IMPACT OF DIETARY HABITS ON HEALTH STATUS OF COLLEGE GOING STUDENTS IN PUNJAB

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Abstract

Purpose of the study: The core objective of this study was to analyze the effect of dietary habits on the health status of college-going students.

Methodology: Two districts of Punjab were selected randomly namely Faisalabad and Rahim Yar Khan. Two public sector colleges were selected purposively from each district i.e. one male and one female keeping in mind low strength and high strength were selected. The population of these colleges was 5372 while the sample size was 189. A well-structured questionnaire was developed on a google form. Collected data were processed through SPSS software for standard deviation, frequency, mean, and weighted score, and rank order.

Main Findings: It was found that most of the respondents were female students and the majority of the student’s family monthly income was Rs. 10,000 – 20,000. The majority of the respondents were not suffering from any disease. The majority of respondents were those who have never eaten snacks in between their meals. Respondents who use to eat breakfast every day were ranked No. 1. Majority of the respondents were using full fat milk, soft drinks, and meat with visible fats. Most of the students were involved with healthy life habits i.e. doing physical activity, consuming fruits and greens.

Application of the study: This study can also be used to determine the dietary habit impact on the health status of college-going students in other districts of Punjab.

Novelty/ originality of the study: This study has provided an overview of different diseases affecting the health of college-going students. In the context of the current portfolio, the results of the current study will create awareness regarding healthy nutrition for improving the health status of the student.

Keywords: Dietary Habits, College Students, Health Status, Nutrition, Diseases.

INTRODUCTION

Nutrition has a significant role in the health status of all ages particularly among adults and is involved in an efficient and healthy ageing process. Several factors i.e. physiologic, economic, and social are involved in the selection of the type of food and can serve as an obstacle to a healthy diet (Viejo et al., 2018). With the passage of time, a prominent change that has been observed is a decrease in the consumption of food. Among aged adults decrease in appetite is associated with alteration in the gastric system, lower salivary secretions due to massive use of therapeutic agents, oral cavity ailments, and minimized taste and smell capabilities (Proserpio et al., 2017; Van Can et al., 2014). Loss of appetite is induced by delayed emptying of the stomach, decreased hunger hormones levels i.e. ghrelin, elevated levels of cholecystokinin and leptin hormones. All aforementioned changes are responsible for weight loss and decreased appetite (Whitelock and Ensaff, 2018; Lupi et al., 2015; Schütz et al., 2014).

Youth is more susceptible to weight gain and obesity cases all over the world and these are becoming alarming issues globally. Nearly a 43million young candidates are classified as obese. Such issues of early ages are associated with serious results in terms of obesity, variable sugar and blood levels, and heart attacks (Curtis et al., 2012). In addition, increased body weight and childhood are also associated with Non-Communicable Diseases (NCD). Lifestyle including eating habits, nutrition status, healthy diet, and eating of breakfast on regular basis generally count for obesity and health status during adulthood.

Breakfast is an essential need of children and is strictly recommended to overcome the problems of overweight and obesity as weight is the key factor of the child (Kesztyüs et al., 2017). World Health Organization has demonstrated good nutrition in terms of “corner stone of good health”. A balanced and healthy diet accounts for the prevention of obesity in children and adults because they require appropriate nutrition and diet at their growing stage. It is obvious from literature that an unbal-
anced, unhealthy, and inadequate diet alters the physical and mental growth of growing children and adults (Soheilipour, and Salehiniya, 2019; Banik et al., 2020).

Acquiring appropriate dietary habits and a sufficient level of physical exercise are well recognized to be the best way in reducing the chances of cardiac issues. (Dobrosielski et al., 2017) A diet containing a lot of cereals, greens, flesh, and the least cholesterol, sugar, sweets, and salt are usually considered best (Monteiro et al., 2019; Stelten et al., 2020).

Breakfast habit is considered as a mandatory indicator of health status and is associated with overweight/obesity among individuals habitual of skipping this meal. Studies have shown that a high risk of developing insulin resistance, poor glycemic control, altered lipid profile, stroke, and coronary heart disease, is associated with skipping breakfast (Ghafari et al., 2017). In this regard, undergraduate students are more vulnerable and have high risks to become overweight or obese. Other aspects to adopt poor dietary routines for college students include social setup and high academic demands by which they become prone to alter the sleep restrictions and sleep-wake cycle and often skipping of breakfast (Arisa et al., 2020; Willie et al., 2020).

