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Knowledge, Attitude and Practice About the Dietary Fibers Among Egyptian Population

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A B S T R A C T

Background: Dietary fiber refers to a wide range of non-digestible plant-derived dietary constituents such as non-starch polysaccharides, oligosaccharides, lignin, and similar polysaccharides. **Objective**: To assess knowledge, attitude and practice related to the intake of dietary fibers among people in Upper Egypt. **Methods:** A cross-sectional survey study among Egyptian participants from Upper Egypt (Quena, Sohag and Assiut). A pre-structured Arabic questionnaire was utilized to examine the research participants' awareness, practice, and attitudes as regard dietary fibers. **Results:** The study included 1156 individuals. Most of the participants were females (68.6%), aged 20 to 40 years (69.4%), had high-school education (62.0%), and living in urban residence (94.0%). Many of the participants had morbid obesity (73.6%). The majority had bread as the main dietary source of dietary fibers (74.7%). The majority had good knowledge regarding the health advantages of dietary fibers, such as preventing constipation (89.4%), preventing bowel cancer (87.8%), and preventing obesity (85.7%). The majority were eating outside served food (71.4%) and prefer the usage of white bread (92.6) and fried potato (88.2%) in fast food and outside served food. The majority usually eat vegetables and fruits with their skins (83.9%) and prefer to eat foods rich in dietary fiber (77.1%). The Internet was the main source of information about dietary fibers (90.1%). **Conclusions:** The majority had good knowledge about dietary fibers and preferred to eat them. However, the majority were eating outside served food. The findings underscore the importance of educating the public about the hazards of fast food.

INTRODUCTION

Dietary fiber (DF) is a large range of non-digestible dietary elements derived from plant sources, including non-starch polysaccharides, oligosaccharides, lignin, and similar polysaccharides.[1] Plants are rich in a range of polysaccharides that are present in all plant-based foods like fruit, vegetables, legumes and cereals.[2,3] Fruit is primarily sugar and DF, such as pectin.[4] Vegetable foods, on the other hand, differ more in terms of plant origin than fruits, with leaves, stems, roots, and tubers varying not only in DF content and amounts, but also in protein and secondary metabolite contents.[4] Following Burkitt's published papers, there was a renaissance of DF study in science during the 1970s.[5] Since then, a considerable amount of research has been undertaken on the association between DF and body weight, as well as general metabolic function

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(including effects on insulin sensitivity, glucose, and lipid metabolism).[6] Many studies found that DF can effectively treat constipation.[7] A low fermentable oligosaccharide, disaccharide, monosaccharide and polyols (FODMAP) diet has also been shown to improve overall irritable bowel syndrome (IBS) symptoms.[8]

DF supplements can help reduce body weight and abdominal adiposity by reducing eating frequency and intake.[9] A high intake of soluble DF seems to provide additional metabolic advantages, such as better glycemic index of carbohydrate-rich diets and lipid profiles.[10] Low DF consumption has been linked to an increased risk of systemic and localized chronic inflammation. According to established theory, ingesting little DF inhibits the establishment and maintenance of a diverse, viable, and healthy colonic microbiota.[11] The consumption of DF appears to be connected to a decreased risk of getting depression. It has been proposed that inflammation may mediate the relationship between DF and depression, and that the correlation between a high-fiber diet and a decrease in inflammatory compounds may change the concentrations of specific neurotransmitters that may lower the risk of developing depression. [12, 13] However, the underlying mechanisms of this relationship are still not fully understood.

Education and knowledge are crucial for maintaining a healthy diet. Individuals with greater levels of education are more likely to consume the necessary amount of nutritious food. This shows that a lack of such knowledge might greatly impede the pursuit of a healthy lifestyle.[14] Even while basic nutritional information is necessary, it is unlikely to be adequate for dietary modifications. Food purchases are impacted by socioeconomic and demographic characteristics such as age, gender, ethnicity, environment, family size, and income. [15] One of the factors that affect eating behavior is beliefs. Thoughts about food like nutritional concepts are almost in the opposite of scientific evidence but are taken as facts by the individual.[16]

Possibly, we can find that food and nutritional knowledge is important to achieve health in the scientific research, how we can reach to that knowledge and factors affecting that knowledge in the general population or specific groups. [17] There are few studies that measure the overall awareness of dietary fibers among the Egyptian population. There is a need to analyze Egyptians' knowledge, attitudes, and practices regarding dietary fibers, as well as identify any community-related elements that may influence their awareness. As a result, the purpose of this study was to assess knowledge, attitude and practice of people attending National Institute of Nutrition toward dietary fibers from three Egyptian governorates.

