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OBESITY: IS IT A COMMON HEALTH PROBLEM AMONG FACULTY MEMBERS AT THE UNIVERSITY? A CROSS-SECTIONAL STUDY

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ABSTRACT

Academic professionals are notably vulnerable to weight gain, often due to sedentary lifestyles, high-stress levels and irregular eating patterns, which exacerbate the risk of obesity and related health complications. This study aimed to evaluate weight status using anthropometric and dietary intake of academics at Jerash Private University. A cross-sectional study involved 103 faculty members from Jerash Private University in Jordan, selected randomly. Socio-demographic information and anthropometric measurements were collected, and dietary intake using a 24-hour recall and food frequency questionnaire was assessed. Of the total, 76.7% were males and 23.3% were females. The mean age was 47.85 ± 10.46 years, weight was 84.32 ± 16.06 kg, height was 171.04 ± 7.92 cm, waist circumference (wc) was 99.95 ± 16.05 cm and body mass index (BMI) was 28.73 ± 4.69 kg/m^2. Overweight was observed in 48.1% of males and 50.0% of females. There were no significant differences in macronutrient intake (energy, protein, fat, carbohydrate, and fiber) among the participants across the different BMI groups. Similarly, there were no significant differences in food groups intake among the participants across the different BMI groups, except for grain, where overweight participants had significantly the highest percent intake from recommended grain intake (38.12 ± 3.13; p = 0.037). The average recommended intake of food groups based on MyPyramid for normal, overweight and obese participants respectively were 8.06 ± 0.39 oz, 9.14 ± 0.16 oz and 9.83 ± 0.08 oz, from grain, 3.24 ± 0.14 cup, 3.57 ± 0.06 cup and 3.82 ± 0.05 cup from vegetables, 2.09 ± 0.08 cup, 2.27 ± 0.04 cup, and 2.44 ± 0.03 from fruit, 3.00 ± 0.00 cup from dairy (for all participants) and 6.26 ± 0.17oz, 6.70 ± 0.05 oz, and 6.94 ± 0.03 oz from protein. The academics had a high prevalence of obesity. Further studies investigating the actual cause of obesity in this category of population are needed.

Key words: Food group intake, Faculty members, Nutritional status, BMI, Overweight, Obesity

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INTRODUCTION

The growing prevalence of overweight and obesity has become a global public health concern, with significant implications for chronic disease risk and overall health outcomes [1]. Obesity, is a complex and multifactorial disease defined as excessive adiposity and is closely linked to an increased risk for many non-communicable diseases (NCDs) [2]. Overweight and obesity affect almost 60% of adults in the World Health Organization Eastern Mediterranean Regional Office (WHO EMRO). Recent estimates suggest that overweight and obesity are the fourth most common risk factors for NCDs in the Region, after high blood pressure, dietary risks and tobacco [3].

Obesity and overweight are significant public health issues in Jordan, with rising incidence rates over the past decades. According to the 2019 Jordan Population and Family Health Survey (JPFHS), approximately 35.5% of Jordanian women and 28.5% of Jordanian men aged 15-49 years were classified as obese. In addition, the prevalence of overweight individuals in Jordan is also high, affecting 36.5% of women and 46.2% of men in the same age group [4]. This adds more pressure on the healthcare system and makes it harder for public health programs to address the issue. In Jordan, as in many other countries, the issues of obesity and unhealthy weight gain are increasingly recognized across various populations, including academic professionals who face lifestyle challenges that contribute to unhealthy weight gain [5]. Academics often engage in sedentary activities, such as long hours of teaching, grading and research, which limit opportunities for physical activity. Moreover, high-stress levels associated with academic workloads, combined with irregular eating patterns, can exacerbate the risk of developing obesity and related comorbidities [5]. Studies have shown that chronic stress can increase cortisol levels, influencing fat storage and promoting unhealthy eating habits, which further contribute to weight gain [6,7]. Additionally, the academic environment often lacks structured opportunities for physical activity, making it challenging for individuals to maintain a healthy weight. Given these findings, addressing the issue of obesity among academic professionals requires targeted interventions that focus on promoting physical activity, improving dietary habits and managing stress [6, 8].

