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Editorial

Diet Intervention: Choice for Cancer Prevention and Patients Survival

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Cancer remains a second leading cause of death in the world, despite significant advances in treatment. It is well known that diet has a significant impact on overall health, calorie restriction may be beneficial for treating a number of diseases and even lengthening patients survival. Obesity and cancer have been shown to have strong epidemiological links, and healthy diets have been shown to lower the risk of developing cancer. There is also evidence that obese patients have a worse outcome and a higher mortality rate after being diagnosed with breast, colon, prostate, pancreatic, ovarian, and hematologic cancers. However, little is known about how nutrition may affect cancer once it has been detected, particularly how diet may influence cancer therapy [1]. The American Institute for Cancer Research (AICR) developed lifestyle recommendations based on the most recent evidence. Following these suggestions may increase overall survival after cancer diagnosis: preserving a healthy body weight; engaging in physical activity; eating a diet high in fiber and soy; and limiting the consumption of fats, particularly saturated fatty acids. Previous study also supports the clinical utility of diet interventions in cancer patients. These interventions aim to ensure adequate energy and nutrient intake during chemotherapy, which may also improve patient response to and alleviate the toxicity of pharmacological anti-cancer therapies. Furthermore, by reducing cancer comorbidities, modifications in lifestyle, like as diet and exercise, might lessen the long-term negative effects of treatment regimens and improve general health over the long term [2]. Consumption of lignans, raw vegetables, dietary fiber, the Mediterranean diet, various dietary sources, low meat consumption, vegetarianism, or veganism, dietary intake (or biomarkers) of specific vitamins, like vitamin D, vitamin K2, or vitamin C, were all linked to a lower risk of developing cancer. An increased risk of cancer mortality was associated with poor food quality, alcohol usage, the intake of soft beverages like juice, and to a lesser extent, the consumption of certain fatty acids. The risk of dying from cancer was significantly enhanced by obesity [3]. The diet play important role in the lifestyle, disease prevention and may act as an immune booster but diet intervention is not surprising topic of discussion in the therapy of cancer. If the dietary intervention found beneficial in cancer treatment and prevention with therapeutic efficacy, it may have little or no toxicity. At this point, it is impossible to be sure which dietary strategy is best, and diet efficacies are likely to vary depending on patient, therapeutic regimen and cancer type. When implementing these strategies in the clinic, some personalization may be required because physician who treat overweight and obese patients are aware that sometimes the best diet is the one the patient is willing and able to follow. Further studies are needed on better diet intervention to cancer patients in order to improve cancer prognosis and patients survival.

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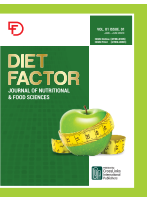

Mini-review

Potential Therapeutic Effect of Barley on Cardiovascular Diseases

Madiha Khan Niazi[1*], Farooq Hassan[2], Sahar Imran[1], Zainab Saeed[1], Khadija Riaz[1], Zuha Sohail[1] and Muhammad Amjed Ismail[3]

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ABSTRACT

Barley is a fantastic food option for those with various illnesses as well as for those who want to lead a healthy lifestyle. This cereal is a great source of soluble dietary fiber, particularly beta glucans, and it also includes vital vitamins and minerals. For its excellent antioxidant activity and as a source of vitamins and minerals, green barley is advised. Depending on phytonutrients such as -glucan, phenolics, flavonoid, lignans, tocols, sitosterol, and folic, regular consumption of whole wheat grain and its hydroethanolic extracts decreases the risk of chronic ailments (hyperglycemia, malignancy, overweight, cardiac disease. Barley and its products in a recent year had gain an importance due to its counteractive components which play potent role against cardiovascular diseases by lowering down the oxidative stress and improving High density lipoprotein further Lowering down low-density lipoprotein, VLDL ratios further regulating insulin levels and lowering down the spike in blood glucose levels showing potent anti-oxidative and cardiovascular functions. Due to their abundance in these nutrients, barley is effective in promoting healthy bodily function. To enjoy all of the advantages of barley, barley grain is a wonderful option.

INTRODUCTION

Elevated blood pressure, coronary heart disease (CHD), heart failure, and stroke are all examples of cardiovascular disease (CVD), a condition that affects the heart and blood arteries. Elevated blood pressure, coronary heart disease (CHD), heart failure, and stroke are all examples of cardiovascular disease (CVD), a condition that affects the heart and blood arteries. This disease is usually related with fatty deposits which are buildup inside arteries and there is chance of blood clots. Strokes and heart attacks are acute events which are mainly caused by obstruction of blood from going from the heart to brain. Heart muscles, valves are affected by the heart disease this can also result in arrhythmias. Heart and blood vessel disorders that impact the anatomy and physiology of the circulatory system are referred to as cardiovascular diseases [1]. Hypertension, ischemic heart disease, Peripheral vascular disease, stroke, rheumatic heart disease, heart failure, valvular heart disease, and a congenital cardiac condition are the most prevalent forms of CVD [2]. Cardiovascular diseases (CVDs) are becoming more common over the world and are currently regarded as the main cause of death in both emerging and industrialized nations. The prevalence of these diseases has increased and reached alarming levels in recent decades as a result of the quick economic development and increasingly westernized lifestyle [3]. Symptoms include chest pain, breathlessness,

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feeling dizzy, faint, swollen limbs, fatigue, weakness, very fast or slow heartbeat, numbness in legs or arms, stress, and being physically inactive[4]as shown in Figure 1.

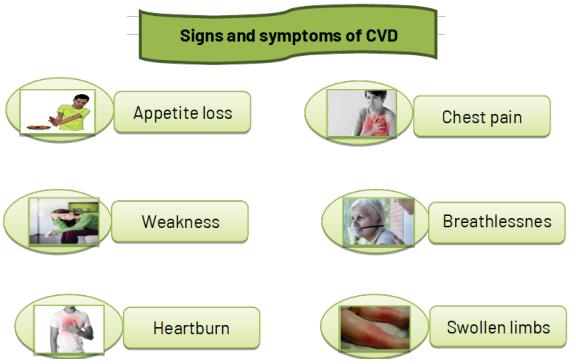

Figure 1: Signs and Symptoms of CVD

Health benefits

Hordeum vulgare, often known as barley, is a plant in the Poaceae family. One of the oldest cereal crops still being cultivated today is barley[5]. It is estimated that barley was cultivated from its native relative roughly 10,000 years ago. Phenolic acid, folate, vitamin E, lignans, phenolic acids, flavonoids, phytosterols are all present in whole grain barley. Barley is not just a significant feeder, malts, and food crops in several countries throughout the world, as well as the greatest cereal resource of functional component among the most widespread variety of multifunctional cereal crops and are incredibly full of beneficial nutrients. Especially fibre, phenol's, flavones, phytosterol, alkylineresorcinols, benzoxenezinoids, lignans, tocols, and folic acid, which have anti-diabetes, anti-cancer, anti-obesity, preventive cardiovascular disease, antioxidant, anti-proliferative, and cholesterol lowering properties[6,7].

Functioning Ingredients in Barley grass and Barley grain against chronic Illnesses:

β-Glucans can be used as candidates for the medication in the treatment of human chronic diseases as depicted in Table 1.

Preventative action against Chronic Illnesses	Functioning component in Grass	Functioning components in Grains	References
Anti-Hyperglycemic effect	Saponin; Fibres Calcium; AMPK, polyaminases; Gamma alpha amino butyric acid, Sodium Oxide Dismutase.	beta-glucan; phenols polysaccharidases; tocolic compounds; phytosterolic compounds, resistant starches.	[8]
Lipid lowering effects or anti-obesity	Saponin; α-tocopherols; 2″-O- homovitexin, polysaccharidases	Polysacchridases, starches, tocolic compounds, dietary fibers, polyphenolic compounds, polysaccharidases, phytosterolic compounds.	[9]
Anti-cancerous	Alkaline, flavonoids, chlorophyll; tricin; Sodium Oxide Dismutase	Beta-glucan, phenolic compounds, arabinoxylanes, phytosterolic compounds, lignans, resistant starches	[10,11]
Anti-oxidative effects	Chlorophyll; lutonarin, saponarin; isoorientin, orientin; γ-tocopherol, glutathione; Sodium Oxide Dismutase, flavonoid, (GABA)	Polyphenolics, anthocyanides, tocotrienols, polysaccharidases, (GABA)	[12,13]
Immunomodulatory effects	Arabinoxylan; polysaccharide, Gamma amino butyric acid	Beta-Glucans, Arabinoxylan's	[14,15]
Cardioprotective effects	potassium, Gamma amino butyric acid	Beta-D-Glucan	[16]
Blood pressure regulatory effect	Saponarin; lutonarin, potassium, Calcium; Gamma Amino Butyric Acid	Beta-Glucans	[17]
Bowel health regulatory effect	Soluble and Insoluble fiber	Beta-Glucans, Soluble and insoluble Fiber	[18]
Anti-preventative effect against CVD	Saponin; tryptophan's, vitamins (retinol, Thymine, tocopherol), Sodium Oxide Dismutase; Potassium, Calcium; Gamma Amino Butyric Acid	Beta-Glucans, Arabinoxylan's, polyphenolic compounds, phytosterolic compounds, lignans, tocolic compounds, folic acid	[19-20, 5]

Table 1: Functioning Ingredients in Barley grass and Barley grain against chronic Illnesses

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CONCLUSIONS

Barley (Hordeum vulgare L.) is the world's fourth most significant cereal grain, with the greatest fibre composition, and can be utilized in a variety of industries for a variety of uses. Regular consumption of whole wheat grain and its hydroethanolic extracts decreases the risk of chronic ailments such as hyperglycemia, malignancy, overweight, cardiac disease, and so on. Barley and its products had gained an importance due to its counteractive components which play potent role against cardiovascular diseases.

Conflicts of Interest

The authors declare no conflict of interest.

