

The relationship between Nutrition Literacy and Nutrition Information seeking attitudes and Healthy Eating Patterns in the Palestinian Society

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Research Article

Keywords: nutrition literacy, nutrition information seeking, nutrition behaviors, Palestinian society

Posted Date: September 22nd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-923058/v1>

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Abstract

Introduction: Nutrition literacy is important because it creates motivation and knowledge among public to have accountability towards their nutrition behaviors. Three types of nutrition literacy including functional literacy (FNL), Interactive literacy (INL) and critical literacy were not studied before in Palestinian society.

Aims: The aims of the study were to 1) describe three forms of nutrition literacy: FNL, INL and CrL in the Palestinian society 2) To study the relationship between different forms of nutrition literacy and food behavior and nutrition seeking information habit.

Methods: A sample of 149 Palestinian participants were recruited to participate in the study. Using an online survey which was distributed through educational and social internet platforms was used to collect data on sociodemographic variable. A translated questionnaire was used to collect information on nutrition literacy and Short Format of the Diet Health and Knowledge Survey (SFDHKS) was used to collect information on diet behavior and USDA food security questionnaire was used to collect data on food security. Data was analyzed by SPSS 21.

Results: This study consisted of young adults (20.4 ± 4.9 y) who are mainly females (78%). Most of our study sample had Bachelors degree or currently enrolled in university to obtain this degree. The mean of FNL was 2.8 ± 0.5 , INL 3.3 ± 0.5 , CrL 3.6 ± 0.5 . There was significant correlation between CrL and INL ($p < 0.05$). There was also significant correlation between various forms of nutrition literacy and some aspects of diet behavior and food label use.

Conclusion: Palestinian society is willing to learn about and understand nutrition information and this related to diet behavior

Introduction

Palestine is a Mediterranean country with a national cuisine that is rich in olive oil, green leafy vegetables, grapes and other fruits and dairy products high consumption(1). Like other middle income countries, health transition is currently present with higher adoption of westernized lifestyle including a diet that is focused on fast food and heavy consumption of food at restaurants which is full of salt, sugar, refined carbohydrate and fried meat and potatoes(2),(3). Alongside with this change rates of Obesity and chronic diseases are high in Palestinian territories. Recent data shows that 65.3% of Palestinians are either overweight or obese(4). Currently Cardiovascular diseases, stroke, cancer and Diabetes mellitus type 2 are among the most leading causes of death in Palestine(5). It is well known that mortality from chronic diseases is highly attributable to poor dietary habits and physical inactivity(6)..

Nutrition awareness and ability to understand and apply health and nutrition standards is very important element in the efforts to prevent diet related chronic diseases in any population. Health literacy itself can be defined as capacity to obtain, process, understand and use health information and practices(7). Moreover, nutrition and food literacy are two concepts that are relevant for human health as they bridge

the gap between continuously changing food environment and consumers(8). Food literacy was first used in cooking books in 1992 (9). Nutbeam's tripartite model has recently identified three forms of nutrition literacy including functional nutrition literacy (FNL), interactive nutrition literacy (INL) and critical nutritional literacy (CrL) (10, 11). FNL refers to basic skills and abilities of consumers to obtain nutrition information, understand them and apply them. INL refers to the ability of consumer to participate in communication of nutrition information, share them and discuss them. Finally, CrL refers to ability of consumers to appraise, criticize nutrition information, its credibility and understand the relationship between food and environment (12). Studies in USA indicate strong relationship between poor nutrition literacy and poor nutrition knowledge and practice, development of chronic diseases, increased hospitalization and cost(13). A clinical trial that improved nutrition literacy lead also to improvement of nutrition knowledge and behavior. Hence the goals of this study is 1) to study patterns of FNL, INL and CrL in Palestinian society. 2) To study the relationship between nutrition literacy and food behavior and label use. 3) To study barriers towards seeking nutrition information.

