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PAKISTAN BIOMEDICAL JOURNAL

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Need of Vaccine development in Pakistan

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In recent years, vaccines have played a critical role in protecting against a wide range of diseases, from influenza to polio. As the world continues to grapple with the COVID-19 pandemic, the need for effective vaccines has never been greater. In Pakistan, the situation is no different. According to data from the World Health Organization, Pakistan has seen over 880,000 confirmed cases of COVID-19 and over 18,000 deaths as of January 2021 [1]. With numbers like these, it is clear that the development of vaccines is essential for bringing the pandemic under control and protecting the people of Pakistan.

One of the primary reasons for the importance of vaccine development in Pakistan is the country's relatively limited resources. While many developed nations have the financial and technological resources to effectively manage the spread of COVID-19 through measures such as widespread testing and contact tracing, Pakistan has fewer resources at its disposal. In such a situation, vaccines provide an important tool for controlling the spread of the virus and protecting the population.

Another reason for the need for vaccine development in Pakistan is the country's high population density. With over 220 million people living in a small area, Pakistan has one of the highest population densities in the world [2]. In such a densely populated country, it is especially important to have effective measures in place to prevent the spread of infectious diseases like COVID-19. Vaccines can play a crucial role in this regard by providing immunity to large numbers of people, thereby reducing the overall transmission of the virus.

There is also the issue of economic impact to consider. The COVID-19 pandemic has had a devastating effect on economies around the world, and Pakistan has been no exception. According to the World Bank, the pandemic is expected to have a significant impact on Pakistan's economy, with GDP growth forecast to fall from 2.4% in 2020 to -0.5% in 2021 [2]. One way to mitigate the economic effects of the pandemic would be to bring it under control as quickly as possible, and vaccines are an essential tool for achieving this.

In order to address these challenges and improve vaccination rates in Pakistan, it is essential that efforts be made to increase the availability and accessibility of vaccines. This could involve investing in infrastructure and training to ensure that vaccines are properly stored, handled, and administered, as well as implementing outreach programs to educate the public about the importance of vaccination. In addition to these efforts, there is also a need for ongoing vaccine research and development in Pakistan.

In conclusion, the need for vaccine development in Pakistan is clear. With limited resources, a high population density, and a struggling economy, the country needs effective tools for controlling the spread of COVID-19 and protecting its citizens. Vaccines have the potential to play a crucial role in this regard, and it is important for Pakistan to prioritize their development and distribution. By prioritizing vaccine development and increasing access to vaccines, we can take an important step towards a healthier and more prosperous future for all.

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PAKISTAN BIOMEDICAL JOURNAL

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Volume 6, Issue 1 (January 2023)

Original Article

Assessment of Lifestyle and Dietary Habits and its Effect on Psychological Health Among University Students

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ABSTRACT

Admission to the university is a new stage in a student's life that is typically related with freedom, jovial activities, and lifestyle changes and behavior entailing eating habits. **Objective**: To look into university students' lifestyles and significant dietary habits. **Methods**: A Cross-Sectional study was conducted at the University of Lahore for a 4-month duration with a sample size of 100 students by using Global sleep assessment questionnaire (GSAQ) and Kessler Psychological Distress Scale (K10). **Results**: Analysis of the students' dietary habits held between 50-day scholars and 50 hostelites, revealed the adoption of several undesired dietary habits. 10% of hostelites are underweight while in comparison percentage of day scholar is 5% less, 34% are normal, 7% overweight and 4% are obese in contrast of hostelites whose percentages are 32%, 5% and 3% respectively. The percentage of daily meal consumption is higher that of hostelites. 28% of day scholars were having snacks while 29% of hostelites were having snacks. **Conclusions**: This study revealed the challenges that university students experience in maintaining a healthy lifestyle nutritionally, especially when they live in hostels.

INTRODUCTION

The time spent at university is a vital time period that may impact one's lifestyle quality and eating habits and one's health as an adult in the long run [1]. Though, in the face of the financial restrictions that many reports, the university time period also includes stressors for students attempting to accomplish achievement in their academic ambitions [2]. As students' progress from secondary school to university and gain independence, they are continuously pushed to make healthy dietary choices. Such a transition into early adulthood is typically characterized by an unhealthy lifestyle, during which young people may develop long-term health behaviors [3]. College students, in particular, are exposed to poor eating behaviors that contribute to body weight increase [4], and they choose their own meal choices, which are sometimes influenced by the cost of food and the availability of fast food [3]. For a variety of reasons, university populations are susceptible in their dietary habits. Students' understanding of healthy food options may be lacking, which may have a detrimental impact on their eating habits [4, 5]. Financial considerations may also play a role, as fats and sweets are less expensive [6]. It has been stated that academic success in school and higher education is influenced by one's well-being. As a result, improving the health and well-being of all members of a university or college entails fostering successful learning [7-9]. Psychological morbidity is frequent among students, and it is particularly noticeable among basic science students and females. The psychological well-being of medical students has to be handled more thoroughly and paying

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more attention to removing risk factors may help to avoid further unhappiness [8]. Many individuals regard stress to be a normal aspect of life in today's fast-paced, competitive society. Students are not immune to emotional pressure and worry due to the educational system's increasing demands on them. Undergraduate education, in particular, is infamous for being both time-consuming and emotionally draining [10]. Young individuals are predisposed to harmfully affect their eating habits in terms of eating a diversity of fruit and vegetable, and as a result the frequency and quantity of consumption changes significantly [11]. Older adults have a far harder time breaking bad behaviors they picked up as children. If health professionals want to improve the community's health-promoting habits and well-being, they should focus their efforts on young people [12]. Many of the variables contributing to health concerns in older people can be avoided if they are identified and addressed early on. Early treatments can change behavioral patterns that put young people at risk for health problems later in life [13]. Important results emerge when the abovementioned restrictions are considered. Physical inactivity among university students is a severe health issue. Physical inactivity has lately been named as one of the top ten causes of death and morbidity worldwide by the World Health Organization [14]. Understanding the prevalence of (in)sufficient physical activity in university students gives useful information regarding the scope of the present problem within this demographic and the relevance of intervening in this health-related behavior for health professionals [13, 15]. Students' access to physical activity options, as well as the extent to which present possibilities are sufficient for students' activity preferences and needs, should be considered by university health services. In this study the lifestyle and eating habits of university students was assessed and the results among day scholars and students living in hostels was compared. There is a need to create awareness for the improvement of lifestyle, eating habits and psychological distress through nutritional education, nutritional seminars and prompt counselling so that the consequences regarding this problem could be reduced.

METHODS

It was a Cross-Sectional study carried out at The University of Lahore. Duration of the study was 4 months. Sample size was 100 and Non-Probability Convenient Sampling technique was used for sample collection. Inclusion Criteria: 1. Day scholars and students living in hostels of both genders aged 18-30 years studying at University of Lahore. Exclusion Criteria: 1. Non-cooperative students. 2. Students from other universities. Global sleep assessment questionnaire (GSAQ) was used for the assessment. The 11 items cover mood, life activities and medical issues as they relate to sleep, along with symptoms associated with insomnia. Obstructive sleep apnea, restless legs syndrome/periodic limb movement and parasomnias. The Kessler Psychological Distress Scale (K10) is a simple measure of psychological distress. The K10 scale involves 10 questions about emotional states each with a five-level response scale. The measure can be used as a brief screen to identify levels of distress. The rules and regulations set by the ethical committee of University of Lahore were followed while conducting the research and the rights of the research participants were respected. Written informed consent attached was taken from all the participants. All information and data collection were kept confidential. Participants were remained anonymous throughout the study. The subjects were informed that there are no disadvantages or risk on the procedure of the study. They were also be informed that they will be free to withdraw at any time during the process of the study. After taking informed written consent, data was collected by the researcher with the help of attached pre-tested data collection tool (questionnaire/Proforma). Data were collected according to the variables of the questionnaire which are as follows: 1. Demographic data were taken from the participants. 2. Questions were asked from students of University of Lahore. Data were tabulated and analyzed with the help of SPSS version 21.0. The data were reported using descriptive and inferential statistics. The quantitative variables like age, etc. was assessed by using mean standard deviation and standard errors. The qualitative variables were reported using percentages and frequencies.