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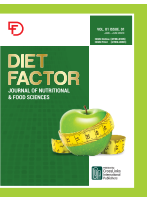

Original Article

Assessment of Hygienic conditions of Street Food Vendors and Identification of Hazardous points involved during Street Food Vending

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ARTICLE INFO

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Hygiene, Street Food, Vendors, Hazards, Contamination

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ABSTRACT

The provision of safe and nutritious food is a fundamental human right that contributes to good health, efficiency, and provides a foundation for people' sustainable development and poverty reduction. **Objectives:** To analyze the sanitary conditions of street food sellers and to identify potential hazards during street food vending. **Methods:** A cross-sectional study was carried out. Between September and November 2013, 100 street food vendors in three heavily populated neighborhoods of Lahore (Ravi town, Data Ganj Baksh, and Shahdara town) were assessed using a questionnaire and a food safety checklist. For the production of safe street food, hazards were identified along the phases involved in street food selling. The SPSS software was used to analyze the data. **Results:** 89% of vendors lacked hygiene and proper clothing, and 71% did not wash their hands before food preparation. 36% of vendors were afflicted with various diseases. Only 27% of the vending units were sufficiently clean and well maintained. The biggest concern with unsanitary food served by street food sellers was that only 19% purchased raw items from trusted sources. Only 18% of respondents used separate utensils for raw and RTE food storage, while 49% did not. The presence of fungal growth (26%) indicated the source of food-borne infections. There were six primary points/steps in street food vendors where contamination and hazardous threats existed. **Conclusions:** Most street foods were found unsanitary and hazardous. The food vendors were mainly ignorant and uninformed about food safety. Basic GHP and HACCP related precautionary measures should be taken.

INTRODUCTION

The availability of safe and nutritious food is the basic human right that contributing to good health, efficiency and gives a platform for sustainable development, and poverty alleviation of citizens [1]. The street food industry expanded rapidly during the last few decades and plays an important role in meeting the requirements of ready to eat foods [2]. This industry provides varieties of relatively cheap and easily accessible food to the millions of peoples in the developing countries [3]. Preparation and sale of street foods said to be an age-old activity and attracts all the age groups, especially the young generation. Street food industry has achieved new dimensions as a result of rapid urbanization. These foods are being served quickly and easily available at reasonable rates [4]. Street foods are defined by the FAO as ready-to-eat (RTE) food and beverages prepared and sold by vendors especially in streets and other similar places for immediate consumption or at a later stage without further processing or preparation [5]. While street vended foods are appreciated for not only their unique flavors and their convenience, but also important for contributing to the nutritional status of the people. They are contributing to food security and provide a livelihood for low-income urban populations [6]. In contrast to the potential benefits, it is recognized that most of the food vendors are often poorly educated (lack of knowledge of food safety), unlicensed, untrained in food hygiene [7]. The traditional methods of preparation of ready to eat food, inappropriate holding temperatures and poor personal hygiene of food handlers are the main causes of contamination [8]. Food-borne

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illnesses are common in most of the developing countries because of the increasing number of street food vendors with poor basic hygienic conditions [9]. The openly displayed foods can easily be contaminated by dust, smoke, insects, and hands of intending buyers, rains and drooping of birds. Microbial contamination of street-vended foods comes on inner surfaces of the food during peeling, slicing, handling, trimming and other processes like packaging, storing [10]. *E. coli*, *Salmonella typhi*, *Pseudomonas species*, *Staphylococcus aureus* and *Proteus* species causes potential health risks by contamination of food by during preparation, post cooking and other handling stages [7]. Food safety is a major concern with street foods as these foods are generally prepared and sold under unhygienic conditions, with limited access to safe water, sanitary services, or waste disposal facilities[11]. To introduce professional look to street food vendors, the street food safety management needs basic Hazard Analysis Critical Control Points (HACCP) and the pre-requisite system in the form of good manufacturing practices (GMPs) and good hygienic practices (GHPs). Critical points and monitoring procedures need to be introduced for the safe street food preparation[12, 13]. The present study was carried out to determine the hygienic conditions of vendors and estimate the knowledge and food safety practices among street-food vendors in Lahore. This study also used to introduce basics of GHP and HACCP for the street food vendors.

METHODS

Based on the observations, cross sectional study was conducted to collect information on the hygienic and sanitation conditions. 100 street food vendors of 3 densely populated areas of Lahore (Ravi town, Data Ghanj Bhaksh and Shahdra town) were surveyed using questionnaire and food safety checklist between September to November 2013. The hygienic conditions of one hundred street food vendors were studied by using questionnaire and food safety checklist. The data collected from street food vendors included: hygienic status of food vendors and vending units, food & utensils handling practices, water source, cleanliness & sanitation, and waste management. Hazards were identified along the steps involved in street food vending for production of safe street food. The data were analyzed using SPSS version 21.0. Descriptive statistics such as frequencies and percentages were used to calculate observed parameters.

RESULTS

In this study the food safety and hygiene practices of street food vendors in three densely populated areas of Lahore city had been studied. It was observed that street vendors were mostly ambulant (83%), and some were stationary (17%) having proper shelters. The main food categories consisted of breakfast meals, frozen products, beverages, fruits, and vegetables etc. (Figure 1).

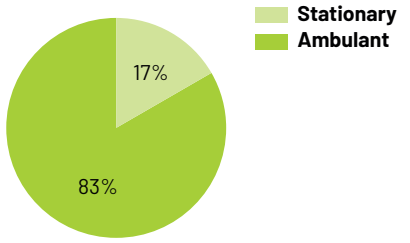

Figure 1: Mode of Vending

The present study included 100 street food vendors, out of which 89% had poor cleanliness and lack of proper clothing and 71% were not washing hands before food preparations. The health status of vendors was also affecting during handling of food because of blowing of nose and sneezing. 36% of vendors were suffering from different type of illnesses. The vending units were not properly clean and well maintain only 27% had proper vending units with covering and cleanliness of food stored. The vending units were not constructed in such a way to minimize the entry of flies and pests. Presence of flies and improper covering of raw and RTE foods were mostly prevalent among food vending units. The main issues of unhygienic food sold by street food vendors was only 19% were purchasing raw foods from reliable sources. Only 18% were using separate utensils for raw and RTE food storage and 49% were not storing raw and RTE foods separately. Storage of hazardous foods was also improper, just 21% were using temperature control strategy to prevent the foods from spoilage. As shown in Table 1, only 34 % was using potable water and 63% were reused water for washing of utensils. The status of cleanliness and sanitation of raw vegetables and fruits were also very poor, only 45% were cleaning fruits and vegetables properly and 38% were washing utensils before using them in preparation of foods. Nothing of them was using any sanitizer for prevention from microbial loads. The presence of fungal growth (26%) showed that improper hygienic conditions are present which could be the cause of food borne illnesses. Waste produced during the preparation of foods was not properly disposed off after the end of activities. There were 63% of chances of contamination during disposal of waste (Table 1).

Hygienic status of food vendors	Yes	No	NA
Cleanliness & Proper clothing	11	89	-
Hand washing	29	71	-
Vendors Healthy	64	36	-
Vending Units	**Yes**	**No**	**NA**
Clean and well maintain	27	73	-
Minimize dust & pests' entry	14	86	-

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Food & Utensils Handling Practices	Yes	No	NA
Reliable source	19	77	4
Storage of Raw & RTE separately	2	49	49
Separate Utensils	18	82	-
Temperature control	21	79	-
Water Source	**Yes**	**No**	**NA**
Potable water usage	34	66	-
Reused water	63	37	-
Cleanliness & Sanitation	**Yes**	**No**	**NA**
Cleanliness of raw vegetables and fruits	45	55	-
Fungal growth	26	74	-
Cleaning utensils before use	38	62	-
Sanitizing utensils	0	100	-
Waste Management	**Yes**	**No**	**NA**
Properly disposal of waste	34	66	-
Chances of contamination during disposal	63	37	-

Table 1: Hygienic conditions observed during survey

There were 6 major points/steps in street food vending where chances of contamination and hazards risks are present. Table 2 shows the hazards and their control measures to reduce the risks of unhygienic practices.

Steps	Hazards/Risks	Precautionary Measures
Purchasing of Raw food	Contamination	• Raw food should from reliable source
Storage of food	Microbial contamination	• Proper storage in clean containers • Time and temperature control • Covering for prevention from flies and pests
Water source	Microbial & Chemical contamination	• Use of potable water • Avoid reused water
Preparation of food	Cross contamination	• Separate utensils for raw and RTE food • Washing of raw fruits & egetables • Hand washing before preparation of food
Vending units	Environmental & Microbial contamination	• Proper construction of vending units • Prevention from entry of dust, wind, and rain • Use of sanitizers to prevent risks of contamination
Waste management	Cross contamination & Growth of pathogens	• Proper disposal of waste at appropriate place • Cleanliness of vending units and surroundings

Table 2: Identification of Hazards in different steps of street food vending

DISCUSSION

This study focused on the hygienic conditions of the street food vendors in Lahore. Street food vendor's hygiene practices and foods were observed in order to sketch out basic strategies for GHP and HACCP to improve the safety of street foods. Most of the street food vendors were ambulant, their vending units are not properly constructed. The vending units did not prevent the entry of flies, pest, and dust particles. The chances of contamination of foods add more due to the presence of air borne particles as a result of heavy vehicles traffic and overcrowding[14]. Poor hygienic conditions of food vendors and vending units were the main cause of food contamination. Food vendors were unaware of the knowledge of food safety. The majority of vendors had improper clothing; few of them were using aprons and masks. The health status of food vendors was also poor, some of them were suffering from cold, fever and other types of diseases. Same results were showed by Adjrah *et al.*, in 2013 [5]. Raw material from non-reliable source was 77% which showed the chances of contamination and adulteration of raw foods. Some vendors purchase low price adulterated ingredients from non-authorized suppliers. Raw meat, poultry and vegetables are usually contaminated with a lot of food borne pathogens, such as *B. cereus, C. perfringens, C. jejuni, E. coli, L. monocytogenes, Salmonella* and *S. aureus* [15]. Conditions of utensils and food storage bins are very important for the food safety point of view. Proper storage and separate utensils for raw and RTE foods were mostly absent. Fungal growth and cross contamination are caused by ineffective cleaning and absence of sanitizers. Same results were observed by Rane S. in India [15]. In another study it was indicated that uncleaned utensils were the cause of re-contamination of RTE foods. Because of the contamination of utensils by dishwater, the foods became health hazards itself [16]. Potable water is an essential requirement in public health prospective. A large number of food vendors were not using potable water for cooking and washing purpose. Many street vendors (63%) tend to reuse water for cleaning and washing purpose due to shortage and unavailability of potable water. Yadav *et al.*, conducted a study in Allahbad City and had been found that heavy contamination in RTE samples sold by street food vendors is due to the use of poor-quality water during preparation of food[14]. Proper waste management is the backbone for the prevention of contamination of foods from microbes and other spoilage bacteria. In the present situation only 37% of food vendors were disposing waste in a manner to avoid from cross contamination. Chumber *et al.*, observed that nearly 60 percent of the vendors threw wastewater alongside the vending units making the environment surrounding unhygienic [17]. Filthy environment due to improper waste disposal attracts the flies and other pests which are the main cause of contamination [18]. The observed hygienic conditions of food vendors draw a clear picture that there is lack of good hygiene practices and basic food safety knowledge among food handlers. Good personal hygiene and HACCP application reduces the chance of contamination of ready to eat products [19, 20]. The main steps involved in the causation of contamination of food during street food

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vending were identified by using data obtained from survey. At the end 6 basics steps were identified, where chances of hazards and risks of contamination may occur during street food vending. The basic GHP and HACCP related preventive measures could be helpful in reduction of contamination and risks of hazards for street food vending business. In Allahabad, Gadi *et al.*, also observed the food vendors in city and devised 5 key critical control points for identify the hazards during food production chain [12].

