DOI : 10.18843/rwjasc/v7i2/04
DOI URL : http://dx.doi.org/10.18843/rwjasc/v7i2/04

A STUDY OF THE STATE OF KNOWING THE NUTRITIONAL LITERACY CONCEPT IN TURKEY

Dr. Nazan AKTAS,

Associate Professor,
Selcuk University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Konya/TURKEY.

Dr. Yahya OZDOGAN,

Research Assistant
Selcuk University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Konya/TURKEY.

ABSTRACT

This study aimed to determine the state of knowing the nutritional literacy concept, self-assessment as a nutritional literate, active stakeholders in nutritional literacy, benefits of being nutritional literate, food and nutrition information resources of university students. The questionnaire had the questions about whether the participants knew Nutrition Literacy (NL) as a concept. It also had self-assesment questions as well as those about the benefits of NL.It was determined that more than half (57.0%) of the undergraduates did not know the NL as a term and definition *(p=0.000)*. The NL level was self-assesment by 30.8%, 51.0% and 18.2% of students as good, intermediate or poor, respectively, (p=0.157).It was determined that undergraduate students included in the study generally had a limited knowledge and consciousness about nutrition literacy, while female students had better nutrition literacy than male students; in addition, family was concluded as the most active stakeholder in nutrition literacy. Qualitative, quantitative researches and experimental interventions are needed to determine the status of nutrition literacy in different parts of society of different demographic characteristics other than undergraduate students so as to set the framework of nutrition literacy concept.

Keywords: Nutrition literacy, literate, undergraduates, Turkey

INTRODUCTION:

Diet and nutrition are important factors in the promotion and maintenance of good health (WHO, 2002). Their role as determinants of chronic noncommunicable disease (obesity, type 2 diabetes, hypertension, dyslipidemia, Coronary Heart Disease (CHD) and stroke) is well established (WHO, 2015). Turkey faces two kinds of nutrition-related problems, undernutrition and micronutrient deficiencies on the one hand and diet-related chronic diseases on the other hand.In general, malnutrition is more prevalent in rural areas, while obesity and cardiovascular diseases are more prevalent in urban areas (Pekcan, 2009).

The most important parameters influencing food consumption patterns in Turkey are income level and lack of knowledge (Pekcan & Karaağaoğlu, 2000; FAO, 2001). In the studies investigating the nutritional habits and status of university students in Turkey, it was reported that undernutrition, malnutrition and eating disorders problems are caused by reasons such as separation from family for university education, living in dorms, economic status, and lack of knowledge on adequate nutrition; in addition, students do not pay attention to consume regular meal time and eating pattern, and skips meals especially the breakfast with fast-food (Sanlier et al. 2008; Gulec et al. 2008; Özdogan et al. 2010; Yardimci et al. 2012; Ozkok, 2015).The college years are the period of significant changes in the lifestyles of young adults. Food patterns established during college are likely to be maintained for the rest of life and may have long-lasting influences on future health (Brown et al. 2005).It is well documented that college students have unhealthy eating behaviors, including skipping meals, (Huang et al. 1994) frequent snacking on energy-dense food, (Nuru & Mamang, 2015) and engaging in unhealthy weight-loss methods (Story et al. 1998; Liebman et al. 2001).

Many factors can contribute to understanding of nutrition and healthy eating habits (Boehl, 2007).Economic and household tasks related to food production, processing, provisioning (meal planning, shopping, etc.), cooking and consumption are becoming increasingly complex and are linked to literacy and language proficiency (Arrom, 2011). The term 'nutrition literacy' has emerged as a distinct form of health literacy, yet scholars continue to reflect on constituent skills and capabilities in light of discussions regarding what it means to be food literate and health literate (Velardo, 2015). Food and nutrition literacy term is defined as taking into account, different aspects like social, health, sustainability, food systems, knowledge, skill, attitude, food choice and food consumption by previous researchers. These definitions are used for food literacy or nutrition literacy in many studies (Cimbaro, 2008; Zoellner et al. 2009; Vidgen & Gallegos, 2014). Several authors conceptualize nutrition literacy as a specific health literacy domain that reflects the ability to access, interpret, and use nutrition information (Silk et al. 2008; Carbone & Zoellner, 2012; Watson et al. 2012). Similarly, tohealth literacy, nutrition literacy can be defined as the degree of individuals where they can obtain, process, and understand the basic health (nutrition) information and services they need to make appropriate health (nutrition) decisions (IOM, 2004).

