Research Article

CLINICAL INVESTIGATION

Healthy Behaviours and Depression among Overweight and Obese: A Social Taboo in Pakistan

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Abstract

Introduction: Obesity has become a serious global epidemic which poses a major health hazard to the human being. Globally, changing trends such as high intake of fast food, sedentary lifestyle, industrialization, and urbanization are significant key factors that are leading to an increase in the burden of overweight and obesity. The rise in obesity has also been linked been with depression and an increase in stigma and discrimination towards such obese individuals.

Objectives: The aim of the present study is to assess health behavior and depression among overweight/obese adults in Pakistan.

Methodology: A descriptive cross-sectional study design was used. Two different data collection tools i.e. Health Behavior Questionnaire (HBQ) and Hospital Anxiety and Depression Score (HADS) were used. The questionnaire was self-administered to a sample of 382 overweight/obese adults residing in Islamabad and Rawalpindi Pakistan calculated by using Raosoft and selected by convenience sampling technique. After data collection, data were coded and analyzed statistically by using Mann-Whitney and Kruskal Wallis Test.

Results: The results of the study highlighted that the healthy eating factor score and amount ate factor score was significantly high among females with a p-value of 0.029 and 0.008 respectively where the amount of sleep factor score with (p=0.000) was significantly high among males with a p-value of 0.001. The study results showed that emotional eating factor score, amount eaten factor score, convenience food factor score, TV watching factor score, travel to work factor score, and early maturation factor score was significantly high among adults with an age group of 48-57 years.

Conclusion: This study concluded that health behavior is linked with gender, marital status, age, physical activity, and educational qualification of adults whereas stress was associated with physical activity and qualification of adults. Females had unhealthy eating habits where males have bad sleep patterns. The stress factor has an inverse relationship with qualification and physical activity. Healthcare professionals should design innovative interventions to improve healthy eating behavior and reduce depression and stigma associated with obesity.

Keywords: obesity • eating disorder • healthy eating • depression • Pakistan

Submitted: 15 June 2020; Accepted: 02 July 2020; Published online: 27 July 2020

Introduction

Obesity has become a serious global epidemic which poses a major health hazard to human being [1]. The prevalence of obesity is rising gradually in adults as well as among children and adolescents [2]. Obesity is related to a higher risk of atherosclerotic cerebrovascular disease, CHD, colorectal cancer, hyperlipidemia, HTN, gallbladder disease, and diabetes mellitus, which ultimately leads to a higher rate of mortality [3]. Comorbidities due to obesity has placed a significant burden on the healthcare system

of society [4]. There are different causes of obesity and its etiology is still not well known but the most attributed causes of obesity are overconsumption of high-calorie diet and physical inactivity. Other risk factors like personality traits, side effects of medicines, food addiction, depression, or genetic tendencies may also contribute to obesity [5]. According to the latest update on obesity prevalence, it was reported that more than one out of every two adults and almost one out of every six children were either overweight or obese in the OECD countries. In 2015, the obesity rate among the adult population was 19.5% across the OECD. On the other hand, more than one out of every four adults was reported obese in Canada, Chile, Australia, South Africa, and the United Kingdom [6].

In both developed and developing countries, the prompt increase in the prevalence of overweight and obesity demonstrates that the trend is mainly due to social, environmental, and behavioral changes, instead of modifications in genetic factors. Modernization and globalization have both positive and negative effects on people. Worldwide, various changing trends such as high intake of fast food, sedentary lifestyle, industrialization, and urbanization are significant key factors that are leading to an increase in the burden of overweight and obesity [7].

In Pakistan, a dramatic increase in the prevalence of obesity has been seen in recent years and it is still increasing at an alarming level. According to the Pakistan National Health Survey (1990-1994), the prevalence of obesity among adults age 25-44 years was 9% among males and 14% among females in rural areas of Pakistan. However, the prevalence of obesity was 22% for males and 37% for females in urban settings. Pakistan demographic health survey 2013 has supported the evidence that a higher incidence of overweight and obesity was found among Pakistani females (National Institute of Population Studies (NIPS) and ICF International, 2013. According to Pakistan Demographic Health Survey 2013, the prevalence of obesity among males was 11% whereas 19% of females living in rural areas were affected while 23% prevalence of obesity was reported among males and 40% females living in urban settings [8].

Obese and overweight individuals are at a higher risk for developing other chronic diseases like diabetes, coronary heart diseases, osteoarthritis as well as psychological problems such as depression than normal weighing individuals which leads to poor quality of life [9]. The obesity epidemic is linked to a substantial waste of health care resources, a reduction in productivity, and increased depression. There is a need to educate people about their dietary behaviors and lifestyle modification to overcome this problem which ultimately helps us to control other comorbidities especially depression [10]. Many studies have been conducted in developed countries; however impact of obesity and adopting healthy behaviors on depression is still under discussion in developing countries like Pakistan. Therefore the present study was designed to assess the health behavior and depression among overweight and obese adults in Pakistan.