CONCLUSIONS

The study demonstrated that most of the street foods were vended in unhygienic and hazardous environment in Lahore city. The food vendors were mostly uneducated and unaware of the knowledge of food safety. Basic GHP and HACCP related precautionary measures described should follow for prevention from contamination of food. Free training and education sessions on GHP and HACCP by the public institutions play an important role for the development of good street food vendors for the developing countries.

Conflicts of Interest

The authors declare no conflict of interest.

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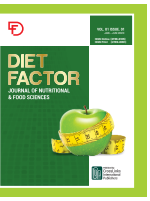

Original Article

Association of Pregnancy Outcome Complications Among Females with Polycystic Ovary Syndrome

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ABSTRACT

Association of pregnancy outcome complications among females with polycystic ovary syndrome among females of reproductive age between 18 to 55 years, in relation to their knowledge and attitude about complications in pregnancy and polycystic ovary syndrome. **Objectives:** To find out the complications and dietary patterns associated with pregnancy due to polycystic ovary syndrome among the reproductive age females. **Methods:** A cross-sectional study was carried out from the Mayo hospital Lahore. 200 participants were included in the study. The participants were assessed through a questionnaire. SPSS version 20 was used for data analysis. In inclusion criteria, female of reproductive age in Mayo hospital Lahore. **Results:** All of the 220 participants filled out the questionnaire under observation and with proper knowledge. The results from the questionnaire suggested that out of 220 participants 21-25 years and >30 years of females with BMI over-weight and obese have more chances on complication in pregnancy while have PCOS. While 18-20 years with under-weight BMI have 20% chances for having complications. **Conclusion:** This study concluded there is a high association in the pregnancy outcome complications in females with polycystic ovary syndrome. Those who have more adverse complications might have chances to have a BMI generally obese or over-weight. Our study significantly reflects that mostly women have a family of gestational diabetes, pregnancy induced hyper-tension have more chances of have preterm babies or delivery complications due to PCOS.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) has been linked inconclusively to an increased risk of miscarriage. The most prevalent endocrine condition in women of reproductive age is polycystic ovarian syndrome (PCOS), with a reported frequency between 6% and 15% [1, 2]. Ovulation problems, an excess of testosterone, and polycystic ovarian morphology are the disease's defining features [3]. Pregnancies in PCOS patients were linked to an increased risk of preeclampsia, preterm delivery, small-for-gestational-age (SGA), gestational diabetes mellitus (GDM), pregnancy-induced hypertension (PIH), and small-for-gestational-age (GDM) [4]. However, caesarean deliveries, operative vaginal deliveries, and large-for-gestational-age (LGA) deliveries were not significantly However, there are little and conflicting data on how PCOS during pregnancy affects subsequent foetal and neonatal outcomes. During pregnancy, PCOS increased the risk of GDM, PIH, preeclampsia, preterm delivery, and caesarean delivery, which had a negative effect on the birth weight and elevated the chance of NICU admission, according to a meta-analysis [5, 6]. Similar findings were obtained when the link between PCOS during pregnancy and GDM risk was investigated [7]. The majority of prenatal and neonatal outcomes could not be examined, which was a

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fundamental shortcoming of the earlier investigations. Furthermore, there is ongoing debate over the likelihood that the relationship between PCOS during pregnancy and unfavourable pregnancy, foetal, and neonatal outcomes may vary depending on aspects including study design, mean age, and pre-body mass index. PCOS during pregnancy did not appear to affect the course of the pregnancy, according to several observational studies [8, 9]. The ovaries produce a lot of androgens, which causes hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology (PCOM), which are common symptoms of PCOS [10]. In women during their reproductive year, polycystic ovarian syndrome (PCOS) is a prevalent endocrine condition that negatively impacts fertility and reproductive health [11]. The Rotterdam criteria state that PCOS must include two of the following three characteristics: polycystic ovaries, clinical or biochemical evidence of hyperandrogenism, and oligomenorrhea/amenorrhea [12]. PCOS is prevalent in 8–12% of females worldwide who are of reproductive age [13].

METHODS

Cross Sectional was conducted at Mayo Hospital Lahore. A total of 200 samples were included in the current study. The inclusion Criteria was female of reproductive age in Mayo hospital Lahore. Exclusion criteria was all male persons, every girl age less than 18 years, and every female age more than 55 years. A standardized questionnaire was used. The study was done in accordance with the guidelines established by the Mayo Hospital ethical committee, and the participants' rights were upheld. All participants provided written informed consent with a copy of their signature. All collected data and information were kept private. A participant's identity was maintained throughout the whole investigation. The study's procedure carries no risks or drawbacks, the subjects were informed. They were also told that they could leave the study at any point while it was still in progress. The researcher used a pre-tested data collecting method (questionnaire/ Performa) to gather data after obtaining informed written consent. The following variables from the questionnaire were used to collect data: From the participants, demographic information was collected. Questions were asked from the females of reproductive ages about their dietetic habits and effects on their health. The data was analyzed through SPSS in the form of tables. The data was reported using descriptive and inferential statistics. The quantitative variables like age, gender, etc. was assessed using mean standard deviation and standard errors. The qualitative variables were reported using percentages and frequencies. The association between variable and subject was determined through p value.

RESULTS

Table 1 describes out of 220 people 14.3% always,27.1% never,41.4% sometimes and 17.1% generally can't control over diet when they have hormonal imbalance. This table describes out of 220 people 16.2% always,32.9% never,32.4% sometimes and 18.6% generally eatfood when they are not feel hungry. This table describes out of 220 people 28.6% always,35.7% never,23.8% sometimes and 11.9% generally get enough sleep.

Frequency distribution of Control of diet during hormonal imbalance	N (%)
Always	30 (14.3%)
Never	57 (27.1%)
Sometimes	87 (41.4%)
Generally	36 (17.1%)
Episodes of overeating when not hungry	
Always	34 (16.2%)
Never	69 (32.9%)
Sometimes	68 (32.4%)
Generally	39 (18.6%)
Enough sleep pattern	
Always	60 (28.6%)
Never	75 (35.7%)
Sometimes	50 (23.8%)
Generally	25 (11.9%)
Total	220 (100%)

Table 1: Difficulty for control over diet during hormonal imbalance, episodes of overeating and enough sleep

Table 2 describes out of 220 people 18.6% always,33.3% never,33.3% sometimes and 14.8% generally eat five portions of fruits and veges per day. This table describes out of 220 people 20% always,27.9% never,31.0% sometimes and 21.0% generally keepon thinking about one or more specific foods until actually you eat the food.

Portions of vegetables and fruits	N (%)
Always	39 (18.6%)
Never	70 (33.3%)
Sometimes	70 (33.3%)
Generally	31 (14.8%)
Eating starters before a complete meal	
Always	42 (20%)
Never	58 (27.6%)
Sometimes	65 (31%)
Generally	44 (21%)
total	220 (100%)

Table 2: Five portions of vegetables and fruits a day and eating starters before a complete meal

Table 3 describes out of 220 people 21.4% always,25.7% never,37.1% sometimes and 15.7% generally have lack of control of eating. This table describes out of 220 people 30.5% always,27.6% never,28.1% sometimes and 13.8% generally have an intense desire to eat one or more food e.g sugary food/oily food.

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Lack of control over eating	N (%)
Always	45 (21.4%)
Never	54 (25.7%)
Sometimes	78 (37.1%)
Generally	33 (15.7%)
Intense desire to eat one or more food	
Always	64 (30.5%)
Never	58 (27.6%)
Sometimes	59 (28.1%)
Generally	29 (13.8%)
total	220 (100%)

Table 3: Lack of control over eating and intense desire to eat one or more food

In the table 04 it is clearly shown that 67% ,55% over-weight or obese female always feel less control in their diet while on periods beside under-weight and normal women have more control over their diet. Having the P-value of .013

		Do you feel less control over your diet when your periods are delayed				Total	P-value
		Always	Never	Sometimes	Generally		
BMI of client	under-weight	3	15	6	12	36	.013
	normal	5	29	13	25	22	
	over-weight	33	03	26	5	67	
	obese	24	9	15	7	55	
Total		25	96	60	29	220	

Table 4: BMI with less control in your diet

Figure 1 describe out of 220 people 8.1% every day, 51.0% every 2 to 3 weeks and 21.4% people never consume meat.

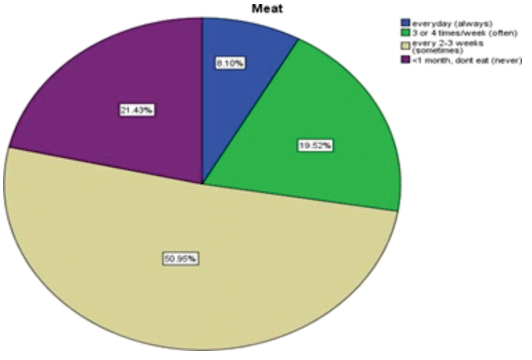

Figure 1: Meat consumption by study participants

Figure 2 describe out of 220 people 10% always , 21.4% often ,37% sometimes and 31% never eat pumpkin.

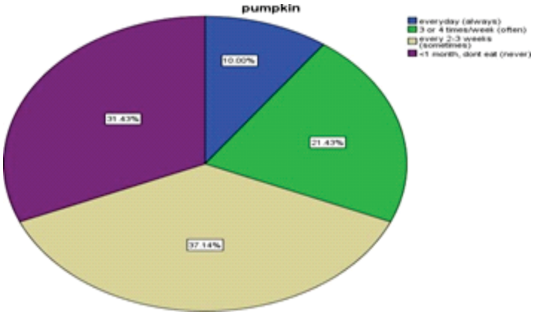

Figure 2: Pumpkin eating by study participants

figure 3 describe out of 220 people 11.4% always ,22.4% often ,35.2% sometimes and 31.0 never consume chia seed.