Methods

A cross-sectional design was used to evaluate nutrition literacy, food security and its association with dietary habits. Palestinians older than 18 y were recruited through an electronic data collection tool which was distributed through different social methods that included facebook and professional, social and student facebook groups, in addition to the university website. The population consisted of all Palestinians living in the West Bank, Gaza, and in Israel. A convenient sampling method was adopted to reach the determined, we were able to include sample size of n = 149 adults in this study.

The data collection tool was adopted based on a Literature review. Information on age, weight, height, diet, use of food label, items of food label used,

gender, education, income were obtained. Nutrition literacy including 3 subtypes were calculated using a translated questionnaire(14). Each questions' answers were given likert scale number and ranged from strongly disagree (1) to strongly agree (5). A translated to Arabic version was used in our study.

Arabic translated version of dietary habits was used and consisted of nineteen questions from the Short Format of the Diet Health and Knowledge Survey

(SFDHKS) (15) that measure use of food labels, consumption of low-fat/low-calorie foods, consumption of fiber, and avoidance of extra fat were used to assess nutrition behaviors.

Ethical Consideration

The research was conducted in accordance with Declaration of Helsinki and approval from the IRB at An Najah National University was obtained before conducting the study. Agreement of participants was ensured through acceptance of the invitation and answering the questionnaire.

Table 1
Description of Study Variables

Study Variable	Percent or means
Age	20.4 ± 4.9 (n = 148)
BMI	22.2 ± 5.4 (n = 147)
Gender	33 (22%)
Male	118 (78%)
Female	
Work	137 (91%)
No	14 (9%)
Yes	
Education	11 (7%)
Tawjihi or less	19 (12.6%)
College	117 (77.4%)
Bachelors	4 (2.6%)
Graduate studies	
Chronic Disease	135 (93.7%)
No	9 (6.3%)
Yes	
Income	49 (33%)
Less 3000 shekel	54 (36.4%)
3000–6000 shekel	45 (30.4%)
More than 6000 shekel	
FNL	2.8 ± 0.5
INL	3.3 ± 0.5
CrL	3.6 ± 0.5
Food Label Use	54 (36.5%)
Yes	54 (36.5%)
No	40 (27%)
May be	

Table 2
Summary of Various Questions related to FNL, INL and CrL

Question	Likert Score
Functional Literacy	
1 I find it hard to understand the language used by dietitians, nutritionist and health workers and experts	2.5 ± 0.7 (132)
2 I find it hard to understand the terms and concepts used by dietitians, nutritionist and health workers and experts	2.66 ± 0.9 (134)
3 When I read information on about nutrition, food and diet plans, I find difficult to understand.	2.15 ± 0.76 (135)
4 I find it difficult to know how to change my diet when I am given advice from doctor or nurse or others	3.33 ± 1.02(136)
5 When I read information about nutrition and food I need somebody to help me to understand them	2.35 ± 0.93 (136)
6 I am not aware of WHO recommendations for intake from fruits and vegetables	3.34 ± 1.02(136)
7 When I read a report on food and nutrition I find words that I can't understand	2.71 ± 0.88(136)
8 I am aware of the balanced diet concept	3.60 ± 0.88 (136)
Interactive Literacy	
1 I collected dietary information from many suitable sources	3.00 ± 1.0 (136)
2 I use internet when I search for dietary information	2.66 ± 0.9 (134)
3 I discuss nutrition matters with my family and friends	3.40 ± 1.06 (136)
4 I change my dietary habits based on my knowledge I gathered from differences	3.04 ± 1.07 (136)
5 I do not follow public discussions on nutrition on TV, radio or other media outlets	3.44 ± 1.07 (135)
6 I sometimes read material on what represents balanced diet	3.20 ± 0.97 (135)
7 I am ready to take initiative to discuss healthy diet with health professionals	3.52 ± 0.99 (136)
8 When I want nutrition information I do not know which health department I can ask for help	2.93 ± 1.07(133)