RESULTS

Figure 1 shows frequency distribution of day scholars and Hostelites. The study was done with 50 day scholars and 50 hostelites.

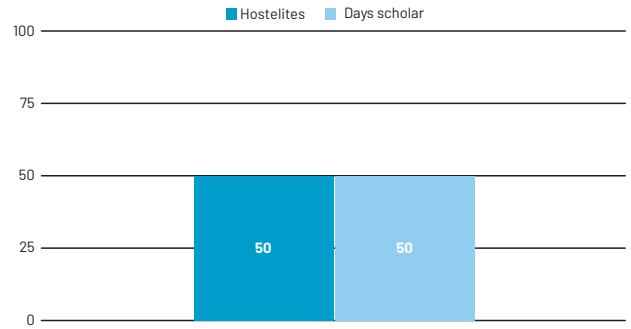

Figure 1: Frequency distribution of hostelites or day scholars

Table 1 shows that 10% of hostelites are underweight while in comparison percentage of day scholar is 5%, 34% are normal, 7% overweight and 4% are obese in contrast to

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hostelites whose percentages are 32%, ,5% and 3% respectively.

Sr. #	Body Mass Index		Frequency		p-value
			Hostelites	Day scholars	
1.	Below 18.5	Underweight	10	5	0.17
2.	18.5 to 24.9	Normal Weight	32	34	
3.	25 to 29.9	Overweight	5	7	
4.	30 or more	Obese	3	4	
5.	Total		50	50	

Table 1: Distribution of Body Mass Index (BMI) of individuals

Table 2 shows frequency distribution and significance of different factors studied. Several questions were asked from hostelites and day scholars and their response were recorded

Questions	Response	Frequency (n=50)		p-value
		Hostelites	Day scholars	
Distribution of Breakfast an important component in diet	No	5	5	0.884
	Yes	31	31	
	Sometimes	9	12	
	Rarely	5	2	
Distribution of Stimulants Consumed	Never	8	13	0.750
	1-3 times	20	20	
	4-7 times	12	10	
	More than 7 times	10	7	
Distribution of fast food consumed in a week	Never	4	4	0.095
	1-3 times	10	42	
	4-7 times	29	3	
	More than 7 times	7	1	
Distribution of no. of meals eaten in a day	1-2 times	13	5	0.435
	3-4 times	26	25	
	5-6 times	8	10	
	More than 6 times	3	0	
Distribution of mindful sensation of hunger	Yes	38	37	0.464
	No	12	13	
Frequency distribution of physically hungry	Yes	33	29	0.002
	No	17	21	
Distribution of time spent walking daily	Less than 10 minutes	11	13	0.707
	10-20 minutes	17	16	
	30-40 minutes	15	12	
	More than 40 minutes	7	9	
Distribution of difficulty falling asleep	Never	11	10	0.447
	Sometime	17	24	
	Often	14	10	
	Always	8	6	
Distribution of Sleep difficulties interfering with daily activities	Never	12	10	0.787
	Sometimes	22	19	
	Often	12	14	
	Always	4	7	
Distribution of loud snoring	Never	34	35	0.007
	Sometimes	11	10	
	Often	3	2	
	Always	2	3	
Distribution of restless or crawling feelings in legs at night	Never	23	26	0.307
	Sometimes	20	22	

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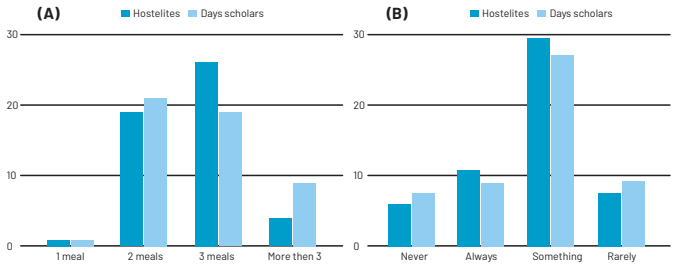
	Often	7	1	
	Always	0	1	
Distribution of nightmares or sleepwalking	Never	23	20	0.300
	Sometimes	14	17	
	Often	13	4	
	Always	0	2	
Distribution of feeling nervous in the past	Score 5	5	5	0.009
	Score 4	9	13	
	Score 3	27	18	
	Score 2	9	6	
	Score 1	0	8	
Frequency distribution of feeling so nervous that nothing could calm you down	Score 5	3	5	0.002
	Score 4	20	11	
	Score 3	18	8	
	Score 2	9	14	
	Score 1	0	12	
Distribution of feeling restlessly or fidgety	Score 5	9	5	0.264
	Score 4	18	14	
	Score 3	15	14	
	Score 2	7	9	
	Score 1	1	8	
Frequency distribution of feeling so restless that could not sit still	Score 5	11	7	0.005
	Score 4	14	12	
	Score 3	19	8	
	Score 2	6	11	
	Score 1	0	12	
Distribution of feeling as everything was an effort	Score 5	12	10	0.376
	Score 4	16	16	
	Score 3	17	12	
	Score 2	5	7	
	Score 1	0	5	
Distribution of worthless feeling	Score 5	3	12	0.000
	Score 4	15	6	
	Score 3	28	13	
	Score 2	4	10	
	Score 1	0	9	
Total		50	50	

Table 2: Frequency distribution and p-value of different factors studied

The consumption of meals per day indicates that 1% of both groups are consuming1 meal a day while hostelites are consuming 19, 26 and 4% of 2, 3 and more than 3 meals daily respectively whereas 21, 19 and 9% of day scholars are consuming 2, 3 and more than 3 meals a day accordingly (Figure 2A). As far as intake of snacks between meals of day scholars is concerned, it shows that 5% of them avoid the intake of snacks between meals,28% have it sometimes and 8% consume snacks rarely. Whereas hostelites consume more snacks,11%daily while 29 % sometimes and very few of them about 4% don't eat snacks(Figure 2B). The dietary habit of milk consumption of hostelites shows that 5% consuming it more than 7 times, 8% 4-7 times ,22 % 1-3 times and 15 % of them don't prefer milk in contrast to them day scholars 19% do not prefer milk while 17% consuming it 1-3 times, 11% 4-7 times and 3% more than 7 times (Figure 2C). Trend of intake of soft drinks shows that 15 % of hostel students never drink, 18%are having it 1- 3 times, 11% 4-7 times and 6% more than 7 times per week but 13% of day scholars are drinking it 1-3 times, 3% 4-7 times and 15% are not having soft drinks(Figure 2D).



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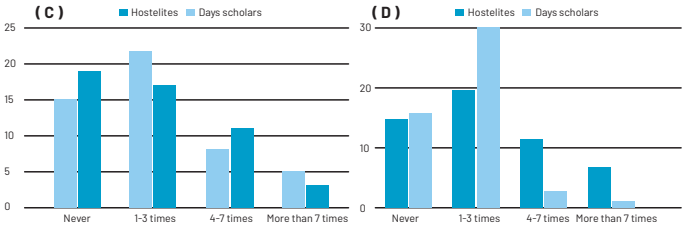

Figure 2: (A) Frequency distribution of No. meals in daily diet (B) Frequency distribution of snacks between meals (C) Frequency distribution of cups of milk consumed in a week (D) Frequency distribution of soft drinks in a week

