



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research  
Vol. 8, Issue, 7, pp. 18707-18711, July, 2017

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Research Article

### NUTRITIONAL STATUS AND FOOD CONSUMPTION PATTERNS AMONG ULCERATIVE COLITIS PATIENTS

**Manisha Verma<sup>1\*</sup>, Meena Godhia<sup>2</sup>, Akash Shukla<sup>3</sup> and Shobna J Bhatia<sup>4</sup>**

<sup>1</sup>Diploma in Clinical Nutrition and Dietetics, Sir Vithaldas Thackersey College of Home Science (Autonomous), SNDT Women's University, SNDT Vidyavihar Juhu, Mumbai- 400 049, India

<sup>2</sup>Department of Food, Nutrition and Dietetics, Sir Vithaldas Thackersey College of Home Science (Autonomous), SNDT Women's University, SNDT Vidyavihar, Juhu, Mumbai- 400 049, India

<sup>3</sup>39 BK Sindhi Society, Shanker Lane, Varahi Mata Mandir, Kandivli (W), Mumbai-400 067, India

<sup>4</sup>Department Of Gastroenterology, Seth GS Medical College and KEM Hospital, Acharya Donde Marg, Parel, Mumbai 400012, India

DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0807.0553>

#### ARTICLE INFO

##### Article History:

Received 17<sup>th</sup> April, 2017

Received in revised form 21<sup>th</sup>

May, 2017

Accepted 28<sup>th</sup> June, 2017

Published online 28<sup>th</sup> July, 2017

##### Key Words:

Ulcerative Colitis, Anthropometry, Food Intake And Self-Imposed Dietary Restrictions, Malnutrition

#### ABSTRACT

Nutritional status of 50 confirmed ulcerative colitis patients (22 men, age 34.7 years) was assessed using anthropometric data (body mass index [BMI], mid upper arm circumference [MUAC], skin fold thickness [SFT], biochemical profile, detailed clinical history and diet history using dietary recall and food frequency questionnaire. Mean BMI was 19.5±4 kg/m<sup>2</sup>, MUAC 22.8±3.8cm, SFT 14.4±3mm. BMI was <16 in 10 patients. The daily caloric intake for men and women was 2148±599kcal/day and 1893±389 kcal/day, proteins 70.7±30.1g/day and 57.8±14.9g/ day respectively, while Kcal/kg intake was 40.1±9.7 and 42.7±11.6 and proteins/kg was 1.3±0.5 and 1.3 ±0.4gm, respectively. BMI correlated with carbohydrate intake (p=0.01), calories/kg (p=0.00) and proteins/kg (p=0.05). MUAC correlated with number of meals consumed (p=0.01), fat intake (p=0.02) and kcal/kg (p=0.04), albumin (p=0.04) and frequency of patient kept fasting (p=0.00). SFT correlated with protein intake (p=0.04). BMI, MUAC and SFT did not correlate with duration of disease, number of relapses, disease activity and extent of disease. 38 patients had self imposed dietary restrictions (Milk 18, spicy foods 34, non vegetarian 11, oily foods 10, and other foods 11). Most patients with ulcerative colitis are malnourished.

**Copyright © Manisha Verma et al 2017**, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

#### INTRODUCTION

The clinical features of ulcerative colitis and Crohn's disease are food intolerances, diarrhea, fever, weight loss, anemia, malnutrition, growth failure and extra intestinal manifestations (arthritic, dermatologic and hepatic). Food allergies and other immunologic reactions to specific foods have been considered in the symptoms, pathogenesis and the potential to worsen symptoms of inflammatory bowel disease (IBD).

Persons with IBD are at a risk for several forms of malnutrition which compromises digestive and absorptive function and may increase the permeability of the gastro intestinal to potential inflammatory agents. Maldigestion, malabsorption, drug nutrient interactions and inability of patient to eat a complete

diet requires supplemental vitamins, minerals and trace elements. Diarrhea can aggravate losses of zinc, potassium, selenium stores in particular.