Materials and Methods

Descriptive cross-sectional study design was used to assess health behavior and depression among overweight/obese adults in Pakistan. Study sites for this research included obesity management clinics, nutrition clinics, gyms, private and public health care facilities, public parks, and Community Pharmacies of Islamabad and Rawalpindi, Pakistan. Study respondents included obese/over-weight men and women (according to WHO criteria of over-weight/obese) with age between 18 years to 65 years, who were visiting these facilities. Children below the age of 18 years, pregnant women, under-weight, and normal-weight adults were excluded from the study. Research approval for the current study was obtained from the Ethical Committee of Hamdard University (Ref. No. HU/IC/DIR/HIPS/2017/493). Informed and verbal consent for participation was also taken from the respondents. The respondents were ensured for the confidentiality of information verbally as well as the undertaking was signed by the principal investigator. The calculated sample size was 382 to achieve a 95% confidence interval and a 5% margin of error. Convenience sampling technique was used for the study as the sampling frame was unknown. Two pre-validated tools Health Behavior Questionnaire (HBQ) and Hospital Anxiety and Depression Score (HADS) were used for the assessment of health behavior and depression associated with obesity.

The Health Behavior Questionnaire (HBQ) is an easy to use self-report questionnaire, which allows the users to assess a wide range of obesity-related risk factors. The final 74-item questionnaire consists of five dietary factors (healthy eating, emotional eating, social influences, amount eaten and convenience food), five activity factors (physical activity, TV watching, travel to work, social influences on activity, and mechanized

transport) and seven additional factors (dieting behavior, alcohol consumption, parental influence on activity, mother's weight/dieting behavior, father's weight/dieting behavior, alcohol consumption, sleep, and early maturation), and an additional single item of breastfeeding. The questionnaire was scored such that the highest scores on all items (and hence all factors) indicated less healthy behavior. In order to permit the equivalent weighting of individual items on every single factor, factor scores were calculated as the mean scores and were based on the means of responses to each item loading on that factor i.e. if there were 4 possible responses on an item, a score of 2 on that item would be calculated as 0.5 (i.e. 2/4). Means of individual items were then averaged across the number of items on that factor. As A/6+B/6 were the same as (A+B)/6. However, if there is missing data on any item, then each item should be divided by the possible number of responses before the mean is calculated. There were also a number of items towards the end of the questionnaire relating to the respondent's and their significant others 'views of the respondent's current weight. All items were scored 1-5 with overweight'or a lot lighter' being scored 5 and a lot underweight' or a lot heavier' being scored as 1. The Hospital Anxiety Depression Score (HADS) is easy to use, self-reported questionnaire. Scores for each subscale (anxiety and depression) range from 0 to 21 with scores categorized as mild depression and anxiety (8-10), moderate depression and anxiety (11-14), and severe depression and anxiety (15-21). The questionnaire was delivered to the respondent by hand and collected back on the same day to avoid any study biasness. After data collection, data was cleaned, coded, and entered into SPSS version-21 for analysis. A skewness test was performed to check the distribution of data. Descriptive statistics comprising frequency and percentages were calculated. Mann-Whitney and Kruskal-Wallis tests were performed to check the association of independent variables to the obesity risk factors.

Results

Out of 382 respondents, 53.90% (n=206) were male while 46.10% (n=176) were female. On the other hand, 48.95% (n=187) of the total respondents were single, 48.42% (n=185) were married. Of the total respondents, 42.93% (n=164) were between 18-27 years of age, 27.75% (n=106) were between 28-37 years, 18.59% (n=71) were between 38-47 years, 7.07% (n=27) were between 48-57 years and 3.66% (n=14) were between 58-67 years of age. Regarding the qualification of the respondents, 16.75% (n=64) were matric, 18.58% (n=71) were intermediate, 40.05% (n=153) were graduate while 24.60% (n=94) were having postgraduate education. Out of 382 respondents 42.67% (n=163) were physically active while 57.32% (n=219) were physically inactive. Of the total respondents, 57.32% (n=219) had full time job, 3.40% (n=13) worked part time while 13.35% (n=51) did not work and 25.91% (n=99) were students. A detailed description is given Table1.

The results highlighted that (32.72%, n=125) respondents usually ate fruit several times a week while (32.20%, n=123) respondents have fruit-eating pattern of at least once a day. Similarly, most of the respondents (45.55%, n=174) usually ate vegetables several times a week, while (42.15%, n=161) respondents often enjoy eating fruits and vegetables. The results of the study show that (43.46%, n=166) respondents tend to eat breakfast every day. The results showed that most of the respondents (34.82%, n=133) tend to eat snacks several times a week where most of the respondents (27.49%, n=105) often snacked on crisps, biscuits, sweets, cakes or chocolate than a piece of fruit, dried fruit or nuts. The results showed that most of the respondents (30.63%, n=117) often while (30.37%, n=116) respondents sometimes eat things which are bad for them. Out of 382 respondents, (30.63%, n=117) respondents reported that their friends and (34.03%, n=130) respondents report that their partner rarely makes fun if they ate healthily. Out of 382 respondents, (29.84%, n=114) often tend to eat everything put in front of them.

