

Assessment of Knowledge, Perception and Practice of Final Year Pharmacy and Medical Students about Nutrition

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ABSTRACT

Background: The objectives of this study were to ascertain the knowledge, attitude and practice about nutrition and to estimate the nutritional supplement consumption in health science students.

Method: A cross-sectional study was conducted in Pharmacy and Medical institutes of Lahore, Pakistan by using previously validated questionnaire. To recruit a sample of 350 students from different Medical & Pharmacy colleges, total 500 students were approached during the study period.

Results: There was no correlation among knowledge, attitude or practice. The response rate of knowledge was equal in both Pharmacy and Medical students. Out of 350 students, majority were females 259 (74%), from age group above 23 years i.e., 197 (66.3%), have normal BMI i.e., 269 (76.9%), family income more than 20 k i.e., 307 (88.7%) and have annual education system 275 (78.6%). Mostly were from urban areas 292 (83.4%) and did not consume any nutritional supplement i.e., 201 (57.4%).

Conclusion: Overall most of the students were aware of the importance of dietary supplements to maintain good health but there was lack of practice in daily appointments. Also, there was dearth of knowledge about TPN, especially regarding calculations of different variables.

Keywords: Nutrition; TPN; Supplements; Knowledge; Perception

Abbreviations: BEE: Basal Energy Expenditure; TPN: Total Parental Nutrition; BMI: Body Mass Index

INTRODUCTION

Nutrition is a science that concerns with nutrients and intake of them. British Nutrition Foundation defined nutrition as “The study of constituents of food, the way in which body utilizes them, and the correlation among food, health and disease” [1]. Diet and nutrition play a vital role in the maintenance of good health. Dietary supplements that are used to upgrade the nutritional contents of the diet includes: Vitamins (e.g. vitamin A, Vitamin B etc.), Minerals (Na⁺, K⁺, Ca²⁺, etc.), Herbs, Natural food supplements and other botanicals [2]. Dietary supplements are important source of nutrients and provide various health benefits, including chronic disease prevention [3]. However, frequent use of nutritional supplements may lead to several adverse effects like gastrointestinal and neurological disturbances, hepatic insufficiency, birth defects

and drug interactions [4]. Nutrition is an important aspect across the life cycle and just like an umbrella surrounds various research areas. In 2005, the study on Chinese students revealed that only minority of students (7%) had the healthy diet practice while majority (51%) showed their interest to know about healthy diet [5]. Likewise, in 2005, a study conducted on Swedish University students showed that female had healthier habits despite being more susceptible to stress. On the other hand, male students were obese, physically inactive, engaged in alcohol consumption and had less interest in nutritional advice [6]. In Pakistan, the study on Karachi University students to assess the knowledge, attitude and practice of nutrition between two different groups i.e., medical and non-medical showed that superior knowledge of students about nutrition and healthy life style did not necessarily result in to better practices due to barriers i.e., lack of time and work related stress

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[7]. As a health care practitioner, Pharmacists are in best position to play an important role in nutrition care and educate public regarding nutrients consumption and physical activity to prevent the development of diseases [8].

There is need to study the current food taking habits in a given population to determine the knowledge, attitude and practice; so as to plan an efficient nutrition education package. The aim of study was to assess the knowledge, perception and practice of final year Pharmacy and Medical students about nutrition.

RESEARCH METHODOLOGY

Ethical approval

This study was approved from research ethical committee of Riphah institute of Pharmaceutical sciences, Riphah International University with reference number REC/RIPS-LHR/2017/11.

Study design

It was a cross-sectional descriptive study that was conducted in different Medical colleges and Pharmacy institutions of Lahore (Private and Government sectors).

Data collection and statistical analysis

Data were collected for the duration of 5 months i.e. 1st December 2016 to 30th April 2017 using structured questionnaire that comprises of 5 sections. Section A: Basic demographics, Section B: perception about nutrition, Section C: Practices about Nutrition, Section D: practices about Total Parenteral nutrition (TPN) and Section E: knowledge about TPN. Likert scale was used to measure positive and negative response to statement. Study population consisted of final year Pharmacy and Medical students. Out of 500 students initially approached, 150 were excluded as they were not of final year and their data was not complete so, 350 students were included study to assess the nutrition knowledge.