Nutrition literacy is about using language for creating, understanding and knowledge about food systems. Ecological relationship with biological, social and environmental systems and introducing this understanding and knowledge to individuals and communities (Cimbaro, 2008). Increasing the population's food literacy will allow and empower people to engage in society and influence their local food systems. Food literacy and health literacy can work in conjunction to enable individuals to take ownership over their health and well-being (Cullen et al. 2015).

There are many studies implemented in Turkey about the eating habits and nutrition knowledge level of university students. However, there is very limited study about nutrition literacy. The aim of this study isto determine *(a)* the state of knowing the nutritional literacy concept, *(b)* self-assessment as a nutritional literate, *(c)* active stakeholders in nutritional literacy, *(d)* benefits of being nutritional literate, *(e)* food and nutrition information resources of university students.

METHODOLOGY:

Research participants:

The study sample comprised a total of 835 undergraduates (423 male and 412 female) who were randomly selected among students attending Selcuk University which is one of the largest state universities in Konya located in Central Anatolia Region in Turkey.

Questionnaire:

The questionnaire used in this study was developed through a three-step process. In the first step, twenty undergraduates were informed about the study, and asked for their opinion on the purpose of study and nutrition

literacy. As a result of the interview, it was decided to include the explanation of nutrition literacy in the questionnaire form. It was assumed that the explanation of nutrition literacy would help students to answer the questions and better assess their nutrition literacy condition with respect to this explanation. In the second step, the developed questionnaire form was applied to twenty five undergraduate through interviews. The questionnaire took its final form after making minor changes (statements in the questionnaire were reorganized clearly how the participant fills easily) as a result of the second step, and it was applied in the third step. Questionnaire contained questions about the general characteristics of undergraduates (gender, age, and living place) and their knowledge about nutrition literacy, self-assessment of their nutrition literacy condition, active stakeholders on nutrition literacy and their information sources of nutrition.

Data Analysis:

The data gathered from the survey forms were evaluated in statistical package programme (SPSS). The subsequent tables of frequency and percentages were prepared regarding the variables, and chi-square (χ^2) testing method was used to determine the relations between the variables.

FINDINGS:

The characteristics of the undergraduates are given represented in Table 1. The majority (92.9%) of undergraduates ages were between 18-24 years of age and the year average was found ($\overline{\chi} \pm S\overline{\chi}$) 21.82±0.071. A significant part (77.2%) of undergraduates has a nuclear family structure and 40.5% of them were determined to reside in official dormitories (Table 1).

Table 1: Demographics of undergraduates (n=835)

Demographics		n	%
Age (years)	18-24	776	92.9
	25 and above	59	7.1
Family Type	Nuclear	645	77.2
	Extended	190	22.8
Residence	With family	94	11.3
	Private dormitory	203	24.3
	Official dormitory	338	40.5
	Apartment	200	23.9

Table 2 presents the findings about knowledge of undergraduates about nutrition literacy, self-assessment of their nutrition literacy and benefits of nutrition literacy. It was determined that more than half (57.0%) of the undergraduates did not know the concept of nutrition literacy (χ^2: 17.436, p= 0.000). The nutrition literacy was self-assessment by 30.8%, 51.0% and 18.2% of students as good, intermediate or poor, respectively, and no significant difference was detected between genders (χ^2: 3.707, p=0.157). Students stated that nutrition literacy contributes to healthy nutrition (47.5%), and conscious food choices (18.7%), while some of them (33.8%) did not have a clear view (χ^2: 7.326, p=0.026) (Table 2).

Table 2: Responses of undergraduates to questions about nutrition literacy

Questions		Male (n=423)	Female (n=412)	Total (n=835)	χ^2	*p value*
		n (%)	n (%)	n (%)		
Knowledge about Nutrition Literacy	Knowing	152 (35.9)	207 (50.2)	359 (43.0)	17.436	0.000
	Not knowing	271(64.1)	205(49.8)	476(57.0)		
Self-assessment Nutrition Literacy	Good	122(28.8)	135(32.8)	257(30.8)	3.707	0.157
	Intermediate	214(50.6)	212(51.5)	426(51.0)		
	Poor	87(20.6)	65(15.7)	152(18.2)		
What are the benefits of being nutritional literate?	Healthy nutrition	207(49.0)	190(46.1)	397 (47.5)	7.326	0.026
	Conscious food choices	64(15.1)	92(22.3)	156(18.7)		
	Don't know exactly	152(35.9)	130(31.6)	282(33.8)		

In the study, the most active stakeholders on nutrition literacy were determined as family (46.9%), individual attention (25.6%), school (15.1%), relevant policies (7.3%), and friends (5.1%). A significant difference was found between genders and stakeholders (χ^2: 312.529, p=0.000) (Table 3).

