalization and health, 15*(1), 26.
- Themba, G., & Tanjo, J. (2013). Consumer awareness and usage of nutrition information in Botswana. *Business and Management Horizons, 1*(1), 2326-2397.
- Verissimo, A. C., Barbosa, M. C. D. A., Almeida, N. A. V., Queiroz, A. C. C., Kelmann, R. G., & Silva, C. L. A. D. (2019). Association between the habit of reading food labels and health-related factors in elderly individuals of the community. *Revista de Nutrição, 32*(13), 1-12.
- Wahab, R. A. (2018). Food label use and awareness of nutritional information among consumers in Bahrain: An exploratory study. *KnE Life Sciences, 4*(6), 26-36.
- Walkinshaw, E. (2011). Small step forward in global food labelling. *Canadian Medical Association Journal, 183*(10) 627-628.
- Wazza, A., (2018). Assessing consumer awareness and usage of nutrition labels on pre- packaged foods in Sagnarigu municipality. Master thesis, University for development studies. Ghana.
- Weaver, D., & Finke, M. (2003). The relationship between the use of sugar content information on nutrition labels and the consumption of added sugars. *Food Policy, 28*(3), 213-219.
- Wills, J. M., Schmidt, D. B., Pillo-Blocka, F., & Cairns, G. (2009). Exploring global consumer attitudes toward nutrition information on food labels. *Nutrition reviews, 67*(s1), 102-106.