STATISTICAL ANALYSIS

Statistical analysis of data was performed using SPSS version 22. The descriptive analysis was performed to compute the response. The χ^2 test was used to assess differences in knowledge among categories of students. The *p*-value <0.05 was considered statistically significant.

RESULTS

The complete information about demographic characteristics of students is given in Table 1. Out of 350 students, majority were females 259 (74%), having age greater than 23 years i.e., 197 (66.3%) normal Body Mass index; BMI i.e., 269 (76.9%) family income more than 20 k i.e., 307 (88.7%), follow annual education system 275 (78.6%). Mostly were from urban areas 292 (83.4%) and did not consume any nutritional supplement i.e., 201 (57.4%) and did not do exercise i.e., 184 (52.6%) (Table 1).

Most of the students were strongly agreed 179 (51.1%) that nutrition assessment and counselling should be included in routine primary care visits, 222 (63.4%) students strongly agreed that a change in healthier lifestyle is very important. Students who strongly agreed that Particular advice regarding change in

Table 1: Respondents basic demographics.

Parameters	Frequency N=350	Percentage (%)
*Name of Institution		
ASCPS	48	13.7
PUCP	90	25.7
UOL	75	21.4
FJMC	83	23.7
KEMU	45	12.9
FM	9	2.6
Gender		
Male	91	26
Female	259	74
Age Group		
20-23	153	43.7
>23	197	56.3
BMI		
Underweight (<18.5)	53	15.1
Normal (18.5-24.9)	269	76.9
Obese (>25)	28	8
Course		
Pharmacy	212	60.6
MBBS	138	39.4
Family Income		
<20k	43	12.3
>20k	307	87.7
Education System		
Annual	275	78.6
Semester	75	21.4
Area of Hometown		
Rural	58	16.6
Urban	292	83.4
Nutrition Supplement Consumption		
Yes	149	42.6
No	201	57.4
Type of Supplement Consumed		
None	210	60.0
Food	4	1.1
Carbohydrates	7	2
Proteins	13	3.7
Vitamins	77	22
Minerals	34	9.7
Others	5	1.4

*ASCPS: Akhtar Saeed College of Pharmaceutical sciences; PUCP: Punjab University College of Pharmacy; UOL: University of Lahore; FJMC: Fatima Jinnah Medical college; KEMU: King Edward Medical University; FM: Fatima Memorial Hospital College of Medicine and Dentistry

lifestyle could help patients to improve their eating habits were 165 (47.1%), 160 (45.7%) students were strongly agreed that the nutrition assessment is of prime importance in developing nutrition care plan. Perception of most of the students 175 (50.0%) is that high risk patients should be counselled properly about dietary modifications. While most of the students were strongly agreed 109 (31.1%) that people will only change their eating habits

if they faced a serious health problem i.e., heart attack. Most of the students were strongly agreed 175 (50%) that efforts should be made to educate patient about nutrition in order to increase patient compliance. Most 173 (49.4%) were strongly agreed that it was their obligation to discuss nutrition with patient. Majority 134 (38.3%) of the students were agreed that they can easily identify the patients who are undernourished. Optimal nutrition leads to fewer complications and early mobilization after surgery, this statement was agreed by 160 (45.7%) students and 135 (38.6%) respectively. While, insufficient practices prolong the duration of hospital stay was agreed by most of the students 165 (47.1%). Only fewer students 8 (2.3%) were unable in assessing total calories and saturated fat per portion of food and 3 (0.9%) were disagreed that they were knowledgeable about the role of dietary cholesterol and saturated fat in elevating lipid concentration in the blood. Mostly students 152 (43.4) were agreed that they know about the indications of all single and multivitamins. Most of the students 158 (45.1%) were agreed that they are knowledgeable about nutritional concern of patient with GI intolerance and malabsorption. 165 (47.1%) were agreed that they have knowledge about risk factors of malnutrition. Most of the students 120 (34.3%) feel comfortable in calculating BMI (Body mass index) and waist to hip ratio based on gender. Many students 148 (42.3%) were agreed that they can assess fluid

needs based on activity level and health. Most of the students 107 (30.6%) were agreed that they can easily calculate calories in gram of fats, proteins and carbohydrates. Majority of students 116 (33.1%) had neutral response about how to prescribe TPN. Likewise, majority of students respond neutrally 102 (29.1%) about how to calculate Basal energy expenditure (BEE) by Harris Benedict equation. Many students 146 (41.7%) were agreed that they know about complications of TPN. Many 134 (38.3%) were agreed about issues related to incompatibility in TPN. Majority of students 153 (43.7%) were knowledgeable about indications for enteral and parenteral nutrition (Table 2).