Table 3: The Active Stakeholders in Nutrition Literacy

Stakeholders	Male (n=423)	Female (n=412)	Total (n=835)	χ^2	*p value*
	n (%)	n (%)	n (%)		
Family	315(74.5)	77(18.7)	392(46.9)	312.529	0.000
Individiual interest	50(11.8)	164(39.8)	214(25.6)		
School	15(3.5)	110(26.7)	125(15.1)		
Relevant policies	11(2.6)	50(12.1)	61(7.3)		
Friends	32(7.6)	11(2.7)	43(5.1)		

The information sources of undergraduates for food and nutrition literacy were determined as tv-radio (72.0%), internet (63.8%), newspaper-journal-book (60.6%) and symposium-conference (21.8%) (Table4). These results indicated a significant difference between genders for using information sources of symposium-conference, TV-radio, and newspaper-journal-book (respectively, χ^2: 3.915, p=0.048; χ^2: 26.592, p=0.000; χ^2: 10.925, p=0.001); however, there was no significant difference in using internet for nutrition information (χ^2: 0.188, p=0.664) (Table 4).

Table 4: Information sources of undergraduates for food and nutrition

Information sources	Gender	Yes	No	χ^2	*p value*
		n (%)	n (%)		
TV-Radio	Male	271(64.1)	152(35.9)	26.592	0.000
	Female	330(80.1)	82(19.9)		
	Total	**601(72.0)**	**234(28.0)**		
Internet	Male	267(63.1)	156(36.9)	0.188	0.664
	Female	266(64.6)	146(35.4)		
	Total	**533(63.8)**	**302(36.2)**		
Newspaper-magazine-book	Male	233(55.1)	190(44.9)	10.925	0.001
	Female	273(66.3)	139(33.7)		
	Total	**506(60.6)**	**329(39.4)**		
Symposium-Conference	Male	104(24.6)	319(75.4)	3.915	0.048
	Female	78(18.9)	334(81.1)		
	Total	**182(21.8)**	**653(78.2)**		

DISCUSSION:

The results of this survey give a descriptive picture of nutrition literacy in a large sample of the undergraduates in Selcuk University, Turkey. It was emphasized in many previous studies that undergraduate students generally study away from their families, which creates problems in terms of nutrition, sheltering, and economy (Gulec et al. 2008; Özdogan et al. 2010; Ozkok, 2015). Nutritional knowledge is a predisposing factor for eating behaviors (Thomas, 1994), even though voluntary behavior improvement requires motivation, ability as well as the opportunity to improve one's own behavior (Brug et al. 2005).

In this study, more than half (57.0%) of the students were determined to know the concept of nutrition literacy. But, as the study sample consisted of undergraduates, it could be considered that they had better nutrition literacy than general population. Undergraduates (51.0%) self-assesment their nutrition literacy as intermediate. The results of a previous research indicated that 24.0% of participants had a high likelihood of limited nutrition literacy, 28.0% had a possibility of limited nutrition literacy, and 48.0% had adequate nutrition literacy (Zoellner et al. 2009). A previous study conducted in Turkey titled Nutritional literacy in high school students and related factors, it was found that the mean nutrition literacy score of students were fairly high and was effected by certain demographics factors (Kurt et al. 2014). A low level of health literacy (on nutrition) may have an impact on an individual's food choices, understanding of dietary terms and concepts, and overall health in general (CPHA, 2006). Health problems related to malnutrition, obesity, diabetes, and cardiovascular disease

require intensive self-management skills, individual navigation and coping with the food systems, and the potential consequences on portion sizes, dietary variety, proportions, toxic exposures, use of food assistance programs, and literacy on food safety (Arrom, 2011). In the previous studies conducted in Turkey, undergraduates were found to have wrongeating habits to be corrected and need more nutritional information about healthy eating habits, adequate intake of nutrients (Rakıcıoğlu & Yıldız, 2011; Yardimci et al. 2012; Ozkok, 2015). Lessthan one fourth ofundergraduates (18.7%) expressed that nutrition literacy would be useful for conscious choice of foods (Table 2).In an earlier study, it was found that undergraduates in control group stated that insufficient nutrition knowledge was obstructive factor for having healthy food choice (Aktaş & Haklı, 2008).

