FACTORS AFFECTING ON OBESITY AND UNDER-WEIGHT WITH OUTCOME AMONG PEOPLE LIVING IN THE VICINITY OF MARZIPURA, FAISALABAD

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ABSTRACT… Due to transformation in nutritional status, along with epidemiological and socio demographic changes in developing countries like Pakistan, obesity and underweight coexist in our community. Date about coexistence of obesity (body mass index, BMI $\geq$ 30kg/m^2) and underweight (BMI $\geq$ 18.5 kg/m^2) and related factors are lacking in this region of our province. This study will help us to relate different sociodemographic factors with obesity and underweight. **Objective:** To know the prevalence of obesity and underweight by body mass index (BMI) and to investigate the association of obesity and underweight with selected health conditions and socioeconomic differences in this group. **Study Design:** Observational retrospective cross-sectional study. **Material & Methods:** The record of 1656 individual presented in medical OPD or Independent University Hospital Marzi Pura Faisalabad, during the period of 4 months Mar 2013 to June 2013 was analysed. Age, Sex, Body Weight and height were enter in a structure format sheet. Date was analysed by SPSS Version17. **Results:** Mean BMI was 24.0 kg/m^2 (SD = 6.2), and was higher for women and decreased with age. Prevalence of obesity was 19.6% and was positively associated with female gender, family income, hypertension, and diabetes and inversely related to physical activity. Underweight affected 15.6% of participants mainly of age group < 25 years and in elderly people, and was higher among women and low-income families. It was negatively associated with hypertension and diabetes and directly associated with Mycobacterium tuberculosis infection and $\geq$ 2 hospitalizations in the previous 12 months. **Conclusions:** Both obesity and underweight were associated with increased morbidity. The association of underweight with Mycobacterium tuberculosis infection, increased hospitalization, and low family income may reflect illness-related weight loss in all age groups especially <25 years due to poor care in younger by family and social deprivation of elderly in this community. Aging in poverty may lead to an increase in nutritional deficiencies and health-related problems among the elderly.

Key words: Aging Health; Obesity; Body Mass Index

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INTRODUCTION

In developed World population obesity is a burden on health care system and his emerging as a significant threat to the health care system and resources[1,2]. Almost all people accumulate some fat as they get older. The present obesity epidemic is mainly due to changes in lifestyle behaviour. The growing obesity problem in humans has affected children, adults and older people[3]. Basal metabolic index is an effective standard to assess the status of obesity in adults. BMI is an economical and non invasive tool to filter different categories of obese population to assess the magnitude of health problems[4].

The developing countries are transforming in their epidemiological, demographic, and nutritional status. The old age population is currently the most rapidly growing group in various parts of the world, as sanitary facilities become better and improvement in medical field. It is estimated that by the end of next 30 years old age population will rise upto 300% in most of the developing countries, commonly in South America and Asian countries[5].

Changes in diet pattern and physical activity are at a rapid pace in developing world. So problems related to extremes of weight such as obesity and underweight are likely to be present, as are other health problems[6]. In Pakistan, like other developing countries, there is major disparity in socioeconomic conditions in living community. As a matter of fact, prevalence of malnutrition and

obesity has been noticed in a very low-income population in South American region[7]. In addition, there is an upward trend in number of patients with obesity in three Brazilian surveys conducted between 1973 and 1996[8].

There is a direct relationship between body mass index and mortality[9,10]. In developed world epidemiological research on mortality points in relation to body mass index suggest that the "favorable" BMI gradually increases with age, with no consistent variation between both genders[10,11].

Independent Medical College/ Independent University Hospital has recently been established. It has a very wide catchment area with socioeconomic disparity (both poor, middle and high gentry class) i.e, Marzipura, Faisalabad main city, and adjoining areas of Chiniot, Narwala Bangla and different chaks from Narwala bypass. In this setting the exact statics in this area of our province are lacking. The objectives of this study were as follows.

- To know the prevelance of obesity and underweight by body mass index (BMI) in a large sample of population in Marzipura and adjoining areas.
- To investigate the relation of obesity and underweight with selected health conditions and socioeconomic differences in this group.

MATERIALS AND METHODS
For measuring obesity and under-weight, the BMI was used as the ratio of body weight (in kgs) to body height (in m^2). Although, BMI dependent on sex and age, as a measure of body fatness,[12] it is the only measure available. BMI is a simple method of screening for weight categories,[4] as well as it is also cheap.

The National Institutes of Health (NIH) define BMI as normal if it is between 18.5-24.9. Underweight if BMI is below 18.5. Overweight if BMI is 25-29.9. Obesity is considered if BMI is > 30 and further divided into 3 classes. 30 – 34.9 (class I obesity), 35-39.9 (class II obesity) and > 40 (class III extreme obesity)[13].

Study design
An observational retrospective cross-sectional study.

Setting and Duration
This study was conducted from Mar 2013 – June 2013 on patients who came in Medical OPD of Independent University Hospital, Marzipura , Faisalabad.