The questions regarding knowledge of TPN calculations were scored from 1-21 i.e., the question which most of the students answered correctly was ranked as 1 and question to which only fewer students know the right answer was ranked as 21. According to this ranking, the question: caloric requirement increases in fever, sepsis and trauma and burn was correctly answered by most of the students and rank 1 and the question: if weight of patients is 155lb, daily fluid requirement will be approximately 2450ml was least correctly answered and it ranked 21 (Table 3).

Response variation was assessed by applying Chi-square test by taking level of significance 0.05 of first 25 questions. There was

Table 2: Perception and practice about nutrition and TPN.

Perception About Nutrition	Strongly Agree N (%)	Agree N (%)	Neutral N (%)	Dis-agree N (%)	Strongly Disagree N (%)
Nutrition assessment and counselling should be included in any routine appointment, just like diagnosis and treatment?	179 (51.1)	141 (40.3)	20 (5.7)	9 (2.6)	1 (0.3)
A change towards the healthier life style is important in any stage of life.	222 (63.4)	110 (31.4)	16 (4.6)	2 (0.6)	0 (0.0)
Specific advice about how to make dietary changes could help some patients improve their eating habits.	165 (47.1)	150 (42.9)	31 (8.9)	1 (0.3)	3 (0.9)
Nutrition assessment is a first step in developing nutrition care plan.	160 (45.7)	154 (44.0)	26 (7.4)	9 (2.6)	1 (0.3)
High risk patients should be counseled about dietary change.	175 (50.0)	128 (36.6)	37 (10.6)	6 (1.7)	4 (1.1)
Patients will only change eating patterns if faced with a significant health problem (i.e. a heart attack).	104 (29.7)	109 (31.1)	67 (19.1)	56 (16.0)	14 (4.0)
Patient education efforts will be effective in increasing patient's compliance with nutrition recommendations.	119 (34)	175 (50)	33 (9.4)	20 (5.7)	3 (0.9)
I feel obliged to improve health of patients by discussing nutrition with them.	101 (28.9)	173 (49.4)	56 (16.0)	17 (4.9)	3 (0.9)
It is easy to identify patients who are undernourished.	65 (18.6)	134 (38.3)	91 (26)	57 (16.3)	3 (0.9)
Optimal nutrition leads to fewer post-operative complications.	80 (22.9)	160 (45.7)	80 (22.9)	27 (7.7)	3 (0.9)
Optimal nutrition leads to early mobilization after surgery.	91 (26)	135 (38.6)	100 (28.6)	22 (6.3)	2 (0.6)
Insufficient nutrition practice leads to increased complications and prolong hospital stay.	111 (31.7)	165 (47.1)	54 (15.4)	17 (4.9)	3 (0.9)
Practices About Nutrition					
I feel comfortable in assessing the total calories and saturated fat per portion of food by using the food label.	61 (17.4)	119 (34)	92 (26.3)	70 (20)	8 (2.3)
I am knowledgeable about the role of dietary cholesterol and saturated fat in elevating blood lipids?	94 (26.9)	149 (42.6)	69 (19.7)	35 (10)	3 (0.9)
I am knowledgeable about indications or use of single vitamins (i.e.: B, C, E) or multivitamin supplements.	71 (20.3)	152 (43.4)	79 (22.6)	44 (12.6)	4 (1.1)
I am knowledgeable about the nutrition concerns of patients with GI intolerances, maldigestion, or malabsorption.	64 (18.3)	158 (45.1)	83 (23.7)	42 (12)	3 (0.9)
I have knowledge about risk factors for malnutrition.	92 (26.3)	165 (47.1)	54 (15.4)	32 (9.1)	7 (2)
Practices About TPN					
I feel comfortable to calculate body mass index (BMI) and waist-to-hip ratio based on gender.	101 (28.9)	120 (34.3)	63 (18)	56 (16)	10 (2.9)
I feel comfortable in assessing fluid needs based on activity level and health.	58 (16.6)	148 (42.3)	85 (24.3)	54 (15.4)	5 (1.4)