In this study, family (46.9%) ranked first among the active stakeholders for the development of nutrition literacy. Only one fifth of the participants indicated school as a stakeholder in nutrition literacy (Table 3). Literature emphasized on the effects of family and school on eating patter and nutrition behavior and indicated that they are two key settings that impact children's diets are home and school (Story, 2009). The development of children's food preferences involves a complex interplay of innate, familial and environmental factors, not all of which are likely to promote a healthy and varied diet. Parents own food preferences, on the other hand, are enormously influential and eating together as a family provides a valuable opportunity for parents to model good eating habits (Scaglioni et al. 2008). However, the school environment has a broad potential to impact on students' food choices and dietary quality (Kubik et al. 2003; Story, 2009).

One fourth of the participants (25.6%) stated that individual attention is an active stakeholder in nutrition literacy. Individual character and personality are decisively formed during adolescence. Young people begin to assume responsibility for their own food habits, health-related attitudes and behaviors. Planning an incisive nutritional intervention on a selected sample of the population requires identification of its nutritional problems and primary needs (Turconi et al. 2008).Adolescents simultaneously experience a need for a personal sense of control over food choices, the desire to be accepted by peers, and the desire to eat with the family to maintain family relationships (Contento, 2006).In the study, undergraduates stated TV (72.0%) and internet (63.8%) as the most common two information sources for nutrition, which have higher percentages close to each other. The high percentage of internet as an information source of nutrition could be attributed to the fact that study sample consisted of undergraduates. In an earlier study, nutrition literacy was found significantly associated with media use for general purposes, media use for nutrition information, and level of trust from nutrition sources; however, internet was the least trusted and least used information source for nutrition by participants (Zoellner et al. 2009).

At present, nutrition information is increasingly distributed in different media sources. This necessitates the consumer needs for writing, speaking and listening skills to understand and interpret the complex information about nutrition, nutrients and alimentation. In the context of increasing nutrition literacy, individuals would likely have acquired preferences for how they would like nutrition information communicated to them (Silk et al. 2008). In the study, a significant difference was found between gender and knowledge of nutrition literacy as well as the benefits of nutrition literacy and the active stakeholders on nutrition literacy (p<0.05). In general, females value health more than males and more readily adopt preventive health strategies(Turconi et al. 2008). Females also acquire knowledge about healthy eating in response to a nutrition education program more satisfactorily than males (Finnegan et al. 1990). In a previous study, men were found to have poorer nutrition knowledge than women (Parmenter et al. 2000). Aihara and Minai stated that the women participants demonstrated adequate nutrition literacy when compared to men (Aihara & Minai, 2011).

CONCLUSION:

This study highlights important factors that researchers and practitioners need to consider in a nutrition literacy context. Universities provide various opportunities to organize incentives and programs to raise consciousness and awareness of nutritional literacy among university students.In conclusion, it was determined that undergraduate students included in the study generally had a limited knowledge and consciousness about nutrition literacy, while female students had better nutrition literacy than male students; in addition, family was concluded as the most active stakeholder in nutrition literacy. Qualitative and quantitative researches, experimental interventions and path modeling studies are needed to determine the status of nutrition literacy in different parts of society of different demographic characteristics other than undergraduate students so as to set the framework of nutrition literacy concept. This study suggested that "Nutrition literacy" should be generalized by media sources, and the familiarity should be established in the society, and appropriate policies should be developed to encourage individuals to become nutritionally literate. The role of media in nutrition literacy

should be emphasized, and the scientific basis should be provided to the information on nutrition literacy in media. Future studies to determine the ways to attracts individuals to become nutritionally literate and to determine the factors effective on individuals to become nutritionally literate are considered to provide valuable support to theoretical and application dimensions of the nutrition literacy concept. Universities should develop policies for educations and non-educational activities to improve nutrition literacy in the society. Opportunities in universities should be used to organize activities to encourage consciousness and awareness for nutrition literacy among undergraduate students.

