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Relationship betweenDigestive Problems and Nutritional Status among Community Dwelling Older Adults

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Abstract
Back ground:*Themultiple changes that take place in the gastrointestinal tract throughout the human life have many clinical and surgical consequences. Malnutrition which is common among community-dwelling older adults may be one of these consequences. Malnutrition associated with pooroutcomes including hospitalization and mortality. The relationship between digestive problems and nutritional status in old age is still unclear. It is necessary to investigatethe nutritional status of older adults from the framework of the functionality of digestive system.*
Aim of the study: *to determine the relationship between digestive problems and nutritional status among community dwelling older adults.* ***Materials & method: Research design:****A descriptive correlational research design was followed.* ***Setting:*** *Outpatient clinics in Sharq El Madina Hospital, Alexandria Governorate which affiliated to the Ministry of health, Egypt.****Subjects:*** *consisted of 170 older adults.* ***Tools:*** *Three tools were used for data collection: 1) Socio-demographic and clinical data of older adults structured interview schedule 2) Self- Mini Nutritional Assessment(SF-MNA), and 3) Digestive problems appraisalof older adults structured interview schedule.* ***Results****: the present study findings showed that all the study subjects reportedmild, moderate, or severe digestive problems which are significantly correlated with poorernutritional status* ***Conclusion:****there are statistical significant negative relations between digestive problems among the study subjectsand theirnutritional status.****Recommendations:*** *the gerontological nurses should identify theolder adults' suffering from any digestive problems. They can helpolder adults to deal and cope effectively with these problems in order to improve and maintain their nutritional status and prevent malnutrition.*

Keywords: *digestive problems; nutritional status; older adults; community dwelling; gerontological nurs*e.

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I. Introduction

Digestive problems are common phenomena in old age. They affect more than one half of older adults(1). Digestive problems create a significant load on the health care system. It may induce significant reduction in the amount of eating among older adults with negative nutritional outcomes such as weight loss and weakness. These, in turn, can contribute to other problems such as immobility with all of its consequences(2).

Digestive problems result from both physiological and pathological changes in old age. There is a circle which links between digestive health changes and nutritional status in old age. For example, the significant oral cavity changes with ageing such as teeth loss and presence of gum diseases can make it difficult to chew easilyand limitation of food alternatives to only soft foods. Furtherreduction in saliva production in older adults with less sensitive taste buds may causereduced appetite for food. Difficult swallowing and experience of heart burn caused by weakened esophageal sphincter may limit the amount of food intake. Age related thinning of gastric mucus membrane results in reduced amount of mucus, hydrochloric acid, and digestive enzymes. This in turn, will reduce the digestion of proteins and may give rise to chronic atrophic gastritis. Small intestines also experience atrophy of its walls which alters the villi shape and reduces the available area of absorption. Furthermore, age related decrease in number of pancreaticsecretory cells causes a lower level of fat digestion(3-7).

Other physiological factors that may influence digestive health and food intake in older adults include diminished olfactory, and visual food perception that induce poor food appetite(7).Also, there are significant changes in the hypothalamus, which controls satiety and hunger as well as the function of vital neurotransmitters (8, 9).In addition to these physiological changes, digestive system relatedpathological disorders and the consumption of multiple medications in old age may complicate the existing normal ageing changes of the

gastrointestinal tract. All these factors, alone or together, may lead to reduced food intake and harm the nutritional status of older adults and are likely to play a rolein the occurrence of malnutrition in older adults(10).

Malnutrition is one of the most significant conditions that negatively impact older adults'health and is suggested to predict prematuremortality. Although aging is not certainly accompanied by malnutrition, numerous ageing changes specifically in the digestive system can promote this serious condition(11). WHO states that malnutrition is "the cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions"(12).Malnutrition prevails among 10% of those who aged 60 years and more.Greater than50% of the health care costs among older peopleis related to the management of nutritional problems (4). Malnutrition is akey risk factor for different hospital parameters which includeduration ofhospitalization, complications, death, and expenses.

Digestive system changes, in old age, gradually decrease the ability of the gastrointestinal system to provide the older adults with acceptable levels of nutrients, whichassistinmalnutrition development. Malnutrition, in turn, accelerates the risks for severalsystems pathologies, in particular the musculoskeletal-, nervous-, cardiovascular-, skin, and immune- systems(13). So, in order to avoid malnutrition, gerontological nurses in collaboration with all multidisciplinary team members should develop dietary plans for older adults that built on the incorporation of knowledge on the functionality of the aging digestive system and the older adults' nutritional status(14). Along with limited researches that deal with nutritional problems from the framework of aging gastrointestinal system, the present study aimed to throw light on the relationship between digestive problems and nutritional status among community dwelling older adults.