DISCUSSION

The present study shows that the trend of breakfast consumption is almost similar among the two groups as 5% of both do not consider breakfast an important part of their diet, 31% view it as an important component of their daily eating habits, 9% of hostelites and 12% of day scholars were recorded to have breakfast sometimes while 5% of hostelites and 2% of day scholars rarely had breakfast. Similarly, a study conducted on 145 total students in a university of Ankara showed that 44.8% of the students consumed breakfast 2-3 times weekly. The percentage of students who had breakfast daily was 44.1% and the percentage that had breakfast only on weekends was 11.1% [16]. As far as snacking between meals is concerned, the results show that 9% of day scholars take snacks in between meals daily, 5% do not have any, 28% have snacks sometimes and 8% rarely snack between meals. As opposed to day scholars, the hostelites seem to be consuming more snacks. 11% of them have snacks between meals on a daily basis, 4% do not consume snacks, 29% have snacks sometimes while 6% rarely snack between meals. Similar findings were observed in research conducted in multiple universities of South India that showed snacking was a habit for a significant amount of the students (54.3 percent) in addition to major meals [17]. An assessment of the weekly intake of stimulants like coffee and tea among both groups was done and it was found that hostelites take these stimulants slightly more often than day scholars. 13% of day scholars were seen to not be taking coffee or tea at all, 10% were having them 4-7 times a week and 7% were having them more than 7 times weekly. Hostelites on the other hand were seen taking coffee and tea in a somewhat higher amount. In a week, about 7% of them were having tea or coffee more than 7 times, 12% had them 4-7 times and a small proportion of 8% were found to not be taking them at all. Another study showed similar results for caffeine consumption among university students in New Zealand as it was seen that ninety-nine-point one percent of students were found to be consuming caffeinated items on a quite frequent basis. Coffee, tea, and chocolate were found to be the most common. Out of which coffee, energy drinks and tea made up most of the total consumption [18]. The dietary habit of milk consumption in a week for hostelites was found to be greater than that of day scholars. In a week, 5% of hostelites were consuming it more than 7 times, 8% had milk 4-7 times a week, 22% had it 1-3 times and 15% of them preferred to not consume milk at all. In contrast, the weekly milk consumption of day scholars is a bit less as 19% prefer not to consume milk, 17% are consuming it 1-3 times, 11% take it 4-7 times and 3% consume milk more than 7 times in a week. Although in one previous research conducted on a university student population, no changes were seen in the frequency with which various dairy products were consumed based on age, type of living, degree of university education, or their class schedules [19]. The weekly fast-food consumption of hostelites was found to be more frequent than that of day scholars. 29% of hostelites were having fast food 4-7 times, 7% had it more than 7 times and 10 % had it 1-3 times a week. Whereas for day scholars, 3% of them were having fast food 4-7 times, 1% was having it more than 7 times and 42% had it 1-3 times a week. Both groups were seen to have the same 4% of students who were not having fast food at all. Likewise, a high percentage of students were found to be consuming fast food in a study among university students in Bangladesh conducted in 2014. Fast-food consumption was found to be common in 55.9 percent of men and 44.1 percent of women. At least once a week, 56 percent of university pupils ate fast food, and 44 percent did so on a routine basis [20]. The physical activity trends among hostelites and day scholars were also observed and hostelites were found to be more active than day scholars. The results showed that 33% of hostelites were physically active while 17% were not. Whereas 29% of day scholars were physically active while 21% were not. Similarly, research was conducted among three hundred participants at Hitit University, Turkey about Physical activity and quality of life in different sports departments. In comparison, men had a greater level of physical exercise than women. It was also revealed that when physical activity rates increased, the quality-of-life scores also increased and there was a positive association between the two [21]. As for the sleeping patterns among the two groups, it was seen that hostelites were having difficulty falling asleep slightly more often as compared to day scholars. Among the group of hostelites, 11% were those who never had difficulty falling asleep, 17% faced difficulty sometimes, 14% often, and 8% answered that they always had difficulty falling asleep. Whereas for the group of day scholars, 10% were those who never had difficulty falling asleep, 24% faced difficulty sometimes, 10% often, and 6% answered that they always had difficulty falling asleep. Similarly, some research conducted on

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seven-thirty-five total participants at Lebanon university showed that 43.7 percent of the total study population were good sleepers. It was also found that 57.8 percent of males faced more sleeping complications than female's 40.8 percent [22].

CONCLUSIONS

This study revealed the challenges that university students experience in maintaining a healthy lifestyle nutritionally, especially when they live in hostels. The current results suggest a concerning prevalence of psychological distress, as well as bad food and sleeping habits and lifestyle behaviors that should be targeted and modified. The comparison of day scholars and students living in hostels revealed that hostelites have more psychological distress, their sleeping quality is worse and they have bad eating habits. There is the need for strategies and coordinated efforts at the family, university, community, and government levels to reduce the prevalence of unhealthy eating habits and their consequences among the students while promoting healthy eating habits among our youth.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Evaluation of Psychological Perceptions and Effectiveness of Health-Related Technologies in University Students

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ABSTRACT

Young people are using wearable technology and mobile health applications in astronomically greater numbers to keep track of their adaption to healthy lifestyles. **Objectives:** To evaluate psychological perceptions, motivation levels, satisfaction levels and effectiveness of health-related technologies in university students. **Methods:** This was a cross-sectional study done at the University of Lahore's Lahore Campus, for the duration of 4 months. Technique used to calculate sample size was convenient sampling technique. A self-governing questionnaire was used to calculate data from 100 university students. Several statistical techniques, including cross tabulation and descriptive statistics, were used to examine the data using SPSS software. **Results:** Regarding psychological perceptions, 61% were conscious about their body image but 39% were not and 54% felt anxious after eating but 46% did not feel so. Regarding Motivation for physical activity, 37% were somewhat motivated, 30% a little bit motivated, 27% not at all and 6% were very well motivated. Regarding satisfaction levels, 52% were satisfied, 12% were highly satisfied and 18% were highly dissatisfied. Regarding effectiveness levels, 27% found these apps somewhat effective, 26% a little effective, 10% very effective and 37% not at all effective. **Conclusion:** These tools and innovations have a beneficial effect on university students' adoption of healthy lifestyles.

INTRODUCTION

The use of innovative technologies, such as fitness bands and mobile health apps, has become increasingly prevalent in our society. These tools have the potential to greatly impact the dietary well-being and living choices of individuals, particularly university students. The purpose of this research article is to examine the role of these tools and technologies in the dietary well-being and living choices of university students [1]. This article aims to provide a comprehensive understanding of the effects of these tools and technologies on the nutritional wellness and lifestyle behaviors of university students, as well as potential implications for future research and practice [2]. In recent years, the use of mobile health (m-health) apps and fitness watches has become increasingly popular among university students. M-health apps and fitness watches are designed to help individuals monitor and improve their health and fitness, by providing information and resources such as nutritional information, exercise tracking, and goal setting [3, 4]. These tools have the potential to be particularly beneficial for university students, who may be facing the added stress and demands of academic and social responsibilities, as well as the challenges of maintaining a healthy lifestyle in a university setting [5]. However, it is important to consider the psychological perceptions and effectiveness of these tools in order to fully understand their impact. For example, it is important to consider how the use of these tools may impact an individual's motivation and self-efficacy, as well as the extent to which they are able to incorporate the information and resources provided by these tools into their daily lives [6, 7]. Additionally, it is important to consider how these tools may impact the social

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interactions and support networks of university students, as well as the extent to which they are able to maintain healthy behaviors over time [8]. The literature on m-health apps and fitness watches is still in the early stages, but the studies that have been conducted show some promising results. These studies suggest that m-health apps and fitness watches may be effective in promoting healthy behaviors among university students, but more research is needed to fully understand the impact of these tools [9-11]. In conclusion, the role of innovative technologies, such as fitness bands and mobile health apps, is an important and emerging area of research. The use of these tools has the potential to greatly impact the nutritional wellness and lifestyle behaviors of university students, but it is important to consider the psychological perceptions and effectiveness of these tools in order to fully understand their impact [14, 15]. Further research is needed to fully understand the impact of these tools on the nutritional wellness and lifestyle behaviors of university students, and to identify potential implications for future research and practice. This research will help to inform the development and implementation of m-health apps and fitness watches for university students, in order to promote healthy behaviors and improve the overall well-being of this population [16].