METHODS

A cross-sectional survey was conducted among Egyptian participants from Upper Egypt (Quena, Sohag and Assiut). It is a multi-centric study conducted at Nutrition Clinic at University Hospital at Sohag, Quena and Assiut. The study was conducted from January to April 2023. Verbal informed consent was obtained from all participants before starting the study. The study was conducted in accordance with the Declaration of Helsinki, and This research was approved by Institutional Ethics Committee. Study participants' data confidentiality was assured.

Represented individual sample including participants from 15-50 years old, adult females and adult males with different socioeconomic level and with no specific dietary recommendation. Individuals with specific nutritional problems and specific dietary recommendation, chronic renal diseases, chronic liver diseases, in born error of metabolism (IEM), or Handicap were excluded.

Sample size: Was calculated using OpenEpi software program with 80% power of the study (1- β) at 0.05 degree of significance, the sample size was 1100. It was then increased by 5% to count for missing data (total 1156).

Sampling: The sample was adjusted according to demographic data (CAPMAS, 2014) of the selected governorates. Two stage sampling procedure was adopted for the study; First stage: multistage random sample design for representative sample, Egypt is divided to four geographical areas as follow: middle, Lower Egypt, Upper Egypt and Frontier. Second stage: The sample of the individuals was represented according to their actual proportion in each governorate; the sample was selected stratified simple randomly represented different social and economic status.

Study tool: A pre-structured Arabic questionnaire was utilized to examine the research participants' awareness, practice, and attitudes on dietary fibers. It

was developed by the investigators and was tested and modified by the Steering Committee members then

Table 1: Sociodemographic characteristics and BMI distribution among the study participants (N=1156)

Sociodemographic characteristics	Frequency	%
Gender:		
Male	363	31.4
Female	793	68.6
Age groups (years):		
15-20	30	2.6
20-40	802	69.4
40-50	324	28.0
Place of residence:		
Urban	1087	94.0
Rural	69	6.0
Occupation:		
Business owner	12	1.0
Craft work	35	3.0
Specialized job	769	66.5
Administrative job	159	13.8
Unemployed	144	12.5
Not working	37	3.2
Educational level:		
Illiterate	38	3.3
Primary education	6	0.5
High school education	717	62.0
Average institute	32	2.8
University education	360	31.1
Postgraduate	3	0.3
Family size:		
< 4 members	727	62.9
≥ 4 members	429	37.1
BMI		
Healthy weight	85	7.4
Overweight	149	12.5
Obese	75	6.5
Morbid obesity	847	73.6

the tested and modified questionnaire was used and conducted by skilled interviewers and included the following: (1) Information about social, economic and demographic situation. (2) Information about the family: position in family, gender, age, physiological status of the married females. Besides information about education and occupation. Also, household size was included. (3) Direct measurements (anthropometry) which were the weight and height for the specific group. (4) History of diseases like diabetes, CVD, Hypertension, Renal disease, and chest disease. (5) Information about knowledge, attitude, nutrition habits and pattern of consumption, including the levels and pattern of fibers consumption and expenditure.

Statistical analysis: Data were analyzed using IBM SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, NY, USA). Data were expressed in numbers and percentages, for qualitative nonparametric variables the median percentiles were used while in quantitative parametric data the mean ± standard deviation (SD) were used

RESULTS

The study included 1156 individuals from three Egyptian governorates (Assiut, Sohag and Qena). Table (1) shows the socio-demographic characteristics of the study participants and BMI distribution among them. Seven hundreds and ninety-three (68.6%) were females. The age range of participants; more than half of them were from 20 to 40 years old (802 (69.4%) participants). Geographical distribution was urban in 1087 (94.0%) participants. Occupation was specialized job in 769 (66.5%) participants and not working in 37 (3.2%) participants. The educational level was illiterate in 38 (3.3 %) participants, university education in 717 (62.0%) participants (about two thirds) and postgraduate in 360 (31.1%) participants. Family size was less than 4 members in 727 (62.9%) participants. 85 (7.4 %) participants had healthy weight, 75 (6.5 %) participants were obese, and 847 (73.6 %) participants had morbid obesity.