Aim of the study:

The present study aimed to determine the relationship between digestive problems and nutritional status among community dwelling older adults.

Research question:

What is the relationship between digestive problems and nutritional status among community dwelling older adults?

II. Materials And Method

Materials:

Design:

The study followed a descriptive correlational research design.

Setting:

The study was carried out at the outpatient clinics of Sharq El Madina hospital which is affiliated to the Ministry of Health, Alexandria,Egypt.The hospital is a general hospital with several outpatient clinics of different specialties such as; dentition, ophthalmology, medical, urology, orthopedic, heart disease, and dermatological clinics. The clinics work from Saturday to Thursday from 8 am to 12pm.

Subjects:

The study included 170 older adults who fulfill the following inclusion criteria;

- Aged 60 years and more
- Able to communicate effectively
- Accept participation in the study
- Available at the selected setting during the period of data collection.

Estimation of the sample size was using the EPI info 7.0 program depending on these parameters; population size: 250, possible error 5 %, confidence coefficient 95%, and minimal sample size 158.

Tools:

Three tools were used in the study to collect the necessary data as follows;

Tool I: Sociodemographic and clinical data of older adultsstructured interview schedule:

Researchers developed this tool based on review of related literature to assess the sociodemographic and clinical data of the study subjects as follows;

- Sociodemographic data such as age, sex, marital status, level of education, and place of residence.
- Clinical data includes life style patterns that may affect digestive system health such as current consumption of certain drugs, types of consumed food, eating and drinking habits, practice of exercise, exposure to frequent stressors.

Tool II: Self- Mini Nutritional Assessment (Self-MNA**):**

Self-MNAis a 6 items questionnaire developed by Huhmannetal, 2013[(15)]whichshowssatisfactory inter-rater reliability to evaluate older adults' nutritional status. This questionnaire includes 6 questions related to:

1- Decline in food intake within the past three months. Older adult selects the appropriate response; severe decrease (0), moderate decrease (1), and no decrease. (2)
2- Weight loss within the past three months. Older adult selects the appropriate response which ranges from weight loss greater than 3 kilograms (0) to no weight loss or loss of weight less than one kilograms (3).
3- Older adults' current mobility status. Older adult selects the appropriate response which ranges from inability to get out from the bed or chair without assistance(0) to having the capacity to leave home alone (2).
4- Experience of stress or severe illness within the last three months. Older adult selects the appropriate response, either yes (0) or no (2)
5- Experience of current prolonged severe sadness. Older adult selects the appropriate response which ranges from prolonged severe sadness (0) severe but not prolongedsadness (1),to no severe or prolonged sadness (2)
6- This question contains two elective parts to be completed, and if one of them completed, the other part should not to be answered. **The first part**designed as a chart which contains several readings of weights and heights. After measuring the participants' height, find the participants' height in the left- hand column in the chart. After measuring the participants' weight, go across that row and circle the range of their weight falls into. Then look at the bottom of the chart to find out the group number 0, 1, 2, or 3.

Concerning the **second part**, it includes measuring the size of calf muscle, through looping a tape measure around it. If the reading is less than 31 cm, the older adult will be scored as 0, and will be scored as 3, if the reading is 31cm and more.

The researchers selectedthe second part to be used in the present study.The total score is calculated by summing the scores of all 6 questions. The higher the score, the better nutritional status. The total score is classified into 3 categories as follows;

- Normal nutritional status (12-14 points)
- At risk for malnutrition (8-11 points)
- Malnourished (0-7 points)

Tool III: Digestive problems appraisalof older adults structured interview schedule:

This tool was developed by the researchers based on review of relevant literature to assess the digestive problems among older adults. This tool composed of 59 items which classified into 6 dimensions as follows;

1- **Oral cavity related problems**(5 items) such as, dry mouth, bad odor, difficult chewing, and teeth or gum problems.
2- **Esophagus related problems**(7 items) such as sour taste in the mouth, difficult swallowing, and continuous aspiration
3- **Stomach related problems** (14 items) such as, difficult eructation, feeling with fullness for long period after meals, stomach pain associated with eating, or with psychological problems, and gases accumulation.
4- **Liver and gall bladder related problems**(12 items) such as, fatigue and sleepiness after meals, fluid retention, body odor, and pain in the upper right quadrant of the abdomen.
5- **Pancreas, small, and large intestine related problems** (7 items) such as, constipation, changes in stool characteristics, colon inflammation, and pain in the left upper quadrant of the abdomen.
6- **Other problems associated with gastrointestinal tract disturbances** (14 items) such as joints' swelling, inflammation, difficult weight gain, dry skin and hair, and rapid visual deterioration.