METHODS

This cross-sectional research was carried out at the Defense Road Campus of the University of Lahore. The trial lasted for four months. A n=100 sample was used. It was done via non-probability convenient sampling. Only university students studying allied health sciences between the ages of 18 and 26 were eligible to participate in the poll, regardless of their ethnicity or gender. Students who are above 26 years old and under the age of 18 are excluded. The study was not open to students studying subjects other than allied health sciences. Students at universities besides the University of Lahore were excluded. Students that were not cooperative were not included in the sample. All data for this research were gathered randomly via a survey utilizing a thorough self-governed questionnaire that was approved by professionals. All of the questions were based on many aspects, such as demographic data, anthropometric measures, use of fitness apps, the effects of utilizing exercise equipment on one's health, physical activity, and lifestyle changes. The head of the department at the University Institute of Diet and Nutritional Sciences and the ethical committee both signed the ethical permission. Before collecting any data, the participants' permission was obtained. Participants were given questionnaires to complete, and they were instructed to do so. While conducting the study, the ethical guidelines established by the university of Lahore's ethics council were adhered to, and the participants' rights were respected. The following variables from the questionnaire were used to gather data: Participants were prompted to provide anthropometric measures and demographic information. Participants immediately posed questions to the group. The data were tabulated and analyzed using SPSS version 21.0. The qualitative data, including gender, the kind of exercise equipment used, etc., were presented as percentages and frequencies. Using chi-square, the relationship between the variables was discovered.

RESULTS

Table 1 shows characteristics of participants according to different categories. 67% participants were of normal weight while 14% and 18% were underweight and overweight respectively and only 1% was obese. 64% were females and 36% were male. 40% were at intermediate level while 33% graduated, 21% in matriculation, 4% in masters and 2% were at PHD level. 78% participants were aware of nutritional education while 22% were not. On the other hand, 60% had no genetic history and 40% participants had family history of obesity/overweight. 67% belonged to upper middle class and 7% belonged to low class while 15% were lower middle class and 11% belonged to high socioeconomic class. 62% had optimal health status, 8% had very poor health. 14% had poor and 16% were very healthy. However, 38% participants were liked eating out with friends, 34% liked eating alone and 29% with family. On the other hand, 35% participants did 30 minutes physical activity,30% for 60 minutes, 28% for more than one hour and 7% not at all.

Variables	Frequency (%)
BMI Categories	
Underweight	14 (14%)
Normal Weight	67 (67%)
Overweight	18 (18%)
Obese	1 (1%)
Gender Categories	
Male	36 (36%)
Female	64 (64%)
Qualification Level	
Matric	21 (21%)
Intermediate	40 (40%)
Graduation	33 (33%)
Masters	4 (4%)
PhD or Higher	2 (2%)
Nutritional Education	
Yes	78 (78%)
No	22 (22%)
Family History of Obesity/ Overweight	
Yes	40 (40%)

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No	60 (60%)
Socioeconomic Status	
Lower class	7 (7%)
Lower middle class	15 (15%)
Upper middle class	67 (67%)
High/ elite class	11 (11%)
Nutritional Status	
Very poor	8 (8%)
Poor	14 (14%)
Optimal	62 (62%)
Very Healthy.	16 (16%)
Food preferences	
Eating alone	34 (34%)
Eating with friends outside	38 (38%)
Eating on table with family	29 (29%)
Duration of physical activity per day	
30 minutes	35 (35%)
60 minutes	30 (30%)
More than one hour	28 (28%)
Never	7 (7%)
Brands Used	
Total	100(100%)

Table 1: Distribution of participants according to different categories

Out of 100 participants, 35% were not interested in using trackers or health apps while 18% used wearables, 22% used mobile health apps and 25% chose other options they had (Figure 1).

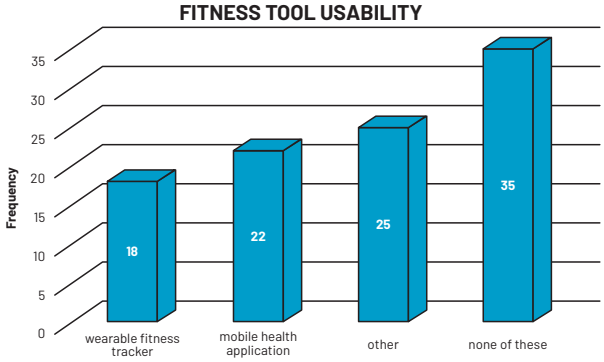

Figure 1: Distribution of frequent fitness tools usability by participants

Out of 100 participants, 25% used other brands that are not mentioned, 23% used apple, 13% fitbit, 15% Samsung, 20% never used and 4% used garmin (Table 2).

Brand names	Frequency (%)
Fitbit	13 (13%)
Garmin	4 (4%)
Samsung	15 (15%)
Apple	23 (23%)
Others	25 (25%)
Don't use	20 (20%)
Total	100 (100%)

Table 2: Distribution of brands used for health and fitness wearable technology

Out of 100 participants,43% used trackers for less than a month, 21% for up to three months, 18% for up to 5 months and 14% for a year (Figure 2).

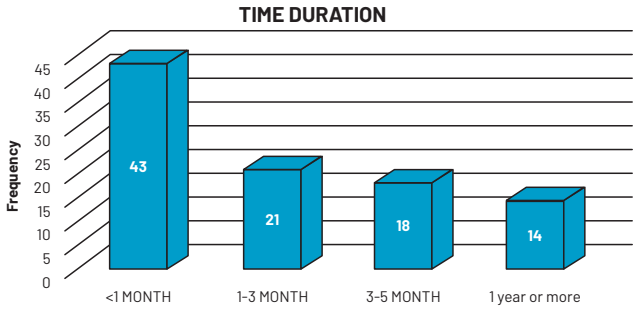

Figure 2: Distribution of time duration of using wearable fitness trackers

Out of 100 participants, 29% use fitness buddy, 10% map my run, 9% 10k runner, 7% runkeeper and my fitness pal while 4% used runtastic and others for work out sessions (Figure 3).

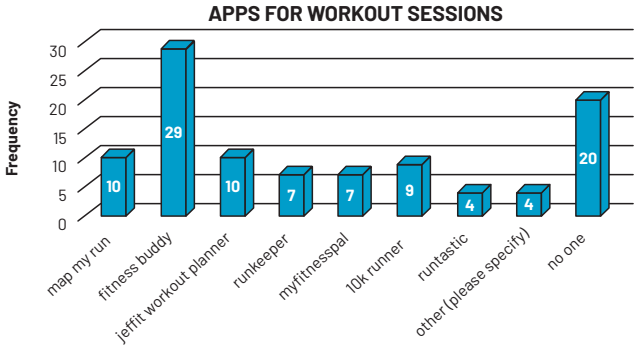

Figure 3: Distribution of health and fitness apps used for workout sessions

Out of 100 participants, 24% tracked their diet for a few days per year, 17% never, 20% for few months, 10% a few days per week and 4% for certain meals (Figure 4).

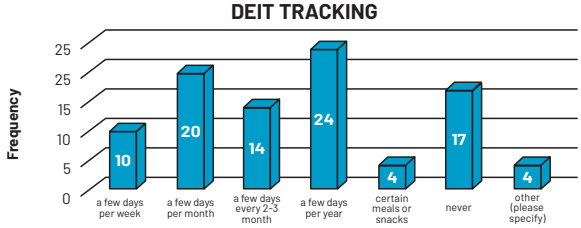

Figure 4: Distribution of frequency of diet tracking through health and fitness wearable technology

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Out of 100 participants, 61% were conscious about their body image but 39% were not and 54% felt anxious after eating but 46% did not feel so (Table 3).

Psychological perceptions	Frequency (%)		
	Yes	No	Total
Body-image consciousness	61	39	100.0
Anxiety after meals	54	46	100.0

Table 3: Distribution of participants according to psychological perceptions of using wearable fitness technology

Regarding Motivation for physical activity, 37% were somewhat motivated, 30% a little bit motivated, 27% not at all and 6% were very well motivated. Regarding satisfaction levels, 52% were satisfied, 12% were highly satisfied and 18% were highly dissatisfied. Regarding effectiveness levels, 27% found these apps somewhat effective, 26% a little effective, 10% very effective and 37% not at all effective (Table 4).