Malnutrition can affect the function and effectiveness of the mucosal, cellular and immune barriers and diet can affect the type and relative composition of the resident microflora. Persons with IBD are at increased risk of nutritional problems for a host of reasons related to disease and its treatment. Diet and specific nutrients may play a role in maintaining or bringing on the remission of IBD. So, timely nutritional support is a vital component of therapy to restore and maintain nutritional health. Thus the primary goal is to restore and maintain the nutritional status of the individual patient. (Peter L. Beyer. 2008)

\*Corresponding author: **Manisha Verma**

Diploma in Clinical Nutrition and Dietetics, Sir Vithaldas Thackersey College of Home Science (Autonomous), SNDT Women's University, SNDT Vidyavihar Juhu, Mumbai- 400 049, India

## METHODS

A cross sectional study was carried out in King Edwards Memorial Hospital (KEMH), one of the most reputed and largest Government Hospital located in South Mumbai, Parel; India. Patients who visited gastroenterology department (in and out patients), with ulcerative colitis confirmed by gastroenterologist (n=50) were enrolled for the present study. Ethical permission was granted by the committee for academic research ethics - Seth GS Medical College and KEMH and informed, written consent was obtained from the patients.

### Inclusion Criteria

Patients with confirmed ulcerative colitis, diagnosed on basis of endoscopic examination and histological confirmation by the gastroenterologist (Semnani et al, 2008 and Lippincott Williams and Wilkins 2007) between the age group of 18- 60 years, and patients willingness to participate in the study were included.

**Exclusion Criteria:** Children, adolescents, pregnant women, bed ridden patients, handicapped patients and elderly patients above 60 years of age.

Nutritional status was assessed using anthropometric measurements (height, weight, mid upper arm circumference [MUAC], skin fold thickness [SFT]) using standardized techniques (Jelliffe 1996). Nutritional status was assessed using dietary recall and food frequency questionnaire. Selected food items like nuts, milk and its products, non vegetarian foods, vegetables, fruits, oil, processed bakery products and fast foods were included in the FFQ to find for any food intolerances.

During the dietary recall interview amount of fluid intake, recent changes in fluid intake, beverages tolerated and not tolerated were asked. Data regarding oral ulcers, recent weight and appetite changes, food allergies, and dietary changes due to disease were obtained. Information regarding food habits along with the number of meals per day, consumption of milk, spicy foods and foods which were consumed before the diagnosis of UC, stress and functional capacity were gathered.

The patients were interviewed using self-designed questionnaire which was first validated. Information such as like name, age, sex, address, occupation, ethnic background, educational status, and type of family, number of family members, monthly family income and family history of UC. Investigation files of each subject were studied and detailed medical history, clinical history, present medications administered, detailed clinical history (lag in diagnosis, age of diagnosis, age at which symptoms appeared, no. of times the patient was hospitalized, no. of exacerbations, no. of endoscopic procedures, total no. of days of hospitalization, no. of times kept nil by mouth, frequency of bowel movements, baseline and present frequency of stools, nocturnal frequency, gastro colic reflux and disease activity) and extra intestinal manifestations (skin, joints, biliary, eyes) were asked to the patients. Data related to the lifestyle habits was also collected. After data collection nutritive intake was calculated using the Nutritive Value of Indian Foods (NIN), 2004. The diet recall for macronutrients was calculated in terms of energy in kilocalories (kcal), kilocalories per kg body weight, and total macronutrients was calculated. proteins (g) proteins in g/ kg body weight, carbohydrate content in grams and fat in grams

and the percent nutritive intake of macronutrients was compared of all the subjects while the nutritive value of macronutrients for the dietary recall was then compared with the Recommended Dietary Intake (RDI). (Gopalan et al, 2004). All UC patients were asked to complete a two- sectioned preformatted questionnaire in the languages which were understood by the patients (English, Hindi and Marathi) which included questions regarding disease awareness and general opinion and views about the disease. Data were analyzed with the statistic of package for Social Sciences (SPSS Version 16) program.