At college, students’ eating preferences and habits lead towards weight gain and other life-lasting issues like uncontrolled sugar and blood levels. As per WHO reports about 80% of the previously discussed chronic diseases are due to lifestyle and dietary factors (Mansoor et al., 2021). Likewise, students have to face several problems involving health affecting one’s eating practices resulting in obesity. Students have easy access to low-quality food items like high energy-containing refreshments in terms of fried items with the least use of fiber-containing products i.e. fruits and different salads. Skipping day or not time meals is another cause (Alkazemi, 2019; Matsumoto et al., 2020).

Life-changing transitions occur by switching adolescents from high school towards college or professional life. According to research, the university period is a critical period for students regarding the adaptation of food choices and understanding the association of their food choices with weight gain and obesity. Some reports suggest more weight gain among college students as compared to those who do not join the university (Häidar et al., 2018). For designing and supporting the health and nutrition campaigns such as consumption of less meat and more healthy foods, it is mandatory to enhance the awareness and knowledge of dietary behaviours and their health impact among the university-going population (Kyrkou et al., 2018; Tunkara-Bah et al., 2021). There had been a great concern in the development and accomplishment of health advancement interventions at the workplace. Although studies related to the exploration of dietary habits and behaviours among children, young adults, and adolescents have been conducted in recent years, theories based upon the dietary habits and behaviours still need to move from the nascent stage to the mature stage (Sogari et al., 2018; Nakatani et al., 2018).

Significant changes while switching from high school to college or any working organization promote lifestyle changes. The college stay period is very much crucial due to different food options and their associations with increased weight. Most of the studies have also proved that weight gain cases are more frequent as compared to other educational steps. So, dietary education and knowledge about healthy diet habits should be provided to all adults through institutional campaigns (Neslisah and Emine, 2011; McLoughlin et al., 2019).

Staying at college is a crucial period for developing healthy eating behaviours because many college-going students learn to establish an independent lifestyle. Poor dietary lifestyles such as decreased intake of vegetables and fruits and increased consumption of fast food are adopted in early adulthood (18-25 years of age) (Tam et al., 2017; Carrero González et al., 2021). The transition from high school to college as adulthood contributes to increased decision-making and influences the development of health behavior patterns to be continued in later stages of life. In this regard, the development of poor dietary habits in the college time period are more likely to continue later which may lead older adults to become obese or overweight and development of chronic health conditions (Crimarco et al., 2019; Abraham et al., 2018).

It is globally evident that alterations in eating habits including consumption of healthy foods along with fast foods, lack of consumption of vegetables and fruits, and increased food portion size lead to obesity as an epidemic particularly in children and adolescents (Mekonnen et al., 2018). In addition, stationary lifestyle and low physical activity have steeply increased with the increased use of personal vehicles. These factors are responsible for the sedentary lifestyle of children. Moreover, people spend most of their leisure time using computers and watching television which may influence their choices to adopt consumption of unhealthy edible items. Based on all these factors, it may be concluded that lifestyle changes and social factors play an obligatory role in the onset of obesity (Mangla et al., 2019; Wadolowska et al., 2018; Kohorst et al., 2018).

Objective

The present study was mainly designed to explore the dietary habits and impact of these habits on the health status of college-going students from Punjab.
METHODOLOGY

Present work includes distribution of prepared electronic questionnaire as Google form, collection of responses against each question, a compilation of data in the form of tables and graphs, interpretation of data through suitable statistical means, and conclusion.

Research area

District Faisalabad that was formerly known as Lyallpur and also familiar with the name as “Manchester of Pakistan” worldwide. Faisalabad is the second major city of the eastern province of Punjab. It has a total area of 58.56 square kilometers. The local language of Faisalabad residents is Punjabi. Various research and academic institutes are running in Faisalabad like the University of Agriculture Faisalabad, Ayyub Research Centre, Nayyab, National Textile University, PINUM cancer hospital of Atomic Energy Commission, National Institute for Biotechnology and Genetic Engineering (NIBGE), Allied Hospital, and teaching institute, etc. District Rahim Yar Khan placed at the border of Sindh and Punjab.