Variables	Frequency (%)
Motivation level categories	
A little bit motivated	30 (30%)
Somewhat motivated	37 (37%)
Very well motivated	6 (6.0%)
Not at all	27 (27%)
Satisfaction level categories	
Highly satisfied	12 (12%)
Satisfactory	52 (52%)
Highly dissatisfied	18 (18%)
Dissatisfactory	18 (18%)
Effectiveness level categories	
Very effective	10 (10%)
Somewhat effective	27 (27%)
A little effective	26 (26%)
Not at all	37 (37%)
Total	100 (100%)

Table 4: Distribution of Motivation, Satisfaction and effectiveness level of using health and fitness apps

DISCUSSION

This 4-month-long cross-sectional research was conducted at the Lahore Campus of the University of Lahore. Convenient sampling technique was used to calculate sample size. A self-governing questionnaire was used to calculate data from 100 university students. Several statistical techniques, including cross tabulation and descriptive statistics, were used to examine the data using SPSS software. Regarding satisfaction levels, 52% were satisfied, 12% were highly satisfied and 18% were highly dissatisfied. Regarding effectiveness levels, 27% found these apps somewhat effective, 26% a little effective, 10% very effective and 37% not at all effective. Present study shows that 22 out of 100 university students who participated in research used mHealth apps while 18 out of them used wearable fitness trackers in order to improve diet and exercise habits. Similar results deduced by Kettunen *et al.*, in 2018 that teenagers are pleased about digital coaching. They prefer instruction and counselling, particularly in the areas of physical activity and diet [17]. In our study, regarding motivation for physical activity, 37% were somewhat motivated, 30% a little bit motivated, 27% not at all and 6% were very well motivated. A study conducted in 2018 showed that the use of m-health apps and fitness watches improved the physical activity levels of university students [18]. In present study, 24% tracked their diet for a few days per year, 17% never, 20% for few months, 10% a few days per week and 4% for certain meals to improve their diet. A study conducted by the Leung and Chen showed that the use of m-health apps and fitness watches improved the dietary habits of university students [19]. Considering psychological perceptions of health-related technology, 61% were conscious about their body image but 39% were not and 54% felt anxious after eating but 46% did not feel so. A study by Lin *et al.*, observed that perceived psychological empowerment and improved hedonic wellbeing may be a more potent strategy to promote the efficacy of mobile health apps [20]. Another study by Ventola, in 2014 showed that these devices had a great impact on patient's life and clinical management [21].

CONCLUSIONS

According to the study's findings, the majority of participants utilize fitness watches and apps. Most people use these tools to monitor their weight and to get healthier. Although step counting, step recording, and calculating calories burned during activity are the main uses of fitness trackers. These tools and technology have a favorable effect on university students' adoption of healthy lifestyles.

Conflicts of Interest

The authors declare no conflict of interest.

Conflicts of Interest

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Original Article

A Study of Urinary Tract Problems using Ultrasound Imaging

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ABSTRACT

Problems of the Urinary Tract are one of the most widespread infectious diseases, if left uncontrolled; it could really result in serious complications that can cause acute and chronic urinary tract failure. **Objective:** To assess the Urinary Tract Problems using Ultrasound Imaging. **Methods:** It is cross-sectional research conducted at the Radiology Department of District Health Quarter Hospital, Gujranwala, Pakistan from 1, August 2022 to 30, November 2022. Abdominal Ultrasound Techniques was performed in a supine position. A sample size of 102 patients has been calculated via a convenient sampling technique. The patients under the age of 10 years were not included. The data was collected, calculated, and analyzed using SPSS version 26.0. **Results:** Most of the patients complaining Urinary Tract Problems were between the age of 40 to 80 years 59(57.8%). It was more common in males 54(52.9%). Most of the patients came for Ultrasound had the past history of UTI. Most of the patients came with pain and burning while urination 36(35.3%). The most common cause of Urinary Tract Problems was hydronephrosis 74(72.5%). **Conclusion:** Urinary Tract Problems were developed in any age group and most common in males. The major cause of Urinary Tract Problem was Hydronephrosis.

INTRODUCTION

A prevalent clinical issue, urinary tract infections can affect the lower urinary tract [1]. The urinary system is made up of the organs that are responsible for urinating and releasing it from the body, including the urethra, urinary bladder, ureters, kidneys, and other supporting organs [2]. The urethra is only 3 to 4 cm length in females. The urethra in men measures about 20 cm in length [3]. If pyuria and bacteriuria are found in a urine sample that has been correctly collected, a UTI can be identified [4]. Urological disorders, such as vesicoureteral reflux, constipation, or voiding dysfunction, increases the risk of UTI. Numerous risk factors that increase the likelihood of treatment failure, recurrent infections, substantial morbidity and death, and unfavorable outcomes might further aggravate UTIs [5]. UTI is classified according to site, episode, symptoms, and complicating factors. It is advised to have an ultrasound of the urinary system to rule out obstructive uropathy [6]. According to United States the most frequent infections treated as outpatients in are UTIs [7]. Urinary tract infections cause over 8 million doctor visits annually in the United States [8]. According to Worldwide150 million people get Urinary Tract Problems [9]. The Department of Nephrology at the Sindh Institute of Urology and Transplantation in Karachi, Pakistan, states that a number of variables, including age, gender of the female patient, co-morbidities, the type and dosage of immunosuppression, the use of urological equipment, and the length of the post-kidney transplant follow-up period,

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affect the occurrence of UTI [10]. Chronic renal scarring may be related to UTI and result in hypertension, proteinuria, pregnancy complications and even progressive renal failure [11]. UTI has become the most common hospital-acquired infection, accounting for 35% of nosocomial infections, and it is the second most common cause of bacteremia in hospitalized patients [12]. Urinary tract infections occur commonly both in inpatient and outpatient settings [13]. Compared to men, UTI is more common in women [14]. One of the most frequent causes of unexpected fever in newborns is a urinary tract infection. Males are more frequently affected during the first 12 weeks of life, probably because structural abnormalities are more common. An ultrasound is one of the suggested diagnostic images in the assessment of the UTI in males [15]. It is frequently brought on by digestive tract bacteria that can rise to the urethral opening and cause infection. (15) Based on the underlying causes, the mortality rate for older adults with UTI can range from 0% to 33% [16]. The method of choice for this study is to use ultrasound imaging to diagnose a few disorders in a variety of individuals, including males, females, and children [17]. Ultrasonography of the renal tract is recommended at the very least to check for any lesions or anatomical anomalies such hydronephrosis or stones [5]. Along with the identification of blockage, masses, calculi, and vascular anomalies, it also includes the evaluation of renal size, cortical thickness, and echogenicity [18]. The objective of the current study was to determine the frequency and pattern of urinary symptoms among patients visiting a hospital. The current study will instruct the people about pain and burning while urination and prepare radiologists to identify the different conditions of pain in lower urinary tract.

METHODS

A descriptive cross-sectional study conducted at the District Health Quarter Hospital, Gujranwala, Pakistan. The data were collected during the period of 4 months from 1st August 2022 to 30th November 2022. The data were collected using simple random sampling. Abdominal Ultrasound Techniques was performed in a supine position. A sample size of 102 patients has been calculated via a convenient sampling technique. The patients under the age of 10 years were excluded. The patient of any gender was included. The patients of diseases other than lower urinary tract problems were excluded [19]. The equipment used for scan is Toshiba Ultrasound Machine [20]. Convex probe with frequency 3.5-6MHz was used to get optimum result [21]. The data were collected, calculated, and analyzed using SPSS version 26.0.

RESULTS

Most of the patients complaining urinary tract problems were between the age of 40 to 80 years 59 (57.8%). It was more common in males 54 (52.9%). Most of the patients came for ultrasound had the past history of UTI. Most of the patients came with pain and burning while urination 36 (35.3%). The most common cause of urinary tract problems was hydronephrosis 74 (72.5%). Table 1 shows the sonographic findings of the patients. The sonographic findings of patients were bladder wall thickened 6(5.9%), free floating internal echoes 4(3.9%), renal simple or cortical cyst 8(7.8%), enlarged prostate 4(3.9%), ureter dilatation 2(2.0%), and renal concretions 12(11.8%).