Question	Likert Score
9 I discussed my nutrition beliefs with others (e.g friend, family, etc)	3.42 ± 1.04 (133)
Critical Literacy	
1 I want to be able to participate easily in any debate on our food and nutrition system in our country	3.56 ± 1.02 (149)
2 I am ready to take active role in any plan to improve nutrition habits in my school or work place	3.69 ± 0.86 (149)
3 I expect my school or work to offer healthy meals	3.64 ± 0.89 (149)
4 I try to influence other (e.g family or friends to take care of their nutritional health and habits	3.66 ± 0.92 (149)
5 It is important for me that my school or work place have healthy meals or food	4.32 ± 0.69(148)
6 I tend to be influenced by dietary advice on media outlets such as TV, radio and newspapers	3.56 ± 0.91 (148)
7 I have confidence in dietary plans I read about in newspapers, magazine, and other media types	3.56 ± 0.91(149)
8 I tend to be influenced by dietary advice from family or friends	3.45 ± 0.92
9 I think that publishing scientific evidence on food and nutrition by media is correct	3.39 ± 0.88(149)
10 I find it is hard to identify the differences between scientific and un-scientific information on diet and nutrition	3.39 ± 0.88(148)
11 When I read information on nutrition it is important that it is based on scientific evidence	4.27 ± 0.78(147)

Table 3
Barriers to seek nutrition information

I have to do a lot of efforts to obtain information	3.14 ± 1.06 (147)
I can't make sure of information credibility	3.50 ± 0.97 (147)
It is hard to understand nutrition information	2.62 ± 0.90 (146)
There is no enough information about nutrition in Arabic, all in English	3.40 ± 0.98 (147)
It takes a lot of time to search for information	2.98 ± 0.88

Table 4
 Pearson correlations of Study variables with FNL, INL and CrL and Diet Behavior and Food Label Use

Variable	FNL (131)	INL (131)	CrL (143)
FNL		0.045	-0.09
		0.60	0.33
INL	0.045		0.23
	0.60		0.008
Food Label			
Use of Label	-0.20	0.15	0.12
	0.02	0.09	0.16
Look on ingredients	-0.11	0.52	0.23
	0.23	0.000	0.006
Low fat	-0.14	0.32	0.04
	0.12	0.000	0.62
Low calorie	-0.11	0.44	0.11
	0.19	0.000	0.18
Serving size	0.01	0.30	0.09
	0.91	0.000	0.3
Health Benefit	-0.12	0.34	0.08
	0.16	0.000	0.32
Age (y)	-0.02	0.10	0.10
	0.79	0.25	0.23
BMI (Kg/m ²)	-0.10	0.03	-0.12
	0.24	0.71	0.15
Low calorie fat	0.14	0.27	0.02
	0.11	0.002	0.84
Low fat meat	0.002	0.28	0.08
	0.98	0.002	0.34
Low fat milk	0.07	0.14	-0.03
	0.43	0.10	0.73

Variable	FNL (131)	INL (131)	CrL (143)
Low fat cheese	-0.01 0.93	0.13 0.14	0.03 0.72
Frozen Yogurt	-0.003 0.97	0.12 0.18	0.08 0.34
Low calorie seasoning	-0.14 0.1	0.22 0.01	0.13 0.11
Fried Potatoes	-0.04 0.65	-0.17 0.056	-0.04 0.60
Frying veggi	0.15 0.09	-0.11 0.20	0.03 0.70
Adding cheese and mayonise	0.06 0.49	-0.11 0.23	-0.25 0.003
Butter, bread, cake	-0.03 0.75	-0.03 0.73	-0.23 0.006
Avoid fat	0.07 0.4	0.25 0.003	0.15 0.06
Fried chicken	0.09 0.29	-0.22 0.01	-0.11 0.18
Remove skin	0.09 0.28	0.32 0.000	0.05 0.57

Table 5
Pearson correlation of study variables and measure of seeking nutrition
Information