Subjects

The study was quantitative. From District Faisalabad and Rahim Yar Khan, four colleges were selected purposively i.e. one with high strength and the other with least strength were chosen from each district. There were the total population of four selected colleges were 5372. The total strength of male students was 669 while the total strength in selected female colleges was 4703. The sample size calculated through the website (www.surveysystem.com) was 189 with a confidence level of 93% and confidence interval.

Assessment

A well-structured questionnaire was developed comprising of closed and open-ended questions. Primarily, the initial draft of the questionnaire was submitted to the research supervisor for analysis, review, and any recommendations. After correcting suggested changes, a questionnaire was reviewed again by the supervisor for final approval. After approval from the supervisor, this questionnaire was formatted into a google form. It was distributed to students with the help of respective college teachers. The questionnaire comprised of different types of questions like about their demographic data, factors associated with obesity, knowledge, and views on dieting, balanced nutrition and self-body image, knowledge about risk factors about non-communicable diseases, and an association between nutritional status and health-oriented life habits. Responses were automatically collected on excel based response sheet.

Analysis of data

Obtained data were processed and analyzed by using computer-based software i.e. Statistical Package of Social Sciences (SPSS) to reach a definite conclusion. Percentage, Mean, Weighted Score, Rank order, and Standard Deviation were used for interpretation and discussion of results.

RESULTS AND DISCUSSIONS

Objective 1: To identify the demographic characteristics of college-going students

Demographic information of the respondents includes general parameters that support in confirming the actuality of the participants. These parameters include name, age, gender, address, parent’s income, height, weight, history of the disease, blood pressures, etc. These are the core elements in one’s specific profile (Abumuhammad et al., 2020; Zhang et al., 2017).
Figure 1: Graphical representation of the distribution of the respondents according to their (A) age, (B) height, (C) gender, (D) weight, and (E) parent’s income

Graphical representation of the distribution of the respondents according to their age, height, gender, weight, and parents’ income is given in Figure 1.

Figure 1(A) shows that less than one-fourth of the total respondents had 16-18 years of age and the majority of the respondents had the age of 19-21 years. On the other hand, few of the respondents had the age of 22-24 years. These findings had highlighted that most of the college students were having age 19 – 21 years of age. These findings were following the results of Sogari et al. (2018) where the majority of the students were having age 18 – 21 years. At this age level usually, students have their attitude and knowledge towards different things like dietary concerns, etc.

Figure 1(B) depicts that less than one-fourth of the total respondents had a height of 4.6-5ft. On the other hand, the majority of the respondents had a height of 5.1-5.5ft while more than one-fourth of the total respondents had a height of 5.6-6ft. Results in terms of the height of respondents of college-going students are in line with the findings of Kilinc and Caguas, (2012). The authors had evaluated the body composition, dietary habits, and nutritional knowledge of college-going students. The majority of respondents were having heights within the range of 5.1 to 5.5 feet.

Figure 1(C) reveals that the majority of the respondents i.e. 58.2% were females while 41.8% of the respondents were males. Oimage and Omuemu, (2018) had highlighted factors associated with the dietary habits and nutritional status of students. The majority of the females were having limited diet diversities as compared to males.

Figure 1(D) illustrates that few of the respondents had a weight of 31-40kg and more than one-fourth of the total respondents had a weight of 41-50kg. On the other hand, the majority of the respondent had a weight of 51-60kg while less than one-fourth of the respondents had a weight of 61-70kg and very few of the respondents had a weight of 71-80kg, respectively.
Ousely et al. (2007) had conducted a study regarding fat talks among college students. Results were following the findings of this study in terms of that majority of students were having body weights between 51-60 kg.