Sonographic findings	F (%)
Bladder wall thickened	6(5.9)
Free floating internal echoes seen	4(3.9)
Renal simple or cortical cyst	8(7.8)
Enlarged prostate	4(3.9)
Ureter dilatation	2(2)
Renal concretion	12(11.8)
Others	66(64.7)
Total	102(100)

Table 1: The sonographic findings of patients

Table 2 shows the level of hydronephrosis, hydro pelvis and hydroureter in patients. The patients with mild were 16(15.7%), moderate 4(3.9%), severe 2(2.0%) and focal 6(5.9%).

Level of hydronephrosis, hydro pelvis and hydroureter	F (%)
Mild	16(15.7)
Moderate	4(3.9)
Severe	2(2)
No	74(72.5)
Focal	6(5.9)
Total	102(100)

Table 2: Shows the level of hydronephrosis, hydro pelvis and hydroureter in patients

Table 3 shows the causes of urinary tract problems. The causes were obstructive uropathy 6(5.9%), renal and ureteric stones 9(8.8%), pregnancy 5(4.9%), benign prostatic hypertrophy 6(5.9%), hydronephrosis 74(72.5%) and others 2(2.0%).

Causes	F (%)
Obstructive Uropathy	6(5.9)
Renal and Ureteric Stones	9(8.8)
Pregnancy	5(4.9)
Benign Prostatic Hypertrophy	6(5.9)
Hydronephrosis	74(72.5)
Others	2(2)
Total	102(100)

Table 3: The causes of urinary tract problems

DISCUSSION

Urinary tract problems are most common disease in

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hospital setting. Initial urinary tract problems are mainly occurred due to obstruction of urinary tract. Obstruction is occurred due to stones or lesions located in renal ureteric and urinary bladder [22]. The normal urinary tract is an open system that carries urine without a clear anatomic break from the renal tubules to the urethra [23]. The current study was actually conducted at the Radiology Department of the District Health Quarter Hospital in Gujranwala to measure the findings of ultrasound in the urinary tract. In the current study 102 patients were examined on ultrasound who were expected to have urinary tract problems. The patients that were taken in the current study mostly the males 54(52.9%) between the age group of 40 to 80 years 59(57.8%). A similar study by Lo *et al.,* showed that males had greater UTI prevalence's. The prevalence of etiologic agents observed in this study with regard to gender and age reflect the pattern seen in a population that spontaneously seeks care at a DHQ hospital. Past history of UTI was the strongest risk factor in the current study. The current study showed that mostly patients had come with the past history of UTI 70(68.6%). A recent study by Lo *et al.,* found that a history of UTI was a major risk factor for urinary tract problems, which primarily affected men [24]. According to this study mostly patients came to hospital with pain and burning sensation while urination 36(35.3%). The current findings visualized on ultrasound shows that most common was hydronephrosis 74(72.5%), hydroureter or hydro pelvis which was the most common cause of urinary tract problems. A previous study by Fatima *et al.,* published in 2018 showed the similar results that the classification of hydronephrosis had been assessed on the degree of dilatation of pelvicalyceal system of the kidneys [25]. According to current study the renal and ureteric stones were the 2nd major cause of urinary trat problems either present in kidneys or urinary tract. The relative risk of UTI in kidney transplant patients is increased by renal stone disease. The current study showed the renal parenchymal changes that were also the important findings which checked the corticomedullary dimensions of the kidneys. Mostly patients were diagnosed with Grade I echogenicity 18(17.6%). The researcher Donatini *et al.,* showed the similar findings of the corticomedullary findings of the kidneys [26].

CONCLUSIONS

In conclusion, most of the patients that were admitted to the radiology department were adult males who had symptoms of pain and burning during urination. The most frequent cause of UTI was hydronephrosis, hydroureter, or hydro pelvis, which is also the most common finding on ultrasonography.

Conflicts of Interest

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Original Article

Antibacterial Activities of Various Antibiotics Against Klebsiella pneumoniae in Clinical Isolates

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ABSTRACT

Antibiotic resistance is not a latest phenomenon, since the introduction of antibiotics, bacteria are noted to posses some resistance. Antibiotic resistance refers to bacteria's capacity to withstand the effects of antibiotics. **Objective:** To compare the antibacterial effects of different drugs on *Klebsiella pneumoniae* clinical isolates. **Methods:** A cross-sectional investigation was conducted in a hospital in Lahore, Pakistan, collecting 1,400 samples over the course of a year. Antibiotic susceptibility testing was performed using the Kirby-Bauer disc diffusion method. **Results:** The results showed that Imipenem, Gentamycin, Amikacin, Augmentin, Linezolid, Levofloxacin, Ceftazidime, Norfloxacine, and Cefazolin were the most effective antibacterial agents against K. pneumoniae. On the other hand, K. pneumoniae was highly resistant to Meropenem, Cephalothin, Rifampicin, Cefoxitin, and Ampicillin. **Conclusion:** The study highlights the growing concern of antibiotic resistance in *K. pneumoniae* and the importance of preventative measures such as responsible use of antibiotics, development of new treatments, and implementation of infection control strategies in healthcare settings to effectively manage and prevent the spread of resistance.

INTRODUCTION

A Gram-negative bacteria called *Klebsiella pneumoniae* is frequently linked to nosocomial diseases such pneumonia, septicemia, and urinary tract infections. Treatment of infections brought on by *K. pneumoniae* has become increasingly difficult due to this bacterium's rising resistance to widely used medicines [1, 2]. The purpose of this study was to compare different drugs' antibacterial effects on *K. pneumoniae* clinical isolates. Ampicillin and sulbactam, followed by imipenem and ceftazidime, were reported to have the strongest action against *K. pneumoniae* in one investigation [3, 4]. Amikacin was found to be effective against *K. pneumoniae* in a different investigation, however certain clinical isolates showed resistance to the drug. According to research comparing the effectiveness of cefotaxime and ceftriaxone in treating infections brought on by the bacteria *K. pneumoniae*, cefotaxime was superior to ceftriaxone in treating isolates of *K. pneumoniae* that were resistant to other antibiotics [5, 6]. Another research examined the effectiveness of tigecycline against *K. pneumoniae* and discovered that it had a modest effect; nevertheless, certain clinical isolates showed resistance to the drug. The study also discovered that the action against *K. pneumoniae* was enhanced when tigecycline was combined with other medicines [7, 8]. Ciprofloxacin and levofloxacin shown modest effectiveness against *K. pneumoniae* in research on the activity of fluoroquinolones against this bacterium, however resistance was also noted in certain clinical isolates [9, 10]. The previous studies emphasize the different levels of antibiotics' efficacy against *K. pneumoniae.* Ampicillin-sulbactam and imipenem, among other antibiotics, had strong action against this bacteria, but cefepime shown modest activity [11, 12]. Additionally, several clinical isolates of *K. pneumoniae* showed signs of

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drug resistance. This emphasizes the necessity of ongoing study into the creation of fresh antibiotics and the improvement of current antibiotic treatments to successfully treat infections brought by *K. pneumoniae* [13].

METHODS

A cross-sectional investigation was conducted in the pathology division of the Fatima Memorial Hospital in Lahore, Pakistan. Over the course of a year, 1,400 samples including blood, pus, swabs, sputum, urine, CSF, and semen were collected from various wards at the hospital. The sample containers were labeled with the collection time, source, and date and transported to the lab for analysis within an hour of being collected. The samples were grown on various medium plates (Eosin thiazine Agar, Mannitol Salt agar, TCBS Agar, MSA agar, MacConkey Agar, and enteric bacteria Agar) and stored for 24 hours at 37 °C in an incubator to create pure cultures. The colony morphology on Mac-Conkey agar was used to identify the clinical isolates. Standard identification and susceptibility techniques were used to identify the species, and gram-negative bacteria were identified as pink-colored organisms in gram-stained smears. Antibiotic susceptibility testing was performed using the Kirby-Bauer disc diffusion method. A colony from the plate was mixed and emulsified in a tube of sterile saline solution. The agar plates were created using Muller Hinton. A sterile cotton swab was used to streak the dried MHA plate surface with the broth culture. Antibiotic discs were positioned on the plate using sterile forceps and incubated for 24 hours at 37 °C. The size of the zone of inhibition for each drug was measured in millimeters and compared to a standard interpretation chart to determine the susceptibility of the bacteria to antibiotics. Data was analyzed using SPSS version 22.0. Both antibiotic sensitivity and resistance were evaluated, and the proportion of sensitivity and resistance was used to calculate an antibiotic's antibacterial activity.