Irregular eating patterns are also common among academic professionals, with many relying on fast food or skipping meals due to time constraints [5]. These behaviors contribute to poor dietary quality, including high intakes of processed foods and low consumption of fruits, vegetables and whole grains, which are associated with an increased risk of obesity [5]. Furthermore, studies from Jordan and other countries in the region have identified rising obesity rates among adults,

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often linked to rapid urbanization, lifestyle changes and dietary transitions toward more energy-dense, nutrient-poor foods [9].
These lifestyle factors, combined with a lack of regular physical activity, create a cycle that increases the risk of developing obesity and related conditions such as metabolic syndrome, cardiovascular diseases, and type 2 diabetes [10, 11]. Addressing these issues requires tailored interventions that consider the specific stressors and dietary habits prevalent in academic environments, promoting healthier lifestyles to mitigate obesity risk. Existing research has highlighted the importance of maintaining a balanced diet and healthy body weight to reduce the risk of non-communicable diseases such as cardiovascular disease, diabetes and certain cancers [12].

Globally, poor dietary habits and obesity are major contributors to the rising burden of these conditions, as illustrated by the Global Burden of Disease Study, which highlights the significant impact of diet-related risk factors on NCD prevalence [13]. In Jordan, the prevalence of diabetes and other NCDs has increased over the years, underscoring the need for targeted interventions to address dietary and lifestyle behaviors [9]. However, limited data are available on the specific dietary habits and nutritional status of academic professionals in Jordan. Thus, the current study aimed to assess the weight status among a sample of academics employed at Jerash Private University. However, while dietary patterns and metabolic health have been examined in certain populations such as university students [5], limited data are available on the specific dietary habits and nutritional status of academic professionals in Jordan.

This study aimed to address the lack of data on the nutritional habits and health of academic professionals by providing an analysis of the dietary intake and anthropometric measurements among academics at Jerash Private University. The findings will offer important insights into the nutritional challenges facing this group, helping to better understand the factors contributing to their health and weight status.

MATERIALS AND METHODS

Study Design

A cross-sectional study that encompassed 103 faculty members with different academic ranks from different colleges and departments in Jerash Private University was conducted between November and January 2023. The authors filled out the questionnaires after interviewing the participants. The faculty members were selected randomly and the inclusion criteria were being a faculty academic at Jerash Private University, possessing the awareness and ability to understand and respond accurately to the questions, and willingness to participate in the study and

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sign the informed consent form, the exclusion criteria was pregnancy for female faculty members.

Sample size

The sample size was calculated by calculator Raosoft (*online)* based on the members of all the academic ranks in the University which was 210. The study sample represented 49% of the total population. With a 5% error margin, 85% confidence interval (CI), and 50% response distribution, and after the addition of 10%, the minimum sample size was 105 faculty members.

Data collection

Two faculty members and a nutritionist (Study researchers) conducted the participant (faculty members) interviews, gathered the necessary data, took the anthropometric data, and then filled out the study questionnaires and dietary surveys. The research team went to different colleges at Jerash Private University and randomly selected the faculty members by visiting the offices of faculty members who were not in lectures and through their office hours. Then, they interviewed them to complete the questionnaires after seeking consent to participate in the study.

Anthropometrics and Dietary Data Collection

A structured questionnaire was developed and translated into Arabic, then administered by directly interviewing the participants. The questionnaire was divided into three distinct parts. Socio-demographic data including age, physical activity and smoking habits, were gathered. All participants underwent physical examinations to determine their height (cm) weight (kg) and Waist circumference WC (cm). The Body mass index (BMI) (kg/ m^2) was calculated, and subjects were categorized as underweight (<18.5), normal weight (18.5-24.9), overweight (25-29.9), or obese (30) according to the international classification used by the World Health Organization WHO (2013). Body height was measured using Stanley Powerlock tape, and the subjects had no shoes on to ensure accuracy in measuring the height, while the weight was measured by a portable digital floor scale. The measurements were recorded to the nearest 0.1 cm and 0.1 kg, respectively.

