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Effect ofSome Probiotic and Prebiotic Food Sources on University Students Inflicted with Indigestion.

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Abstract :

Given the importance of probiotic and prebiotic as a pure pharmaceutical and medical preparations in the treatment of digestive problems, this research aims to study the impact of some food sources probiotic and prebiotic (yogurt, parsley, sprouted wheat) on the health of a sample of University students inflicted with indigestion.

The research was conducted on a sample of students (64 students) (48 dormitory and 16 external housing) are all suffering from symptoms of indigestion, data were collected through a questionnaire with questions about the social situation, health status, dietary habits and anthropometric measurements in addition to analysis of complete blood picture and stool analysis.

Participants involved in this study were randomly divided into three groups as follows:

The first group (G1): Consisted of 20 students who added fresh parsley (*Petroselinumcrispum)* (100 g/day) to their usual daily diet.

The second group (G2): Consisted of 22 students who added unflavored plained yogurt (full creamed) (180 g/day) to their usual daily diet.

The third group (G3): Consisted of 22 students who added sprouted wheat (*Triticumaestivum*) (50 g seeds/day) to their usual daily diet.

The results showed a significant improvement in symptoms that were complained by the complaints while diarrhea appeared in nearly a quarter of the sample, not a distinct change in the CBCs has been observed. A significant decrease was noticed in the weights for two groups who eat parsley or yogurt, respectively. The study therefore

recommends yogurt intake as a dietary source of probiotic, parsley and sprouted wheat as food sources for prebiotic to relieve and prevent the symptoms of indigestion.

Key words: indigestion- probiotic & prebiotic -yogurt, parsley, sprouted wheat.

Introduction :

The gastrointestinal (GI) tract is one of the most important organs in the human body. Gastrointestinal disorders have a high prevalence in human societies. Functional digestive disorders are the most important ones, and about 50% of patients who refer to gastroenterology care centers suffer from many diseases such as parasitic and infectious disorders, diarrhea, reflux, gastroenteritis, constipation, and bloating (**Kasper *et al*., 2005**).

Gastrointestinal manifestations of metabolic disorders include vomiting, diffuse abdominal pain, pancreatitis, slowed transit time and constipation, maldigestion and malabsorption (which may result in diarrhea), and ascites. These symptoms may occur as part of a systemic disorder of intermediary metabolism in which other symptoms predominate or as the major or exclusive symptoms (**Kahler, 2010**). Indigestion, also known as gastrointestinal disorders and dyspepsia, is a term used to describe one or more symptoms including a feeling of fullness during a meal, uncomfortable fullness after a meal, and burning or pain in the upper abdomen (**NIH, 2008**).

Probiotics and prebiotics have been reported to help in the treatment of gastrointestinal disorders. Moreover, the scientific research from the past decade has demonstrated the great potential for probiotics and prebiotics to promote human well-being (**Wallace *et al*., 2011**). Probiotics are live microbial food supplements or components of bacteria which have been demonstrated to have beneficial effects on human health (**Wullt *et al*., 2003**). Prebiotics were originally defined by **(Glenn and Roberfroid, 1995**) as ‘‘nondigestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of 1 or a limited number of bacteria in the colon, and thus improve host health‘‘.

Probiotics introduce new microbes to the GI tract to enhance microbiota maintenance and modification, while most prebiotic components have been shown to enhance the Bifido bacterium biota.

Each prebiotic component possesses different microbiota-modifying properties (**Wullt *et al*., 2003**). Most prebiotics identified are nondigestible oligosaccharides, and those containing fructose (inulin, oligofructose, fructo–oligosaccharides) are used most commonly.

Parsley is a good source of antioxidants (especially luteolin), folic acid; vitamin A. Proclaimed health benefits include anti-inflammatory properties and boosted immune system. This herb contains no cholesterol, while eugenol has been used in therapeutic to reduce blood sugar levels in diabetics.

Germination is an inexpensive and effective technology for improving nutrients availability, diminishing anti-nutritional factors (trypsin inhibitors and phytic acid) and maximizing levels of some of the utilizable nutrients (**Inyang and Zakari, 2008**). Moisture, protein and total dietary fiber contents increased while carbohydrates and fat were decreased (**El-Safy *et al*., 2013**).

The mechanisms by which probiotics exert their effects are largely unknown, but may involve modifying gut pH, antagonizing pathogens through production of antimicrobial compounds, competing for pathogen binding, receptor sites, nutrients and growth factors, stimulating immunomodulatory cells, and producing lactase **(Lee and Salminen, 2009**). Another mechanism by which probiotics can enhance gut barrier function is via enhanced production of cytoprotective molecules **(Petrof *et al.*, 2004).**

The gastrointestinal beneficial effects of both probiotics and prebiotics; as pure strains and compounds, respectively; were investigated in a large number of studies. However, there is a lack in the studies highlighted their effects in natural food sources and investigated the role of interaction among them and other bioactive constituents of these sources. So, this study was carried out, using probiotic and prebiotic food sources for female university students inflicted with indigestion.