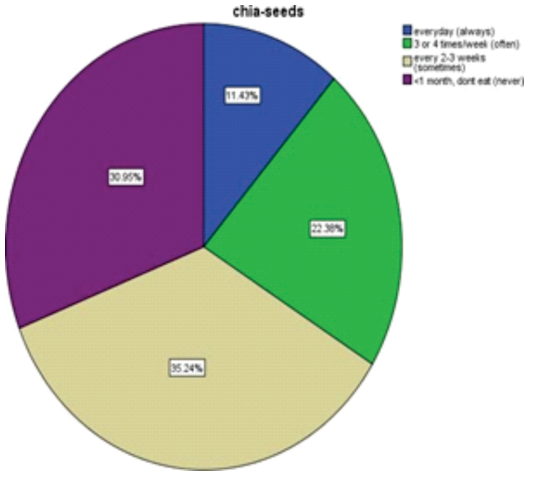

Figure 3: Chia seed eating by study participants

Figure 4 describe out of 220 people 27.6% always ,31.0% often ,26.7% sometimes and 14.8% never consume junk food

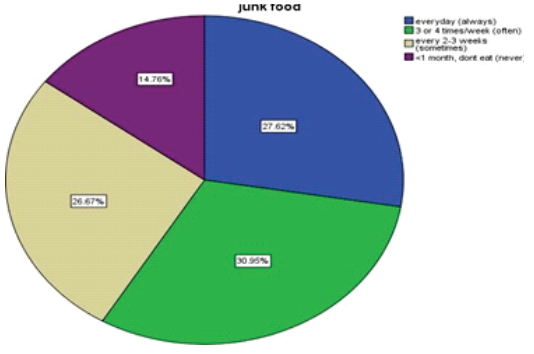

Figure 4: Junk food eating by study participants

DISCUSSION

We conducted a study to determine the prevalence of association of pregnancy outcome complications among females with polycystic ovary syndrome.2 We enrolled 200 students for our study, all of them whom are females, using non probability technique [2]. According to Kjerulff et al., PCOS in pregnancy is related with greater rates of gestational diabetes mellitus, pregnancy-induced hypertension, preeclampsia, preterm delivery, caesarean delivery, operative vaginal delivery, SGA, and large-for-gestational age. [14]. Similarly our study concluded that 30% and 21% of women who are obese of over-weight having PCOS show the symptoms of hypoglycemia gastational diebeties etc. According to Hai-Feng Yu et al., the purpose of this study is to understand the relationship between pregnancy in women with PCOS and pregnancy complications [15]. which discovered a connection between PCOS and an increased risk of gestational

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diabetes mellitus (GDM), preeclampsia, PIH, preterm birth, caesarean section, miscarriage, hypoglycemia, and neonatal death during pregnancy. Similarly, according to our study, 200 women 10.0% yes, 31.4% maybe, have gestational diabetes, preeclampsia, PIH, preterm delivery etc. According to a similar study conducted by Ghazeeri *et al.*, metformin has proven efficacy in improving ovulation and pregnancy rates among patients receiving fertility-enhancing agents; thus, its use among an ovulatory women with PCOS is of prominent significance [16]. Likewise in our study which we conducted reported that out of 200 people 44.3% never take hormonal contraceptives or metformin in their life or during PCOS or pregnancy that's why they got higher chances of complications in pregnancy with PCOS as these medicines helps to lowers the adverse consequences by PCOS in pregnancy. According to the results of our study 200 people 29.0% never take inositol while having PCOS. Out of 200 people 20.5% never use folic acid supplements before and after having PCOS and 44.3% never use any contraceptives. Similarly according to the study conducted by Joham AE, *et al.*,concluded that women with PCOS had lower rates of contraceptive usage and were more likely to be attempting to conceive, implying that they were aware of possible reproductive issues. Obesity, metabolic problems, infertility, and fertility medication usage may all have an influence on pregnancy outcomes in PCOS. Those with PCOS have been found to have a threefold increased risk of miscarriage compared to women without PCOS [17]. In our survey,it describes out of 200 people 11.4% have diabetes in their family history. It is shown that 40.1% of female have gestational diabetes, pregnancy-induced hypertension, and preeclampsia, hyperinsulinemia.Similarly a study that is conducted by Sruthi Viswanathan, *et al.*, shows that pregnancy complications like spontaneous abortions, gestational diabetes, APGAR and low HRQoL was more associated with PCOS. Which can be genetic or in family history of the patients [18]. A study by Stefano Palomba, *et al.*,onfirmed that women with PCOS, a possible relationship with genetic, environmental, clinical and biochemical factors involved in this complex condition, as well as with pregnancy complications and long-term health for both mother and child, remains to be established [19].. Likewise in our study, it is clearly evident that 41.0% never have a good social life which eventually lead toward pregnancy complications. A study conducted by Priyanka Raj, et al. showed that the participants with overweight/obesity were 35% among the women with PCOS when compared to 25% among the women without PCOS.26 Similarly our study shows, 67%, 55% over-weight or obese female always feel less control in their diet while on periods beside under-weight and normal women have more control over their diet [20].

CONCLUSIONS

This study concluded that there is a high association in the pregnancy outcome complications in females with polycystic ovary syndrome. Those who have more adverse complications might have chances to have a higher BMI or generally obese or over-weight. Our study significantly reflects that mostly women have a family of gestational diabetes, pregnancy induced hyper- tension have more chances of have preterm babies or delivery complications due to PCOS. Women who have no intake of metformin, inositol, folic acid during or before pregnancy while having pregnancy might have greater chances of having complications. Good social life style also have a great impact on complications associated with pregnancy or having PCOS.

Conflicts of Interest

The authors declare no conflict of interest

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Original Article

Causes of Infertility Among Married Women Visiting Outdoor Hospitals in Lahore, Pakistan

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ABSTRACT

Infertility is defined as the inability to conceive following a reasonable period of unprotected sexual activity without the use of contraception. **Objective:** To find the determinants of infertility among married women visiting public Hospitals, Lahore. **Methods:** A cross sectional study was conducted at Public hospitals in Lahore during 4 months. A questionnaire was used to collect data from 100 married women. The study included all adult married women with infertility. SPSS version 21.0 was used to analyze the data. **Results:** The results revealed that the minimum age of participants was 20 to 30 years and the maximum was 30 to 40 years. The minimum weight of the participants in the study is 40 to 50 kg and maximum value was 50 to 60 kg. Infertility was found in 50% of women who had previously been treated for infertility, and in 52% of women who were experiencing trouble getting pregnant. Endometriosis, the most prevalent cause of infertility, was detected in 45 percent of the subjects. 57% participants has been attempting pregnancy in months and 43% were attempting in years. **Conclusions**: With 60% of the participants in this study developing glucose tolerance, which can result in celeic diseases, women who experience unexplained infertility or recurrent miscarriages are also more likely to experience celeic sickness. In order for medical experts and the government to be able to provide infertility care, further research is urgently required to learn more about the current state of fertility and associated risk factors.

INTRODUCTION

Infertility is a reproductive system condition characterized by the lack of ability of a sexually active, non-contraceptive couple to obtain conception in one year after failing to attain being pregnant for 365 days or greater with frequent unprotected sexual intercourse [1]. The period of sexual exposure, frequency of coitus, and age of the pair all affect the couple's chances of conceiving. Normal, younger couples have a 25% chance of conceiving after 30 days of unprotected intercourse; 70% of couples conceive after 180 days, and 90% of couples conceive after a year. After 12 months and a 1/2 of a year, just 5% of couples will conceive. Infertility prevailing in Pakistan is 22% and of which 4% is primary infertility and 18% is secondary infertility [2]. It is divided into two categories: primary and secondary [3]. Primary infertility refers to a patient's inability to conceive after a previous attempt, whereas secondary infertility refers to a patient's failure to conceive after a previous attempt [4]. Female infertility is a significant concern in today's world for a variety of causes. Many childless couples struggle with mental and emotional issues. Even if the majority of instances are unsolved, female infertility can be blamed for a significant proportion of them [5]. It puts a lot of financial strain on families and societies. When a couple has children, their marriage is considered successful. Failure to do so frequently results in troubled marriages and divorces [2]. Infertility in a couple can be caused by issues with either the woman or the man, but not always both. It was observed that 1/3rd of the time, fertility difficulties are caused by males, 1/3rd by women, and 1/3rd by both men and women [6]. According to local

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demographics, infertility causes fluctuate. Infertility can be caused by a sort of factors, including reproductive system problems, sexually transmitted symptoms illnesses, and hormonal imbalances in both men and women. Obesity, diet, smoking and alcohol intake, mobile, smartphone use, sexual violence, and anxiety have all been identified as pregnancy disruptors [7]. In the past, illnesses like gonorrhoea and sexually transmitted diseases were the leading causes of infertility; however, these have now been supplanted by stress, male factor, and different factors, and regardless our arsenals, a substantial sizeable part of infertility stays unexplained. In addition, the growing occurrence of scientific troubles along with diabetes, hypertension, and hypothyroidism, in addition to way of life ailment like as weight problems and addictions among the young, has been discovered to make contributions to infertility [8]. To begin with, many of the characteristics frequently associated with fertility, such as BMI, antimüllerian hormone, smoking, and alcohol consumption, are not independent predictors of results. Second, the fact that age predicts primary outcomes is expected and can be interpreted as a validation of the study's concept and execution. The third finding, which was rather unexpected, was that income influenced fertility outcomes. After age and treatment type, income is the third most powerful predictor [9]. Hypothyroidism, hyperprolactinemia (high levels of the male hormone), and luteal phase defect (poor progesterone) are only a few of these conditions. Hormonal imbalances are a leading cause of female infertility. Endometriosis is an inflammatory illness caused by ectopic endometrial implants that is caused by oestrogen. Endometriosis affects between ten and fifteen percent of women of childbearing age [10]. Endometriomas treatment is a constant difficulty for gynaecologists, as is determining the optimum treatment. Treatments are typically dependent on the clinical condition of the patient and must be tailored to the patient's specific needs, with the goal of reducing pain, enhancing fertility, or both [11]. Untreated sexually transmitted contamination (STIs) are among the variables that harm men's and women's reproductive systems [12].