Table 1. Dose escalation schedule

Characteristics		n (%)
Age	18-27 Y	164 (42.93)
	28-37 Y	10 (27.75)
	38-47 Y	71 (18.59)
	48-57 Y	27 (7.07)
	58-67 Y	14 (3.66)
Gender	Male	206 (53.93)
	Female	176 (46.07)
Marital status	Single	187 (49.99)
	Married	185 (48.43)
	Widow	3 (0.79)
	Divorced	7 (1.83)
Qualification	Matric	64 (16.75)
	Intermediate	71 (18.59)
	Graduation	153 (40.05)
	Post-graduate	94 (24.61)
	Active	163 (42.67)

(24.61%, n=94) respondents rarely where (24.35%, n=93) respondents sometimes found it hard to stop themselves from eating a lot when there was a lot of food available. The results showed that the food that most of the respondents (31.15%, n=119) ate at home was almost entirely prepared from raw ingredients while (4.19%, n=16) respondents ate the food which was almost entirely ready-made when bought. On the other hand, (25.39%, n=97) respondents often tend to eat snack foods or drink alcohol or fizzy drinks whilst watching TV, videos, or DVDs. Most of the respondents (23.30%, n=89) often watched TV whilst eating their meals. The results showed that (19.90%, n=76) respondents have dieted very often, (30.90%, n=118) respondents have dieted sometimes to try and lost weight in the past. Where (17.28%, n=66) respondents have never dieted to try and lost weight in the past. A detailed description is given in Table 2.

The results highlighted that (28.27%, n=108) respondents feel tense most of the time, (17.28%, n=66) respondents feel tense a lot of time, (31.94%, n=122) respondents feel tense from time to time (occasionally) where (22.51%, n=86) respondents do not feel tense at all. On the other hand, (49.21%, n=188) respondents still enjoy the things definitely as much as they used to enjoy, (20.42%, n=78) respondents enjoy only a little where (7.10%, n=27) respondents hardly enjoy the things they used to enjoy. Out of total respondents, (17.54%, n=67) got a sort of frightened feeling very definitely and quite badly as if something awful is about to happen, were (37.96%, n=145) respondents got a sort of frightened feeling very definitely but not too badly. Also, (22.25%, n=85) respondents did not get any frightened feelings at all. (49.21%, n=188) respondents said that they can laugh and see the funny side of things as much as they

Table 2. Healthy behaviours among overweight and obese individuals in Pakistan.

Variables		n (%)
Healthy eating		
I enjoy eating different fruit and vegetables	Very often	89 (23.30)
	Often	161 (42.15)
	Sometimes	92 (24.08)
	Rarely	35 (9.16)
	Almost never	5 (1.31)
I eat 5 servings of fruit and/or vegetables in a day	Every day	39 (10.21)
	Almost every day	48 (12.57)
	Several times a week	57 (14.92)
	At least once a week	61 (15.97)
	At least once a month	57 (14.92)
	Less than once a month	58 (15.18)
	Never	62 (16.23)
I would rather have a sandwich, salad, soup or fruit for lunch than a pasty, pie, chipsor chocolate.	Almost always	39 (10.21)
	Most of the time	70 (18.32)
	Often	91 (23.82)
	Sometimes	115 (30.10)
	Rarely	51 (13.35)
	Almost never	16 (4.19)
I tend to eat breakfast	Every day	166 (43.46)
	Almost every day	83 (21.73)
	Several times a week	52 (13.61)
	At least once a week	32 (8.38)
	At least once a month	26 (6.81)
	Less than once a month	22 (5.76)
	Never	1 (0.26)
I eat things which are badfor Me	Very often	54 (14.14)
	Often	117 (30.63)
	Sometimes	116 (30.37)
	Rarely	61 (15.97)
	Almost never	34 (8.90)

I feel I've eaten or drink more than I should	Very often	22 (5.76)
	Often	66 (17.28)
	Sometimes	178 (46.60)
	Rarely	77 (20.16)
	Almost never	39 (10.21)
I tend to eat when I'm bored	Very often	36 (9.42)
	Often	52 (13.61)
	Sometimes	146 (38.21)
	Rarely	82 (21.47)
	Almost never	66 (17.28)
I tend to eat when I'm feeling fed up or anxious	Very often	26 (6.81)
	Often	69 (18.06)
	Sometimes	102 (26.70)
	Rarely	90 (23.56)
	Almost never	95 (24.87)
Eating makes me feel happier	Almost always	61 (15.97)
	Most of the time	85 (22.25)
	Often	99 (25.92)
	Sometimes	83 (21.73)
	Rarely	46 (12.04)
	Almost never	8 (2.10)
Social influence		
My friends make fun of me if I Eat healthily	Almost always	15 (3.93)
	Most of the time	37 (9.69)
	Often	62 (16.23)
	Sometimes	64 (16.75)
	Rarely	117 (30.63)
	Almost never	87 (22.77)
My partner (or close family if no partner) makes fun of me if I eat healthily	Almost always	6 (1.57)
	Most of the time	30 (7.85)
	Often	59 (15.45)
	Sometimes	52 (13.61)
	Rarely	130 (34.03)
	Almost never	105 (27.49)
I would choose a particular food or drink because it contained a free gift, special offer or competition	Very often	27 (7.07)
	Often	81 (21.20)
	Sometimes	97 (25.39)
	Rarely	94 (24.61)
	Almost never	83 (21.73)
I would choose a particular food or drink because it was advertised by afavorite celebrity, actor or sports star	Very often	24 (6.28)
	Often	43 (11.26)
	Sometimes	78 (20.42)
	Rarely	84 (21.99)
	Almost never	153 (40.05)
Amount eaten		
I tend to eat everything put in front of me	Almost always	32 (8.38)
	Most of the time	66 (17.28)
	Often	114 (29.84)
	Sometimes	64 (16.75)
	Rarely	73 (19.11)
	Almost never	33 (8.64)