Subjects & Methods:

Subjects:

A random sample of 64 single females, aged 19-24 years old, and inflicted with parasites were chosen from Faculty of Home Economics, Al-Azhar University, to study the effect of some

functional foods on public health. The experimental period was continued for two months (from March to April).

Materials:

Fresh parsley(*Petroselinumcrispum*), plain yogurt full cream , sprouted wheat (*Triticumaestivum*) were purchased from local market, Tanta City, El -Gharbia Governorate, Egypt.

Preparation of sprouted wheat:

Firstly wheat grains were cleaned manually to remove broken grains, dust and other extraneous materials, and then soaked in water overnight. The soaked grains were allowed to germinate under a wet muslin cloth without light at 37 C and 99% relative humidity, with frequent watering as described by (**Obizoba and Atii, 1994)**. Ideally, they should be around a quarter inch in length.

Methods:

Generally, experimental with pre and post-tests were preceded by a pilot survey. Pilot study on follow up students was undertaken for demographic and socio economics, food consumption and intakes whereby an interview schedule was used to collect data. Pre-tests questionnaires included determination of health and sanitation (hygiene and food safety) and food habits. The assessment of complete blood picture, stool analysis before and after treatment carried out.

Collected data:

Data collected from each subject included:

1- Demographic data:

Data included participants housing (ruler, urban, private property, dormitory).

2- Anthropometric measurements:

Anthropometric measurements, in the present study, included weight, height and body mass index (**BMI**). BMI was calculated according to (**Webb,2002**) using the following equation:

$$BMI = \frac{\text{Weight (Kg)}}{\text{Height (m)}^2}$$

Body weight was measured before and after treatments to the nearest 0.5 kg with a standard beam scale. Height was measured to

the nearest 0.1 cm with a stadiometer. For these measurements, the subjects wore regular street clothes but no shoe (**Jelliffe, 1997**).

Study design:

Participants involved in this study were randomly divided into three groups as follows:

The first group (G1): Consisted of 20 students who added fresh parsley (*Petroselinumcrispum)* (100 g/day) to their usual daily diet.

The second group (G2): Consisted of 22 students who added unflavored plained yogurt (full creamed) (180 g/day) to their usual daily diet.

The third group (G3): Consisted of 22 students who added sprouted wheat (*Triticumaestivum*) (50 g seeds/day) to their usual daily diet.

Statistical analysis:

Obtained data were analyzed using SPSS 20 software**.** The results were expressed as mean ± standard deviation **(mean ± SD).** Data were analyzed using one way classification, analysis of variance (**ANOVA**). The differences between means were tested for significance using least significant difference (LSD) test at $p<0.05$. Paired-samples T test was also used to determine the statistical difference between the pre- and post-means for each parameter in each group (**Sendcor and Cochran, 1979)**.

Results And Discussion :

Table (1) shows the demographic data of study sample. It is clear that rural students were higher than that of the urban (62.5% and 37.5% respectively).

Parameters		No	%
Locality	Rural	40	62.5
	Urban	24	37.5
	Total	64	100
Housing	Dormitory	48	75
	House	16	25

Table (1): Demographic data of participants

Table (2) shows the mean of age and anthropometric measurements of the study participants. The age of sample was between 19 to 23 year. On the other hand, height was ranged between 151 to 173 cm; divided to greater than 162 cm (51.6% of the sample), while the smaller than 162 cm was 48.4% of the sample. Regarding weight of the participants, it ranged from 53 to 87 kg, most of them (71.9%) were less than 70kg, while 28.1% were greater than 70kg.

Moreover, BMI of sample ranged 18.5–24.9, 25–29.9 and 30 or greater which were (54.7%, 35.9% and 9.4%, respectively).

Table (2): Anthropometric measurements of samples

Parameters	Mean	ND	%
Age (year)	**19 : 23**	**64**	**100%**
Height (cm): min-max	**151-173**	**--**	
	> 162	**33**	**51.6%**
	< 162	**31**	**48.4%**
Weight (kg): min-max	**53-87**	**--**	
	> 70	**18**	**28.1%**
	< 70	**46**	**71.9%**
BMI :(kg/m^2) min-max	**20.2 -32.7**	**---**	
	18.5–24.9	**35**	**54.7%**
	25–29.9	**23**	**35.9%**
	30 or greater	**6**	**9.4%**

Health status:

Table (3) shows the health status and sanitary habits of participants. Regarding washing hands before eating, 40.6% of sample members wash their hands sometimes. All of participants sample wash vegetables before eating. Most of participants (81.2%) always clip their nails. Quarter of sample participants sleep less than 6 hrs/day, while 46.9% sleep more than 6 hrs and the remains (28.1%) sleep 6 hrs/day. 56.3% from subjects rarely do periodic check, compared with a small of participants 3.1% always do check. All of subjects were suffering from digestive disorders. Only 12.5% of the participants always suffer from those disorders directly after meal while 31.3% rarely and 56.3% sometimes suffer from digestive disorders directly after meal. Symptoms of digestive disorders found in participants were presented as 59.4% flatulence, 21.9% constipation, 9.4% heart burn (acidity) and finally 9.4% acidity & constipation. Medicines taken for digestive disorder were Nassar, Digestin, Ranitidine, Laxatives, and no medicine (3.1%, 7.8%, 6.3%, 6.3% and 76.6%, respectively).

From all participants, only 21.1% always practice exercise, while 50% and 28.1% participants sometimes and rarely do that. Types of exercise were walking, running and aerobic exercises.

Finally, just 15.6% from participants had food allergic, represented as onion, garlic, beans, egg, cabbage, milk, cauliflower and radish.

Table (3): Health status and sanitary habits

Parameters	**No.**	%
Washing hands before eat (64)		
Always	38	59.4
Sometimes	26	40.6
Rarely	0	0
Washing vegetables before eat		
Always	64	100
Clipping nails		
Always	52	81.2
Sometimes	12	18.8
Rarely	0	0
Sleeping hours		
Less than 6hrs	16	25
6 hrs	18	28.1
More than 6 hrs	30	46.9
Periodic checks		
Always	2	3.1
Sometimes	26	40.6
Rarely	36	56.3
Chronic diseases		
Digestive disorders	64	100
Other diseases	0	0
Digestive disorders directly after meal		
Always	8	12.5
Sometimes	36	56.3
Rarely	20	31.3
Symptoms of Digestive disorders were found inparticipants		
Flatulence	38	59.4
Constipation	14	21.9
Heart burn(acidity)	6	9.4
Acidity & Constipation	6	9.4
Diarrhea	0	0
Nausea & vomiting	0	0
Medicines were taken for digestive disorder		
Nassar	2	3.1
Digestin	5	7.8
Ranitidine	4	6.3
Laxatives	4	6.3
No medicine	49	76.6
Exercise		
Always	14	21.9
Sometimes	32	50
Rarely	18	28.1
Types: walking, running, aerobic exercises		
Food allergy		
Yes	10	15.6
No	54	84.4
Allergic foods in participants: onion, garlic, beans, egg, cabbage, milk, cauliflower, radish.		

Food habits of participants:

From results of **Table 4,** it is obvious that (71.9%) ofparticipants take two meals daily; the most common neglected meal was breakfast (50%) then dinner (60.9%). Only 25%of participants sleep directly after meal. 43.7% of participants don't chew food. About41% of participants like fried and Foundry food. Of all the participants, about 23% don't used to soak beans, and 50% do sometimes. It seems that some of participants always consume salad and the others sometimes or rarely (34.4, 59.4 and 6.3, respectively).

Regarding fixing meal time, only 9.4% always fix, 53.1% sometimes and 37.5% rarely fix meal time.Of all participants, 37.4% of participants drink less than 1 liter of water per day. Also, 59.4% of participants prefer to drink water directly after meal time, while 28.1% before and 12.5 with meal time.

It seems that 53.1% drink carbonated beverages after meal time, and 6.2% of participants drink them during and after meal time. Most of participants (68.8%) used to drink tea directly after meal time, and also 90.6% drink it after soaking only (Infusion).

Table (4): Food habits of participants

Parameters	**No.**	**%**
Meals number 64		
One	2	3.1
Two	46	71.9
Three	16	25
Neglected meal		
Breakfast	32	50
Lunch and breakfast	2	3.1
Dinner	39	60.9
Practices directly after the meal		
Sleep	16	25
Walk	6	9.4
Other things	42	65.6
Chew food		
Good	36	56.3
Bad	28	43.8
Cooking method		
Boiling	10	15.6
Cooking in its own	28	43.8

Frying & foundry food	26	40.6
Soak beans		
Yes	18	28.1
Sometimes	32	50
No	14	21.9
Eating salad		
Always	22	34.4
Sometimes	38	59.4
Rarely	4	6.3
Fixed meal times		
Always	6	9.4
Sometimes	34	53.1
Rarely	24	37.5
Drinking water daily amount		
Less than liter	24	37.4
1 liter	20	31.3
More than 1 liter	20	31.3
Water with meal time		
Before	18	28.1
During	8	12.5
After	38	59.4
Carbonated beverages		
Always	10	15.6
Sometimes	46	71.9
Rarely	8	12.5
Carbonated beverages with meal time		
Don’t drink	8	12.5
During	6	9.4
During and After	4	6.2
After	34	53.1
Other times	12	18.8
Drinking tea	64	100
Directly after meal	44	68.8
Without meal time	20	31.3
Tea methods		
Soaking	58	90.6
Boiling	6	9.4

Table (5) results show that there was highly significant reduction in the weight of participants after eating parsley for (G1) and yoghurt for (G2). The percentages reduction were (6.89% and 3.19%) respectively, compared with weight of (G3) who consumed sprouted wheat daily (0.503%)**.**

Table (5): Mean ± SD for difference in weight of participants in different groups before and after taking treatment diets.