METHODS

A cross sectional study was conducted at Public hospitals in Lahore during 4 months, from September to December 2022. Ethical approval was taken from IRB of The University of Lahore, Lahore, Pakistan. A pre-tested questionnaire was used to collect data from 100 married women through convenient sapling technique. The study included all adult married women with infertility. Prior written inform consent were taken from all the participants. SPSS version 21.0 was used to store and analyze the data.

RESULTS

The results revealed that the minimum age of participants was 20 to 30 years, and the maximum was 30 to 40 years. The minimum weight of the participants in the study is 40 to 50kg and maximum value was 50 to 60kg.

Frequency Distribution	Minimum	Maximum
Age	1	3
Weight	1.00	3.00

Table 1: Frequency distribution of patients age and weight

57 participants that has been attempting pregnancy in months and 43 were attempting in years and the previous pregnancies and outcome numbers was 45 in live birth and 55 were miscarriages.

Previous Pregnancies and Outcome	Percentage
Live Birth	45%
Miscarriages	55%

Table 2: Frequency distribution of live birth and miscarriages

The 52 women were having difficulty in pregnancies and 48 were well. 50% women have been previously treated for infertility or 50% not treated. In the study 46% families has the history of infertility and 54 has no history yet. 50 participants think spouse is responsible for infertility and 50 participants are not yet thinking about this. 48 women taking medications regularly on daily basis and 52 were not taking. 30 women had pain with periods and 47 women had no pain or 23 had suffering from severe pain.

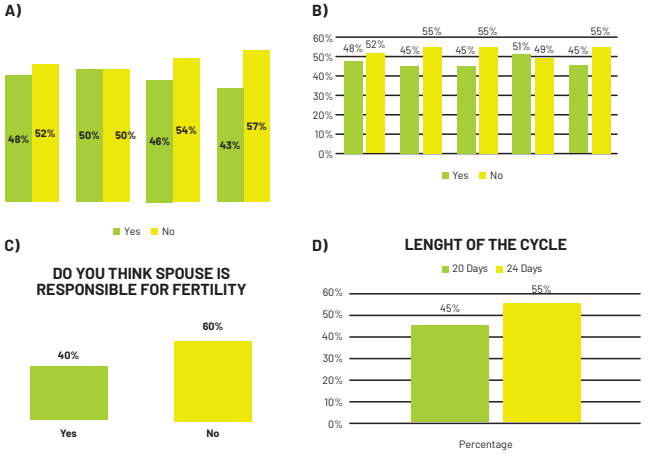

Figure 1: A) Difficulty in Pregnancies B) History of fertility C) Responsibility of spouse for fertility D) Length cycle of periods

55% women were vegetarian and 45% were eating all round food. 45 participants were diagnosed with endometriosis and 55 participants were not diagnosed. 40% participants were taking folic acid supplements and 60% were not taking folic acid supplements. 40% women has lactose intolerance allergy and 60% women has glucose intolerance allergy. Round about 44 women were taking multivitamins and 54 women were not taking multivitamin and 2 women were taking sometimes. In the study, 45 participants were suffering from hypertension for 6 weeks

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and 55 participants were suffering from 6 months. 51 participants has a problem with sense or smell and 49 participants has no problem yet. 40% women were treated for pelvic infection and 60% were not treated yet.

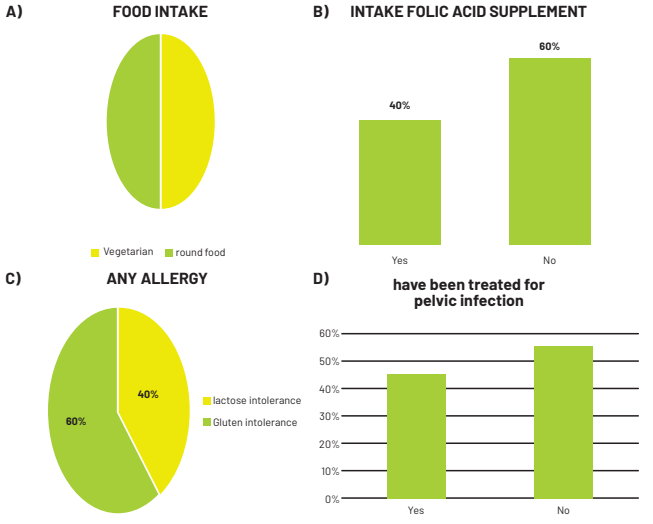

Figure 2: A) Food Intake B) Intake of Folic Acid Supplement C) Lactose vs gluten intolerance D) Pelvic Infection

DISCUSSION

The purpose of this study is to find the determinants of infertility among married women attending public hospitals in Lahore, Pakistan. Data from the married women who full filled the criteria was collected regarding infertility related questions. Our study showed that, 46% of families had a history of infertility, and 50% people believe that assume is to blame for infertility, while the other 50 haven't given it a second thought. Liu *et al.*, claims that between 2009 and 2012, Infertility rates were 13.6 % and 8.5 % after 12 months and 24 months, respectively [13]. According to our study the 52 women were having difficulty in pregnancy and 48 were well. 50% women have been previously treated for infertility or 50% not treated. In the study 46% families has the history of infertility and 54 has no history yet. On the other hand, a study by Akalewold *et al.*, the prevalence of infertility was 27.6% among women attending gynecologic clinics in three public hospitals in Addis Ababa, Ethiopia. Infertility, both primary and secondary, was found to be prevalent in this study, which was higher than the WHO global estimate[14]. According to our study, 52 women were having difficulty in pregnancies and 48 were well. 50% women have been previously treated for infertility or 50% not treated. In the study 46% families has the history of infertility and 54 has no history yet. 50 participants think suppose is responsible for infertility and 50 participants are not yet thinking about this. According to Briceag *et al.*, when the egg is unable to move down the tube due to a blockage, this is known as tubal factor infertility [15]. This can happen on one or both sides, and it can cause up to 30% of female infertility. Results showed that, 46% of families had a history of infertility, and 50 people believe that assume is to blame for infertility, while the other 50 haven't given it a second thought. According to Zhou *et al.*, the overall prevalence of infertility in China was 15.5% among women 'at risk' of pregnancy and 25.0% among women trying to conceive [16]. This is supported by the findings of this study, which show that people with irregular coitus have a higher risk of infertility than people with regular coitus. According to our study, out of 100 married women who are attending public hospitals only 40% of them taking folic acid while 60% said no. A study by Murto *et al.*, in 2015 concluded that unexpected infertility was linked to significantly higher median plasma folate and lower median plasma homocysteine concentrations than fertile women (both p 0.001), but no link between folic acid supplementation or folate status and pregnancy outcome was found [17]. According to the findings of our study, 60% of 100 married women who visited public hospitals for infertility had gluten intolerance, with the remainder having lactose intolerance. According to Pourhoseingholi (2022), gluten-related illnesses (GRDs) are the most common gastrointestinal maladies, with a global prevalence of 1% to 1.4%. Women who have unexplained infertility or recurrent miscarriages are also at a higher risk of getting CD[18]. Half of 100 married women who visited public hospitals for infertility were vegetarians, while the other half ate a variety of meals, according to our data. Grieger *et al.*, published a study in 2018 that looked into the relationship between eating habits and infertility in women. According to studies, women who ate dark green leafy vegetables, fruit, and milk or curd had a lower risk of infertility. Eating a plant-based diet rich in fruits and vegetables has been shown to boost the odds of natural conception and minimize the time it takes to become pregnant [19]. According to our study results the 52 women were having difficulty in pregnancies and 48 were well. 50% women have been previously treated for infertility or 50% not treated. In the study 46% families has the history of infertility and 54 has no history yet. 50 participants think suppose is responsible for infertility and 50 participants are not yet thinking about this. According to AlTaee *et al.*, the prevalence of infertility was 3.3%, and almost half of the couples experiencing primary infertility. Government employment, increased duration of bleeding days and duration of infertility were associated with increased odds ratio for the primary infertility [20]. In our study the 60% women has 24 days of length cycle and 40 women has 20 days of cycle. 48 women taking medications regularly on daily basis and 52 were not taking. 30 women had pain with periods and 47 women had no pain or 23 had suffering from severe pain. According to Javaid et al., out of 2657 patients,

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186 (7%) were infertile. Different reasons of infertility were discovered using ultrasound, laparoscopy, and HSG [21].

CONCLUSIONS

Infertility was found in about half of women who had previously been treated for infertility, and in 52% of women who were experiencing trouble getting pregnant. Endometriosis, the most prevalent cause of infertility, was detected in 45% of the subjects. Almost half of the population's infertile women had not sought medical help. Study also revealed that just a small percentage of women were taking folic acid on a regular basis. Women who have unexplained infertility or recurrent miscarriages were also at a higher risk of having celiac sickness, with 60% of those in this study acquiring glucose tolerance, which can lead to celiac disorders.

Conflicts of Interest

The authors declare no conflict of interest

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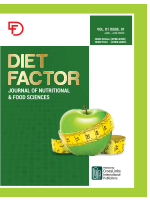

Original Article

Comparison of Dietary Habits and Psychological Outcomes in Hostelites and Day Scholars

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ABSTRACT

A student's transition to college is marked by a new phase of independence, joyous activities, lifestyle changes, and behavior that includes eating habits. Eating habits have a long-term effect on a person health. **Objective:** To assess and compare dietary habits among day scholar and hostelites and their psychological outcomes. **Methods:** Using the Kessler Psychological Distress Scale (K10) and the Global Sleep Assessment Questionnaire (GSAQ), a cross-sectional study with a sample size of 100 students was carried out at the University of Lahore over a period of four months. **Results:** Frequency of normal BMI was more in hostelites as compared to Day scholars. The comparison of day scholars and students living in hostels also revealed that hostelites have more psychological distress, their sleeping quality is worse and they have bad eating habits. Several aspects was assessed by questionnaires in the study which find out that Lifestyle and dietary habits have an effect on the psychological health among university students. **Conclusions:** This study highlighted the difficulties college students have in leading nutritionally healthy lives, particularly when they reside in dorms. The current findings point to a worryingly high incidence of psychological discomfort, as well as unhealthy eating, sleeping, and lifestyle choices that need o0to be targeted and changed.