Older adults indicate the degree to which they suffer from each problem (no problem = 0, mild = 1, moderate= 2, severe = 3.

Total score isclassified into four categories as follows;

- No problem: 0
- Mild problem: 1- 59
- Moderate problem: 60- 118
- Severe problem: 119- 177

Method

1. Permission to carry out the study from the responsible authorities of the Faculty of Nursing, Alexandria University was obtained.
2. A letter was issued from the Faculty of Nursing, Alexandria University to the director of the study setting to obtain his approval for data collection.

3. The responsible authorities of the study setting were informed about the purpose of the study, the date and time of data collection.
4. Tool I was developed by the researchers to assess the sociodemographic and clinical data of the study subjects.
5. Tool II was translated into Arabic language by the researchers to be used in assessing the nutritional status of the study subjects.
6. Tool III wasdeveloped by the researchers based on reviewing of related literature to assess the digestive problems of the study subjects.
7. The Arabic version of tool II, and tool III were tested for content validity by three experts in the study field.
8. Tool II, and tool III were tested for reliability. The result of Cronbach's Coefficient alpha was 0.85 for tool II and 0.88 for tool III.
9. A pilot study was carried out on 20 older adults selected from the study setting. They were not included in the study sample. The pilot study was done to assess the applicability and clarity of the tools.
10. Older adults who fulfill the inclusion criteria were interviewed by the researchers individually in the waiting area in the outpatient clinics to collect the necessary data after clarification of the study purpose.

Ethical considerations:
Informed witness consent was obtained from each study subject after clarification of the study purpose. Anonymity and privacy of the study subjects were maintained. Confidentiality of the collected data and the subject's right to withdraw at any time from the study were assured.

Statistical analysis:
Data collected were analyzed by computer using the Statistical Package for Social Sciences (SPSS) software version 20. Reliability of the tools was determined by Cronbach Coefficient alpha. Data were presented by descriptive statistics in the form of frequencies and percentages for qualitative variables, and arithmetic mean, mean percent and standard deviation for quantitative variables.Pearson Correlation Coefficient was used for testing relationship between variables. Significant difference was considered if $p \leq 0.05$.

III. Results

Table 1: Shows the socio-demographic characteristic of the study subjects. The table indicates that the age of the study subjects ranges from 60 years old up to 75 years and more with a mean age of 66.83 ± 5.63. Also, the table indicates that 54.7% are females, 77.1% married, 48.8% illiterate, 45.9% housewives, and 15.9% are current workers. Concerning monthly income, the majority, 86.5%,of the study subjects reported it to be inadequate. Also, 66.5% of the study subjects live in urban areas and 92.9% live with the family and 20.6% reported poor self-evaluation of health.

Table 2: Illustrates the distribution of the study subjects according to their life style pattern which may affect their digestive system health. The table shows that 80.6%, 77.6%, 52.4% of the study subjects eat fried foods, use margarine in food cooking, and eat excessive sweets respectively. Also, drinking caffeine directly after meals, drinking more than 2 times of caffeinated fluids per day and consumption of less than 2L liters of fluid daily are reported by 83.5%, 68.8%, and 77.1% of the study subjects respectively. Moreover, 24.1%, 22.4% of the study subjects do not practice any exercises and suffer from persistent stressors respectively.

Regarding current consumed medications, 57.6%, 35.3%, 28.2%, 27.6% of the study subjects consume the following medications which may affect their digestive system health as follows; anti-inflammatories, antacids, vitamins, and laxatives respectively.

Table 3: Indicates the distribution of the study subjects according to their digestive problems. The table shows that all the study subjects reported either mild49.4%, moderate48.8%, or severe digestive problems1.8% with mean score of 60.48 ± 33.87. For specification, the main digestive problems which reported by the study subjects are as follows;oral cavity related problems 51.61 ± 29.56, esophagus related problems 47.0 ± 3061, and stomach related problems 40.69 ± 26.57.