## RESULTS

Of the 50 patients recruited 28 were female and 22 were male. The average age (range/ mean) was 38 years (34.70 ± 9.90) with minimum age being 18 and maximum 56 years.

Patients visiting KEM Hospital are mostly low income group; since KEM caters low income and the below findings are not surprising. Mumbai is a metropolitan city, 60% of the study group belonged to the nuclear family background and 40% lived in a joint family. The educational level of 62% subjects was up to Secondary level (X<sup>th</sup> standard). Education influences family income and as to be expected, 1/3 rd of the subjects educational level was poor so the monthly family income of 48% subjects was 5,000. However, no study on Asian Indian has been done to determine the educational and family income of ulcerative colitis patients.

The predominant form of Ulcerative colitis was left sided colitis which affected 40% (n=20) of the studied patients. The most extensive form (pancolitis) was present in 18% (n=9); rectosigmoidocolitis in 26% (n=13) and proctitis in 16% (n=8). Hindus were predominant 88% as compared to Muslims 12% which is similar to disease prevalence as reported by Sood Aji, V Midha et al, 2003.

**Table 1** Baseline Characteristics of Ulcerative Colitis Patients

Anthropometric Data	n=50 (mean ± sd)	
	Male	Female
Height (cms)	166.13 ± 5.76	154 ± 6.56
Weight (kgs)	54.40 ± 12.64	46.05 ± 9.96
Body Mass Index [BMI] (kg/m <sup>2</sup> )	19.63 ± 3.99	19.45 ± 4.20
Skin Fold Thickness (triceps) [SFT] (mm)	14.90 ± 3.99	13.96 ± 3.36
Mid Upper Arm Circumference [MUAC] (cms)	22.79 ± 4.32	22.73 ± 3.50

**Table 2** Prevalence of Malnutrition in Ulcerative Colitis Patients

BMI Classification *	Normal Values (kg/m <sup>2</sup> )	Male n =22 (%)	Female n =28 (%)
Severe underweight	< 16.00	5 (10)	5 (10)
Moderate underweight	16.00 – 18.99	5 (10)	11 (22)
Normal	19.00 – 22.99	6 (12)	6 (12)
Overweight	23.00- 24.99	4 (8)	1 (2)
Obese	>25.00	2 (4)	5 (10)
Parameter **	Normal values	n =subjects	Mean ± standard deviation
Hb (g)	11-15	41	10.62 ±1.72
Total Proteins (g %)	6.0-7.5	39	6.33 ± 1.10
Serum Albumin (g %)	3.0-5.0	39	3.24 ± 0.89
Globulin (g %)	2.5-3.5	50	2.40 ± 1.47
Creatinine (mg %)	1-2	28	0.97 ±0.60

(\* WHO, 2004), (\*\* Handbook of Nutrition and Food, 2002)

The average height (cms) if males compared to females was (166 vs 154); weight (kgs) was (54 vs 46), Body Mass Index (BMI- kg/m<sup>2</sup>) was (19.63 vs 19.45), Skin Fold Thickness (SFT-mm) was (14 vs 13) and Mid Upper Arm Circumference (MUAC- cms) was 22. Values of MUAC and SFT were less than standard in 48 and 29 patients, respectively.

It was observed that 6 subjects each from male and female had normal BMI, while 5 subjects each from male and female were severely underweight; 5 male and 11 female subjects were moderately underweight. The remaining 5 subjects overweight while 7 were obese. The biochemical profile of all the subjects could not be obtained. The mean hemoglobin was 10.62 ± 1.72; out of 41 subjects, 24 had low Hb (<11g). Out of 39 subjects, the mean for total proteins and albumin (g %) was 6.33 ± 1.10 and 3.24 ± 0.89. the mean for globulin (g %) was 2.40 ± 1.47 (n=50) and for creatinine (mg %) was 0.97 ± 0.60 for 28 subjects.