ACKNOWLEDGEMENTS:

The authors would like to thank the undergratudates who participated this study.

REFERENCES:

[1] Aihara, Y., & Minai, J. (2011). Barriers and catalysts of nutrition literacy among elderly Japanese people. *Health Promotion International*, 26(4), 421-431.
[2] Aktaş, N., & Haklı, G. (2008). *Does Nutrition Education Effect Healthy Food Preferences of Undergraduates?* Issues on Education and Research: 1; 109-115 Atiner: The Athens Institute for Education and Research (G. T. Papanikos, Ed.) First Published in Athens, Greece.
[3] Arrom, J. O. (2011). Literacy and nutrition-health challenges of complex food environments. *Appetite*, 56:518.
[4] Boehl, T. (2007). Linguistic issues and literacy barriers in nutrition. *Journal* of the *American Dietetic Association*,107:380-383.
[5] Brown, L.B., Dresen, R. K.,& Eggett, D. L. (2005). College students can benefit by participatingin a prepaid meal plan. *Journal* of the *American Dietetic Association*,105:445-448.
[6] Brug, J., Oenema, A.,& Ferreira, I.(2005). Theory, evidence and intervention mapping to improve behavior nutrition and physical activity interventions. *International Journal of Behavioral Nutrition and Physical Activity*, 2:2.
[7] Carbone, E.T.,& Zoellner, J. M. (2012). Nutrition and health literacy: a systematic review to inform nutrition research and practice. *Journal* of the *Academy of Nutrition and* Dietetics, 112:254-265.
[8] Cimbaro, M. A. (2008). Nutrition literacy: Towards a new conception for home economics Education. [master's thesis]. The Faculty of Graduate Studies. The University of British Columbia. [Online]. Available: https://circle. ubc. ca/handle/2429/7579?show=full (June 9 2015).
[9] Contento, I. R., Williams, S. S., Michela, J. L.,& Franklin, A, B. (2006). Understanding the food choice process of adolescents in the context of family and friends. *Journal of Adolescent Health*, 38:575-582.
[10] CPHA (2006). *Health literacy intervention.* Canadian Public Health Association, Available:http://www.cpha.ca/uploads/portals/h-l/interventions_e.pdf (January 15 2016).
[11] Cullen, T., Hatch, J., Martin, W., Higgins, J.W.,& Sheppard, R. (2015). Food Literacy: Definition and Framework for Action. *Canadian Journal of Dietetic Practice and Research*, 76(3), 1-6.
[12] FAO. (2001). Nutrition Country Profile of Turkey. Food and nutrition division, Rome;Available: http://www.fao.org/ag/agn/nutrition/tur_en.stm, (July 10 2015).
[13] Finnegan, JR, Viswanath, K., & Rooney B. (1990). Predictors of knowledge about healthy eating in a rural midwestern US city. *Health Education Research*, 5:421–431.
[14] Gulcin Algan Ozkok, (2015). Evaluation of Dietary Habits Among University Students in Konya, Turkey. *International Journal of Nutrition and Food Sciences*, 4(4), 431-438.
[15] Gulec, M., Yabancı, N., Gocgeldi, E.,&Bakır, B. (2008). Nutritional habits of students living in two female dormitories in Ankara. *Gulhane Journal of Medicine*, 50:102-109.
[16] Huang, Y. L., Song, W. O., Schemmel, R.A., &Hoerr, S. M. (1994). What do college students eat? food selection and meal pattern. *Nutrition Research*, 14:1143-1153.
[17] Institute of Medicine. (2004). *Health Literacy: A Prescription to End Confusion*. Washington, DC: National Academies Press.
[18] Kubik, M. Y., Lytle, L. A., Hannan, P.J.,&Perry, C. L., (2003). Story M. The association of the school food environment with dietary behaviors of young adolescents. *American Journal of Public Health*, 93:1168–1173.
[19] Kurt, A. S., Kalkan, I., Filiz, E., & Bodur, S. (2014). Nutritional literacy in high school students and related factors. *IX. Uluslararası Beslenme ve Diyetetik Kongresi*, 2-5 April, Ankara, Türkiye.