Waist circumference was measured to the nearest 0.1 cm, by flexible ruler sewing tape [14]. Dietary data were collected by using 24-hour recall over two days, one work day through visiting their offices in the University, and the other day was in the weekend in which 24-hour recall data were collected by phone. Also, dietary data were gathered by a valid qualitative food frequency questionnaire that consists of 29 food items from the different groups of cereals, legumes, fruits, vegetables, dairy products, meats, poultry and fish, eggs, olive oil and other plant

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oils, butter, nuts, sweets, carbonated beverages and processed juices. In addition, the participants selected one of the following options that represent the frequency of food consumption like: (daily, weekly, monthly, yearly and the option of "I never eat"). The 24-hr recalls were analyzed using dietary analysis software (Food Processor SQL version 10.1.1, 2008, ESHA Research) with additional data on foods consumed in Jordan. The mean serving intake from each food group per day was compared to the Food Guide Pyramid.

Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 25 (IBM, Chicago, IL, USA). Frequencies and percentages were used to present the categorical variables, while means and standard deviation were used to present the continuous variables. Chi-square tests were used to assess the differences between categorical variables, while one-way ANOVA tests were used to analyze the differences between the means for continuous variables. The statistical significance was set at $p < 0.05$.

Ethical approval

The study protocol was submitted to the Ethics Committee of the Institutional Review Board (IRB) of the Deanship of Scientific Research at Jerash Private University, and was approved by the resolution number (2025/2024/1/1). The study was conducted in strict accordance with the Declaration of Helsinki and written consent was obtained from all of the participants. To preserve their anonymity and confidentiality, the data collected were processed anonymously.

RESULTS AND DISCUSSION

General information (Table 1)

A total of one hundred and three academics employed in Jerash Private University participated in this study. The mean age was 47.85 ± 10.46 years, weight was 84.32 ± 16.06 kg, height was 171.04 ± 7.92 cm, WC was 99.95 ± 16.05 cm and BMI were 28.73 ± 4.69 kg/m^2. Of the total sample, 76.7% was male and 23.3% female which was representative of the selected community. Thirty-eight-point eight percent of the participants were practicing exercises, 66% were nonsmokers and 48.5% were overweight (Table 1).

BMI and WC distributions (Table 2)

Table 2 shows the BMI and WC distributions among participants based on sex. As seen there were no significant differences in the prevalence of BMI and WC categories between male and female participants. Most of the male and female participants were overweight (48.1% and 50.0%, respectively), normal weight (12.7% and 29.2%, respectively) and obese (39.2% and 20.8%, respectively) and they had high (30.4% and 37.5%, respectively) or very high risk of cardiovascular

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disease (54.4% and 37.5%, respectively) based on WC, whereas, the prevalence of obesity in current study among male participants was 39%, and 20.8% among female participants.

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Macronutrients and food group intake based on BMI (Table 3)

The mean macronutrients and food group intake among the participants based on BMI are presented in Table 3. There were no significant differences among the participants across the different BMI groups in energy, protein, fat, carbohydrate and fiber. The intake (in gram) of carbohydrate among male participants were: 150.70 ± 68.96, 139.53 ± 56.12, and 136.87 ± 60.90 for normal, overweight, and obesity respectively. The intake (in gram) of carbohydrate among female participants were: 126.71 ± 62.49, 189.14 ± 65.76, and 127.73 ± 60.54 for normal, overweight, and obesity, respectively. The intake (in gram) of protein among male participants were: 62.80 ± 20.09, 62.59 ± 30.33, and 64.13 ± 25.55 for normal, overweight, and obesity respectively. The intake (in gram) of protein among female participants were: 56.17 ± 20.72, 62.70 ± 24.60, and 42.87 ± 10.81 for normal, overweight, and obesity respectively. The intake (in gram) of fat among male participants were: 50.95 ± 17.32, 53.14 ± 23.27, and 48.37 ± 21.79 for normal, overweight, and obesity, respectively. The intake (in gram) of fat among female participants were: 53.96 ± 25.20, 60.47 ± 26.03, and 38.41 ± 17.24 for normal, overweight, and obesity, respectively.

There were no significant differences in the average intake from all food groups among normal, overweight and obese participants. Similar results were seen in the intake showed as percent recommended from all groups, except for grain, where overweight participants had significantly higher percent intake from recommended grain intake (38.12 ± 3.13) in comparison to normal (31.40 ± 5.13) and obese participants (26.49 ± 3.05; p=0.037).