Groups / Parameters		Group 1 M±SD	Group 2 M±SD	Group 3 M±SD	F	Sig.
Weight(Kg)	Before	69.8±8.1	67.9±10.3	60.0±6.5	4.625	0.013
	After	65.3±6.4 a	65.8±9.8 a	59.7±5.7 b		
	difference%	-6.891	-3.191	-0.503		
T. test		8.8	3.4	0.76		
Sig.		0.000***	0.003**	0.45NS		
BMI (Kg/m^2)	Before	26.1±2.8	26.1±3.2	23.5±2.4	3.12	0.05
	After	24.4±2.1a	25.3±2.9 a	23.4±2.2 b		
	difference%	-6.967	-3.162	-0.427		
T. test		8.9	3.4	0.70		
Sig.		0.000***	0.003***	0.48 NS		

Means in the same row with different letters are significantly different (p≤0.05).
*** P<0.05, ** P < 0.01 *** P<0.001 NS = not significant**

Table (6) and (7) results show that half of the dormitory sample was infected with parasites, but most of the sample members who live with their families 87.5% suffer from parasites. There was significant correlation between prevalence of parasites and living place (P<0.001).

Table (6): Frequency distribution of parasite infection according to residence

living	Count	Parasites inflicted	%
Dormitory	48	24	50
House	16	14	87.5

Table (7): Correlations in data of table (6)

		Q4	ova b
living	Pearson Correlation	1	.331(**)
	Sig. (2-tailed)		.008
	N	64	64
ova	Pearson Correlation	0.331(**)	1
	Sig. (2-tailed)	.008	
	N	64	64

** **Correlation is significant at the 0.01 level (2-tailed).**

There was no report of a successful preventive or therapeutic use of the suggested foods in patients with parasites, as 59.4% with parasites (50.1% *Entameba sp.*, 6.2% *Giardia lamblia*, 3.1% *H. nana*) become 87.5% (75% *Entameba sp.*, 12.5% *Entrobius sp.*) after treatment, but each of *Giardia lamblia*, *H. nana* disappeared (**Table 8**), and there was undigested food in stool analysis of all participants.

Table (8): Ova of parasites before and after treatment

	Before treatments		**After treatments**	
	Frequency	**Percent**	**Frequency**	**Percent**
Absent	26	40.6	8	12.5
***Entameba* +**	20	31.3	16	25.0
***Entameba* ++**	4	6.3	22	34.4
***Entameba* +++**	8	12.5	10	15.6
***Entameba*++ *Giardia lamblia*(+)**	2	3.1	0	0
***Giardia lamblia*(++)**	2	3.1	0	0
***H. nana* +**	2	3.1	0	0
***Entrobius* +**			8	12.5
Total	64	100.0	64	100.0

There were significant differences between after and before taking parsley ((G1) at P<0.05) in each MCH, MCHC, leucocytic count and platelet count but all of them within normal. While it was proved that there was no significant difference in other blood parameters (**Table 9**). Also, there were significant differences between after and before taking yogurt ((G2) at P<0.05) in just MCH, MCHC and leucocytic count (**Table 10**). As for (G3) group for participants who take germinated wheat, it was declared that there were significance differences at P<0.05 in each of hemoglobin, hematocrit, MCV, MCH, MCHC and segmented neutrophils between after and before taking germinated wheat diets, provided that all values after and before, were within normal (**Table 11**).

Findings presented in table (**12**) declared that dietary supplementation with yogurt improved MCHC levels in participants compared to parsley and (sprouted) germinated wheat. As for immunity parameters yogurt and germinated wheat increased the level of eosinophils and monocytes more than parsley. On the other hand, there were no significant changes in other parameters among all groups.