RESULTS

Antibiotics which showed high sensitivity against Klebsiella species were Imipenem (100%), Gentamycin (99%), Amikacin (99%), Augmentin (99%), Linezolid (99%), Levofloxacin (84%), and Ceftazidime (78%), Norfloxacine (76%), Cefazolin (75%). Klebsiella species were highly resistant to Meropenem (100%), Cephalothin (99%), Rifampicin (98%), Cefoxitin (98%), and Ampicillin (85%). Other antibiotics with high resistance were Ceftriaxone (83%), Cefazolin (75%), Cefuroxime (75%), and Cefixime (67%)(table 1).

Antibacterial agent	*Klebsiella pneumoniae* (105)	
	Sensitive n (%)	Resistance n (%)
Amikacin	104 (99.0%)	1 (1.0%)
Ampicillin	16 (15.0%)	89 (85.0%)
Augmentin	104 (99.0%)	1 (1.0%)
Cefazolin	26 (25.0%)	79 (75.0%)
Cefepime	37 (35.0%)	68 (65.0%)
Cefixime	35 (33.0%)	70 (67.0%)
Cefoxitin	2 (2.0%)	103 (98.0%)
Ceftriaxone	18 (17.0%)	87 (83.0%)
Ceftazidime	82 (78.0%)	23 (22.0%)
Cefuroxime	26 (25.0%)	79 (75.0%)
Cephalothin	1 (1.0%)	104 (99.0%)
Ciprofloxacin	66 (63.0%)	39 (37.0%)
Gentamycin	104 (99.0%)	1 (1.0%)
Imipenem	105 (100.0%)	0 (0.0%)
Levofloxacin	88 (84.0%)	17 (16.0%)
Linezolid	104 (99.0%)	1 (1.0%)
Meropenem	0 (0.0%)	105 (100.0%)
Nalidixic Acid	36 (34.0%)	69 (66.0%)
Nitrofurantoin	36 (34.0%)	69 (66.0%)
Norfloxacin	80 (76.0%)	25 (24.0%)
Ofloxacin	67 (64.0%)	38 (36.0%)
Rifampicin	2 (2.0%)	103 (98.0%)

Table 1: Antibacterial activities against *Klebsiella pneumoniae*

DISCUSSION

The findings of the Friedrich *et al.*, research under consideration show that different antibiotic types have different degrees of efficiency against *K. pneumoniae*. Ampicillin-sulbactam and imipenem, two antibiotics, shown strong activity against this bacterium, but cefepime, another drug, demonstrated moderate action [14, 15]. Antibiotic combinations with other antibiotics, shown better action against *K. pneumoniae*. This emphasizes the significance of combining antibiotics to improve the efficacy of treatment for *K. pneumoniae*. However, the research also revealed that certain clinical isolates of *K. pneumoniae* had antibiotic resistance [17, 18]. This is a developing worry since *Klebsiella* pneumoniae infections are becoming harder to treat as a result of the bacteria's increasing drug resistance. The public's health is seriously threatened by the introduction of K. pneumoniae strains that are multi-drug resistant since it reduces the range of possible treatments. To treat infections brought on by *K. pneumoniae*, new medicines must be developed and existing antibiotic regimens must be improved [19]. The development of antibiotic resistance can also be prevented by using antibiotics properly. Antibiotic resistance among bacteria may rise as a result of overuse and abuse, making it more challenging to treat diseases in the future. Fang *et al.*, study offered significant new information on how different antibiotics interact with clinical isolates of *K. pneumoniae* to fight bacteria [20].

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While certain medications had excellent antibacterial action against this bacterium, others had very moderate antibacterial activity, and other clinical isolates had antibiotic resistance. To effectively treat infections brought on by *K. pneumoniae*, new medicines must continue to be developed and existing antibiotic regimens must be improved.

CONCLUSIONS

The results of this investigation showed a higher prevalence of antibiotic resistance in *K. pneumoniae*. The most effective antibacterial agents against *K. pneumoniae* infections were Linezolid, Imipenem, Amikacin, and Gentamycin. However, it is imperative to note that the development of antibiotic resistance is a growing concern in the field of medicine. To effectively manage and prevent the spread of antibiotic resistance, preventative measures must be taken. These measures may include the responsible use of antibiotics, the development of new treatments, and the implementation of infection control strategies in healthcare settings. By taking these steps, the medical community can work to mitigate the impact of antibiotic resistance and ensure effective treatment for bacterial infections.

Conflicts of Interest

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Original Article

Trigger Factors of Consuming Tea and Coffee in University Students

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ABSTRACT

Consuming excessive amounts of tea and coffee can have negative effects on your health, including increased anxiety, disrupted sleep patterns, and digestive issues. **Objective:** The objective of this study was to assess trigger factors after consuming tea or coffee. **Methods:** A random sample of 150 female students from the University of Lahore willingly participated in a survey aimed at evaluating the link between tea consumption and its trigger factors. Data was collected using questionnaires comprising questions related to excessive tea or coffee consumption. **Results:** Results showed that participants felt anxiety, insomnia, digestive issues, caffeine addiction, rapid heart rate, fatigue, headache and other symptoms after excessive tea or coffee consumption. There was an association between excessive consumption of tea or coffee as the chi-square value is significant ($p= 0.025$) whereas irregular menstrual cycle also shows a significant association with excessive consumption of tea or coffee ($p=0.000$). **Conclusions:** The findings show a significant association between excessive tea or coffee consumption and the trigger factors studied, including irregular menstrual cycles. This study could be used to inform public health campaigns aimed at promoting healthy beverage consumption habits.

INTRODUCTION

Iron deficiency is a major public health concern worldwide, affecting approximately 1.6 billion people, particularly women of reproductive age [1]. It is a leading cause of anemia, which is associated with a range of negative health outcomes, including impaired cognitive function, reduced work productivity, and increased morbidity and mortality [2]. One potential cause of iron deficiency is excessive consumption of tea and coffee, which are known to contain compounds that can inhibit the absorption of iron in the body [3]. Tea and coffee are popular beverages consumed worldwide, with estimated global consumption of tea and coffee at 273 billion liters and 162 billion liters, respectively [4, 5]. Despite the widespread consumption of these beverages, there is a paucity of research on the potential link between tea and coffee consumption and iron deficiency. To address this gap in the literature, a population-based cross-sectional study was conducted on the association of iron deficiency caused by tea and coffee consumption among 150 female students at the University of Lahore. A purposive sampling technique was used to recruit participants who met specific inclusion criteria, and data were collected using questionnaires comprising questions related to excessive tea or coffee consumption. The study aims to investigate the factors that trigger excessive consumption of these beverages. The findings of this study could have important implications for public health, particularly in the prevention and management of iron deficiency anemia. Previous research has shown that excessive consumption of tea and coffee can impair the absorption of iron in the body, leading to iron deficiency

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anemia [6, 7]. Studies have also suggested that caffeine, the primary active ingredient in tea and coffee, can have a range of negative health consequences, including increased anxiety, disrupted sleep patterns, and digestive issues [8, 9]. Additionally, research has found that tea and coffee consumption may be associated with irregular menstrual cycles in women [10, 11]. Efforts have been made to promote healthy dietary habits among university students, as they are a vulnerable population due to their busy schedules and reliance on convenience foods [12, 13]. There is a need for further research to explore the potential link between tea and coffee consumption and iron deficiency, as well as the mechanisms underlying this association. Additionally, further studies are warranted to explore the relationship between tea and coffee consumption and menstrual irregularities in women. In this context, the present study aims to contribute to the existing literature on the potential health risks associated with excessive tea and coffee consumption. The findings of this study could inform the development of interventions aimed at promoting healthy dietary habits among university students and reducing the burden of iron deficiency anemia.