Table 4: Shows the distribution of the study subjects according to their nutritional status. The table indicates that only 9.4% of the study subjects have normal nutritional status, while the rest are either at risk for malnutrition 51.8%, or actually malnourished 38.8% with a mean score of 8.32 ± 2.06.

Table 5: Illustrates the relationship between socio-demographic characteristics and nutritional status among the study subjects. The table shows that the lower mean percent scores of nutritionalstatus are reported by those who are divorced 7.33 ± 0.58, illiterate 7.87 ± 1.97, unskilled workers 7.14 ± 1.11, and rural residents 7.86 ± 1.51. The differences are statistically significant $p \leq 0.05$.

Fair and poor self-health evaluation are associated with lower mean scores of nutritional status among the study subjects, 7.39 ± 1.22, 7.86 ± 2.06 respectively and the difference is statistically significant P= 0.001.

Table 6: Indicates the relationship between digestive problems and nutritional status of the study subjects. The table shows highly statistically significant negative relations between all of the digestive problems and nutritional status among the study subjects. For illustration, higher score of any digestive problems which indicates increasing problem severity is significantly associated with lower score of nutritional status. These relations are highly significant $p< 0.001$

IV. Discussion

Although it is recognized that malnutrition is a significant problemamong older adults, yet this problem has not been scientifically analyzed from the perspective of the aging gastrointestinal tract[16]. This study aimed to determine the relationship between digestive problems and nutritional status among community dwelling older adults.

The current study findings indicate that study subjects reported either mild, moderate, or severe digestive problems (Table 3). This result may be related to the life style patterns of the study subjects where more than two thirds drink caffeinated fluids directly after meals and more than 2 times per day. Also, they consume less than 2 liters of fluid daily (table 2). Excessive caffeine intake especially after meals directly can endanger stomach lining and affect absorption ofmany nutrients such as iron. The present study result is congruent with what reported by Nwokediuko, 2009 who revealed that there is an association between the use of caffeine-containing substances and the frequency of gastro esophageal reflux [17]. Moreover, digestive problemsamong the study subjects may be caused by inadequate fluid intake (table 2). This is supported by the finding of another studycarried out in 2017 and reported a significant negative effect of low fluid intake on digestive system such as recurrent constipation [18].

Consumption of anti-inflammatory drugsby more than 50% of the study subjects (table 2) may be another reason for the prevalence of digestive problems among them due to their adverse effects and their subsequent stomach discomfort. This result is supported by Sostresetal, 2013 whoindicated that non-steroidalanti-inflammatory drugs increase the liability of gastrointestinal bleeding [19]. Also, consumption of excessive sweetswhich contain few nutrients and contain many simple sugars thatmay stimulate small intestine bacterial overgrowth and increase incidence of tooth decay was reported by greater than half of the study subjects (table 2)Sugar intolerance and malabsorption are reported to be associated with abdominal distension and gas-related problems among older adults in other studies[20, 21]. In addition, use of margarine in cooking and consumption of fried foods by greater than two third of the study subjects may be another possible reasons for digestive problems among them (table 2). Margarine contains hydrogenated oils that entered the cells causing its stiffness and increase activity of free radicals. Moreover, oils used in deep frying are used several times. This causes a breakdown of oil and increases the inflammatory processes throughout the body[22]. The present study finding is in the same line with what was reported by another study that dyspeptic symptomsare correlatedto the consumption offat rich foods [22].The other possible causes of the present study finding are related to physiological and pathological changes in gestational system with advancing age. There are many researches which suggest anassociation between old age and digestive problems such as oral cavity and esophagus relatedchanges which induce greater risk of dysphagia and aspiration [23-27].

The present study finding reveals that study subjects who are divorced are significantly have lower mean scores of nutritional status (table 5). This result can be justified by the fact that divorced study subjects may lack enough motivations and internal power to prepare healthy foods or eat regular meals. Also, they might feel with loneliness and ignore any participation in exercises or recreational activities which are necessary to enhance appetite for eating. Ramicetal,2011 reported that older adults who feel loneliness, and are socially isolated are liable to malnutrition[28].