	FNL	INL	CRL
efforts to obtain information	0.26 0.003	0.11 0.21	0.11 0.18
Not sure of information credibility	0.19 0.03	-0.03 0.77	-0.02 0.79
hard to understand nutrition information	0.58 0.000	-0.004 0.96	0.06 0.50
no enough information about nutrition in Arabic	0.28 0.001	0.1 0.27	0.12 0.17
takes a lot of time to search for information	0.33 0.000	0.11 0.23	0.06 0.46
Doctor, nurse, health worker	-0.15 0.08	0.17 0.05	0.11 0.19
Dietitian	-0.20 0.02	0.03 0.70	0.08 0.33
Family	-0.04 0.63	0.03 0.73	0.08 0.33
Friend	-0.08 0.35	0.02 0.84	-0.02 0.83
School Books	-0.17 0.05	0.02 0.84	-0.02 0.83
Newspapers and magazines	-0.12 0.15	-0.07 0.41	0.12 0.14
Internet	0.08 0.38	0.03 0.74	0.03 0.74
TV and Radio	-0.003 0.97	0.05 0.55	0.09 0.27

	FNL	INL	CRL
Government institution	0.02	0.002	0.11
	0.87	0.98	0.19
International Organization	-0.31	-0.10	0.02
	0.000	0.24	0.83

Consent for Publication: was obtained

Statistics:

The study demographic variables were summarized using proportions or means. Ordinal data was given numbers like Likert scale from 1 to 5 according to order and were summarized using means and standard deviation. Normality was checked and histograms provided. Pearson correlations were used to assess association between FNL, INL and CrL and food label use, diet behavior and nutrition information resources measures. Significant values are less than $p < 0.05$. Data was analyzed using IBM SPSS 21.

Results

This study consisted of adults mostly in their twenties (20.4 ± 4.9) y who have Bsc or are currently enrolled in programs that lead to Bsc degree. Most of our study participants are female. The income of this ranged mainly from 3000-6000 shikel.

Different pointed related to FNL, InL and CrL and the rest of factors related to seeking nutrition information are expressed in likert scale. (Table 1)

In sum, the highest likert scale value was for CrL and the lowest were for FNL.

Functional literacy

FNL consisted of seven points. The lowest likert scale was for participants was for the understanding of what balanced diet is composed, awareness of WHO recommendation for healthy diet and ability of the study participants to apply principles of healthy diet on their everyday diet style. In terms of dietitian and nutrition information and language, the participants had better likert scale. (Table 2)

Interactive Literacy

The INL is composed of 8 points. Participants had higher scores of INL factors relative to FNL. INL was composed seeking nutrition information resources, sharing information with friends and family. The participants seemed to express low confidence of internet as source of information. (Table 2)

Critical Literacy

The study participants showed positive attitudes for towards engagement in nutrition change towards healthier diet at social, work-place, family and friends level. They expressed high demand of having meals served at work, university and school places. They also expressed motivation towards influence on other to make healthier dietary choices. (Table 2)

Barriers to seek nutrition information

Study participants disagreed on difficulty of nutrition information as barriers to seek nutrition information diet and healthy dietary guidelines. However, study participants agreed that presence of Arabic resources for information and credibility could be obstacles towards using nutrition information use. (Table 3)

Relationships between Different Types of Literacy, Food Label and Diet Behavior

In this study FNL did not correlate with CrL and INL. However, FNL correlated with use of food label, whereas both CrL and INL correlated with looking at ingredients and points related to low fat, low calorie, serving size and health benefit were significantly related to INL. Similar to that in terms of diet behavior, seeking low calorie, low fat products and cooking correlated significantly with INL, whereas adding cheese and mayonise was less common in participants with CrL accountability. There was significant correlation between FNL and nutrition information seeking information (Table 4). Participants with better FNL seemed to rely on health professional, scientific books rather than internet. Participants with higher education showed higher average CrL (3.52 ± 0.48 versus 3.71 ± 0.45 , $p=0.03$), whereas there were no differences between FNL and INL according to education. Incomes was not significant predictors of FNL, INL and CrL. (Table 5)

Discussion

In this study we describe three different forms of nutrition literacy in a group of Palestinians mainly youth who study or work in health related profession. Also we showed that nutrition label use, nutrition seeking information and diet behavior are related significantly related to nutrition literacy.