**Table 3** Detailed Clinical History of Ulcerative Colitis Patients

n=50	
Clinical History	Mean ± standard deviation
Age at which symptoms appear (yrs)	29.93 ± 8.714
Age of diagnosis (yrs)	30.73 ± 8.799
Lag in diagnosis (yrs)	0.84 ± 1.279
No. of exacerbations (times)	1.5 ± 1.832
Total no. of times the patient was hospitalized since diagnosis	1.5 ± 1.832
Total no. of days of hospitalization	19.34 ± 26.83
Total no. of days kept nil by mouth	0.48 ± 2.092
Frequency of bowel movements (blood/ mucous)	2.14 ± 0.92
Frequency of stools at presentation (at diagnosis) (times)	5.14 ± 5.52
Present frequency of stools (times)	4.60 ± 2.68

The mean age at which symptoms appeared and confirmed diagnosis was 29.93 and 30.73 years. The time elapsed between appearance of symptoms and confirmed diagnosis i.e. lag in diagnosis was 0.84 (8 months approximately). Mean for no of exacerbations and total no of times of hospitalization was same 1.5 times. Mean frequency of passing stools at diagnosis was 5.14 times while present frequency of stools was 4.60 times which varied with frequency of bowel movements (blood/mucous) 2.14.

**Table 4** Association of Energy Intake (Diet) with Anthropometric Details

BMI and Dietary Parameters			
Parameter/ day	BMI <19	BMI ≥ 19	P value
Calories (Kcals)	1728 (368)	2083 (512)	0.03
Carbohydrates (gms)	246 (71)	313 (86)	0.01
Proteins (gm)	52.6 (16.1)	66.5 (24.5)	0.08
Proteins / kg	1.3 (0.5)	1.4 (0.4)	0.04
Kcals/ kg	45.1 (8.7)	40.1 (11.1)	0.001
MUAC and Dietary Parameters			
Parameter/ day	Low MUAC	Normal MUAC	P value
Calories (Kcals)	2004 (510)	2042 (383)	0.92
Carbohydrates (gms)	296 (88)	344 (60)	0.45
Proteins (gm)	63.4 (23.9)	65 (14.1)	0.92
Proteins / kg	1.3 (0.5)	1.2 (0.4)	0.29
Kcals/ kg	41.9 (10.7)	30.9 (9.0)	0.15
SFT and Dietary Parameters			
Parameter/ day	Low SFT	Normal SFT	P value
Calories (Kcals)	1889 (492)	2179 (479)	0.045
Carbohydrates (gms)	279 (87)	327 (81)	0.053
Proteins (gm)	58.5 (24.2)	70.9 (20.7)	0.068
Proteins / kg	1.3 (0.5)	1.3 (0.4)	0.0954
Kcals/ kg	42.7 (11.4)	40.6 (9.9)	0.826

**Table 5** Extent of Prevalence of Disease Factors among Ulcerative Colitis Patients

Parameters	n= 50 (%)	Parameters	n= 50 (%)
Nocturnal frequency	56	Recent Fluid Changes	
Gastro colic reflux	46	Increased	22
Type of bowel movements		Decreased	4
Mucous	4	No change	74
Blood + mucous	38	Recent Weight Changes	
Blood	26	Increased	24
none	32	Decreased	44
Disease Activity (Truelove and Witt's Criteria)		No change	32
Mild	48	Recent Appetite Changes	
Moderate	28	Increased	8
Severe	24	Decreased	68
Extra Intestinal Manifestations		No change	24
Skin	0	Patients Appetite Condition	
Joints	66	Good	24
Biliary	2	Doesn't feel like eating	8
Eyes	7	No urge to eat	68
Mouth	10		

Various prevalence of disease factors was considered in the present study; 56% had nocturnal frequency while 46% had gastro colic reflux. Blood + mucous was present in 38% of subjects bowel movements. Severe disease activity was seen in 24% subjects. Many extra intestinal manifestations were seen in ulcerative colitis patients; out of that 66% had joints related problems. No change in fluid intake was seen in 74% subjects. 44% had a decrease in their weight while 68% had decreased appetite and no urge to eat.