Figure 1(E) indicates that more than one-fourth of the total respondent’s parents had an income level of 10,000-20,000 and less than one-fourth of the total respondent’s parents had 21,000-30,000 income levels. On the other hand, 24.3% of the respondents had a 31,000-40,000 income level while >40,000 had an income level of 23.8% of respondents. These findings had highlighted that all respondent’s families were not having high incomes. Ojha (2019) had also conducted a study regarding the socioeconomic status and lifestyle of college-going students. It was observed that the majority of respondents were having a low income. It was concluded that a positive association between these two parameters exists. Similarly, it can be observed in our findings that economic values have a strong impact on one’s lifestyle and eating habits.

Similarly, Table 1, 2, and 3 contains frequency distribution and percentages of respondents according to their health status, disease, and specific disease respectively.

**Table 1:** Frequency distribution and percentages of respondents according to their health status (n = 189)

| Scale    | Frequency | Percent |
|----------|-----------|---------|
| Excellent| 57        | 30.2    |
| Very good| 50        | 26.5    |
| Good     | 64        | 33.9    |
| Fair     | 16        | 8.5     |
| Poor     | 2         | 1.1     |
| Total    | 189       | 100.0   |

Table 1 demonstrates that more than one-fourth of the total respondents had excellent health status and few of the respondents had fair health status. On the other hand, the majority of the respondents had good health status while 26.5% of the respondents had very good health status, respectively.

**Table 2:** Frequency distribution and percentages of respondents according to their Diseases (n=189)

| Diseases           | Frequency | Percentage |
|--------------------|-----------|------------|
| No                 | 167       | 88.4       |
| Yes                | 22        | 11.6       |
| Total              | 189       | 100.0      |

Table 2 shows that 88.4% of the respondents had not suffered from any sort of disease while 11.6% of the respondents had different diseases. A significant number of students had not suffered from any disease. Chakma and Gupta (2017) have conducted a study regarding the association of lifestyle involving eating habits with non-communicable diseases among college-going students with similar findings as in our study.

**Table 3:** Frequency distribution and percentages of respondents according to their specific diseases (n = 189)

| Diseases                | Frequency | Percent |
|-------------------------|-----------|---------|
| B.P. & Blood Sugar      | 1         | 0.5     |
| Backache and Arthritis  | 2         | 1.1     |
| Cough and flu           | 2         | 1.1     |
| Fever and weakness      | 21        | 11.1    |
| Stomach disorder        | 8         | 4.2     |
| No diseases             | 136       | 72.0    |
| Obesity                 | 2         | 1.1     |
| Skin allergy            | 3         | 1.6     |
| Typhoid                 | 2         | 1.1     |
| Hair loss               | 10        | 5.3     |
| Asthma                  | 2         | 1.1     |
| Total                   | 189       | 100     |

Table 3 highlights that the majority of the respondents (72%) had not suffered from any disease. Few of the respondents had blood sugar and blood pressure issues while some of the respondents had suffered from cough, flu, backache, and arthritis, respectively. On the other hand, more than one-tenth of the respondents had suffered from fever and weakness while less than one-tenth of the respondents had suffered from stomach disorders.
Dietary habits and preferences change with the growing age. Both have a critical role in student’s life. Healthy eating habits predispose a healthy lifestyle in one’s life.

Table 4: Frequency distribution and percentage of dietary habits of respondents (n = 189)

| Dietary habits                        | Never | Sometimes | Often |
|---------------------------------------|-------|-----------|-------|
|                                       | f     | %        | f     | %    | f     | %    |
| Eat meals regularly on daily basis    | 24    | 12.7     | 0     | 0.0  | 165   | 87.3 |
| Eat breakfast every day               | 15    | 7.9      | 9     | 4.8  | 165   | 87.3 |
| Eat lunch every day                   | 17    | 9.0      | 7     | 3.7  | 165   | 87.3 |
| Eat dinner every day                  | 15    | 7.9      | 14    | 7.4  | 160   | 84.7 |
| Snack in between regular meals        | 114   | 60.3     | 0     | 0.0  | 75    | 39.7 |

Table 4 shows that the majority of the respondents had taken meals on regular basis (87.3%), breakfast (87.3%), lunch on daily basis and a significant number of respondents had often taken dinner every day (84.7%). Moreover, 39.7% of respondents had eaten snacks occasionally between their meals. A significant number of respondents i.e. 114 (60.3%) had never eaten snacks between their regular meals. Less than one-fourth of respondents had not eaten their meals regularly on daily basis. Likewise, more than one-tenth of respondents had never taken their breakfast every day.