People who showed higher FNL were less likely to have poor dietary behavior. Also, participants who had higher level of FNL seemed to trust resources of nutrition information such as doctors, nurses, books and internet. Previous literature supports positive association between diet behavior and nutrition literacy (16, 17). So one can conclude that improved nutrition literacy could prevent chronic diseases (18).

In terms of FNL, although our study group showed lack of knowledge in terms of WHO guidelines for healthy diet and application of dietary guidelines to everyday living. They expressed high understanding of nutrition knowledge and languages which correlated significantly with low calorie and low fat diet. This could be overestimated and misleading as guidelines to healthy diet have other aspects such as intake of fruits and vegetables and lower intake of soft drinks among others, which is in accordance with what was found previously (17, 19). For example the score for confidence on the definition of healthy

diet was high, whereas the knowledge of WHO guidelines on healthy nutrition was low, which indicate that the participants may have overestimated their skills with regards to nutrition knowledge.

With regards to INL, participants were confident in sharing nutrition information and influencing peers and family, also health professionals, whereas internet as source of information was not well received. In a study among women using facebook as source of information on eating disorders was related to disorganized eating and negative body image (20).

Our study group are critical of work, university and work place attitudes towards providing healthy meals. In addition, study group showed tendency to influence and be influenced by others. They are confident more of that they think is credible source of information. Young students use websites such as facebook, twitter and Youtube to obtain information about diet when confronted health issues such as DM2(21).

Nutrition knowledge was associated with decrease intake of fat rich food sources and calories. A diet rich in cholesterol, saturated fat and trans-fat is associated with increase in serum low density lipoprotein (22). To reduce the risk of cardiovascular disease the amount of saturated fat and trans fat in diet should be reduced (23, 24). In literature, food selection is related to nutrition knowledge(25, 26) as some nutrition basic knowledge is related to diet change (27). In study among 231 students, those who have more than 35% of their total calories from fat had lower nutrition knowledge scores and females had more nutrition knowledge than males.

Nutrition literacy was higher in females compared to males. This in agreement with what was done before in 201 adults older than 18 y from Australia, nutrition knowledge with regards to nutrition recommendations, food nutrients, food choices, diet related diseases were higher in females relative to males, although total knowledge and nutrition recommendations were significantly higher(28). Other studies report demographic variation in nutrition knowledge, lower SES, unemployed, less educated have lower knowledge scores (29). Particularly, nutrition knowledge is important for women as it help to protect their offspring from malnutrition or future over-nutrition(30).

Mediterranean diet is a diet that lowers chronic disease and it is predominant in countries like Palestine. In a study among 127 students, greater nutrition education was associated with higher adherence to Mediterranean diet (31). Hence, nutrition education to improve nutrition literacy among Palestinian people could have impact on the prevalence of chronic diseases in the society.

This study is not without limitation including using convenient sample and its cross sectional design. Our sample represented mainly young students who had or currently enrolled in basic clinical nutrition class, so this sample is not represented of general Palestinian society who may be lagging behind in terms of nutrition knowledge which indicate the need for programs to improve nutrition literacy among Palestinian society.

In this study we reported descriptive data on different types of nutrition literacy that indicated that Palestinian society has interest in knowing better about nutrition from credible, but find it difficult to apply

healthy nutrition on everyday life. Both CrL and INL significantly correlated with each other. Nutrition literacy correlated significantly with label use, diet behavior and credible sources of nutrition information. Efforts are needed to raise the nutrition knowledge in the Palestinian society.

Declarations

Consent form

The goals of the study were discussed in social media platforms and participants were asked to fill online survey if they want to participate in the study and filling the form was considered consent to participate in the study.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due [being kept confidential for future work] but are available from the corresponding author on reasonable request.