I feel comfortable to calculate calories in a gram of fat, protein and carbohydrates.	63 (18)	107 (30.6)	105 (30)	65 (18.6)	10 (2.9)
I am comfortable to prescribe total parenteral nutrition.	43 (12.3)	101 (28.9)	116 (33.1)	75 (21.4)	15 (4.3)
I feel comfortable to calculate basal energy expenditure by Harris Benedict equation.	43 (12.3)	91 (26)	102 (29.1)	85 (24.3)	29 (8.3)
I am knowledgeable about complications of TPN.	56 (16)	146 (41.7)	88 (25.1)	47 (13.4)	13 (3.7)
I am knowledgeable about issues related to incompatibility in TPN.	56 (16)	134 (38.3)	84 (24)	58 (16.6)	18 (5.1)
I am knowledgeable about indications for enteral and parenteral nutrition.	60 (17.1)	153 (43.7)	71 (20.3)	50 (14.3)	16 (4.6)

Table 3: Knowledge about TPN calculations.

Knowledge About TPN Calculations	Yes N (%)	No N (%)	Don't Know N (%)	Ranking Score (1-21)
Daily energy requirements in malnourished patients are 25 to 30 kilocalories per kg?	177 (50.6)	36 (10.3)	137 (39.1)	8
Caloric requirement increases in fever, sepsis, and trauma and burn injury?	224 (64)	62 (17.7)	64 (18.3)	1
Refeeding is the major metabolic complication of TPN?	161 (46)	62 (17.7)	127 (36.3)	12
Refeeding is characterized by hypokalemia, hypophosphatemia and hypomagnesaemia?	150 (42.9)	72 (20.6)	128 (36.6)	15
In critically ill patients daily energy requirement is high as compared to malnourished patients?	181 (51.7)	97 (27.7)	72 (20.6)	7
Adults consume 45% to 65% of total calories from carbohydrates, 20 to 35% from fat and 10 to 35% from protein?	189 (54)	56 (16)	105 (30)	4
Fluid requirement decreases in fluid overload and cardiac failure?	185 (52.9)	79 (22.6)	86 (24.6)	5
In adult parenteral nutrition, daily sodium and potassium requirement are 60 to 100 meq?	116 (33.1)	72 (20.6)	162 (46.3)	19
Enteral nutrition decreases septic complication as compared to parenteral nutrition in severely injured trauma patients?	159 (45.4)	75 (21.4)	116 (33.1)	13
An adjustment in tpn dosing is required in the presence of major organ failure?	200 (57.1)	68 (19.4)	82 (23.4)	3
1 g of protein provides 4 calories?	166 (47.4)	70 (20)	114 (32.6)	9
BMI<18.5kg/m2 are indicative of under nutrition?	163 (46.6)	71 (20.3)	116 (33.1)	11
Recommended daily protein allowances for patients with surgery is 1.5-2g/kg?	118 (33.7)	70 (20)	162 (46.3)	18
In patients with kidney failure, calcium requirement is decreased?	158 (45.1)	86 (24.6)	106 (30.3)	14
Parenteral nutrition in adults should be considered after suboptimal intake for 7-14 days?	133 (38)	63 (18)	154 (44)	17
1 g of hydrated dextrose yield 3.4 kcal?	144 (41.1)	56 (16)	150 (42.9)	
1 g of fat yield 9 kcal?	184 (52.6)	58 (16.6)	108 (30.9)	6
Carbohydrates and fats provide optimal energy source for tpn patients?	165 (47.1)	87 (24.9)	98 (28)	10
Weight of patient is 155lb; daily fluid requirement will be approximately 2450 ml?	103 (29.4)	57 (16.3)	190 (54.3)	21
In post-surgical patient weighing 64 kg, protein requirement will be approximately 96 g/day?	107 (30.6)	65 (18.6)	178 (50.9)	20
Routes of TPN administration are selected on the basis of nutritional requirements of patient?	204 (58.3)	63 (18.0)	83 (23.7)	2

significant variation of response towards nutrition perception and practices among students of different institutions, economic status and area of hometown (Table 4).