INTRODUCTION

The time spent in college is a crucial phase that may have an influence on one's long-term health as an adult as well as the quality of one's lifestyle and eating habits [1]. Although there are pressures for students trying to attain their academic goals throughout the university years [2], especially in light of the financial limitations that many experience. In order to maintain their independence as they transition from secondary school to university, students are constantly encouraged to make nutritional choices that are healthy. A frequent characteristic of such a transition into early adulthood is an unhealthy lifestyle, during which young individuals may establish long-lasting health habits [3]. In particular, college students are exposed to unhealthy eating habits that lead to weight gain [4], and they make their own meal decisions, which are sometimes affected by the price of food and the availability of fast food [3]. The food habits of university populations are prone for a number of factors. Lack of knowledge about healthy food alternatives among students may negatively affect their eating habits [4, 5]. Given that fats and sweets are less costly, financial factors may also be important [6]. It has been said that a person's wellbeing has an impact on their academic achievement in high school and college. As a consequence, encouraging effective learning is necessary to enhance the health and wellbeing of every student and employee at a university or college [7-9]. Student psychological morbidity is common, and it is especially evident in females and students of fundamental sciences. More attention must be paid to the psychological health of medical students, and focusing more on reducing

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risk factors may assist to prevent more dissatisfaction [8]. In today's fast-paced, competitive environment, many people see stress as a normal part of life. Due to the growing expectations placed on them by the educational system, students are not immune to mental stress and anxiety. Particularly undergraduate education is notorious for taking a lot of time and being emotionally taxing [10]. The frequency and amount of intake alter dramatically in young people due to their propensity to adversely impact their eating habits when it comes to consuming a variety of fruits and vegetables [11]. Bad habits that older individuals have picked up as youngsters are more difficult to change. Health practitioners should concentrate their efforts on young people if they wish to increase the community's well-being and health-promoting behaviors [12]. If they are recognized and dealt with early on, many of the factors causing health issues in older individuals may be avoided. Early interventions may alter adolescent behavior that puts them at risk for health issues later in life [13]. When the aforementioned limits are considered, significant results are produced. University students who are physically inactive have serious health problems. The World Health Organization has identified physical inactivity as one of the top 10 global causes of mortality and morbidity [14]. Understanding the prevalence of (in)sufficient physical activity among university students helps health practitioners better understand the size of the issue currently facing this population and the need of intervening in this health-related behavior [13, 15]. University health services should consider students' access to physical activity alternatives as well as the degree to which current options are adequate for students' activity preferences and requirements. In this investigation, the eating and living habits of college students were evaluated, and the findings between day students and those residing in dorms were contrasted. Through nutritional education, nutritional seminars, and quick counselling, there is a need to raise awareness for the improvement of lifestyle, eating habits, and psychological discomfort in order to lessen the effects of this disease.

METHODS

This study was carried out at The University of Lahore, and it was a cross-sectional study. The study duration was four months. The Non-Probability Convenient Sampling technique was utilized, with a sample size of 100. Students at The University of Lahore's was included in the study and both day scholars and hostel residents must be both sexes and between the ages of 18 and 30 to be included. Students that are uncooperative were excluded College students from other institutions were also excluded. The examination was conducted using the Global Sleep Assessment Questionnaire (GSAQ). The 11 categories address mood, daily activities, and health conditions that may affect sleep, as well as signs of insomnia. Restless legs syndrome/periodic limb movement, obstructive sleep apnea, and parasomnias. A straightforward tool for measuring psychological discomfort the Kessler Psychological Distress Scale (K10) was used in this study. The K10 scale consists of 10 questions, each with a five-level response scale, describing different emotional states. The test can be used as a quick screening tool to determine the severity of discomfort. While conducting the study, the ethical guidelines established by the University of Lahore's ethical council were adhered to, and the participants' rights were respected. All participants provided written informed consent with a copy of their signature. Data gathering and all information were kept private. A participant's identity was maintained throughout the whole investigation. The study's procedure carries no risks or drawbacks, the subjects were informed. They were also told that they could leave the study at any point while it was still in progress. Data was gathered by the researcher using the pre-tested data collection method (questionnaire/Proforma) after receiving informed written consent. SPSS version 21.0 was used to tabulate and analyze data. Statistics that were both descriptive and inferential were used to report the data. The mean, standard deviation, and standard errors were used to evaluate the quantitative variables such as age, etc. Frequency and percentages were used to report the qualitative factors.

RESULTS

Table 1 shows frequency distribution of day scholars and Hostelites. 50 day scholars and 50 hostelites participated in this study.

Sr.#	Frequency	
1.	Hostelites	Day scholar
Total	50	50

Table 1: Distribution of hostelites or day scholars

Figure 1 shows body mass index distribution among day scholars and hostelites. 10 Hostelites were underweight, 32 were normal, 5 were overweight and 3 were obese while in comparison, 5 day scholars were underweight, 34 were normal, 7 were overweight and 4 were obese.

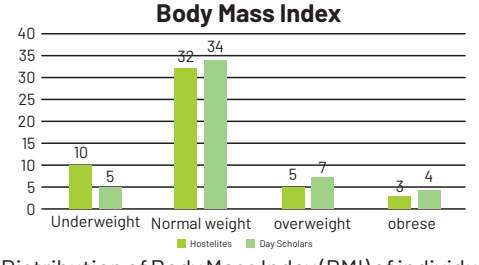

Figure 1: Distribution of Body Mass Index (BMI) of individuals

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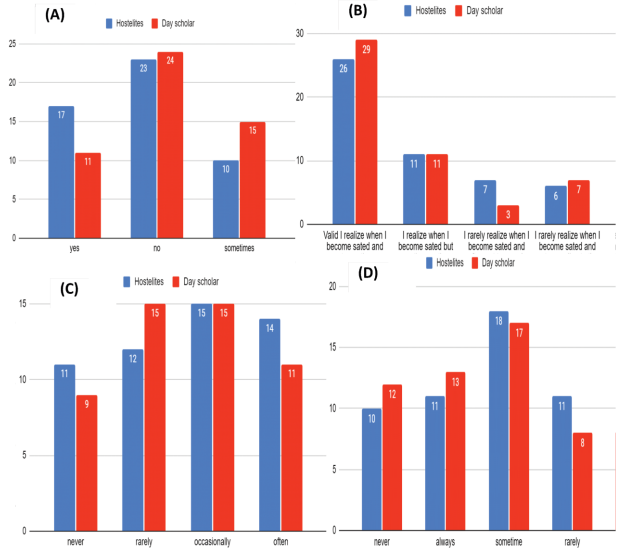
According to the Figure 2A, 17% of hostelites and 11% of day scholar's getup at night to eat or eat at night because of sleeplessness while 23% of hostelites and 24% of day scholars answered No and 10% hostelites and 15% Day scholars answered sometimes. Figure 2B indicates that 29% of day scholar are more aware about being feeling of fullness and stop eating 3% often end up eating too much, 7% eat according to standard serving sizes; whereas 26% of hotel student stop eating after being full, 7% rarely realize and eat too much, 6% use standard portions. While 11% of both groups won't be able to control themselves and continue eating. According to the Figure 2C, 11% of hostelites and 9% of day scholars answered that they never eat when they feel stressed, unhappy or bored, 12% of hostelites and 15% of day scholars answered rarely, 15% of both answered occasionally while 14% of hostelites and 11% of day scholars answered often. Figure 2D shows that 10% of hostelites and 12% of day scholars answered never, 11% of hostelites and 13% of day scholars answered always, 18% of hostelites and 17% of day scholars answered sometimes while 11% of hostelites and 8% of day scholars answered rarely.



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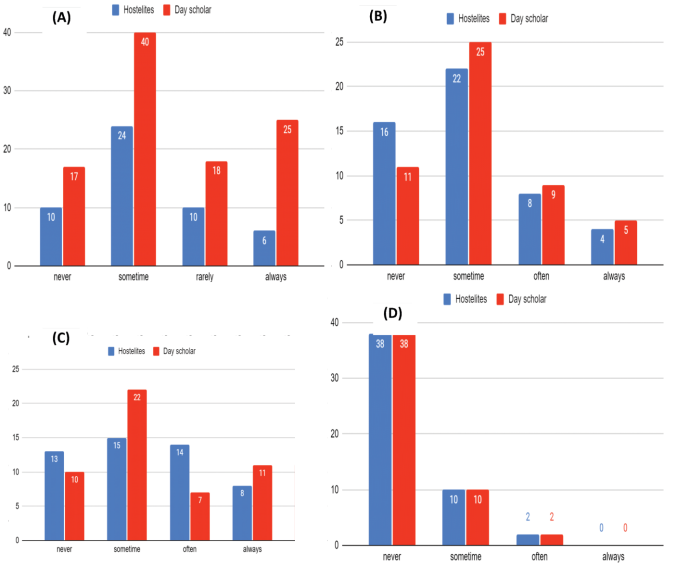

Figure 2: (A) Frequency distribution of getting up at night to eat (B) Frequency distribution of mindfulness of sensation of satiety (C) Frequency distribution of eating when stressed (D) Frequency distribution of exercise 10% of hostelites and 17%-day scholars never find time for exercising. 40% of day scholars and 24% of hostel students spent time exercising. 25% of day scholars and 6% of hostelites are exercising regularly whereas 10% of hostelites and 18% of day scholars answer that they don't have time for exercise (Figure 3A). 11% of day scholars and 16% of hostelites never fall asleep unintentionally or have to fight to stay awake during the day, 22% of hostelites and 25% of day scholars answered sometimes, 8% of hostelites and 9% of day scholars answered often while 4% of hostelites and 5% of day scholars answered always (Figure 3B). 13% of hostelites and 10% of day scholars answered never to this question, 15% of hostelites and 22% of day scholars answered sometimes, 14% of hostelites and 7% of day scholars answered often while 8% of hostelites and 11% of day scholars answered always (Figure 3C). The trend of breathing pattern during sleep is quite similar indicated frequency percentages 38% of individuals of both groups never show such behavior, while 10% of them sometime and 2% often suffer from breathing pauses, or stopped breathing during sleep (Figure 3D).