Table (9): Mean ± SD of complete blood counts (CBCs) of study participants before and after taking parsley G(1)

Parameters	Before		After		T. test		Normal
	Mean	± SD	Mean	± SD	T value	Sig.	
Haemoglobin g/dl	12.33	0.74	12.17	0.76	-0.64	0.531 NS	12.0 - 16.0
Haematocrit %	0.36	0.03	0.36	0.02	0.45	0.661 NS	35.0 - 50.0
Red cell count millions/Cmm	4.34	0.44	4.50	0.37	1.42	0.171 NS	4.5 – 6.0
MCV fl	83.96	4.65	81.40	3.62	-1.72	0.102 NS	80.0 - 95.0
MCH pg	30.13	3.56	28.00	2.34	-4.05	0.001*	27.0 - 32.0
MCHC g/dl	34.90	1.97	33.30	1.64	-3.49	0.002*	30.0 - 37.0
Leucocystic count thousands/Cmm	8.15	1.21	6.25	1.65	-5.57	0.000*	4.000 - 11.000
Basophils %	0.10	0.31	.00	.000	-1.45	0.163 NS	0 – 1%
Eosinophils %	1.90	0.72	1.70	0.47	-0.89	0.385 NS	0 – 6%
Segmented neutrophils %	55.40	6.02	59.40	7.53	1.99	0.061 NS	25 – 70%
Lymphocytes %	41.20	7.51	36.60	7.57	-2.05	0.054 NS	15 – 40%
Monocytes %	2.40	1.23	2.40	0.50	0.00	1.000 NS	2 – 8%
platelet count Thousands/Cmm	221.000	48.03	258.000	55.69	2.79	0.012*	140.000-440.000

Means in the same row with different letters are significantly different (p≤0.05), *P<0.05, ** P < 0.01 *** P<0.001 NS = not significant

Table (10): Mean ± SD of complete blood counts (CBCs) in study participants before and after taking yogurt G(2)

Parameters	Before		After		T. test		Normal
	Mean	± SD	Mean	± SD	T value	Sig.	
Haemoglobin g/dl	12.65	0.47	12.58	0.61	-0.589	0.562 NS	12.0 - 16.0
Haematocrit %	0.38	0.04	0.38	0.03	-0.186	0.854 NS	35.0 - 50.0
Red cell count millions/Cmm	4.39	0.48	4.51	0.34	0.855	0.402 NS	4.5 - 6.0
MCV fl	85.73	3.21	80.36	6.28	-4.190	0.000**	80.0 - 95.0
MCH pg	30.55	1.47	28.50	2.256	-3.973	0.001**	27.0 - 32.0
MCHC g/dl	35.09	1.34	35.18	1.22	0.385	0.704 NS	30.0 - 37.0
Leucocystic count thousands/Cmm	7.45	1.76	6.15	1.48	-3.102	0.005*	4.000 - 11.000
Basophils %	0.00	0.00	0.00	0.00			0 – 1%
Eosinophils %	2.09	1.48	2.45	0.51	1.164	0.257 NS	0 – 6%
Segmented neutrophils %	54.64	8.10	56.73	8.01	1.398	0.177 NS	25 – 70%
Lymphocytes %	39.09	4.37	37.36	7.75	-0.923	0.366 NS	15 – 40%
Monocytes %	2.73	1.16	3.45	0.91	2.082	0.050 NS	2 – 8%
platelet count Thousands/Cmm	218.73	46.86	236.55	45.68	1.411	0.173 NS	140.000-440.000

Means in the same row with different letters are significantly different (p≤0.05), *P<0.05, ** P < 0.01 *** P<0.001 NS = not significant

Table (11): Mean ± SD of complete blood counts (CBCs) in study participants before and after taking germinated wheat G(3)

Parameters	Before		After		T. test		Normal
	Mean	± SD	Mean	± SD	T value	Sig.	
Haemoglobing/dl	12.91	0.31	12.35	0.69	-3.672	0.001**	12.0 – 16.0
Haematocrit %	0.36	0.03	0.38	0.03	2.787	0.011*	35.0 – 50.0
Red cell count millions/Cmm	4.38	0.37	4.48	0.48	1.241	0.228 NS	4.5 – 6.0
MCV fl	83.49	3.59	81.64	4.88	-2.331	0.030*	80.0 – 95.0
MCH pg	30.18	1.85	27.82	1.99	-10.216	0.000**	27.0 – 32.0
MCHC g/dl	35.55	1.13	33.91	1.72	-5.020	0.000**	30.0 – 37.0
Leucocystic count thousands/Cmm	7.35	1.94	6.52	2.50	-1.682	0.107 NS	4.000 - 11.000
Basophils %	0.00(a)	0.000	0.00(a)	0.00			0 – 1%
Eosinophils %	2.36	0.66	2.36	0.90	0.000	1.000 NS	0 – 6%
Segmented neutrophils %	53.00	12.63	59.36	8.02	2.447	0.023*	25 – 70%
Lymphocytes %	38.00	10.21	35.18	7.93	-0.977	0.340 NS	15 – 40%
Monocytes %	3.05	1.26	3.09	1.19	-0.951	0.352 NS	2 – 8%
platelet count Thousands/Cmm	229.18	50.97	245.18	45.81	1.588	0.127 NS	140.000-440.000