DISCUSSION

It is a fact that balanced diet and adequate nutrition is very important for good health. With an increase in awareness of health and disease prevention, the utilization of nutrition supplement is also increased [3]. Healthcare professionals play an important role in diverting the behaviour of people regarding health related issues and hence, it is very important that patients should be counselled about nutrition and its role in maintaining health [9].

In this study, the knowledge, attitude and practice of final year Medical and Pharmacy students regarding nutrition supplement consumption and TPN were explored. Our findings confirmed moderate knowledge about nutrition supplements, low knowledge

about TPN and low level of nutrition supplements consumption as reported in previous studies [10].

Less number of students consumed nutritional supplements and do exercise. The supplements consumed mostly consist of vitamins and female students were most likely to use nutrition supplements which are consistent with results found in other studies. Though less than half of the students use nutritional supplements, their opinion regarding nutrition and TPN were between strongly agree and agree. These findings suggest that there is adequate knowledge in the health sciences students regarding to the health benefits of supplements. Pharmacy students scored highest percentage in knowledge, attitude and practice of nutritional supplements and TPN with a significant difference between the medical and pharmacy students. This difference may be because of better perception and practice regarding TPN and supplements of pharmacy students than those of medical students. Similar findings were reported in other studies [11].

Table 4: Correlates of perception and practice about nutrition with demographic variables among students.