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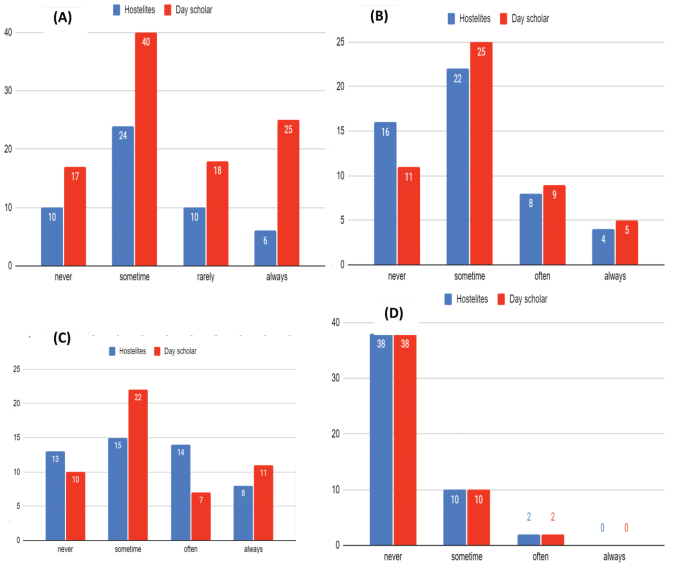

Figure 3: (A) Frequency distribution of finding the time for exercising (B) Frequency distribution falling asleep unintentionally (C) Frequency distribution of work or other activities preventing from getting enough sleep (D) Frequency distribution of stopping breathing in sleep

20% of hostelites and 25% of day scholars answered never to this question, 23% hostelites and 19% of day scholars answered sometimes, 6% of hostelites and 4% of day scholars answered often while 1% of hostelites and 2% of day scholars answered always (Figure 4A). 12% hostelites and 11%-day scholars have scored 5, 20% of hostelites and 14% of day scholars scored 4, 14% of hostelites and 17% of day scholars scored 3, 3% of hostelites and 6% of day scholars scored 2 while 1% of hostelites and 2% of day scholars scored 1 for how often did they feel tired out for no good reason in last 4 weeks (Figure 4B). 19% of hostel students and 9 % of day scholar fall under score 3, 5% of hostelites and 7% of day scholars gain score 5, while 18% of hostel students and 14 % gain score 4. 9% of day scholar and 1% gained score 1 (Figure 4C). Figure 4D shows that hostelites students are more depressed as 23% got score 3 as compared to them 12% of the day scholar gained the same score. 15% gain score 4 8% gain score 5 and 4% of hostelites gain score 2 whereas 13% gain score 5, 13 percent gain score 4, 12% gained score 3 and 5 % fall under score 2 and 7% gain score of 1(Figure 4D).

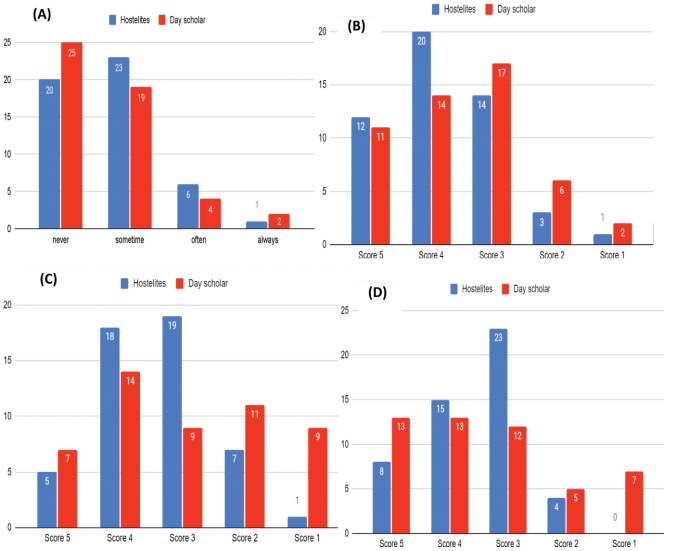

Figure 4: (A) Frequency distribution repeated rhythmic leg jerks (B) Frequency distribution of Feeling tired out of no-good reason (C) Frequency distribution of feeling hopeless (D) Frequency distribution of feeling depressed

DISCUSSION

The goal of the current study was to compare the food and lifestyle preferences of university Day Scholars and Hostel Residents, as well as the implications these differences have on their psychological well-being. Through the use of a non-probability selection approach, the participants were chosen. Regarding Body Mass Index, 10 Hostelites were underweight, 32 were normal, 5 were overweight and 3 were obese while in comparison, 5 day scholars were underweight, 34 were normal, 7 were overweight and 4 were obese. Similar study was done by Tufail et al., which found 15 students as underweight, 82 as normal weighted, 41 as pre-obese and 4 as obese [16]. On question "Getting up at night to eat", 17% of hostelites and 11% of day scholars said they get up at night to eat because of sleeplessness while 23% of hostelites and 24% of day scholars answered No and 10% hostelites and 15% Day scholars answered sometimes. Another study also observed night eating

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problems in university students. 2.3% got extreme carvings at night [17]. In our study on question of mindfulness of sensation of satiety, 29% of day scholar said they are more aware about being feeling of fullness and stop eating, 3% often end up eating too much, 7% eat according to standard serving sizes; whereas 26% of hotel student stop eating after being full, 7% rarely realize and eat too much, 6% use standard portions. Another study done by Moor et al., they found mindful eating summary score of 2.89±0.32. They also found negative correlation between mindful eating score and BMI [18]. On question of frequency of exercise, 10% of hostelites and 12% of day scholars answered never, 11% of hostelites and 13% of day scholars answered always, 18% of hostelites and 17% of day scholars answered sometimes while 11% of hostelites and 8% of day scholars answered rarely. On question of feeling hopeless, 19% of hostel students and 9 % of day scholar fall under score 3, 5% of hostelites and 7% of day scholars gain score 5, while 18% of hostel students and 14 % gain score 4. 9% of day scholar and 1% gained score 1. Similar study by Reed et al., found mean of 10.54±6.86 as frequency of exercise among university students [19]. On question about feeling of depression, 23% got score 3 as compared to them 12% of the day scholar gained the same score. 15% gain score 4 8% gain score 5 and 4% of hostelites gain score 2 whereas 13% gain score 5, 13 percent gain score 4, 12% gained score 3 and 5 % fall under score 2 and 7% gain score of 1. In a study done by Liu et al., they also found the effect of dietary habits and consumption of food on depression among university students [20].

CONCLUSIONS

This study highlighted the difficulties college students have in leading nutritionally healthy lives, particularly when they reside in dorms. The current findings point to a worryingly high incidence of psychological discomfort, as well as unhealthy eating, sleeping, and lifestyle choices that need to be targeted and changed. In contrast to students who attend day schools, those who live in dorms experience higher psychological discomfort, worse sleep quality, and poorer food habits.

Conflicts of Interest

The authors declare no conflict of interest.

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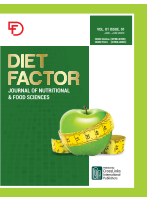

Original Article

Role of Advanced Tools and Technologies (M-Health Apps & Fitness Watches) in Affecting the Nutritional Wellness and Lifestyle Behaviors of University Students

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ABSTRACT

A huge increase in mobile health applications and wearable technologies has been seen in young individuals to track the records of progress in healthy lifestyle adaptation. **Objective:** To determine the role of advanced technologies and tools in affecting the nutritional wellness and lifestyle behaviors among university students. **Methods:** A cross sectional study was done at University of Lahore, Lahore Campus for duration of 4 months, using convenient sampling technique. Data were collected from 100 university students by a self-governing questionnaire. Different statistical tools were applied using SPSS version 21.0 software to analyze the data which included descriptive statistics and cross tabulation. **Results:** Out of 100 participants, 56% used wearable technology and 32% did not use while 12% used it in the past. On the contrary, 36% maintained weight and 27% did not maintain. 33% used this technology for awareness against diseases and 36% found no use in awareness out of 100. 52% got help in choosing portion sizes, 48% maintained hydration and joined exercise programs. 40% participants reduced interactions with their doctors due to this technology. 26% participants found that it reduces public health cost while 26%used it for detection of drug cravings. **Conclusions:** The results of this research conclude that there were a large number of participants use fitness apps and watches. Individuals mostly use these technologies for weight loss tracking and to improve their health. A positive impact of these tools and technologies is hence found upon healthy lifestyle adaptation among university students.

INTRODUCTION

Obesity is a disease comprising of multiple etiologies, in which body deposits abnormal amount of fat. According to WHO BMI of overweight and obese person will be that of 25.0 to 29.9 and ≥ 30.0 respectively. Further obesity is classified into three categories, obese-I from (30.0 to 34.9), obese-II (35.0 to 39.9) and obese-III will be ≥ 40.0 [1]. Excess deposition of fat in lower belly region is termed as abdominal obesity and this type of obesity is linked with severe health risks [2]. Since 1980 percentage of overweight has been doubled throughout the world and one third of world population has been considered as obese [3]. Different studies have identified the significant increase of obesity mostly among children which comprises 43 percent of the total population of Pakistan [4]. The factors which cause obesity include psychological factors, history of family and lifestyle [5]. The probability of becoming fat can enhanced by heredity, accumulation of fat in body and lifestyle (poor diet or less exercise) [6, 7]. Various interventions like modification in lifestyle, daily exercise habit and weight reduction drugs are effective in both treatment and prevention for obesity. Time consumption and great financial burden are two major cons of the above-mentioned procedures [8]. Recently, many smartphone apps and nutrition gadgets have demonstrated at least partial efficacy in promoting successful weight reduction [9]. These apps often provide information related to one's

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diet, energy consumption, energy expenditure, nutrition value and other anthropometric measurements. Sometimes, it also connects you to other groups of people having familiar health targets [10]. Many of these gadgets have similar functions, such as counting calories, step counting, heart rate monitoring, water consumption tracking, food planning, and sleep tracking. Since the release of first smartphone in 2008, people have been using these devices to improve their health habits [11]. Certain brands have recently launched many mHealth apps and fitness gadgets to help people improve their wellbeing. These include — Fitbit — which introduced an app known as sleep tracker. The purpose of this was to measure the duration as well as the quality of sleep of individual [12]. Daily allowance of fluid can be estimated by iDrated app which helps to calculate your daily fluid requirements by the input of water consumed throughout the day. For this purpose, Fitbit and Apple watch were introduced [13]. For weight reduction, one of the most widely used app is —MyFitnessPal‖, used by approximately 50 million individuals. In order to estimate individual's nutrient needs, these fitness apps help analyze food consumption and prepare customized meal plans. They also help individuals compare their calories consumed with their estimated kcal requirement [14]. Nowadays, walking steps can also be measured with the help of Fitness trackers such as—Step counter. Measurement of individual steps is also done by wearing fitness watches containing step counter [15]. Metabolites in the human sweat can now be analyzed to detect individual's physiological condition, drug addiction and measurement of energy expenditure during strenuous physical activity. Detectors such as —Lumee‖ are developed by Profusa company can be used to assess the composition of electrolytes in an individual's serum [16, 17]. To improve an individua's health and nutrition related behavior, —wrist-worn devices are popular nowadays. Fitness coaches, athletes and the general population commonly use them for wellness purposes [18]. Three recently released wrist-worn devices (Apple Watch 6, Polar Vantage V and Fitbit Sense) are used to assess heart rate, energy expenditure during sitting, walking, running, resistance exercises and cycling are popular nowadays [19]. The aim of study was thus to investigate the knowledge of people regarding m-health apps and wearable trackers in the management of obesity, their usage as well as the effectiveness of these wearable gadgets and healthcare applications in healthy lifestyle and dietary adaptation.