Table 5: Frequency distribution and percentage of eating patterns of the respondents (n = 189)

| Eating patterns                        | Never | Several times in a month | Once or twice in 2 weeks | Several times a week | Daily |
|----------------------------------------|-------|--------------------------|--------------------------|----------------------|-------|
| How often do you eat vegetables?       | 1     | 0.5                      | 19                       | 10.1                 | 31    | 16.4 | 99    | 52.4 | 39    | 20.6 |
| How often do you eat fruits?           | 1     | 0.5                      | 28                       | 14.8                 | 44    | 23.3 | 54    | 28.6 | 62    | 32.8 |
| How often do you eat fast food?        | 40    | 21.2                     | 61                       | 32.3                 | 57    | 30.2 | 28    | 14.8 | 3     | 1.6  |
| How often do you eat fried food?       | 32    | 16.9                     | 53                       | 28.0                 | 72    | 38.1 | 32    | 16.9 | 0     | 0    |
| How often do you use energy drinks?    | 64    | 33.9                     | 30                       | 15.9                 | 43    | 22.8 | 28    | 14.8 | 24    | 12.7 |
| How often do you eat at restaurants (KFC, MacDonald etc.)? | 106  | 56.1                     | 47                       | 24.9                 | 26    | 13.8 | 10    | 5.3  | 0     | 0    |
| How often do you visit cafes?          | 150   | 79.4                     | 17                       | 9.0                  | 12    | 6.3  | 8     | 4.2  | 2     | 1.1  |

Table 5 demonstrates that more than half of the respondents (56.1%) reported that they had not visited restaurants i.e. KFC, MacDonald, etc. for eating their food. Approximately one-third of the respondents (32.3%) had consumed fast food several times in a month. Less than one-third of respondents (28%) reported that they had consumed fried food several times in a single month. Less than one-fifth of the respondents (15.9%) had drunk energy drinks many times during a single month. Less than one-fourth of respondents (24.9%) had visited restaurants (KFC, MacDonald) several times in a month.

Table 6: Weighted score, mean, standard deviation, and rank order of eating patterns of the respondents (n = 189)

| Eating patterns                        | W.S. | Mean | S.D. | Rank |
|----------------------------------------|------|------|------|------|
| How often do you eat vegetables?       | 723  | 3.83 | 0.891| 1    |
| How often do you eat fruits?           | 715  | 3.78 | 1.077| 2    |
| How often do you use energy drinks?    | 485  | 2.57 | 1.411| 3    |
| How often do you use fried food?       | 482  | 2.55 | 0.964| 4    |
| How often do you eat fast food?        | 460  | 2.43 | 1.033| 5    |
| How often do you eat out in restaurants (KFC, MacDonald etc?) | 318  | 1.68 | 0.902| 6    |
| How often do you visit cafés?          | 262  | 1.39 | 0.865| 7    |

Scale: 1 = Never, 2 = Several times in a month, 3 = Once or twice in 2 weeks, 4 = Several times a week, 5 = Daily

Table 6 presents the ranking order of eating patterns of the respondents. Respondents who often eat vegetables ranked No.1 were having weighting score 723 with mean value 3.83 and standard deviation of 1. Respondents who often use to eat fruits were ranked at No.2 were having weighting score of 715 with mean value 3.78 and standard deviation of 1.077. Respondents who were involved in using energy drinks were ranked at No. 3 with weighting score of 4.85, mean value of 2.57, and standard deviation of 1.4111. Respondents who often use fried food were ranked No. 4 with weighting score of 482, mean value 2.55, and standard deviation of 0.964. Likewise, respondents who used to eat fast food were ranked No. 5 with weighting score of 460, mean value 2.43, and standard deviation of 1.033. Moreover, respondents who used to eat out at restaurants were ranked at No. 6 with weighting score of 318, mean value 1.68, and standard deviation of 0.902. Lastly, respondents
who often used to visit cafe were ranked at No. 7 with weighting score of 262, mean value of 1.39, and standard deviation of 0.865. Findings were in line with the outcomes of a study conducted by Khosravi et al. (2015).