When there's a lot of foodavailable I find it hard to stop myself eating a lot	Almost always	35 (9.16)
	Most of the time	58 (15.18)
	Often	61 (15.97)
	Sometimes	93 (24.35)
	Rarely	94 (24.61)
	Almost never	41 (10.73)
When ordering food or drink items I would choose the largest size	Almost always	26 (6.81)
	Most of the time	49 (12.83)
	Often	66 (17.28)
	Sometimes	107 (28.01)
	Rarely	85 (22.25)
	Almost never	49 (12.83)
I would say I am a fussy eater	Almost always	13 (3.4)
	Most of the time	38 (9.95)
	Often	61 (15.97)
	Sometimes	128 (33.51)
	Rarely	74 (19.37)
	Almost never	68 (17.80)
Convenience eating		
The food I usually eat at home has been	Almost entirely prepared from raw ingredients	119 (31.15)
	Mostly prepared ***from raw ingredients***	111 (29.06)
	Mostly ready-made when bought	26 (6.81)
	Almost entirelyready-made when bought	16 (4.19)
	Don't know	30 (7.85)
I tend to eat out	Every day	29 (7.6)
	Almost every day	43 (11.26)
	Several times a week	93 (24.35)
	At least once a week	84 (21.99)
	At least once a month	74 (19.37)
	Less than once a month	56 (14.66)
	Never	3 (0.78)
I tend to eat fast food	Several times a day	23 (6.02)
	At least once a day	57 (14.92)
	Several times a week	73 (19.11)
	At least once a week	89 (23.30)
	At least once a month	63 (16.49)
	Less than once a month	72 (18.85)
	Never	5 (1.31)
Physical activity		
I spend at least half an hour in some sport or physical activity ard enough to make mesweat	Every day	30 (7.85)
	Almost every day	26 (6.81)
	Several times a week	50 (13.09)
	At least once a week	65 (17.02)
	At least once a month	39 (10.21)
	Less than once a month	94 (24.61)
	Never	78 (20.42)

I would rather read, spend time on a computer or watch TV, videos or DVDs than go for a walk or go to the gym	Almost always	79 (20.68)
	Most of the time	76 (19.90)
	Often	68 (17.80)
	Sometimes	93 (24.35)
	Rarely	33 (8.64)
	Almost never	33 (8.64)
Exercising makes me feel happier	Almost always	82 (21.47)
	Most of the time	74 (19.37)
	Often	101 (26.44)
	Sometimes	55 (14.40)
	Rarely	36 (9.42)
	Almost never	34 (8.90)
TV watching trend		
On a typical day I watch TV, videos or DVDs for:	At least 5 hours	66 (17.28)
	Three or four hours	98 (25.65)
	One or two hours	137(35.86)
	Less than one hour	51 (13.35)
	Not at all	30 (7.85)
Whilst watching TV, videos or DVDs I tend to eat snack foods or drink alcohol or fizzy drinks	Almost always	36 (9.42)
	Most of the time	48 (12.57)
	Often	97 (25.39)
	Sometimes	95 (24.87)
	Rarely	67 (17.54)
	Almost never	39 (10.21)
Dieting behaviour		
In the past I have dieted to try and lost weight	Very often	76 (19.90)
	Often	63 (16.49)
	Sometimes	118 (30.90)
	Rarely	59 (15.45)
	Almost never	66 (17.28)
In the past I have dieted to try and stay the same weight	Very often	41 (10.73)
	Often	61 (15.97)
	Sometimes	111 (29.06)
	Rarely	90 (23.56)
	Almost never	79 (20.68)
When dieting, I succeed in losing weight	Almost always	48 (12.57)
	Most of the time	59 (15.45)
	Often	97 (25.39)
	Sometimes	58 (15.18)
	Rarely	39 (10.21)
	Almost never	26 (6.80)
	Never diet	55 (14.40)
After finishing a diet, I find I regain weight	Almost always	30 (7.85)
	Most of the time	45 (11.78)
	Often	90 (23.56)
	Sometimes	84 (21.99)
	Rarely	60 (15.71)
	Almost never	22 (5.76)
	Never diet	51 (13.35)

always could where (4.97%, n=19) respondents said not at all. Out of 382, (29.32%, n=112) respondents said that worrying thoughts go through their mind a lot of time, (28.53%, n=109) said worrying thoughts go through their mind from time to time, but not often, (25.40%, n=97) said only occasionally. The study results show that (40.31%, n=154) respondents said that they feel cheerful most of the time, (34.82%, n=133) said they feel cheerful sometimes where (4.97%, n=19) said they do not feel cheerful at all.