Sex-based food group intake based on BMI (Table 4)

Table 4 shows the sex-based mean macronutrients and food group (grain, vegetables, fruit, dairy, and protein) intake among the participants based on BMI. In contrast to the findings of the current study, the results of a study by Vieira *et al.* [15] showed that for teenagers who had a normal weight, the average percentage of daily energy consumption was 56.7% for carbohydrates, 154% for proteins and 27.9% for lipids, whereas for overweight adolescents, the average percentage of daily energy consumption was 52.7%, 17.1% and 30.2%, respectively. As explained above, the study of Vieira *et al* showed that the group of normal weight participants had the highest percent intake of carbohydrates, whereas in the present study the results showed that the group of the overweight participants had significantly the highest percent intake from grain which is considered a carbohydrate. They also found that the group of normal-weight adolescents tended to consume higher amounts of the group of cereals, roots, and tubers.

In their study that related to teachers, Aykut *et al.* [16] found that 46.1% of the teachers in Turkey were overweight [16]. These data are similar to this study's

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findings that most of the male and female participants were overweight (48.5% and 35%, respectively) [16].

Effect of physical activity on BMI

The prevalence of overweight/ obese office female workers in Riyadh city in Saudi Arabia was 58.3% (26% obese), according to a study conducted by Albawardi *et al.* [17]. They related the prevalence of overweight and obesity to the educational level which was a significant predictor of obesity. Also, income level, working in the public sector and physical inactivity were among the predictors for overweight and obesity.

The prevalence of inactivity in the current study was high 61.2%. Unfortunately, there was no data to describe their daily routine and what activities did they participate in and this was one of the limitations of the study. However, these findings are close to those of Albawardi [17], in Riyadh city in Saudi Arabia which reported that 52.1 % of the respondents were insufficiently active. The high prevalence of inactivity among the faculty members in the current study related to a certain extent to the type of their work as they spend most of the day at the university, so the available time for extra exercise is limited which led to low physical activity as present by the percentage (61.2%). The job of the faculty members requires a lot of time where they keep sitting either during the lectures, or throughout their office hours and preparing study papers. Based on the results of a study conducted by Dewi and Wirjatmedi [18] in Surabaya, Indonesia that included 32 office workers aged 25-55 -years, physical activity can reduce food intake by affecting the appetite. In addition, the effect of physical activity on appetite is influenced by the type of physical activity, exercise intensity, environmental temperature and characteristics of the exerciser. Therefore, in the above study, they concluded that increased physical activity and exercise habits were associated with decreased BMI and body fat percentage [18]. Furthermore, Fabunmi *et al.* [19] and her coworkers conducted a study to investigate physical activity parameters and Body mass index (BMI) among public secondary school teachers in Nigeria. The results showed that 70% of the overweight teachers, and 55.6% of obese ones lived either a sedentary or low-active lifestyle. The authors attributed the reason for the sedentary lifestyle of teachers to the long hours of sitting due to the nature of their work. The teachers mostly stand while teaching [19]. Also, the teachers assume a sitting position while marking students' answer scripts, planning for the next lecture and during teacher-to-teacher conversation. The above-mentioned explanation could also be used for the results of this current study since the participants in the two studies are teachers.

Effect of smoking on BMI

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In a Turkish study established by Kangalgil *et al*. [20] to evaluate the eating habits of teachers who worked in various primary schools in Ankara, more than one-third of teachers (36.5%) were smokers. These were almost similar results in the current study as 34% of the faculty members at Jerash University were smokers. As it is well known, smoking affects eating habits and causes insufficient and unbalanced nutrition. Also, smoking affects the ability to exercise and breathe normally. Furthermore, smoking may increase female smokers' exercise fatigue and decrease their average performance. It also reduces their maximal aerobic capacity. Smoking also reduces parasympathetic nerve activity and activates sympathetic cardiac control [20, 21].