Perception About Nutrition	Name of Institution	Gender	Age Group	BMI	Course	Economic Status	Area of Home Town	Family Income	Nutrition Supplement Consumption	Exercise	Type of Supplement Consumed
Nutrition assessment and counselling should be included in any routine appointment, just like diagnosis and treatment.	0.001**	0.323	0.693	0.007*	0.040*	0.132	0.173	0.336	0.409	0.455	0.484
A change towards the healthier life style is important in any stage of life.	0.038	0.242	0.287	0.709	0.245	0.017*	0.010*	0.001**	0.035	0.705	0.108
Specific advice about how to make dietary changes could help some patients improve their eating habits.	0.295	0.103	0.614	0.021*	0.592	0.119	0.001**	0.381	0.207	0.680	0.974
Nutrition assessment is a first step in developing nutrition care plan.	0.036*	0.124	0.810	0.336	0.650	0.053	0.559	0.080	0.184	0.587	0.988
High risk patients should be counselled about dietary change.	0.006*	0.986	0.306	0.728	0.261	0.001**	0.136	0.313	0.745	0.429	0.816
Patients will only change eating patterns if faced with a significant health problem (i.e. a heart attack).	0.021*	0.062	0.067	0.716	0.257	0.007*	0.163	0.083	0.484	0.282	0.755
Patient education efforts will be effective in increasing patient's compliance with nutrition recommendations.	0.000***	0.091	0.111	0.610	0.026*	0.000***	0.004**	0.158	0.294	0.712	0.280
I feel obliged to improve health of patients by discussing nutrition with them.	0.126	0.992	0.538	0.109	0.561	0.023*	0.615	0.778	0.873	0.935	0.593
It is easy to identify patients who are undernourished.	0.378	0.006*	0.231	0.309	0.180	0.017*	0.693	0.295	0.038*	0.074	0.182
Optimal nutrition leads to fewer post-operative complications.	0.147	0.629	0.260	0.462	0.779	0.009	0.176	0.725	0.376	0.921	0.237
Optimal nutrition leads to early mobilization after surgery.	0.074	0.495	0.070	0.761	0.050	0.004**	0.701	0.399	0.033*	0.674	0.170
Insufficient nutrition practice leads to increased complications and prolong hospital stay.	0.014*	0.071	0.281	0.598	0.154	0.000***	0.185	0.133	0.308	0.467	0.411
Practices About Nutrition											
I feel comfortable in assessing the total calories and saturated fat per portion of food by using the food label.	0.002**	0.395	0.337	0.470	0.319	0.003**	0.057	0.036*	0.123	0.139	0.510
I am knowledgeable about the role of dietary cholesterol and saturated fat in elevating blood lipids.	0.000***	0.000***	0.688	0.741	0.000***	0.000***	0.180	0.000***	0.015*	0.008	0.180
I am knowledgeable about indications or use of single vitamins (i.e.: B, C, E) or multivitamin supplements.	0.001**	0.048*	0.502	0.608	0.191	0.000***	0.109	0.238	0.595	0.707	0.941
I am knowledgeable about the nutrition concerns of patients with GI intolerances, maldigestion, or malabsorption.	0.000***	0.011*	0.756	0.398	0.631	0.000***	0.592	0.213	0.301	0.271	0.492
I have knowledge about risk factors for malnutrition.	0.000***	0.411	0.503	0.644	0.315	0.000***	0.725	0.147	0.220	0.969	0.538
Practices About TPN											
I feel comfortable to calculate body mass index (BMI) and waist-to-hip ratio based on gender.	0.000***	0.570	0.400	0.466	0.000***	0.000***	0.747	0.000***	0.005	0.072	0.003**
I feel comfortable assessing fluid needs based on activity level and health.	0.001**	0.801	0.966	0.693	0.148	0.004**	0.818	0.016*	0.725	0.453	0.088
I feel comfortable to calculate calories in a gram of fat, protein and carbohydrates.	0.046*	0.468	0.489	0.747	0.376	0.083	0.300	0.504	0.417	0.484	0.037*
I am comfortable to prescribe total parenteral nutrition.	0.011*	0.226	0.896	0.509	0.023*	0.115	0.571	0.005	0.771	0.436	0.492
I feel comfortable to calculate basal energy expenditure by Harris Benedict equation.	0.002**	0.148	0.233	0.189	0.133	0.009	0.652	0.339	0.047*	0.170	0.079
I am knowledgeable about complications of TPN.	0.000***	0.825	0.060	0.574	0.030*	0.184	0.218	0.015*	0.469	0.511	0.302
I am knowledgeable about issues related to incompatibility in TPN.	0.014*	0.727	0.215	0.894	0.001**	0.972	0.945	0.020*	0.054	0.240	0.053
I am knowledgeable about indications for enteral and parenteral nutrition.	0.083	0.393	0.473	0.505	0.020*	0.684	0.807	0.005	0.554	0.068	0.224

Self-perceived proficiency was low in study population and about less than half of the students was confident in their ability to assess the nutritional status of patients or to discuss general nutritional issues. Rather they felt proficient in discussing general topics like life style modifications and counselling on the benefits of exercise. Their response was significantly lower for specific topics i.e., only 34.3% were comfortable in calculating BMI and waist to hip ratio, only 34% were confident in calculating calories by using food label and only 26% were comfortable in calculating BEE by using Harris Benedict equation as reported in earlier studies [12]. Medical students may not understand the clinical relevance of nutrition when it is included in the preclinical years. Previous studies reveal that students became knowledgeable about nutrition and TPN and were able to counsel their patients about nutritional complications [13].

Lifestyle modification is the cornerstone of primary and secondary prevention of obesity related disease like hypertension and diabetes. Medical nutrition therapy (MNT) including well balanced diet and exercise is an important component of therapeutic plans for disease prevention and management. Pharmacist by using MNT can educate patients in both clinical and retail setups [14].

So, Medical and Pharmacy student's knowledge and practice can be increased by nutrition education during clinical internship and graduation. The interns have more contact with patients thus maximizing the skills about nutritional practice. Nutritional assessment guidelines should also include in the course studies [15].

CONCLUSION

Overall most of the students were aware of the importance of dietary supplements to maintain good health but there were lack of practice in daily appointments. Also, there was dearth of knowledge about TPN, especially regarding calculations of different variables. The results of our study may reveal the knowledge and practice of medical students about nutrition on evidence-based data. Hence, it is important to promote provision of nutrition education and practice for adaptation of healthy eating habits and maintenance of good health.

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