**Table 6** Food Allergies, Foods That Disagree and Kind of Food Eaten Before Diagnosis by Ulcerative Colitis Patients

Food Items	Food allergies		Foods that disagree		Before diagnosis kind of food eaten	
	n=50					
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Milk	2 (4)	48 (96)	16 (32)	34 (68)	8 (16)	42(84)
Curd	0 (0)	50 (100)	1 (2)	49 (98)	3 (6)	47 (94)
Egg	0 (0)	50 (100)	0 (0)	50 (100)	30 (60)	20 (40)
Fish	1 (2)	49 (98)	3 (6)	47 (64)	33 (66)	17 (34)
Chicken	1 (2)	49 (98)	4 (8)	46 (92)	36 (72)	14 (28)
Mutton	1 (2)	49 (98)	4 (8)	46 (92)	35 (70)	15 (30)
Pickle	2 (4)	48 (96)	9 (18)	41 (82)	44 (88)	6 (12)
Papad	2 (4)	48 (96)	9 (18)	41 (82)	44 (88)	6 (12)
Khari, toast	0 (0)	50 (100)	0 (0)	50 (100)	22 (44)	28 (56)
Bread, pav	0 (0)	50 (100)	1 (2)	49 (98)	32 (64)	18 (36)
Sev, panipuri, samosa, vadapav	1 (2)	49 (98)	9 (18)	41 (82)	40 (80)	10 (20)

An attempt was made with selective food items which are implicative as causative factors in the Food frequency questionnaire (FFQ). No specific allergy was reported by any subjects. With milk, pickle and papad 2 subjects had allergy. 16 (32%) disagreed with milk while 9 (18%) disagreed with pickle, papad and sev, panipuri, samosa, vadapav. Intake of non vegetarian foods was found to be higher before diagnosis. The kind of food eaten after confirmed diagnosis of ulcerative colitis showed that there was decrease in the consumption of milk and its products; non vegetarian foods; processed bakery products and fast foods.

**DISCUSSION**

Ulcerative Colitis (UC) is a chronic, relapsing mucosal disorder that extends in continuous fashion proximally from the rectum

and is limited to the colon. (Magee A Elizabeth et al, 2005) Predominance of gender is controversial as few studies report slight predominance in females. According to a study in Northern India it was found that prevalence of female was more than men. Khosla has shown recently that the prevalence of UC in Northern India is 43/10<sup>5</sup> for men and 48/10<sup>5</sup> for women and is comparable with European studies. (Semnani et al, 2008) (Probert C, Jayanthi et al, 1992)

While studies suggest that UC primarily affects young adults between the age group of 20 - 40 years but may be present at all ages. (Jewell P Derek, 2002), (M J Carter, A J Lobo et al, 2004)

According to NIN the average weight of male is 60 kgs and that of female is 50 kgs. While in the present study the weight was found to be less when compared to ICMR, 1989 for both the genders. BMI entirely depends upon height and weight. The mean BMI in the present study of male was found 19.63 ± 3.99 and that of female was 19.45 ± 4.20 (normal=19.00- 22.99 kg/m<sup>2</sup>). (WHO, 2004). The standard SFT for male is 12.5 mm and 16.5 mm for female. (Jelliffe, 1966) According to the results males were having a higher SFT than females compared to standard values. MUAC is a tool used for measuring nutritional status. According to Jelliffe, 1966; the standard MUAC for male is 29.3 cms and 28.5 cms for females. In the present study, MUAC of both the genders was less compared to standard values. This clearly indicates that UC patients were malnourished.

BMI is a standard tool for determining the nutritional status of subjects. The common symptoms of ulcerative colitis are weight loss due to decreased appetite and are also often malnourished. The study results showed that around 50% of the subjects were below the normal values (were underweight). (WHO, 2004)

The common symptoms of ulcerative colitis are rectal bleeding, diarrhea (i.e. bloody diarrhea) anorexia and nausea. (Jewell P Derek, 2002), (Lippincott Williams & Wilkins, 2007) Loss of blood in the stools leads to low hemoglobin levels (anemia), which was also been observed in the present study. Diarrhea leads to electrolytes, proteins and albumin loss. Patients may become anorectic and nauseated and in severe attacks, may vomit. These symptoms, as well as protein loss through inflamed mucosa; hyper catabolism and down- regulation of albumin synthesis caused by the inflammation, account for weight loss and hypoalbuminemia. (Jewell P Derek, 2002) However researches have not been done to find any association between the levels of globulin, creatinine and ulcerative colitis patients.