Table (2) shows that participants' knowledge about dietary sources; dietary fibers sources were in bread in 864 (74.7%) of our participants and only 14 (1.2%) participants answered that DF were present in fat. Knowledge about dietary fibers sources was eating DF help in feel full in 1079 (93.3%) participants, DF is one of the components of plant foods in 992 (85.8%) participants, brown bread contains a higher percentage of DF compared to white bread in 962 (83.2%) participants, legumes (such as beans, chickpeas …etc.) are sources of DF in 724 (62.6%) participants, nuts are a source of DF in 562 (48.6%) participants and milk and dairy products do not contain DF in 756 (65.4%) participants.

Table (3) shows that knowledge about dietary habits among study participants was that cooked vegetables contain the same amount of DF compared to raw vegetables in 394 (34.1%) participants, the orange

fruit contains more DF than a cup of orange juice in 893 (77.2%) participants, an apple with its skin

Table 2: Knowledge about dietary fibers sources in the whole sample (N=1156)

	N*	%
Dietary fibers sources		
Bread	864	74.7
Meat	278	24.0
Fats	14	1.2
Total	1156	100.0
Responses about dietary fiber sources: *		
Eating dietary fiber help in feel full	1079	93.3
Dietary fiber is one of the components of plant foods	992	85.8
Brown bread contains a higher percentage of dietary fiber compared to white bread	962	83.2
Legumes (such as beans, chickpeas ...) are sources of dietary fiber.	724	62.6
Nuts are a source of dietary fiber	562	48.6
Milk and dairy products do not contain dietary fiber	756	65.4

** Positive responses*

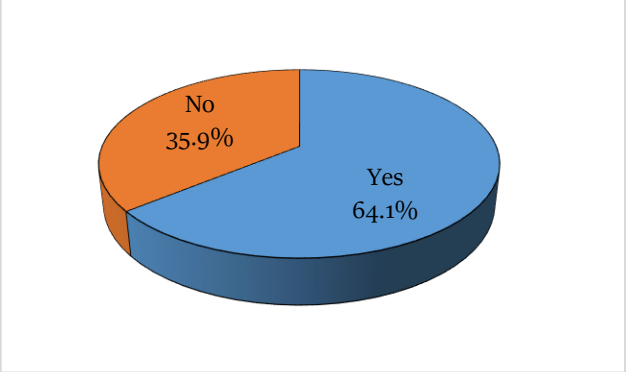

Figure 1: Response to a question about the necessity to eat foods that contain dietary fiber on a daily basis

contains the same DF content as an apple without the skin in 305 (26.4%) participants and DF intake can be increased by consuming more meat, poultry and fish in 414 (35.8%) participants.

Table (4) shows that knowledge about dietary fibers benefits among study participants was DF contains a high percentage of energy and calories in 514 (44.5%) participants, DF prevent obesity (reduce the body weight) in 991 (85.7%) participants, DF reduce blood sugar (eating is good for diabetic patient) in 291 (25.2%) participants, DF prevent bowel cancer in 1013 (87.6%) participants, DF prevent breast cancer in 540 (46.7%) participants, DF prevent constipation in 1033 (89.4%) participants, DF prevent flatulence in 1071 (92.6%) participants and DF prevent vision problems in 420 (36.3%) participants.

Figure (1) shows knowledge about the relationship between DF and health most participants did not agree that it is not necessary to eat foods that contain DF daily (74.8%) and 291 (25.2%) participants agreed with that.

Table (5) shows knowledge about what follow the excess consumption of dietary fibers among the study participants impaired absorption of iron and vitamins was reported by 123 (10.6%) participants, diarrhea in 147 (12.7%) participants, flatulence in 224 (19.4%) participants and cancer in 662 (57.3%) participants.

Figure (2) shows that source of information about DF among the study participants was internet in 1041

Table (3) Knowledge about dietary habits related to fibers intakes (N=1156)

	N*	%
Cooked vegetables contain the same amount of dietary fiber compared to raw vegetables	394	34.1
The orange fruit contains more dietary fiber than a cup of orange juice	893	77.2
An apple with its skin contains the same dietary fiber content as an apple without the skin.	305	26.4
Dietary fiber intake can be increased by consuming more meat, poultry and fish	414	35.8

** Positive responses*

Table (4) Knowledge about dietary fibers benefits among study participants (N=1156)

	N*	%
DF contains a high percentage of energy and calories	514	44.5
DF and prevention of obesity (reduce the body weight)	991	85.7
DF and blood sugar (eating is good for diabetic patient)	291	25.2
DF and prevention of bowel cancer	1013	87.6
DF and prevention of breast cancer	540	46.7
DF and prevention of constipation	1033	89.4
DF and prevention of flatulence	1071	92.6
DF prevent vision problems	420	36.3

** Positive responses. DF, Dietary fibers*

(90.1%) participants, TV/Radio in 289 (25.0%) participants, newspaper and magazine in 84 (7.3%) participants, PHCs in 95 (8.2%) participants and school in 93 (8.0%) participants.