METHODS

This was a Cross-sectional study conducted at The University of Lahore Defense Road Campus. The duration of the study was 4 months. Sample size was n=100. Non-probability convenient sampling was done. Inclusion Criteria: Only university students of age 18-26years of allied health sciences regardless of race or gender participated in the survey. Exclusion Criteria: 1. The students below 18 and above 26 years. 2. The students other than allied health sciences were not eligible to participate in the study. 3. University students other than University of Lahore. 4. Non cooperative students were excluded from the sample. In this study, all data were collected randomly through a survey using a detailed self-constructed questionnaire after approval from experts. All the questions were based on different sections including demographic information, anthropometric measurements, fitness apps usage, health impact using fitness gadgets, physical activity, and lifestyle modification. The ethical approval was signed by the ethical committee, Head of the department of the University Institute of Diet and Nutritional Sciences. The consent was taken from the participants before data collection. Questionnaires were distributed among participants, and they were asked to fill them. 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. After taking informed written consent, data were collected by the researchers with the help of attached pre-tested data collection tool (questionnaire). Data were collected according to the variables of the questionnaire which were as follows: Demographic data and anthropometric measurements were asked from the participants. Questions were directly asked from participants. SPSS version 21.0 was used to tabulate and analyze the data. The qualitative variables such as gender, type of fitness tools etc. were reported in the form of percentages and frequencies. The association between the variables was found by using chi-square.

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%

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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%)
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%)
Total	100(100%)

Table 1: Distribution of participants according to different categories

Out of 100 participants, 29% did not used mhealth apps, 17% used apple heart, 16% used Samsung health, 6% used google fit, 4% used fitbit and 20% used other apps (Figure 1).

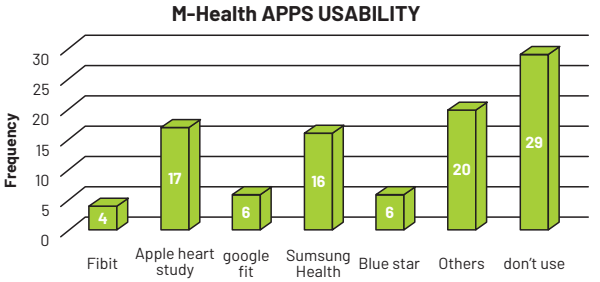

Figure 1: Distribution of M-Health apps usability by participants

Out of 100 participants, 56% used wearable technology and 32% did not use while 12% used it in the past. On the contrary, 36% maintained weight and 27% did not maintain. 33% used this technology for awareness against diseases and 36% found no use in awareness out of 100. So more, 52% got help in choosing portion sizes, 48% maintained hydration and joined exercise programs. 40% participants reduced interactions with their doctors due to this technology (Table 2).

Perceptions	Frequency (%)			
	Yes	No	Maybe	Total
Apps Currently being used	56	32	12	100.0
Role in weight maintenance	36	27	37	100.0
Awareness against diseases	33	36	31	100.0
Impact on eating habits	50	50	0	100.0
Impact on food choices	56	44	0	100.0
Impact on portion sizes	52	43	5	100.0
Help in eating less	51	42	7	100.0
Hydration alerts	48	35	20	100.0
Exercise programs	48	23	29	100.0
Health improvement	38	27	35	100.0
Decreased Doctor-patients' interactions	40	29	31	100.0

Table 2: Distribution of perception of participants regarding wearable technology

Table 2: Distribution of perception of participants regarding wearable technology

Reduce Public Health Costs	Frequency (%)
Yes	37 (37%)
No	29 (29%)
Maybe	34 (34%)
Total	100 (100%)

Table 3: Distribution of health apps usefulness in reducing public health costs

Out of 100 participants, only 26% used apps for detection of drug cravings, 60% did not find apps useful while 14% had benefit sometimes (Table 4).

Detection of drug craving	Frequency (%)
Yes	26 (26%)
No	60 (60%)
Sometimes	14 (14%)
Total	100 (100%)

Table 4: Distribution of health apps usefulness in detection of drug craving

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Out of 100 participants, 20% used all of the indicators of apps, 19% for physical activity, 13% for workout improvement, 16% to lose weight 7% and 8% to monitor health and heart rate respectively (Figure 2).

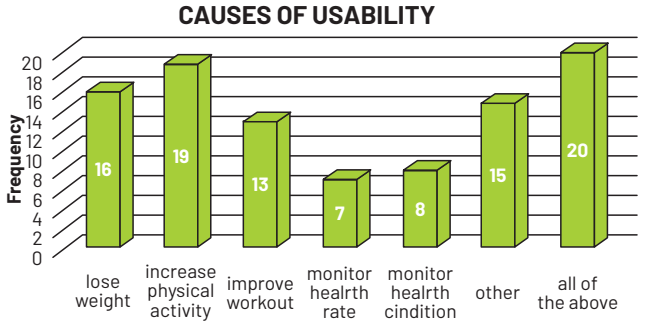

Figure 2: Distribution of causes of wearable fitness trackers/M-Health apps usability

Out of 100 participants, 22% found no need to use, 18% had other reasons, 13% for their non accuracy, 14% non-useful and 4% find them difficult to use (Figure 3).

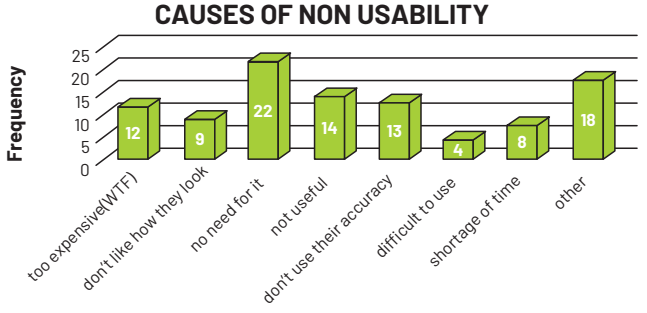

Figure 3: Distribution of causes of wearable fitness trackers/M-Health apps non usability

Out of 100 participants, 39% used wearable technology for step counting, 17% for calorie counting, 11% for physical activity, 7% and 8% for monitoring menstrual cycle and heart rate while 7% for kcal burnt (Figure 4).

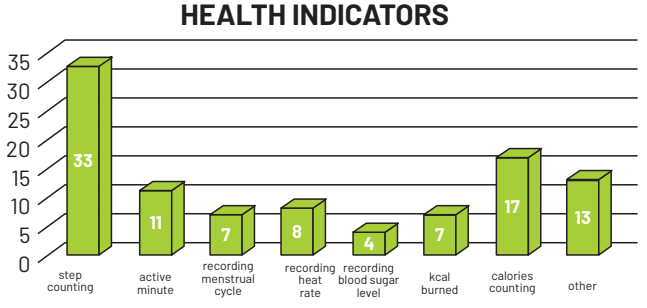

Figure 4: Distribution of indicators frequently used in health and fitness wearable technology

DISCUSSION

Present study found that out of 100 participants, 37% were somewhat motivated, while 30% were a little bit motivated to perform physical activity after using mHealth apps. Similar findings were deduced by Cho *et al.*, that the oriental behavior of college students towards fitness was increased after using fitness/health apps [20]. Findings of our study indicated the role of fitness apps and trackers in kcal control. Out of 100 participants, 58% think that fitness apps encourage to eat less and aids in kcal control, while 36 out of 100 individuals experienced weight loss using these apps. Similar study conducted by Miller *et al.*, showed that Wearable trackers helped in improving caloric intake from 3500/day to suggested 2500 calories/day [21]. Our study concludes that 48 out of 100 individuals found these fitness apps helpful in exercise programs and fitness goals. Similar findings given by Gowin *et al.*, indicate that students downloaded the m Health apps to get particular goals as for exercise routines and to improve eating habits [22]. Another study conducted by Seiler *et al.*, to assess the use of E-health, fitness trackers and wearables among swiss students found the similar positive effect on exercise due to these apps or devices [23]. Present study found that out of 100 participants, 29% did not used mhealth apps, 17% used apple heart, 16% used Samsung health, 6% used google fit, 4% used fitbit and 20% used other apps. Similar results were drawn by André *et al.*, according to which every year, new fitness trackers and smartwatches are introduced to the consumer market [24]. Fitbit, Garmin, Misfit, Apple, and Polar are the five most popular brands now available in research initiatives. Findings of current study show that using these fitness apps and trackers, weakens doctor-patient interactions as 40 out of 100 participants believe so. A similar conclusion was drawn by Decker, according to which Scientific and technological advancements have underlined the significance of comprehensive healthcare, lifestyle services, and individualized suggestions [12]. Results of present study indicate that m-Health apps and fitness trackers help reduce the public health costs as 37 out of 100 participants believe the same. Similar findings were given by Khan *et al.*, that Digital health has quickly emerged as a technology that has the ability to bridge the gap in self-management of cardiovascular disease [25].

CONCLUSIONS

The results of this research conclude that majority of participants use fitness apps and watches. Individuals mostly use these technologies for weight tracking and to improve their health. Although, fitness tracker is mostly used for step counting, recording steps and to count kcals lost after exercise. A positive impact of these tools and technologies is hence found upon healthy lifestyle adaptation among university students. Increasing trends of using wearable technologies show that may be in future proper professional medical and nutritional help which require physically visiting a health- care center will be

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replaced by these apps and trackers.

Conflicts of Interest

The authors declare no conflict of interest.

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