Nocturnal frequency is incontinence during the night. The gastro colic reflex is partly a neurogenic process in which there is an increase in colonic motility, triggered by eating, when food passes from the stomach into the upper part of the small intestine. Thus, this reflex is responsible for the urge to defecate following a meal. These symptoms are commonly observed in ulcerative colitis patients. But no research data is available to find the association of these in ulcerative colitis patients.

Diarrhea is often associated with passing large quantities of mucus, often with blood and pus. Patient with proctitis often

passes, and may even be incontinent of, a blood stained mucus. When the disease is severe, patients pass liquid stool containing blood, pus, mucus and fecal matter. (Jewell P Derek, 2002), (Lippincott Williams & Wilkins, 2007) However no such study has been conducted to find the percentage of patients passing blood or mucous or blood with mucous or none of the things.

According to Truelove and Witt's severity of disease can be assessed / ascertained by various criteria. Mild activity- fewer than four stools daily, with or without blood, moderate- more than four stools daily but with minimal systemic disturbance or more than four stools daily but with minimal signs of toxicity and severe- more than six stools daily with blood and with evidence of systemic disturbance, or an ESR greater than 30 or more than six bloody stools daily.

Patients with UC are at higher risk for developing a number of secondary conditions, including osteoporosis, liver disease, skin, mouth, eye diseases etc.

Secondary manifestations related to skin occur in 2-4% of patients. Around 12-15% of patients have joints problems; the major liver complication of UC is primary sclerosing cholangitis (PSC), which occurs in approximately 3% of all patients. Episcleritis or anterior uveitis occurs in 5% to 8% of patients with active colitis. And oral ulcers in approximately 10% of patients experiencing an acute flare up and rapidly resolve once the disease goes into remission. (Jewell P Derek, 2002)

The common signs and symptoms of ulcerative colitis patients are abdominal pain (cramping), fever all these leads to weight loss in more severe cases and finally causes decrease in appetite especially during periods of disease exacerbation. (Kathleen A and Julie S, 2003) But none of the studies specifies to find if ulcerative colitis patients have changes in fluid intake, weight and appetite changes.

The kind of food eaten after confirmed diagnosis of ulcerative colitis showed that there was decrease in the consumption of milk and its products; non vegetarian foods; processed bakery products and fast foods.

Majority of patients were consuming non vegetarian foods 43 (86%) and remaining were vegetarian 7 (14%). Magee Elizabeth and H Tilg et al have reported that there is a strong relationship between a dietary factor and an increased risk of relapse when high intake of meat, particularly of red meat and processed meat are consumed. 16 felt that disease worsened with milk and 9 with spices.

Restrictions of food intake were observed by subjects though 12 subjects reported no dietary restrictions. Milk was restricted by 18 subjects, spicy foods 34, non vegetarian 11; oily foods 10, maida products 3 and 8 subjects restricted other foods. Half the equal number of patients represented with subjective stress. Functional capacity means ability to do activities on their own. Functional capacity of 19 subjects was normal; 16 had slightly impaired capacity; 7 subject's activities were restricted and 8 subjects were unable to work.

Most of the patients were aware of the disease, though most of them 36 (72%) felt that their fate is responsible for the disease. Most of the patients agreed to know more about the disease. Due to the disease 40 (80%) subjects education was affected.

Most of the subjects stopped or decreased the medications on their own when symptom free and resorted to other treatment modalities (homeopathy, ayurveda, indigenous and multiple therapies). With respect to causes of relapse 22 % felt it was due to poor compliance. There was no fear of interview in the patients on follow up while 72 % feared sigmoidoscopy.