**Table 7:** Respondent’s nutritional status and health-related life habits

| Response                                      | No | Yes | W.S. | Mean | S.D. | Rank |
|------------------------------------------------|----|-----|------|------|------|------|
| Physical activity > 150 min/week              | 58 | 30.7| 131  | 69.3 | 320  | 1.69 | .462 | 1   |
| Consumption of fruits (≥ 5 times/week)        | 65 | 34.4| 124  | 65.6 | 313  | 1.66 | .476 | 2   |
| Consumption of greens (≥ 5 times/week)        | 75 | 39.7| 114  | 60.3 | 303  | 1.60 | .491 | 3   |
| Consumption of salad (≥ 5 times/week)         | 96 | 50.8| 93   | 49.2 | 282  | 1.49 | .501 | 4   |
| Consumption of beans (≥ 5 times/week)         | 105| 55.6| 84   | 44.4 | 273  | 1.44 | .498 | 5   |
| Consumption of soft drinks (≥ 5 times/week)   | 116| 61.4| 73   | 38.6 | 262  | 1.39 | .488 | 6   |

Scale: 1= Often, 2= Sometimes, 3 =Never

Table 7 indicates the ranking of responses of respondents about nutritional status and health-related life habits. Less than 50% of the respondents had confirmed that they are not performing physical activity greater than 150 minutes in a week while 69.3% of the respondents had confirmed that they are performing physical activity greater than 150 minutes in a week. This response from the respondents was ranked at No. 1 with a weighting score of 320, mean value 1.69 and standard deviation of 0.462. 34.4% of the respondents had confirmed that they are not consuming fruits five or more times in a week while 65.6% of the respondents had confirmed that they are consuming fruits five or more times in a week. This response from the respondents was ranked at No. 2 with a weighting score of 313, mean value 1.49, and standard deviation of 0.476.

The respondents who had confirmed that they are not consuming greens five or more times in a week were 39.7% while 60.3% of the respondents had confirmed that they are consuming greens five or more times in a week. This response from the respondents was ranked at No. 3 with weighting score of 303, mean value 1.60, and standard deviation 0.491. 50.8% of the respondents had confirmed that they are not consuming salad five or more times in a week while 49.2% of the respondents had confirmed that they are consuming salad five or more times in a week. This response from the respondents was ranked at No. 4 with weighting score of 282, mean value 1.49, and standard deviation of 0.501.

The respondents who had confirmed that they are not consuming beans five or more times in a week were 55.6% while 44.4% of the respondents had confirmed that they are consuming beans five or more times in a week. This response from the respondents was ranked at No. 5 with weighting score of 273, mean value 1.44, and standard deviation 0.498. 61.4% of the respondents had confirmed that they are not consuming soft drinks five or more times in a week while 38.6% of the respondents had confirmed that they are consuming soft drinks five or more times a week. This response from the respondents was ranked at No. 6 with a weighting score of 262, mean value of 1.39, and a standard deviation of 0.488.

**Table 8:** Association of health status with the eating pattern, knowledge of risk factors, and nutritional status

| Correlations | Eating Pattern | Knowledge about risk factors for NCD’s | Nutritional status and health-related life habits |
|--------------|----------------|----------------------------------------|-------------------------------------------------|
| Health status| Pearson Correlation | 0.196** | 0.013 | 0.353* |
| Sig. (2-tailed) | 0.007 | 0.859 | 0.000 |

Table 8 depicts that based upon the Pearson correlation coefficient ($r = 0.196^{**}$) a significant and positive correlation between health status and the eating pattern was found. It means that the eating patterns of college-going students had positively influenced their health status. Similarly, the Pearson correlation coefficient ($r = 0.353^{*}$) also showed a significant and positive relationship between health status and nutritional status, and health-related life habits. However, knowledge about risk factors for NCD’s had insignificant relation with the health status of the college-going students.