(38.48%, n=147) respondents said that they can sit at ease and feel relaxed were (36.13%, n=138) said that they definitely feel relaxed, (3.93%, n=15) said they do not feel relaxed at all. On the other hand, (42.15%, n=161) respondents said that sometimes they feel slow down where (23.82%, n=91) respondents do not feel slow down at all, (40.58%, n=155) respondents said that sometimes they get assort of frightened feeling like-butterflies in the stomach where (32.72%, n=125) said that they do not feel so. The results reveal that (32.20%, n=123) respondents have not lost interest in their appearance and they take just as much care where (31.41%, n=120) respondents said have lost interest in their appearance and do not take as much care as they should. Out of the total, (26.44%, n=101) respondents said that they feel restless quite a lot as they have to be on the move, (30.10%, n=115) said that they feel restless not very much as they have to be on the move where (28.53%, n=109) said that they do not feel restless at all as they have to be on the move. The study results highlights that (28.80%, n=110) respondents said that they get sudden feelings of panic quite often, (27.75%, n=106) said that they get sudden feelings of panic not quite often where (25.13%, n=96) said they do not get sudden feelings of panic at all. Out of 382, (50.0%, n=191) respondents said that they can often enjoy a good book or radio/TV program where (10.21%, n=39) said that they can enjoy a good book or radio/TV program very seldom. A detailed description is given in Table 3.

Table 3. Hospital anxiety and depression among over-weight/obese adults.

Variables		n (%)
I feel tense or wound up	Not at all	86 (22.51)
	From time to time (occ.)	122 (31.94)
	A lot of the time	66 (17.28)
	Most of the time	108 (28.27)
I still enjoy the things I used to enjoy	Definitely as much	188 (49.21)
	Not quite as much	89 (23.30)
	Only a little	78 (20.42)
	Hardly at all	27 (7.10)
I get a sort of frightenedfeeling as if something awful isabout to happen to me	Not at all	85 (22.25)
	A little, but it doesn't worry	85 (22.25)
	Yes, but not too badly	145 (37.96)
	Very definitely and quite badly	67 (17.54)
I can laugh and see the funny side of things	As much as I always could	188 (49.21)
	Not quite so much now	95 (24.87)
	Definitely not so much now	80 (20.94)
	not at all	19 (4.97)
Worrying thoughts go through my mind	Only occasionally	97 (25.40)
	From time to time, but not often	109 (28.53)
	A lot of the time	112 (29.32)
	A great deal of the time	64 (16.75)
I feel cheerful	Most of the time	154 (40.31)
	Sometimes	133 (34.82)
	Not often	76 (19.90)
	Not at all	19 (4.97)
I can sit at ease and feel relaxed	Definitely	138 (36.13)
	Usually	147 (38.48)
	Not often	82 (21.47)
	Not at all	15 (3.93)
I feel as if I am slowed down	Not at all	91 (23.82)
	Sometimes	161 (42.15)
	Very often	95 (24.87)
	Nearly all the time	35 (9.16)

I get a sort of frightened feeling like butterflies in the stomach	Not at all	125 (32.72)
	Occasionally	155 (40.58)
	Quite often	74 (19.37)
	Very often	28 (7.33)
I have lost interest in my appearance	I take just as much care	123 (32.20)
	I may not take quite as much care	74 (19.37)
	I don't take as much care as I should	120 (31.41)
	Definitely	65 (17.02)
I feel restless as I have to be on the move	Not at all	109 (28.53)
	Not very much	115 (30.10)
	Quite a lot	101 (26.44)
	Very much indeed	57 (14.92)
I look forward with enjoyment to things	As much as I ever did	173 (45.29)
	Rather less than I used to	101 (26.44)
	Definitely less than I used to	76 (19.90)
	Hardly at all	32 (8.38)
I get sudden feelings of panic	Not at all	96 (25.13)
	Not very often	106 (27.75)
	Quite often	110 (28.80)
	Very often indeed	70 (18.32)
I can enjoy a good book or radio/TV program	Often	191 (50.0)
	Sometimes	107 (28.01)
	Not often	45 (11.78)
	Very seldom	39 (10.21)

The results of the study highlighted that healthy eating factor score with (p=0.029) and the amount is eaten factor score with (p=0.008) was significantly high among females where the amount of sleep factor score with (p=0.000) was significantly high among males. On the basis of marital status, the study results revealed that emotional eating factor score with (p=0.000), social influence on eating factor score with (p=0.000), amount eaten factor score with (p=0.008), convenience food factor score with (p=0.000), TV watching factor score with (p=0.012), social influence on activity factor with (p=0.001), parents encourage activity factor score with (p=0.001), mother's weight/dieting behavior score with (p=0.000) and father's weight/dieting behavior score with (p=0.002) was significantly high among married people where the amount of sleep factor score with (p=0.032) was significantly high among single people. With the relation of physical activity, the healthy eating factor score with (p=0.018), TV watching factor score with (p=0.42), amount of sleep factor score with (p=0.009) and early maturation factor score with (p=0.018) was significantly high among adults who were physically inactive where the amount is eaten factor score with (p=0.008) was significantly high among adults who were physically active. With respect to the age, the study results showed that emotional eating factor score with (p=0.000), social influence on eating factor score with (p=0.019), amount eaten factor score with (p=0.016), convenience food factor score with (p=0.000), physical activity factor score with (p=0.008), TV watching factor score with (p=0.011), travel to work factor score with (p=0.043) and early maturation factor score with (p=0.027) was significantly high among adults with the age group of 48-57 years where parents encourage activity factor score with (p=0.008) was significantly high among adults with the age group of 38-57 years. With respect to qualification, adults with matric qualifications were strongly associated with bad eating habits and low physical activity. The results of the study revealed that the adults who are physically inactive with (p=0.031) and matric qualification with (p=0.004) were strongly associated with stress factors. A detailed description is given Table 4.