## CONCLUSION

The exact cause of ulcerative colitis is unclear; clinical, animal, and epidemiological studies have clearly demonstrated that ulcerative colitis is caused because of genetic changes, infections, Immune responses to bacterial which are not modifiable. So, attention was focused on factors that may be more amenable to change, with consequent reduction in relapse of ulcerative colitis patients. In this context, there is considerable interest in the possible associations between ulcerative colitis and dietary factors along with lifestyle habits. Hence the purpose of this study was to determine whether dietary and non dietary factors acts as a causative in ulcerative colitis patients along with diet anthropometric parameters too were taken in consideration as a potential to identify mal nutritional status.

Malnutrition correlates with dietary factors and not with most disease-related factors. Most patients impose dietary restrictions on themselves.

## Bibliography

1. Peter L. Beyer. (2008). "Medical Nutrition Therapy for Lower Gastrointestinal Tract Disorders" in, L. Kathleen Mahan (eds). Krause's Food and Nutrition Therapy. Chapter 27, pp 689-695.
2. SemnaniSh, AzarhouSh *et al.* (2008). "Inflammatory Bowel Disease (IBD) in Northeast of Iran", *Journal of Clinical and Diagnostic Research*, Apr; 2(2):731-734.
3. Lippincott Williams and Wilkins. (2007). "Differentiating Ulcerative Colitis from Crohn Disease in Children and Young Adults: Report of a Working Group of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the Crohn's and Colitis Foundation of America", *Journal of Pediatric Gastroenterology and Nutrition*, 44:653-674.
4. Boa Raton. (2002). "Anthropometric Assessment in Adults" in, Berdanier Carolyn (eds). Handbook of Nutrition and Food. Chapter 33, pp 695-707.
5. Gopaldas *et al.* (1987). "Nutrition Monitoring and Assessment", Delhi Oxford University Press.
6. Derrick B Jelliffe. (1966). The Assessment of Nutritional Status of the Community, WHO Monograph Series no- 53, WHO, Geneva.
7. Boa Raton. (2002). "Dietary intake Assessment: Methods for Adults" in, Berdanier Carolyn (eds). Handbook of Nutrition and Food. Chapter 19, pp 477-481.
8. Gopalan *et al.* (2004). "Proximate Principles: Common Foods", Nutritive Value of Indian Foods, pp 47-58.
9. SoodAjit, V Midha *et al.* (2003). "Incidence and Prevalence of ulcerative colitis in Punjab, North India", *Gut*. Vol 52, pp 1587-1590.
10. Magee A Elizabeth, Laurie M Edmond, Shiona M Tasker, San Choon Kong *et al.* (2005). "Associations between diet and disease activity in ulcerative colitis patients using a novel method of data analysis", *Nutrition Journal*. Vol 4:7, pp 1-8.
11. Probert C S J, V Jayanthi *et al.* (1992). "Epidemiological study of Ulcerative proctocolitis in Indian Migrants and the indigenous population of Leicestershire", *Gut*. Vol 33, pp 687-693.
12. Jewell P Derek. (2002) "Ulcerative Colitis" in Feldman Mark, Lawrence Friedman, Sleisenger Marvin (eds). Gastrointestinal and Liver Disease- pathophysiology, diagnosis, management. Seventh Edition, pp 2039-2067.
13. M J Carter, A J Lobo *et al.* (2004). "Guidelines for the management of inflammatory bowel disease in adults", *Gut*, 53 (Suppl V):v1-v16.
14. Kathleen A and Julie S. (2003). "Inflammatory Bowel Disease Part I: Ulcerative Colitis Pathophysiology and Conventional and Alternative Treatment Options", *Alternative Medicine Review*, Volume 8, Number 3, pp 247-283.

### How to cite this article:

Manisha Verma *et al.* 2017, Nutritional Status And Food Consumption Patterns among Ulcerative Colitis Patients. *Int J Recent Sci Res.* 8(7), pp. 18707-18711. DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0807.0553>

\*\*\*\*\*