Illiteratestudy subjects, unskilled workers, or who live in rural areas reported lower mean scores of nutritional status (table 5). These results may be attributed to that study subjects with these characteristics may have poor access to essential knowledge, skills, and finance to maintain good nutritional status. In addition, inadequate monthly income and poor dietary and eating habits may prevail among those who live in rural areas which influence their nutritional status. The present study result is supported by what was reported by other studies [29, 30].At the same time, the relationship betweenthe power of purchasing and food intake was reported by other studies [31, 32].Indeed, older adult may be decisive about food choices if he is financially independent.

Lower mean scores of nutritionalstatus are found to be significantly associated with fair and poor self-rating health among the study subjects (table 5). This result may be due to the actual negative effect of poor nutritional status on the older adults' functional status and quality of life.Malnutrition might beaccompanied with progressive deterioration of health and physical abilities among older adults.The present study result is supported with what was reported by other studies which revealed that functional problems and several co-morbidities were associated with poor nutritional status[33-35].

According to the present study results, the higher percentages of the study subjects reported either malnutrition or risk of malnutrition (table 4). This result may be due that all the study subjects suffer from digestive problems (table 3) which have significant negative relations with nutritional status(table 6).These significant relations can be interpreted by the fact that the cycle of food processing start and happened within the digestive system and any digestive problem will exactly affect the outcomes of this process. For example, older adult who suffer from oral problems are exposed to a higher risk of malnutrition by avoiding nutritious food being difficult to chew. Furthermore, older adults with esophagus related problems are exposed to malnutrition through their attempt to cope with heart burn and gastric reflux by avoiding eating or omitting certain meals as dinner. Also, gastric related problems may be a causative agent of malnutrition due affection of the digestive enzyme secretions. Indeed, poor digestive health will eventually affect the nutritional status of the study subjects. The present study result is in the same line with the results of other studies which revealed that the digestive problems increase the rate and severity of malnutrition through several paths [(36-37)].

V. Conclusion

Based on the present study results, it can be concluded that all of the study subjects reported mild, moderate, or severe digestive problems which are significantly correlated with poorer nutritional status. Highly statistical significant negative relations between digestive problems and nutritional statusamong the study subjects were found.

Recommendations

Based on the findings of the present study, the following recommendations aresuggested:

1- Continuous monitoring of digestive problems among older adults and proper management of it by the gerontological nurses is essential to maintain good nutritional status in old age.
2- The gerontological nurses should teach older adults the necessary healthy life style patterns such as, heathy eating habits, practice of exercises,oral hygieneand periodichealth checkup to prevent and manage any digestive problems.
3- Assessment of nutritional status must be carried out by the gerontological nurses relying on simple, reliable, and validated tools. Sorting ofolder adults' status either at risk of malnutrition, malnourished or normal nutritional status should be done.
4- When a risk of malnutrition is detected, it is essential to include a nutritional support with measures for the controlling of all risk factors considering the capacity and functionality of the senescent digestive system.
5- Managing nutritional problems among older adults should involve a multidisciplinary team to provide proper assessment and treatment of digestive problems and other underlying causes.

The future researches in this field could include:

Studies are needed to determine the effect of self-care interventions for managing digestive health problemson the nutritional status of older adults.

Table (1): Distribution of the study subjects according to their socio–demographic characteristics

Sociodemographic characteristics	**No=170**	**Frequency %**
Age in years		
60-	61	35.9
65 – 75	87	51.2
≥75	22	12.9
Mean ± SD.	66.83 ± 5.63	
Sex		
Male	77	45.3
Female	93	54.7
Marital status		
Married	131	77.1
Widow	36	21.1
Divorced	3	1.8
Educational level		
Illiterate	83	48.8
Read and write	36	21.2
Basic education	13	7.6
Secondary education	20	11.8
University education	18	10.6
Occupation prior to retirement		
House wives	78	45.9
Employee	39	22.9
Unskilled workers	37	21.8
skilled workers	16	9.4
Current work status		
Yes	27	15.9
No	143	84.1
Monthly income		
Enough	23	13.5
Not enough	147	86.5
Place of residence		
Urban	113	66.5
Rural	57	33.5
Living style		
With family	158	92.9
Alone	12	7.1
Self-evaluation of health		
Very good	23	13.5
Good	74	43.5
Fair	38	22.4
Poor	35	20.6

Table (2): Distribution of the study subjects according to their life style patterns that may affect their digestive health