Table (6) shows attitude of participants towards DF in fast food and outside served food; the frequency of eating outside among participants; 331 (28.6%) participants wasn't eating outside, and 825 (71.4%) participants was eating outside. Preference of DF intake in fast food/ eating outside; (45.7%) participants was regularly eating fast foods / eating outside, (20.3%) participants were eating fast food consumption, in general, contributes to their DF intake, (96.2%) participants used white bread in fast food /eating outside, (88.2%) participants used fried potato in fast food /eating outside, (30.8%) participants used peeled fruits in fast food /eating outside, (24.1%) participants used legumes in fast food /eating outside, (19.7%) participants used cooked vegetables in fast food /eating out and (8.0%) participants used brown bread in fast food /eating outside. Also, preference of DF intake in fast food / eating outside was food rich in DF are expensive in 208 (18.0%) participants, there is limited health benefit of DF in 59 (5.1%) participants, "I do not like DF food taste" in 285 (24.7%) participants, food rich in DF are not easily available in 400 (34.6%) participants and other as GIT problems or do not care in 72 (6.2%) participants.

Table (5) Knowledge about consequences of excess consumption of dietary fiber among study participants (N=1156)

	N	%
Excess consumption of dietary fiber leads to all of the following except:		
Impaired absorption of iron and vitamins	123	10.6
Diarrhea	147	12.7
Flatulence	224	19.4
Cancer	662	57.3

Table (7) shows practices related to care about DF, 476 (41.2%) participants read the food leaflet, 83.9 of them eat fruits and vegetables with their skin and 77.1% of them preferred to eat foods rich in DF.

DISCUSSION

It is important for humans to have a balanced diet and a healthy lifestyle throughout their lives. This aids in the prevention and treatment of certain disorders. [18] Young people and adults must be informed of the basic benefits and drawbacks of the foods they consume. DF refers to the edible fraction of a complex combination of plant polysaccharides and lignin that cannot be digested or absorbed in the small intestine. [19]

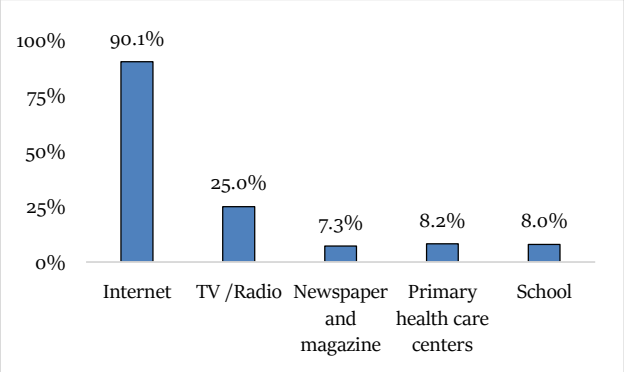

Figure (2): Source of information about dietary fiber among the study participants (N=1156)

In line with our findings, Guiné et al. investigated the level of awareness regarding DF. Descriptive cross-sectional research was conducted on a non-probabilistic sample of 6010 adults from ten nations across three continents (Europe, Africa, and America). The results showed that 65.7% were female and 34.3% were male. Most participants (79.7%) lived in an urban setting, while 19.6% resided in rural regions.[20] Chronic health issues were ruled out in 808 (69.9%) of the individuals and confirmed in 348 (30.1%). NCDs were not present in 812 (70.2%) participants, osteoporosis in 36 (3.1%) participants, hypertension in 53 (4.6%) participants, constipation in 94 (8.1%) participants, diabetes in 63 (5.4%) participants, coronary heart disease in 18 (1.6%) participants, thyroid disorders in 48 (4.2%) participants, anemia in 8 (0.7%) participants, and asthma in 24 (2.1%) participants. Constipation, high cholesterol, obesity, and osteoporosis were the most frequent health issues among the study's participants. Moreover, females had a significantly higher rate of osteoporosis than males, and this is similar with an epidemiological analysis on 24 studies, where 34% and 30.7% of healthy Saudi women and men respectively.[21]

Wronka et al. estimated BMI using measured weight and height. The questionnaire included questions regarding socioeconomic status, weight perception, and target body weight. They showed that 71.9% of

the questioned students accurately assessed, 24.2% overestimated, and 3.9% underestimated their body weight.[22] Our study found that 775 (67.0%) individuals had normal blood pressure, while 381 (33.0%) had hypertension. Bread was the source of DF in 864 (74.7%) participants, meat in 278 (24.0%), and fats in 14 (1.2%) participants. Consuming a fiber-rich diet helps lower blood pressure.[23].