Sampling Technique
Convenient sampling

Sample size and criteria
A total of 1656 individuals are included in this study with following criteria.

Inclusion criteria
Individuals aged ≥14 years of either sexes.

Exclusion criteria
Individuals aged less than 14 years of either sex and pregnant females.

Data collection and analysis procedure
Every Individual came in Medical OPD during this period were examined. An occupational nurse noted age, sex, body weight and height of every individual. Data was entered in a structured format sheet. Then the data were analyzed through SPSS Version 17.

RESULTS
In our study, 1656 individuals were reviewed, during the period of four months (from March 2013 to June 2013). The most common age group was between 25-40 yrs (32.6 %), followed by between 40-55yrs (31 %), < 25yrs (23.0 %), between 55-70 yrs (11.5 %), between 70-85 yrs (1.7 %) and > 85 yrs were only 0.2 % . Female was dominated i.e, 1094 (66.06 %) against male gender i.e, 562 (33.94 %) as shown in Table I.

Table-II. shows distribution of BMI (kg/m2) for both gender by age group. Mean total BMI was 24.0 kg/m2 (SD = 6.2). As the age increased, BMI was significantly decreased particularly in males.

Age Group		Sex			%age
		F	M	Total	
Age	Less than 25	252	129	381	23.0
	25-40	396	144	540	32.6
	40-55	328	185	513	31.0
	55-70	109	81	190	11.5
	70-85	9	19	28	1.7
	Greater or Equal to 85	0	4	4	0.2
Total		1094	562	1656	100.0

Table-I. Distribution of patients by age group and sex.

Age	BMI		
	Minimum	Maximum	Mean (SD)
Male			
Less than 25	13.2	42.5	23.9(5.6)
25 - 40	13.3	44.9	23.5 (5.5)
40-55	14.6	43.5	23.0 (5.4)
55-70	13.1	36.9	24.2 (6.1)
70-85	16.2	32.4	22.7 (4.8)
Greater than 85	14.7	33.0	21.1 (8.4)
Female			
Less than 25	11.0	47.0	25.1(6.5)
25 – 40	13.0	52.0	25.6(6.5)
40-55	11.0	47.0	25.1(6.1)
55-70	14.0	43.0	26.16.5)
70-85	15.0	34.0	24.3(6.4)
Greater than 85	--	--	--

Table-II. Distribution of BMI by age and gender

BMI		
BMI	Frequency	%age
<18.5 (under-weight)	258	15.6
18.5-24.9 (Normal)	673	40.6
25-29.9 (Over-weight)	401	24.2
30-34.9 (Obese – C-I)	223	13.5
35-39.9 (Obese – C-II)	73	4.4
>40 (Obese –C-III)	28	1.7
Total	1656	100.0

Table-III. Frequency and percentage of BMI (Prevalence of underweight and Obesity)

More over it was higher for female than males.

A total of 258 (15.6%) individuals were underweight (BMI $\leq$ 18.5 kg/m^2) and 324 (19.6%) were obese (BMI $\geq$ 30kg/m^2). (Table-III).

The prevalence of obesity decreased with increasing age. Obesity was particularly more common in females. But statistically, this decrease in BMI was only important among female, but similar for both genders after the age of 70 years. In contrast with underweight, different research reveals that obesity is more common in high income family and people with high level of education.

Underweight was also significantly more common among females than male. An increase was observed after the age of 25 years and in elderly people. On the other hand, prevalence of underweight was statistically, very important in people with minimum income. There was also downward trend with respect to age and gender.

As far as, the associations of obesity and malnutrition with the factors presented in Table IV and V was concerned, there were no significant gender variations. Therefore, the results of multiple variables analysis are presented together and adjusted for gender.

Results of multiple variables analysis of underweight and obesity in relation to different social-demographic factors like life-style, and different health conditions are shown in table-IV. More importantly, obesity was directly related and associated with sedentary life style, hypertension, and diabetes. But was negatively related to anemia. Underweight was inversely related to hypertension and diabetes. It was more common

Factor	Reference group (n – 1656)	Underweight (n = 258)	Obesity (n = 324)
Gender			
Male	562	124 (48%)--- (47%)	65 (20%)--- (19%)
Female	1094	134 (52 %)—(53%)	259 (80%) – (81%)
Age group years			
< 25	381	122	109
25– 40	540	65	110
40-55	513	29	85
55-70	190	38	15
70-85	28	3	5
85 +	4	1	0
Smoker			
Never	855	75	212
Former	384	43	84
Current	417	140	28
Physical inactivity			
No	1324	154	203
Yes	332	104	121
Salary			
< 10000	994	133	188
10000 – 30000	570	112	110
> 30000	92	13	26
Dietary habits			
> 3 meals a day	159	24	55
3 meals a day	975	154	147
< 3 meals a day	522	80	122
Hypertension			
No	629	138	72
Yes	1027	120	252
Diabetes			
No	1407	207	242
Yes	249	51	82
Anemia			
No	1518	232	322
Yes	138	26	2
Mycobacterium tuberculo-sis infection			
No	993	121	282
Yes	663	137	42
Table-IV. Sociodemographic factors and BMI (Obese and Under-weight)			

among smokers and especially those people who were smoking currently. Mycobactrium Tuberculosis infection and anemia were also more common in underweight individuals.