Means in the same row with different letters are significantly different (p≤0.05).
*** P<0.05, ** P < 0.01 *** P<0.001 NS = not significant**

Table (12): Effect of post-feeding effects of parsley, yogurt and germinated wheat on complete on complete blood counts (CBCs)

Parameters	G1	G2	G3	F	Sig.
	M±SD	M±SD	M±SD		
Haemoglobin g/dl	12.17±0.76 a	12.58±0.61 a	12.35±0.69 a	1.89	0.15NS
Haematocrit %	0.36±0.0 a	0.38±0.03 a	0.38±0.03 a	1.42	0.249 NS
Red cell count millions/Cmm	4.50±0.37 a	4.51±0.34 a	4.48±0.48 a	0.02	0.974 NS
MCV fl	81.40±3.6 a	80.36±6.28 a	81.64±4.88 a	0.38	0.681 NS
MCH pg	28.00±2.34 a	28.50±2.256 a	27.82±1.99 a	0.53	0.587 NS
MCHC g/dl	33.30±1.64 b	35.18±1.22 a	33.91±1.72 b	8.27	0.001**
Leucocystic count thousands/Cmm	6.25±1.65 a	6.15±1.48 a	6.52±2.50 a	0.22	0.804 NS
Basophils %	.00±.000	0.00±0.00	.00(a) ±0.00		
Eosinophils %	1.70±0.47 b	2.45±0.51 a	2.36±0.90 a	11.39	0.000**
Segmented neutrophils %	59.40±7.5 a	56.73±8.01 a	59.36±8025 a	0.82	0.446 NS
Lymphocytes%	36.60±7.57 a	37.36±7.75 a	35.18±7.93 a	0.45	0.637 NS
Monocytes %	2.40±0.50 b	3.45±0.91 a	3.09±1.19 a	6.98	0.002**
platelet countThousands/Cmm	258.000±55.69 a	236.55±45.68 a	245.18±45.81a	1.01	0.371 NS

Means in the same row with different letters are significantly different (p≤0.05).
*** P<0.05 ** P < 0.01 *** P<0.001 NS = not significant**

The results of **table (13)** show symptoms of indigestion as influenced by pre & post diets. It could be noticed that a decline in flatulence symptoms for (G2) from 63.6% to 9.1%, (G3) from 72% to 27.3% then (G1) from 40% to 35%, respectively. From the results of same table, it is obviously that the acidity decreased from 20% to 5% for G1 but without change for G2. Regarding constipation with flatulence; parsley and yogurt improved the status of all participants. On the other hand, it is cleared that (diarrhea appeared after added suggested experimental food) values were as follow (31.8% of G2, 15% of G1 and 18.2% of G3). Moreover, the percentage of cure from

indigestion symptoms was (50% for G2, 35% for G1 then 31.7% for G3, respectively).

Table (13): Indigestion symptoms pre and post treatment.

Groups	Group 1 (20)				Group 2 (22)				Group 3 (22)			
	Before		After		Before		After		Before		After	
Symptoms	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
flatulence	8	40%	7	35%	14	63.6%	2	9.1%	16	72.7%	6	27.3%
Acidity	4	20%	1	5%	2	9.1%	2	9.1%				
Acidity + constipation	2	10%	2	10%	2	9.1%	0	0%	2	9.1%	2	9.1%
flatulence + constipation	6	30%	0	0%	4	18.2%	0	0%	4	18.2%	3	13.6%
Diarrhea	0	0%	3	15%	0	0%	7	31.8%	0	0%	4	18.2%
Without symptoms	20	100%	7	35%	22	100%	11	50%	22	100%	7	31.8%

Symptoms	Before		After	
	Frequency	Percent	Frequency	Percent
Flatulence	38	59.4%	15	23.4%
Acidity	6	9.4%	3	4.7%
Acidity + constipation	6	9.4%	4	6.3%
Flatulence + constipation	14	21.9%	3	4.7%
Diarrhea	0	-	14	21.9%
Without symptoms	64	100	25	39.1%
Total	64	100%	64	100

Generally, results of the present study declared amelioration of all indigestion symptoms.

Discussion :

Indigestion symptoms, sometimes occur due to improper food habits and irregular life style, and about 50% of patients suffering from these symptoms refer togastroenterologycarecenters. For this reasons, the current study aimed to alleviate gastrointestinal disorders through some probiotics and prebiotics food sources.

The relationship between acidity and osmolality of various beverages and their propensity to cause Gastroesophageal Reflux Disease (GERD) symptoms was evaluated by (**Feldman and**

Barnett, 1995). Consequently, sweeping recommendations for cessation of all carbonated beverages as part of lifestyle modifications should be reevaluated. Regardless, sugary carbonated beverages have been blamed for their contribution to the obesity epidemic in westernized societies and may contribute to GERD through increase in BMI. it appears that there is no direct evidence that carbonated beverages promote or exacerbate GERD.