Competing interest

None

Author Contributions:

NN designed the study, collected data, analyzed data and wrote part of the manuscript. M.T obtained IRB approval, revised the manuscript

Funding

None

Ethical Approval

This study was approved by Najah University IRB board

Consent for publication

All the study authors read and approved the manuscript for publication

Acknowledgement

We would like to thank members of the Palestinian society who participated in this study

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Figures

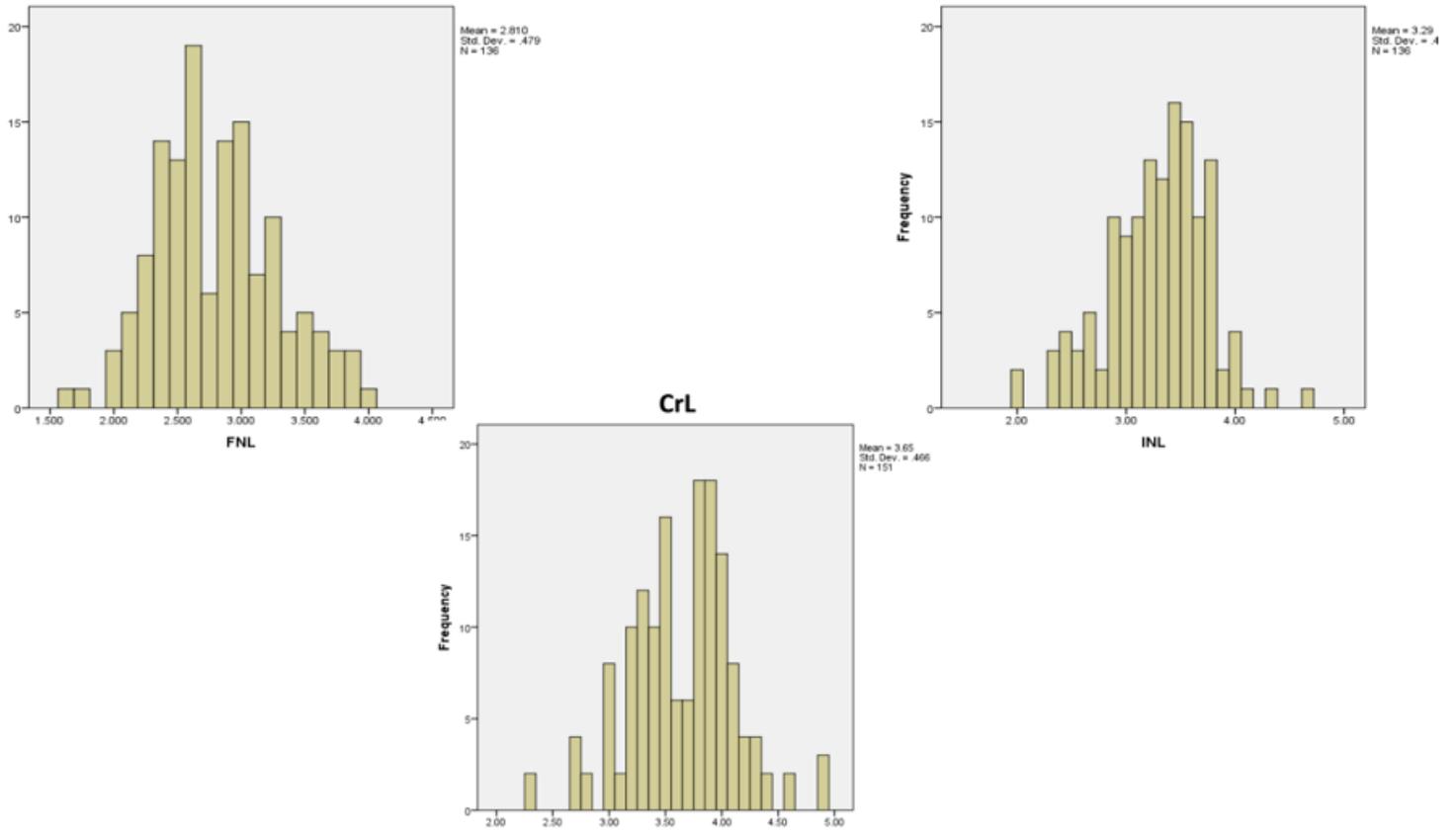


Figure 1

Graph 1: Descriptive Histograms of FNL, INL and CrL