Table 4. Assessment of health behavior among overweight/obese adults in relation to different variables.

Healthy eating factor score															
	Gender		Marital status		Age (yrs.)					Physical activity		Qualification			
	M	F	Single	Married	18-27	28-37	38-47	48-57	58-67	A	I.A	Matric	F.A	Grad.	P.G
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	179.96	205.01	181.61	191.45	192.14	201.67	173.95	223.39	134.57	175.96	203.07	189.48	177	199.22	191.27
Test score	15750		16382.5		8.671					15315		1.993			
P-Value	0.029[b]		0.371[b]		0.07					0.018[b]		0.574			
Emotional eating factor score															
	Gender		Marital status		Age (yrs.)					Physical activity		Qualification			
	M	F	Single	Married	18-27	28-37	38-47	48-57	58-67	A	I.A	Matric	F.A	Grad.	P.G
n	206	176	187	185	164	106	71	27	14	163	219	64	71	153	94
Mean score	199.97	181.59	158.68	214.62	165.28	195.65	209.51	272.59	219.43	194.41	189.33	230.9	194.54	176.96	186.04
Test score	16384		12096		26.746					17374		11.084			
P-Value	0.105[b]		0		0					0.658b		0.011			
Social influence on eating factor score															
	Gender		Marital status		Age (yrs.)					Physical activity		Qualification			
	M	F	Single	Married	18-27	28-37	38-47	48-57	58-67	A	I.A	Matric	F.A	Grad.	P.G
n	206	176	187	185	164	106	71	27	14	163	219	64	71	153	94
Mean score	183.28	201.13	164.37	208.87	178.96	193.98	187.57	253.94	219.14	194.43	189.32	201.97	189.65	185.02	196.31
Test score	16434		13159		11.782					17370.5		1.302			
P-Value	0.112[b]		0.000[b]		0.019					0.656[b]		0.729			
Amount eaten factor score															
	Gender		Marital status		Age (yrs.)					Physical activity		Qualification			
	M	F	Single	Married	18-27	28-37	38-47	48-57	58-67	A	I.A	Matric	F.A	Grad.	P.G
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	178.08	207.21	171.77	201.39	184.99	179.92	191.68	248.72	244.11	208.84	178.6	202.56	191.98	183.79	196.16
Test score	15363.5		14543		12.232					15022.5		1.566			
P-Value	0.008[b]		0.008[b]		0.016					0.008[b]		0.667			
Convenience food factor score															
	Gender		Marital status		Age (yrs.)					Physical activity		Qualification			
	M	F	Single	Married	18-27	28-37	38-47	48-57	58-67	A	I.A	Matric	F.A	Grad.	P.G
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	195.1	187.28	161.94	211.33	158.66	198.89	216.81	283.63	214.29	188.02	194.09	260.65	203.15	169.27	171.8
Test score	17386		12704.5		38.111					17281.5		35.087			
P-Value	0.494[b]		0.000[b]		0					0.0581[b]		0			
Physical activity factor score															
	Gender		Marital Status		Age (yrs.)					Physical Activity		Qualification			
	M	F	Single	Married	18-27	28-37	38-47	48-57	58-67	A	I.A	Matric	F.A	Grad.	P.G
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	187.48	196.2	180.52	192.55	178.23	195.77	188.93	262.89	190	133.89	234.38	256.46	188.2	182.99	163.61

Test score	17300.5		16179		13.857					8458.5		29.122			
P-Value	0.432[b]		0.0276[b]		0.008					0.000[b]		0			
TV watching factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	185.73	198.26	172.63	200.52	178.9	177.61	220.23	228.41	227.36	204.86	181.56	209	192.11	183.02	192.93
Test score	16939		14704		13.123					15671.5		2.53			
P-Value	0.269[b]		0.012[b]		0.011					0.042[b]		0.47			
Travel to work factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	184.81	199.33	183.21	189.83	186.91	191.05	183.83	252.7	169.54	185.73	195.79	217.88	183.23	191.15	180.35
Test score	16750		16681.5		9.839					16908		5.203			
P-Value	0.195[b]		0.543[b]		0.043					0.371[b]		0.158			
Social influence on activity factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	192.99	189.76	168.44	204.75	176.52	186.89	209.85	237.74	219.71	189.31	193.13	173.62	186.87	194.17	202.83
Test score	17822		13920.5		11.144					17491		2.97			
P-Value	0.776[b]		0.001[b]		0.025					0.734[b]		0.396			
Mechanized transport factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	177.02	208.44	190.17	182.79	192.97	186.79	204.68	177.54	169.96	204.09	182.13	199.51	193.97	193.15	181.49
Test score	15146		16611		2.272					15797		1.219			
P-Value	0.005[b]		0.500[b]		0.686					0.052[b]		0.784			
Dieting behavior factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	190.82	192.3	184.3	188.72	187.38	195.21	191.67	195.63	202.86	183.4	197.53	195.41	206.35	184.73	188.65
Test score	17988		16886		0.535					16529		2.01			
P-value	0.897[b]		0.689[b]		0.97					0.218[b]		0.57			
Parents encourage activity factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94