Factors related to overweight and obesity

The results of the present study showed that there were no significant differences in the macronutrient intake among normal, overweight and obese male and female participants ($p > 0.05$). Similarly, there were no significant differences in the intake and percentage of recommended intake from grain, vegetables, fruits, dairy and protein among normal, overweight, and obese male and female participants ($p > 0.05$). These findings suggest that there are other factors not related to sex that may contribute to the prevalence of overweight and obesity among participants such as meal timing, sleeping hours, smoking, physical inactivity, pharmacological agents, some types of medical conditions like hypothyroidism, as well as cultural and behavioral changes in eating patterns.

Effect of meal timing on BMI

When it comes to meal timing, Albrecht [22] found that mistimed food intake in relation to the day/night cycle can lead to circadian disruption, which has been suggested to contribute to the development of obesity and associated cardiometabolic disorders. Food consumption that is out of synchronization with typical light/dark cycles could lead to impaired production of satiety hormones like leptin and ghrelin resulting in increased food consumption [23]. The feed/fast cycle, as well as the sleep/wake behaviors with light/dark cycles, can impact gut microbiota, which is considered an emerging mediating factor contributing to increased adiposity [24]. In addition, Rochelle *et al.* [25] examined the potential for manipulating the timing of nutrient intake and fasting periods as a therapeutic intervention to ameliorate weight gain and improve metabolic health [25]. In research established by Longo-Silva *et al.* [26] to study the association between the timing of the largest meal of the day and eating frequency with BMI and obesity, they found that consuming the largest meal earlier in the day, concentrating the majority of caloric intake during lunch, and the participants in the study having more than three meals a day, could be used as a promising intervention for preventing and treating obesity/overweight.

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Effect of sleeping hours on BMI

Another factor that can mediate the increase in body weight is inadequate sleep duration, as night shift patterns are unfavorable to sleep [27]. Antza *et al.* [28] found that shorter sleep duration could contribute to the development of obesity and type 2 diabetes. Also, it was found that a higher prevalence of obesity and cardiometabolic dysregulation was seen in people working on night shifts, as well as in those with changes in the time of sleep between working "days on" and "days off", work patterns which desynchronize the circadian clock [29]. Disturbed sleeping patterns are associated with increased energy intake, partly because of excessive snacking, mainly on foods high in fat and carbohydrates. Therefore, it is necessary to explore sleep routines that could enhance the efforts of obese and overweight people to lose weight, maintain their weight loss, and improve their overall health [30].

In a cross-sectional study of the National Health and Nutrition Examination Survey 2015–2016 that included a total of 2459 participants, the results revealed that there was a significantly higher overweight incidence in the short-sleep group compared to the normal-sleep group (OR = 1.825, 95%CI: 1.251–2.661, P = 0.004). Also, short-sleep (OR = 1.832, 95%CI: 1.215–2.762, P = 0.007) duration and long-sleep duration (OR = 1.370, 95%CI: 1.043–1.800, P = 0.027) were associated with higher prevalence of obesity. Therefore Li [31] concluded that there is an association between sleep duration and the occurrence of overweight and obesity, and that sleep duration less than 7 h increases the overweight and obesity rate nearly 2 folds compared to sleep 7–9 h [31].

Limitations

The current study was limited by the cross-sectional design, which disallowed a causality assumption. Another limitation was the single-center data collection and small sample sizes. In addition, it should be noted that the data in this study lack information about the type of physical activity, fat types, salt intake, meal timing, sleeping hours and food preparation methods as well as the place of meal consumption.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

The current results indicate that obesity is prevalent among academic staff. Also, there were no significant differences in general or based on sex in macronutrient intake or food groups between different BMI groups. This may indicate that other factors may affect their weight such as sleeping hours, type of physical activity, the preparation method of food, meal timing, and frequency. Therefore, we recommend further studies with larger samples and multicenter that take into consideration these factors to collect a sufficient database that can be relied on to

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set a recommendation for these groups of people to improve their life quality and health.

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Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of the Jerash University (approval number: 1/1/2024/2025).

Consent for publication

All authors have read and agreed to the published version of the manuscript.

Availability of data and materials

The data presented in this study are available on request from the corresponding author.

Competing interests

No competing interest.

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Author Contributions

Conceptualization, S.S. and L.A.; methodology, S.S.; investigation, S.S., F.H., L.A and A.S.A.; data curation, S.S., L.A., and A.S.A., writing—original draft preparation, S.S., F.H., and L.A; writing—review and editing, S.S., F.H., L.A and A.S.A.; visualization, S.S. and; supervision, S.S.