Life style patterns	**No= 170**	**Frequency %**
Type of consumed food#		
Fried food	137	80.6
Margarine	132	77.6
Excessive sweets	89	52.4
Soft drinks (e.g, cocca)	80	47.1
Smoking	51	30.0
Luncheon meats	26	15.3
Eating, and drinking behaviors#		
Caffeinated fluids directly after meals	142	83.5
Less than 2L of fluid per day	131	77.1
Caffeine more than 2 times	117	68.8
Improper food mastication	107	62.9
Pickles	105	61.8
Very hot food or fluids	87	51.2
Irregular meals	74	43.5
Lack of exercises	41	24.1
Exposure to persistent stressors	38	22.4
Current consumed medications#		
Ant inflammatory	98	57.6
Antacids	60	35.3
Vitamins	48	28.2
Laxatives	47	27.6
Antibiotics	35	20.6
Aspirin	28	16.5
Corticosteroids	9	5.3

#more than one answer were given

Table (3): Distribution of the study subjects according tothe type and severity of digestive problems

Digestive problems	**N= 170**	**Frequency %**
Severity of digestive health problems		
Mild	84	49.4
Moderate	83	48.8
Severe	3	1.8
Type of digestive health problems	**Mean ± SD**	**Mean percent score**
1. Oral cavity related problems	7.74± 4.43	51.61± 29.56
2. Esophagus related problems	9.87± 6.43	47.0± 30.61
3. Stomach related problems	17.09± 11.16	40.69± 26.57
4. Pancreases, small and large intestine related problems	7.50± 4.62	35.71± 21.99
5. Other problems associated with GIT disturbances	11.86± 7.27	28.25± 17.30
6. Liver and gall bladder related problems	5.92± 4.31	16.44± 11.97

Table (4):Distribution of the study subjects according to their nutritional status

Nutritional status	**No= 170**	**Frequency %**
Malnutrition	66	38.8
At Risk for malnutrition	88	51.8
Normal nutritional status	16	9.4
Mean ± SD.	8.32 ± 2.06	

Table (5):Relationship between socio demographic characteristics and nutritional status of the study subjects

Socio demographic characteristics	Nutritional status Mean ± SD.	Test of sig.	p
Age in years			
60 -	8.28 ± 1.99		
65 – 75	8.44 ± 2.26	F=0.495	0.610
≥75	7.95 ± 1.33		
Sex			
Male	8.53 ± 2.38	t=1.205	0.230
Female	8.14 ± 1.75		
Marital status			
Married	8.53 ± 2.19		
Widow	7.64 ± 1.38	F=3.045*	0.049*
Divorced	7.33 ± 0.58		
Educational level			
Illiterate	7.87 ± 1.79		
Read and write	8.67 ± 1.85		
Basic education	8.23 ± 1.36	F=5.271*	0.001*
Secondary education	8.0 ± 1.97		
University education	10.11 ± 3.03		
Occupation prior to retirement			
Employee	9.33 ± 2.50		
House wives	8.33 ± 1.90	F=8.200*	<0.001*
Skilled workers	8.50 ± 2.07		
Unskilled workers	7.14 ± 1.11		
Current work status			
Yes	8.41 ± 2.27	t=0.246	0.806
No	8.30 ± 2.02		
Monthly income			
Enough	8.57 ± 2.13	t=0.619	0.537
Not enough	8.28 ± 2.05		
Place of residence			
Urban	8.55 ± 2.26	t=2.364*	0.019*
Rural	7.86 ± 1.51		
Living style			
With family	8.20 ± 1.93	t=1.848	0.090
Alone	9.83 ± 3.01		
Self-evaluation of health			
Very good	9.09 ± 2.02		
Good	8.77 ± 2.22	F=5.852*	0.001*
Fair	7.39 ± 1.22		
Poor	7.86 ± 2.06		

t, p: t and p values for **Student t-test**
F,p: F and p values for **ANOVA test**
*: Statistically significant at $p \leq 0.05$

Table (6): relationship between digestive problems and nutritional status of the study subjects

Digestive health problems	Nutritional status	
	R	p
1.Oral cavity related problems	-0.360*	<0.001*
2. Esophagus related problems	-0.497*	<0.001*
3. Stomach related problems	-0.519*	<0.001*
4. Liver and gall bladder related problems	-0.394*	<0.001*
5. Pancreases, small and large intestine related problems	-0.473*	<0.001*
6. Other problems associated with GIT disturbances	-0.473*	<0.001*
Total	-0.540*	<0.001*

r: Pearson coefficient
*: Statistically significant at $p \leq 0.05$

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