Table V shows that obese people rate their health poor/very poor than those in the reference BMI category. Statistically, this difference was interestingly not significant for underweight individuals. It also showed that hospitalizations during last 12 months, were reported more by underweight individuals. While obese persons reported more doctor visits during the last 12 months.

DISCUSSION
Study shows that in over community the prevalence of obesity is slightly more than the people with under-weight. As far as age and sex are concerned result shows that obesity as well as under-weight are similar to the results of studies in other parts of the world[10,14].

Obesity is a big issue now a days in the developing

Factors	Reference Group (n-1656)	Underweight (n-258)	Obesity (n-324)
Visit to GP in last 12 months None 1 2+	311 351 994	48 52 158	38 76 210
Admission to hospital in last 12 months None 1 2+	1324 249 83	1088 331 237	256 47 21
Health problems in last six months Very good/good Fair Poor/very poor	440 828 388	49 121 88	68 160 96
Table-V. Doctor visits And hospitalization with self-related health opinion			

countries, just like in our society also. It has variable pattern in different geographic regions and high in females living in city area instead of villages. In our study, people with obesity in adult population has the prevalence to other parts of the world i.e. in European population, united states[15,16] and in India[2]. However, in difference to developed world, in old age population obesity was more common among higher income group as compared to low income population[17].

Association of obesity with high income population has been shown in other developing communities[19] as well as in other countries like United States and Brazil[16,18]. In China as well as in India, people living in cities especially with high income are with obesity problems due to high fat in there diet[20,21]. Overweight among high income people appear first than among no income classes. The main causes include decrease physical activity as well as nutritional change to high fat die.

In our study, hypertension and diabetes mellitus is directly proportionate to obesity. It is positively associated with hypertension and diabetes. Obesity is a complex metabolic disorder frequently associated with insulin resistance, hyper-insulinemia, increased atherosclerosis, hypertension, and diabetes type II[22]. The association between obesity and decreased physical activity is present in other studies also. Decreased physical activity leads to decreased calorie burn which causes increased calorie reserve leading to our weight and later on obesity[23]. However, the relative risk of death with

excessive body fat in old population is for less than in younger adults[24]. Actually, epidemiological studies do not support overweight (BMI=25-29kg/m^2), as opposed to obesity ($\geq$ 30kg/m^2), as conferring an excess mortality risk to the elderly[24].

Obese old age population reported more visits to GP and believed their health status lesser than those with weight within normal range. It has been seemed that health problems are more among obese people and they also rate there health status as poor or at the most fair as for as they concerned[14]. As a matter of fact these factors explain the similar feeling of deteriorating and trend of modern society to invariably condemn obesity.

In our study, families who earn more or equal to 30,000 rupees monthly have obesity problem and are similar other study results[25]. James et al. showed that in United States people earning US$600 or more monthly have similar problem. Prevalence of underweight is directly proportionate to low income families. Malnutrition lead to decreased physical strength decreased activities, high accidents risk and there immune system also become weak especially in elderly along with other health problems[26,27,17].

In our study, people with underweight admitted more in hospitals profthat they have ill health condition especially in old age. Elderly people are usually dependent and more neglected in our community suffering from different nutritional deficiencies. Protein-energy malnutrition appears

to be a strong independent risk factor for non-elective hospital readmission, especially among the highest-risk patients, those who are elderly and functionally independent and cognitively intact[26]. It has been argued that the inverse association of weight and mortality in old age is related to smoking and reflects illness-related weight loss[28]. In a longitudinal study, elderly women with lower energy intake than recommended by international organizations in 1980 were three times more likely to die in 10 years than those with satisfactory energy intake[9].

Nutritional deficiencies lead to different infections and chronic disease. In our community, tuberculosis infection is more common due to poor sanitary facilities. In Brazilian population, Chagas disease due to T. cruzi infection[29] is more common in elderly underweight people.
The cut-points that we used to define underweight and obesity may be conservative. A meta-analysis of the relationship between body weight and all-cause mortality has identified an increased risk of death among older adults with BMI < 23 or > 28kg/m^2 [30].

In our study we have shown that body mass index is directly proportionate to economic status, as in studies from developed countries[14,15]. A similar relationship has also been reported from India and this tends to express the massive socioeconomic variability present in most of developing nations[2]. The economic variability between developed and under-developed countries is widening. Meanwhile, in developing countries like Pakistan, disparity in income is rising as in others parts of the world[6]. Pakistan is one of the countries with the major socioeconomic inequalities. People under age of 25 years and elderly people are mostly suffering from nutritional abnormalities. Even considering that age is increasing all the time in both groups high income and low income. The association of aging with low income group may lead to increase in metabolic and nutrition diseases in old age population.

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