After the data obtained from the questionnaires and interviews were analyzed, as regard the weight , there was highly significant reduction in the weight of participants after eating parsley for (G1) and yoghurt for (G2). These results were supported by **Piernas and Popkin (2010)** who showed that yogurt consumption may have a beneficial role on body weight regulation and cardiovascular health. High-protein snacks and meals induce a greater reduction in appetite than do isoenergetic high-fat or high-carbohydrate foods.

The mechanisms by which probiotics can act on weight management remain to be clearly established but could involve interaction with the resident bacteria in the gut, which may affect metabolic pathways implicated in the regulation of fat metabolism (**Arora *et al.*, 2013)**.

There are also mechanistic studies that explain how yogurt's nutrients may contribute to a negative energy balance and the maintenance of a healthy body weight. Weight -loss studies in low calcium consumers have shown that low calcium intake is a risk factor for overweight and obesity, and that this effect may be explained by an increase in fat oxidation, facilitation of appetite control, and fecal loss (**Tremblay and Gilbert, 2011)**.

Fresh parsley leaves are rich in many essential vitamins such as pantothenic acid, riboflavin, niacin, pyridoxine and thiamin. These vitamins play a vital role in carbohydrate, fat and protein metabolism by acting as co-enzymes inside the human body (**Richmond and Mackley, 2000)**.

As noticed in the present work findings, BMI of (G1) participants who consumed parsley and (G2) who consumed yogurt were decreased.

As regard parasitic infection and living place, there was significant correlation between prevalence of parasites and living place. Half of

the dormitory sample was infected with parasites, but most of the sample members who live with their families (87.5%) suffer from parasites. This result matched with (**Frydas *et al.*, 2007**) who showed that most participants with parasitic infection living in the outer housing, while non-infected participants were living in the dormitory and this may be due to the level of a cleaner working and sanitation in dormitory.

Wensaas *et al.*, (2016) have shown a high risk of different functional gastrointestinal disorders (FGIDs) and gastrointestinal symptoms after acute giardiasis. With suggested experimental food *Giardia lamblia* disappeared (**Table8**).

In the present study, all participants suffering from indigestion and over half of was not correlated to parasitism, as was concluded in other similar studies . them are infected with gastrointestinal parasites (59%). Everyone suffers from the presence of fat cells and non-digestible vegetable in their stool analysis that refer to indigestion. These results were not matched with **Frydas *et al.*, (2007)**who reported that gastrointestinal symptoms was not correlated to parasitism, as was concluded in other similar studies .

Therefore, the lack of association of symptoms and detection of parasitic infections does not support the screening for parasitic infections in symptomatic subjects only **(Benzeguir *et al.*, 1999**). Parsley tea at one time was used to treat dysentery and gallstones (**Duke, 2002**).

In a study, leucocytic count was improved after parsley consumption, accordingly **Kolarovic *et al.*, (2010)**&**Ozsoy-Sacan *et al.*, (2006**) concluded that myristicin, an organic compound found in the essential oil of parsley activates the enzyme glutathione-S-transferase, which helps the molecule glutathione attached to and fight against, oxidized molecules. Apigenin, one of the main flavonoids in parsley showed strong antioxidant effects, increasing the activities of antioxidant enzymes and, in turn, decreasing the oxidative damage to tissues.

From this study parasitic infestation may prevent improvement in blood picture despite a slight rise in immune indicators.

In Africa, anaemia caused by parasitic infestation with nutritional undertone is due to a deficiency of iron, folic acid, and protein. This

could occur singly or in combination with other causative agents **(McGregor *et al.*, 1966)**. These findings also are in line with **(Brooks *et al.*, 1979)** who proved that malnutrition and anaemia were reported among some segments of Kenyan population infected with parasites. Also ,(**Oguntibeju, 2003**) confirmed the existence of relationship between parasitic infestations and alterations in haematological indices resulting into anaemia. This situation calls for a further, comprehensive, and careful evaluation of the social behavior /life style, nutritional habits, and the environment factors, together constitute the major determining factors of human health and wellbeing.

In this study regarding constipation and flatulence, there was an improvement in the status of all participants.

These findings also are in line with **Savaiano and Levitt, (1987)** who concluded that Yogurt bacteria contain high levels of a lactase and this enzyme acts in the intestine to help digest the lactose. So eating yogurt is like taking a digestive enzyme supplement.

Obviously, the present study declared amelioration in all indigestion symptoms. Best reduction declared in the group which supplemented with yogurt.