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Table 1: General characteristics of study participants (n=103)

	Mean ± SD
Age (years)	47.85 ± 10.46
Weight (kg)	84.32 ± 16.06
Height (cm)	171.04 ± 7.92
Waist circumference (cm)	99.95 ± 16.05
Body mass index (kg/m^2)	28.73 ± 4.69
	n (%)
Sex	
Male	79 (76.7)
Female	24 (23.3)
Exercises	
Yes	40 (38.8)
No	63 (61.2)
Smoker	
Yes	35 (34.0)
No	68 (66.0)
BMI categories	
Normal weight	17 (16.5)
Overweight	50 (48.5)
Obese	36 (35.0)

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Table 2: Body mass index and waist circumference distributions among participants based on sex

	Sex		*p*-value*
	Male	**Female**	
BMI categories			
Normal weight	10 (12.7)	7 (29.2)	
Overweight	38 (48.1)	12 (50.0)	0.089
Obese	31 (39.2)	5 (20.8)	
Waist circumference categories			
Low risk	12 (15.2)	6 (25)	
High risk	24 (30.4)	9 (37.5)	0.309
very high risk	43 (54.4)	9 (37.5)	

**p*-value <0.05 considered significant
*BMI categories: Normal weight= 18.5- 24.9 Kg/m^2, overweight= 25-29.9 Kg/m^2, obese= 30 Kg/m^2 and more

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Table 3: Macronutrients and food group intake among the participants based on BMI (n=103)

	Mean ± SEM			*p*-value*
	Normal weight	Overweight	Obese	
Energy (kcal)	1269.45 ± 101.95	1362.41 ± 61.31	1174.12 ± 71.99	0.139
Protein (g)	60.07 ± 4.85	62.61 ± 4.08	61.00 ± 4.29	0.928
Fat (g)	52.27 ± 5.10	54.98 ± 3.45	46.91 ± 3.64	0.281
Carbohydrate (g)	141.11 ± 16.85	151.43 ± 8.73	135.56 ± 10.15	0.496
Fiber (g)	11.83 ± 1.44	12.47 ± 0.88	11.33 ± 1.09	0.708
Grain intake (oz)	2.41 ± 0.34	3.42 ± 0.27	2.61 ± 0.31	0.060
% Grain intake from the recommended	31.40 ± 5.13	38.12 ± 3.13	26.49 ± 3.05	**0.037**
Grain average recommended intake (oz)	8.06 ± 0.39	9.14 ± 0.16	9.83 ± 0.08	-
Vegetable intake (cup)	0.43 ± 0.10	0.74 ± 0.09	0.64 ± 0.11	0.183
% Vegetable intake from the recommended	13.29 ± 3.05	21.26 ± 2.58	16.71 ± 2.79	0.193
Vegetable average recommended intake (cup)	3.24 ± 0.14	3.57 ± 0.06	3.82 ± 0.05	-
Fruit intake(cup)	1.07 ± 0.38	1.39 ± 0.21	1.20 ± 0.21	0.679
% Fruit intake from the recommended	49.24 ± 15.46	61.82 ± 9.27	49.64 ± 8.25	0.585
Fruit average recommended intake (cup)	2.09 ± 0.08	2.27 ± 0.04	2.44 ± 0.03	-
Dairy intake(cup)	0.15 ± 0.09	0.13 ± 0.04	0.16 ± 0.06	0.940
% Dairy intake from the recommended	4.88 ± 3.04	4.46 ± 1.21	5.25 ± 2.12	0.946
Dairy average recommended intake (cup)	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00	0.999
Protein intake(oz)	2.84 ± 0.42	3.07 ± 0.39	3.64 ± 0.42	0.467
% Protein intake from the recommended	46.76 ± 7.41	45.65 ± 5.80	52.39 ± 6.05	0.707
Protein average recommended intake (oz)	6.26 ± 0.17	6.70 ± 0.05	6.94 ± 0.03	-

*p-value <0.05 considered significant

Table 4: Macronutrients and food group intake distribution among male and female participants based on BMI categorization (n=103)