Mean score	190.01	193.24	167.89	205.31	168.82	205.67	215.82	215.35	180.46	166.34	210.23	214.5	173.73	187.17	196.31
Test score	17821.5		13818		13.714					13747.5		5.106			
P-value	0.772[b]		0.001[b]		0.008					0.000[b]		0.164			
Amount of sleep factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	217.71	160.83	198.3	174.57	199.11	201.75	180.01	154.91	153.64	174.93	203.83	172.23	200.05	200.43	183.62
Test score	12729.5		15090.5		7.339					15148		4.001			
P-value	0.000[b]		0.032[b]		0.119					0.009[b]		0.261			
Mother's weight/dieting behavior factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	194.51	187.98	167.14	206.06	171.05	204.5	217.23	217.72	151.54	189.26	193.17	213.67	181.43	183.58	196.89
Test score	17508.5		13678		14.857					17483.5		4.343			
P-value	0.551[b]		0.000[b]		0.005					0.729[b]		0.227			
Father's Weight/Dieting Behavior Factor Score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	187.32	196.39	170.36	202.81	182.45	199.63	198.63	203.3	176.96	184.63	196.61	189.82	192.13	184.86	202.98
Test score	17266.5		14279.5		2.719					16728.5		1.71			
P-value	0.404[b]		0.002[b]		0.606					0.276[b]		0.635			
Early maturation factor score															
	Gender		**Marital atatus**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean score	195.33	187.02	195.66	177.24	189.15	181.44	191.95	254.35	171.68	176.77	202.47	213.7	201.01	192.46	167.64
Test score	17339		15584.5		10.926					15447		8.087			
P-Value	0.442[b]		0.088[b]		0.027					0.018[b]		0.044			
Stress factor score															
	Gender		**Marital status**		**Age (yrs.)**					**Physical activity**		**Qualification**			
	M	**F**	**Single**	**Married**	**18-27**	**28-37**	**38-47**	**48-57**	**58-67**	**A**	**I.A**	**Matric**	**F.A**	**Grad.**	**P.G**
n	206	176	187	185	164	106	71	21	14	163	219	64	71	153	94
Mean	187.27	196.45	183.79	189.24	183.34	201.33	187.48	213.41	190.79	177.37	202.02	236.16	179.92	187.73	175.97
Test score	17256		16791.5		2.898					15545		13.314			
P-Value	0.417[b]		0.625[b]		0.575					0.031[b]		0.004			

Discussion

In recent decades, the adoption of a healthy lifestyle and behaviors has been the center of interest for public health professionals. It has been stated by WHO that approximately 60% of the chronic disease burden is due to unhealthy behaviors and obesity. The unhealthy eating behaviors have been reported

in individuals suffering from eating disorders which ultimately lead to depression among such individuals [2-3]. The present study was designed to assess the association of health behavior and depression with different demographic variables such as age, gender, marital status, and physical activity of overweight and obese individuals. The results of the present study showed that the Healthy Eating Factor Score of females is high which indicated that females had less healthy eating habits as compared to males. This less healthy eating behavior of females may be due to lack of time for working women to cook at home. It might be due to the fact that females are not as conscious about their health due to their busy routine. Therefore, the gender difference in the choice of food seems to be partly attributable to male's greater participation in and somewhat to their strong beliefs in healthy eating. The study results also highlighted that emotional eating factor score of overweight/obese males was high as compared to overweight/obese females which means that males have bad emotional eating habits. The results also showed that overweight/obese females had a more social influence on eating habits as compared to males. Also, the amount ate factor score of females was higher. Similar findings from the literature support the results of the current research which reported that food addiction is significantly high among females [11].

The results of the present study revealed that the emotional eating habits factor score of married people was high as compared to people who were single. This may be due to psychological changes when someone is in a relationship. On the other hand, this study also highlighted that social influence on eating habits and the amount is eaten factor score was also high among married people. This might be due to greater social interaction and get together after marriages. The current study also revealed that the convenience food factor score was higher among married people whereas TV watching factor score was also high among married people. This might be due to the reason that people do not have enough time to cook at home because both of them work and it is more convenient for them to bring cooked food rather cook at home. The present study showed that the social influence on activity factor score and parent encouragement activity factor score was high among married people where the amount of sleep factor score was high among single as compared to married people. This might be due to the study load or greater social interactions of single people. The current study highlighted that parent's weight/dieting behavior factor score was greater among married people where early maturation factor score was higher among single people. Another study results reveal that regular physical exercise was positively related to all four indicators for healthy dietary habits in both sexes [9]. Another study has shown that physical activity was strongly associated with different variables such as age, gender, physical activity preferences, and parental weight status [12].