METHODS

This study investigated the relationship between iron deficiency and the consumption of tea and coffee among 150 female students at the University of Lahore, using a population-based cross-sectional design and purposive sampling technique. To be eligible for inclusion, participants had to be between 18-30 years of age and consume at least 2-3 cups of tea or coffee, while those under 18 or over 30, those who did not consume tea or coffee, and those with any pre-existing medical conditions were excluded. The administered questionnaire consisted of 43 questions, divided into 2 main parts. The first part included questions concerning demographic characteristics such as age, gender, marital status, educational level, BMI, residential status, and residential level. The second part consisted of questions related to trigger factors after the consumption of tea or coffee such as insomnia, anxiety, dehydration, rapid heart rate, disturbance in the menstrual cycle, headache, digestive issues, addiction, and fatigue. Written informed consent was obtained from all participants. Data was analyzed using descriptive and inferential statistics and the chi-square test was used to assess associations between variables. Participants' confidentiality was maintained throughout the study. The findings of this study may shed light on the impact of tea and coffee consumption on iron deficiency, as well as other negative health consequences, and may inform efforts to promote healthy dietary habits among university students.

RESULTS

To summarize the information presented in Figure 1, out of the 150 participants, the majority (141) were between the ages of 18-24, while the remaining 9 were between 25-30. In terms of BMI, 89 participants had a normal BMI, 27 were overweight, 31 were underweight, and 3 were obese. In terms of marital status, 145 participants were unmarried and 5 were married. With respect to education level, 126 were pursuing a graduate degree, 15 were in pre-graduate studies, and 9 were in post-graduate studies. In terms of socio-economic status, 109 were middle-class, 32 were upper-class, and 9 were lower-class. Finally, 122 participants lived in urban areas, while 28 lived in rural areas.

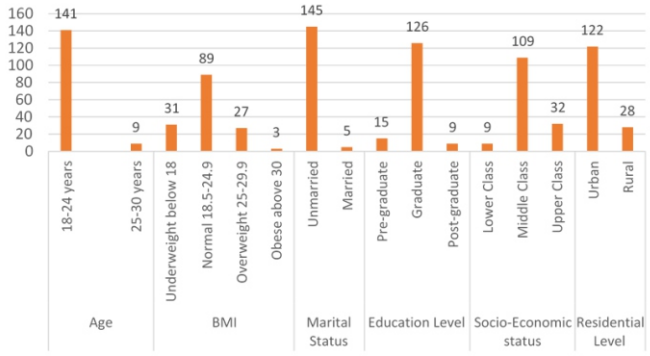

Figure 1: Demographic characteristics of the participants

According to Figure 2, results showed that after the consumption of tea or coffee between 150 participants, 107 participants felt anxiety, 122 participants felt insomnia, 80 participants experienced digestive issues, 79 participants were caffeine addicted, 127 participants experienced rapid heart rate, 52 participants felt fatigued, 60 participants experienced headache, 76 participants felt dehydration, and 147 participants experienced an irregular menstrual cycle.

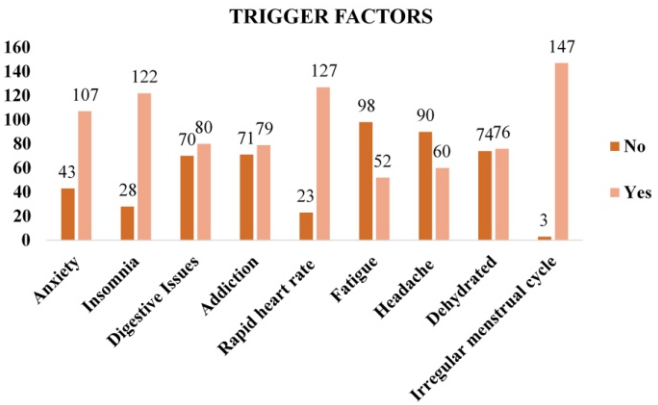

Figure 2: Trigger factors after consuming tea or coffee

Results showed that there was an association between excessive consumption of tea or coffee and anxiety among

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university students as the chi-square value is significant (p= 0.025) whereas irregular menstrual cycle also shows a significant association with excessive consumption of tea or coffee among university students as the shown by chi-square value (p= 0.000)(Table 1).

Sr No.	Past 4 weeks, excessive consumption of tea or coffee		No	Yes	p-value
1.	Anxiety	All of the time	41	107	0.025
		Some of the time	2	0	
2.	Irregular menstrual cycle	All of the time	2	146	0.000
		Some of the time	1	1	

Table 1: Comparison between excessive consumption of tea or coffee and anxiety & irregular menstrual cycle

DISCUSSION

The findings of this study suggest that there is a potential association between iron deficiency and tea and coffee consumption in female university students. In the current study, 71.3% of participants felt anxiety after consuming tea or coffee. In 2017, another study by Wachamo *et al.*, suggested that caffeine in coffee increases anxiety and depression in most women [11]. In the present study, 81.3% of participants have insomnia after consuming too much tea or coffee. A similar study conducted by Jin *et al.*, investigated that increased caffeine intake was linked with an increased rate of insomnia [14]. In a recent study, 53.3% of participants felt digestive issues due to the consumption of tea or coffee. In 2020, a similar study was conducted by Vieux *et al.*, who also reported that the consumption of coffee may increase the acidity in the stomach but doesn't seem to cause any digestive issues to most people [15]. In the current research, about 52.7% of participants are addicted to caffeine intake in the form of tea & coffee. In 2020, Zahra *et al.*, performed similar research on university students. He concluded that 75.5% of the participants are caffeine addicted. As his result showed that participants claimed that they drink coffee because it boosts their energy and increases alertness. They experienced caffeine depletion, without caffeine [16]. In the current study, most participants had headaches if they didn't consume tea or coffee. In 2019, the study related to this factor conducted by Alstadhaug *et al.*, explains it very well. The body depends on caffeine effects when tea or coffee is consumed regularly. Because of caffeine, blood vessels become narrow that are present surround the brain, when the consumption of tea or coffee stopped, blood vessels become large. This causes a high blood flow around the brain or high pressures surrounding the nerves. Thus, it can trigger what is known that caffeine withdrawal as a headache [17]. In recent research, 50.7% of participants believed that excessive consumption of tea or coffee causes dehydration. In 2017, a similar study by Seal *et al.*, concluded that caffeine intake (>6 mg/kg) in the form of coffee can induce a diuretic effect, increasing urinary osmotic excretion. Hence, there is an association between tea or coffee and dehydration [18]. In a recent study, 98% of participants have menstrual irregularity due to the excessive consumption of tea or coffee. In 2022, similar research was conducted by Indu *et al.*, and Joseph *et al.*, which stated that excessive consumption of coffee was associated with an irregular menstrual cycle in females [19, 20]. One interesting finding of this study was the significant association between irregular menstrual cycles and excessive tea and coffee consumption. This is a novel finding that warrants further investigation, as it may have important implications for women's health. The study has some limitations that should be considered. First, the sample size was relatively small, which may limit the generalizability of the findings. Second, the study relied on self-reported data, which may be subject to recall bias and may not be entirely accurate.

CONCLUSIONS

In conclusion, this study provides evidence that excessive consumption of tea and coffee can have negative effects on health and can trigger a variety of symptoms, including anxiety, insomnia, digestive issues, caffeine addiction, rapid heart rate, fatigue, headache, and others. The findings show a significant association between excessive tea or coffee consumption and the trigger factors studied, including irregular menstrual cycles. The results of this study highlight the importance of moderation in the consumption of tea and coffee, and suggest that individuals should be aware of the potential negative consequences associated with excessive consumption of these beverages. This study could be used to inform public health campaigns aimed at promoting healthy beverage consumption habits.

Conflicts of Interest

The authors declare no conflict of interest.

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