Like our results, Alfawaz et al. found that participants chose fruits and vegetables in the form of salads, cooked veggies, and fruit juices, with oats and wheat being the favored cereals. Peanuts, pistachios, and almonds were the chosen nuts; dried pineapple, dates, and raisins were the favored dry fruits; and in legumes, fava beans and yellow lentils were consumed more than Libya beans. At restaurants, white bread (84.4%), fried potatoes (69.9%), and peeled fruits (60.6%) were preferred over cooked vegetables (29.6%) and brown bread (18.1%).[24] This similarity may be because both Egyptian and Libyan populations have the same culture and thoughts.

Consistently with our results, also, Alfawaz et al., found that preference of DF intake in fast foods/eating out were 652 (47.8%) participants were regularly eating fast foods/eating out, 1150 (84.4%) used white bread in fast foods/eating out, 952 (69.9%) used fried potato in fast foods/eating out, 825 (60.6%) used peeled fruits in fast foods/eating out, 598 (43.8 %) used legumes in fast foods/eating out, 404 (29.6%) used cooked vegetables in fast foods/eating out, and 246 (18.1%) participants used brown bread in fast foods/eating out.[24] This similarity because white bread, fried potato and other foods preferred by participants have better taste and are delicious especially in eating outside.

Table (6) Dietary fiber in fast food/ outside served food among the participants in the study (N=1156)

	N*	%
The frequency of eating outside among the participates		
Not eating outside	331	28.6
Eating outside	825	71.4
Preference of DF intake in fast food / eating outside		
Regularly eating fast foods / eating outside	528	45.7
Fast food consumption, in general, contributes to our dietary fiber intake	235	20.3
Use of white bread in fast food /eating out	1112	96.2
Use of fried potato in fast food /eating out	1020	88.2
Use of peeled fruits in fast food /eating out	356	30.8
Use of legumes in fast food /eating out	228	19.7
Use of cooked vegetables in fast food /eating out	279	24.1
Use of brown bread in fast food /eating out	92	8.0
Preference of DF intake in fast food / eating outside		
Food rich in DF are expensive	208	18
There is limited health benefit of DF	59	5.1
I do not like DF food taste	285	24.7
Food rich in DF are not easily available	400	34.6
Other as GIT problems or do not care	72	6.2

* *Positive responses.* DF, Dietary fibers

Table (7) Practices related to care about dietary fibers among participants (N=1156)

When buying any food product:	N*	%
Do you read the food leaflet?	476	41.2
Do you care to read the fiber content of the product?	236	20.4
Does this affect your choice of product?	282	24.4
Do you usually eat vegetables and fruits with their skins?	970	83.9
Do you prefer to eat foods rich in dietary fiber?	891	77.1

* *Positive responses.*

The current study had several advantages; The large sample (N=1156) participants shared in the study which may be representative to the population from which they were selected. Revised and modified questionnaire which included many questions about knowledge, attitude and practice of participants towards dietary fiber. Nevertheless, we acknowledge few limitations. Only three Egyptian governorates were included in the study. The questionnaire can't define level of awareness, attitude nor practice of participants towards dietary fiber.

CONCLUSIONS

Most participants in the current study had good knowledge about dietary fibers and preferred to eat them. The majority had good knowledge regarding the health advantages of dietary fibers, such as preventing constipation, bowel cancer, and obesity. However, the majority were eating outside served food. The findings underscore the importance of educating the public about the hazards of fast food. As the Internet was the main source of information about dietary fibers, they can be very effective in spreading educational information about healthy diet and dietary fibers.

Ethical Considerations

This research was approved by Institutional Ethics Committee. Study participants' data confidentiality was assured. IRB Registration number: Soh-Med-24-07-14PD.

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Authors' Contributions: Rasha Gamal El Din Abu El-goud participated in analyzing data and in writing the manuscript. Farida Sami Abdou participated in collecting data and in writing the manuscript. Samah W. Elkhayat participated in collecting data and in writing the manuscript. Mariam Roshdy Elkhayat participated in collecting data and in writing the manuscript. Hend Abdel ElHakam participated in analyzing data and in writing the manuscript. Eman Roshdy Mohammed participated in collecting and analyzing the data and revised the manuscript The final manuscript was revised and approved by all the authors before submission.

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