Parsley seed was used traditionally as a carminative to decrease flatulence and colic pain as shown by **(Zaynoun*et al.*, 1985).** Also, sprouted wheat, in the present findings, ameliorated bloating. This result was supported by some studies including that of**(Eyzaguirre *et al.*, (2006) and Osman, (2007)**who reported that soaking and germination of cereals reduce trypsin inhibitor activity level and flatulence caused by oligosaccharides, thereby increasing protein digestibility and improving sensory properties.

The present findings showed a reduction in constipation. This also is in line with **Magro *et al.*, (2014**) who found that yogurt with polydextrose, *B. lactis* and *L. acidophilus* significantly shortened colonic transit time after two weeks and may be an option for treatment of constipation.

Functional foods could be promising in alleviating motility problems of the gastrointestinal tract, in relation to irritable bowel syndrome and constipation as reported with (**Moayyedi *et al.*, 2010**).

The decrease of the intestinal pH (**Picard *et al.*, 2005**), a competitive action with intestinal pathogen(s) or production of substances with neurotransmitter activities (**Quigley, 2007**) are some of the mechanisms attributed to selected strains of probiotics which stimulate the intestinal peristalsis.

The best treatment for constipation in present study was parsley. **Kreydiyyeh and Usta (2002**) reported that parsley serves as a diuretic and laxative. The mechanism of action of parsley extract seems to be mediated through an inhibition of the Na+K+ pump that would lead to a reduction in Na+ and K+ reabsorption leading thus to an osmotic water flow into the lumen and diuresis.

Obviously, as shown in this study, diarrhea appeared after added experimental foods. This is possibly a result of side effects such as gas, borborygmus, pain, or diarrhea, which can sometimes be observed when therapeutic doses of prebiotics are administered to particularly sensitive subjects **(De Vrese and Marteau, 2007).** In this study, as regard to acidity, there was a decrease from 20% to 5% of participants after eating parsley but without change for yogurt group.

Generally, results of the present study declared amelioration in all indigestion symptoms.

Conclusion:

In conclusion, yogurt, parsley and sprouted wheat as probiotics and prebiotics food sources ameliorate gastrointestinal disorders. Also, yogurt and parsley show reduction in body weight of sample participants. Also, study recommends treating gastrointestinal parasites because they may be the cause of indigestion. Additional studies are required to delineate further the role of yogurt, parsley and sprouted wheat as probiotics and prebiotics food sources and other sources.

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تأثير بعض المصادر الغذائية للبروبايوتيكوالبريبايوتيك على طالبات الجامعة المصابات بعسر الهضم

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ملخص البحث :

نظرا لأهمية البروبايوتيكوالبريبايوتيك كمستحضرات طبية ودوائية نقية فى علاج مشاكل الجهاز الهضمى، فإن هذا البحث يهدف الى دراسة تأثير بعض المصادر الغذائية للبروبايوتيكوالبريبايوتيك (الزبادى - البقدونس – القمح المنبت) على صحة عينة من طالبات الجامعة المصابة بعسر الهضم.

أجرى البحث على عينة من الطالبات (٦٤ طالبة) (٤٨ يسكنون المدينة الجامعية – ١٦ سكن خارجى) جميعهن مصابات باعراض عسر الهضم، تم جمع البيانات عن طريق استبانة تتضمن اسئلة عن الحالة الاجتماعية والصحية والعادات الغذائية والمقاييس الجسمية بالاضافة لتحليل صورة الدم كاملة وتحليل البراز، وتم تقسيمهمعشوائيا لثلاث مجموعات....

المجموعة الأولى(١): تناولت البقدونس (١٠٠جم/يوم) بالاضافة للطعام المعتاد

المجموعة الثانية(٢): تناولت زبادى سادة كامل الدسم(١٨٠جم/يوم) بالاضافة للطعام المعتاد.

المجموعة الثالثة (٣): تناولت قمح منبت (٥٠جم/يوم) بالاضافة للطعام المعتاد.

وقد تمت التغذية المذكورة لمدة شهرين متتابعين.

ولقد أظهرت النتائج تحسنا ملحوظا فى الاعراض التى كانت تشكو منها المشاركات بينما ظهر الاسهال فيما يقارب من ربع افراد العينة ، ولم يحدث تغير واضح فى صورة الدم وقد لوحظ انخفاض معنوىفى اوزان (المجموعتين اللتين تناولتا البقدونس أوالزبادى بالترتيب).

ولهذا توصى الدراسة بتناول الزبادى كمصدر غذائللبروبايوتيك والبقدونس والقمح المنبت كمصادر غذائية للبريبايوتيك للتخفيف والوقاية من أعراض عسر الهضم.

الكلمات المفتاحية: عسر الهضم - البروبايوتيكوالبريبايوتيك - الزبادى - البقدونس – القمح المنبت.