[20] Liebman, M., Cameron, B.A., Carson, D.K., Brown. D.M.,&Meyer, S.S. (2001). Dietary fat reduction behaviors in college students: relationship to dieting status, gender and key psychosocial variables. *Appetite*, 36:51-56.
[21] Nuru, H., & Mamang, F. (2015). Association between snacking and obesity in children: a review. *International Journal of Community Medicine and Public Health*, *2*(3), 196-200.
[22] Özdogan, Y., Özcelik, A. Ö., & Sürücüoğlu, M. S. (2010). The breakfast habits of female university students. *Pakistan Journal of Nutrition*, 9:882–886.
[23] Parmenter, K., Waller, J., & Wardle, J. (2000). Demographic variation in nutrition knowledge in England. *Health Education Research*, 15:163–74.
[24] Pekcan, G. (2009). Türkiye'de Beslenme ve Sağlık Durumu. *Hacettepe Beslenme ve Diyetetik Günleri*, II. Mezuniyet Sonrası Eğitim Kursu, 19-20 Haziran 2009, Ankara.
[25] Rakıcıoğlu, N.,&Akal Yıldız, E. (2011). Energy and nutrient intake and food patterns among Turkish university students. *Nutrition research and practice*,5(2):117-123.
[26] Sanlier, N., Yabanci, N.,& Alyakut, O. (2008). An evaluation of eating disorders among a group of Turkish university students. *Appetite*, 51:641–645.
[27] Scaglioni, S., Salvioni, M.,&Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour. *British Journal* of *Nutrition*,99:S22–S25.
[28] Silk, K.J., Sherry, J., Winn, B., Keesecker, N., Horodynski, M.A.,&Sayir, A. (2008). Increasing nutrition literacy: testing the effectiveness of print, web site, and game modalities. *Journal of Nutrition Education and Behavior*, 40:3-10.
[29] Story, M. (2009). The third school nutrition dieatry assessment study: findings and policy implications for improving the health of US Children. *Journal of the American Dietetic Association*, 109:7-13.
[30] Story, M., Neumark-Sztainer, D., Sherwood, N., Stang, J., & Murray, D. (1998). Dieting status and its relationship to eating and physical activity behaviors in a representative sample of US adolescents. *Journal of the American Dietetic Association*, 98:1127-1132, 1135.
[31] Thomas, J. (1994). New approaches to achieving dietary change. *Current opinion* in *lipidology*, 5:36–41.
[32] Turconi, G., Guarcello, M., Maccarini, L., Cignoli, F., Setti, S., Bazzano, R.,& Roggi, C. (2008). Eating habits and behaviors, physical activity, nutritional and food safety knowledge and beliefs in an adolescent Italian population. *Journal* of the American *College* of *Nutrition*,27:31–43.
[33] Velardo, S. (2015). The nuances of health literacy, nutrition literacy, and food literacy. *Journal of Nutrition Education Behavior*, 47:385–389.
[34] Vidgen, H.A.,& Gallegos, D. (2014). Defining food literacy and its components. *Appetite*, 76(1):50-59.
[35] *Watson, W. L., Chapman, K., King, L.,* Kelly, B., Hughes, C., Yu Louie, J.C., Crawford, J., &Gill, T. P. (2013). How well do Australian shoppers understand energy terms on food labels? *Public Health Nutrition*, 16:409–417.
[36] WHO. (2002). The *World Health Report 2002: reducing risks, promoting healthy life*. Geneva, World Health Organization, 2002. Available: http://www.who.int/nutrition/topics/2_background/en/index2.html (December 5 2015).
[37] WHO. (2015). *The World Health Statistics*. World Health Organization. Luxembourg.[Online]Available: http://apps.who.int/iris/bitstream/10665/170250/1/9789240694439_eng.pdf (January 9 2016).
[38] Yardimci, H., Özdoğan, Y., Özçelik, A.Ö., & Sürücüoglu, M.S. (2012). Fast-food consumption habits of university students: The Sample of Ankara. *Pakistan Journal of Nutrition*, 11(3), 265-269.
[39] Zoellner, J., Connell, C., Bounds, W., Crook, L., & Yadrick, K. (2009). Nutrition literacy status and preferred nutrition communication channels among adults in the Lower Mississippi Delta. *PreventingChronic Disease*, 6(4), 1-11