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	Male			*p*-Value*	Female			*p*-Value*
	Normal weight	Overweight	Obese		Normal weight	Overweight	Obese	
Energy (kcal)	1472.63 ± 487.28	1283.37 ± 432.83	1247.08 ± 504.04	0.445	1318.54±574.41	1539.71± 432.99	1032.93 ± 426.09	0.153
Protein (g)	62.80 ± 20.09	62.59 ± 30.33	64.13 ± 25.55	0.973	56.17±20.72	62.70±24.60	42.87±10.81	0.245
Fat (g)	50.95 ± 17.32	53.14 ± 23.27	48.37 ± 21.79	0.689	53.96± 25.20	60.47± 26.03	38.41±17.24	0.257
Carbohydrate (g)	150.70 ± 68.96	139.53 ± 56.12	136.87 ± 60.90	0.829	126.71± 62.49	189.14±65.76	127.73±60.54	0.092
Fiber (g)	11.05 ± 4.83	12.82 ± 6.53	11.33 ± 6.81	0.568	12.94 ± 7.49	11.28 ± 4.88	11.32 ± 4.40	0.820
Grain intake (oz)	2.79 ± 1.53	3.40 ± 1.83	2.75 ± 1.89	0.319	1.82 ± 0.65	3.47 ± 2.29	1.77 ± 0.94	0.107
% Grain intake from the recommended	34.00 ± 24.58	36.22 ± 19.24	27.77 ± 18.93	0.222	27.50 ± 10.33	44.00±28.95	18.80± 8.76	0.100
Grain average recommended intake (oz)	9.00 ± 1.25	9.47 ± 0.86	9.94 ± 0.25	-	6.71 ± 0.95	8.08 ± 1.24	9.20 ± 1.10	-
Vegetable intake (cup)	0.47 ± 0.30	0.78 ± 0.62	0.62 ± 0.67	0.284	0.38 ± 0.52	0.62 ± 0.58	0.84 ± 0.45	0.407
% Vegetable intake from the recommended	13.10 ± 8.36	21.58 ± 18.00	15.71 ± 16.74	0.208	13.57±17.78	20.25±19.88	24.50± 14.27	0.611
Vegetable average recommended intake (cup)	3.60 ± 0.46	3.71 ± 0.36	3.87 ± 0.22	-	2.71 ± 0.27	3.13 ± 0.31	3.50 ± 0.50	-
Fruit intake(cup)	1.45 ± 1.93	1.35 ± 1.37	1.25 ± 1.34	0.916	0.51 ± 0.54	1.52 ± 1.81	0.93 ± 0.37	0.303
% Fruit intake from the recommended	62.20 ± 77.43	57.16 ± 55.69	50.90 ± 52.90	0.835	30.71±34.13	76.58±91.16	41.80±18.66	0.348
Fruit average recommended intake (cup)	2.25 ± 0.26	2.33 ± 0.24	2.47 ± 0.12	-	1.86 ± 0.24	2.08 ± 0.19	2.30 ± 0.27	-
Dairy intake(cup)	0.20 ± 0.47	0.09 ± 0.20	0.18 ± 0.41	0.396	0.07 ± 0.19	0.28 ± 0.36	0.00 ± 0.00	0.123
% Dairy intake from the recommended	6.60 ± 15.61	2.87 ± 6.53	6.10 ± 13.54	0.405	2.43 ± 6.43	9.50 ± 12.11	0.00 ± 0.00	0.124
Dairy average recommended intake (cup)	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00	-	3.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.00	-
Protein intake(oz)	3.06 ± 1.55	3.33 ± 2.87	3.85 ± 2.63	0.614	2.54 ± 2.07	2.28 ± 2.32	2.35 ± 1.29	0.967
% Protein intake from the recommended	45.90 ± 22.17	48.62 ± 41.72	55.29 ± 37.81	0.703	48.00±41.79	36.50±37.03	34.40±18.74	0.752
Protein average recommended intake (oz)	6.65 ± 0.41	6.80 ± 0.30	6.97 ± 0.12	-	5.71 ± 0.62	6.38 ± 0.43	6.80 ± 0.27	-

values presented as Mean ± SD
* p-value <0.05 considered statistically significant

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