According to the present study results, healthy eating factor score was high among people who were physically inactive which means that the people who are physically inactive have bad eating habits where the amount is eaten factor score is high among physically active people. The current study results showed that the physical activity factor score was high among people who are physically inactive. This might be due to the fact that physically inactive people like to spend time watching TV or DVD rather than going to the gym or it's not really important for them to be physically active. The results of the current study showed that TV watching factor score and mechanized transport factor score was high among physically active people. This might be due to a hurry in going to the office or to reach work on time. On the other hand, the results of the present study showed that the parents encourage activity factor score was higher among physically inactive people where the amount of sleep factor score was high among people who are physically inactive which means physically inactive people enjoy less sleeping hours than others. The results of this study revealed that early maturation was more among physically inactive people which might be due to increased body weight due to physical inactivity. Various studies have reported that the levels of physical activity are different in individuals of different age groups [13]. The results of the current study highlighted that healthy eating factor score, emotional eating factor score, social influence on eating factor score, the amount is eaten factor score, convenience food factor score, physical activity factor score, TV watching factor score, travel to work factor score, social influence on activity factor score and early maturation factor score is high among adults of age 48-57 years, where parent encourage activity factor score and mother's weight/dieting behavior factor score was high among adults of age 38-57 years. Different studies have shown the relationship of stress factors in association with levels of qualification in different individuals [14]. The results

of the present study showed that emotional eating factor score, convenience food factor score, physical activity factor score, and early maturation factor score was high among adults with matric qualification. This might be due to a lack of knowledge about a healthy diet and the benefits of physical activity among people with matric qualification. A similar study reported that the people who are highly educated have healthiest dietary and exercise habits as compared to people with a low level of education [15]. The present study results showed that stress factor among males and females was almost the same and no significant difference was found among them. The current study results highlighted that adults who are physically inactive have high-stress factors and the adults who are physically active have fewer stress factors. A study has reported the similar findings that increased physical activity was related to psychosocial well-being which shows that stress factor was low among people who were physically active [16]. Another study has also reported that a decrease in physical activity is strongly associated with stress factors [17]. This might be due to the fact that increased physical activity helps store laxthemind and the body which results in decreasing anxiety. Different studies have shown that the stress factor has an association with the marital status of the individuals along with its age and gender [18]. The present study results revealed that the stress factor was almost the same among single and married adults and there was no significant difference among them. Similarly, the stress factor was the same among adults of all age groups and no significant difference was found among them. The current study results highlighted that stress factor is significantly high among adults with matric qualification. This might be due to the fact that people who are not much educated have to work hard and they have a tough routine and low income which may lead to high-stress factors among them. A study with similar findings has also supported these results which revealed that less well-educated people were at greater risk of having depressive syndrome and required therapeutic interventions than those in other education categories [4].

Conclusion

The results of the current study concluded that females have more unhealthy eating habits and have a more social influence on eating habits than males, where males have bad emotional eating habits and bad sleep patterns. No significant difference was found in the stress factor among males and females. The present study concluded that married adults have more emotional eating habits and social influence on eating habits than single adults. The current study results also concluded that the amount was eaten and the use of convenience food is greater among married adults. On the other hand, TV watching pattern was also greater among married people. This study concluded that single people have bad sleep patterns than married people where no significant difference is found in the stress factor.

Recommendations

Global evidence shows a high prevalence of overweight and obese patients in our country but strategies to overcome the obesity rate are not incorporated in the healthcare plans. To improve treatment outcomes and reduce the rate of mortality and morbidity related to overweight and obesity, more studies should be conducted to assess the most crucial contributing risk factors for obesity that are affecting the health-related quality of life. Health-care providers should have an understanding of effective treatment approaches to treat obesity by resourceful means. General Practitioners should have a positive assertiveness towards the management of obesity including dietary constraints, improving physical activity, pharmacotherapy, and surgical interventions to overcome the risk factors related to obesity. Educating people about their actual weight, ideal weights, and prevention of weight gain are vital steps towards addressing the obesity issue.

Executive summary

Introduction: Obesity has become a serious global epidemic which poses a major health hazard to the human being. Globally, changing trends such as high intake of fast food, sedentary lifestyle, industrialization, and urbanization are significant key factors that are leading to an increase in the burden of overweight and obesity. The rise in obesity has also been linked been with depression and an increase in stigma and discrimination towards such obese individuals.

Objectives: The aim of the present study is to assess health behavior and depression among overweight/obese adults in Pakistan.

Methodology: A descriptive cross-sectional study design was used. Two different data collection tools i.e. Health Behavior Questionnaire (HBQ) and Hospital Anxiety and Depression Score (HADS) were used. The questionnaire was self-administered to a sample of 382 overweight/obese adults residing in Islamabad and Rawalpindi Pakistan calculated by using Raosoft and selected by convenience sampling technique. After data collection, data were coded and analyzed statistically by using Mann-Whitney and Kruskal Wallis Test.

Results: The results of the study highlighted that the healthy eating factor score and amount ate factor score was significantly high among females with a p-value of 0.029 and 0.008 respectively where the amount of sleep factor score with (p=0.000) was significantly high among males with a p-value of 0.001. The study results showed that emotional eating factor score, amount eaten factor score, convenience food factor score, TV watching factor score, travel to work factor score, and early maturation factor score was significantly high among adults with the age group of 48-57yrs.

Conclusion: This study concluded that health behavior is linked with gender, marital status, age, physical activity, and educational qualification of adults whereas stress was associated with physical activity and qualification of adults. Females had unhealthy eating habits where males have bad sleep patterns. The stress factor has an inverse relationship with qualification and physical activity. Healthcare professionals should design innovative interventions in order to improve healthy eating behavior and reduce depression and stigma associated with obesity.

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