**Table 9:** Association of eating pattern with knowledge of risk factors and Nutritional status and health status

| Correlations | Health Status | Knowledge about risk factors for NCD’s | Nutritional status and health-related life habits |
|--------------|---------------|----------------------------------------|-------------------------------------------------|
Similarly, variable responses in case of skipping breakfast, eating pattern (r = 0.242**) also showed a significant and positive relationship between eating patterns and nutritional status and health-related life habits of college-going students. However, knowledge about risk factors for NCD’s had insignificant relation with the health status of college-going students.

**Table 9:** Association of knowledge of risk factors with eating patterns, nutritional status, and health status

| Correlations                                      | Health status | Eating pattern | Nutritional status and health-related life habits |
|---------------------------------------------------|---------------|---------------|--------------------------------------------------|
| Knowledge about risk factors for NCD’s Pearson Correlation | 0.013         | 0.081         | 0.089                                            |
| Sig. (2-tailed)                                    | 0.859         | 0.265         | 0.223                                            |

Table 9 depicts that based upon the Pearson correlation coefficient (r = 0.196**) there is found a significant and positive correlation between eating patterns and health status of the college-going students. It means that the eating patterns of college-going students had positively influenced their health status. Similarly, the Pearson correlation coefficient (r = 0.242**) also showed a significant and positive relationship between eating patterns and nutritional status and health-related life habits of college-going students.

**Table 10:** Association of nutritional status with knowledge of risk factors, eating patterns, and health status

| Correlations                                      | Health status | Eating pattern | Knowledge about risk factors for NCD’s |
|---------------------------------------------------|---------------|---------------|---------------------------------------|
| Nutritional status and health-related life habits Pearson Correlation | 0.353**       | 0.242**       | 0.089                                 |
| Sig. (2-tailed)                                    | 0.000         | 0.001         | 0.223                                 |

Table 10 depicts that based upon Pearson correlation coefficient results in respect of health status (r = 0.013), eating patterns (r = 0.081) and nutritional status, and health-related life habits (r = 0.089) no significant correlation was found between knowledge about risk factors for NCD’s and these three aforementioned parameters.

**Table 11:** Association of nutritional status with knowledge of risk factors, eating patterns, and health status

| Correlations                                      | Health status | Eating pattern | Knowledge about risk factors for NCD’s |
|---------------------------------------------------|---------------|---------------|---------------------------------------|
| Nutritional status and health-related life habits Pearson Correlation | 0.353**       | 0.242**       | 0.089                                 |
| Sig. (2-tailed)                                    | 0.000         | 0.001         | 0.223                                 |

Table 11 depicts that based upon Pearson correlation coefficient results in respect of health status (r = 0.353**) and eating patterns (r = 0.242**), a significant correlation was seen between these parameters and nutritional status and health-related life habits. However, based upon the Pearson correlation coefficient (r = 0.089) no significant correlation was found between knowledge about risk factors for NCD’s and nutritional status and health-related life habits.

Correlation results lie between -1 to +1. Pearson correlation test was used to determine the fate of correction of these responses with the health status of the respondents (N = 189). Pearson correlation coefficient values in all of the responses mentioned in the above-mentioned tables are less than one to exactly one that indicates that a perfect positive correlation exists between mentioned responses i.e. eating patterns and nutritional status, health-related life habits, and health status of the respondents.

Pearson correlation coefficient proved a significant and positive relationship. Pearson correlation test had confirmed a significant and positive relationship among eating patterns, knowledge, nutritional status, and health-related life habits (p<0.01). This means that if the respondents had awareness about their eating pattern, nutritional status, and dietary habits then they can adopt a healthier lifestyle as compared to those who were unaware of all these. The results showed that eating patterns, nutritional status, and awareness about nutrition had reduced the chances of occurrence of many diseases. Results were in accordance with the findings of Alkazemi (2019). In that study, they have assessed the association between dietary habits, health attitudes, and health status of college-going students. A perfect positive correlation was noticed in their findings as was revealed in our study.

**CONCLUSIONS**

It was concluded that plenty of students were upgraded from school to college for seeking higher studies. Diet is basically the food choices. A healthy dietary habit helps them to stay fit and healthy throughout his life. A healthy diet includes the consumption of fruits, vegetables, cereals, water, low-fat dairy products, etc. Eating breakfast is good for health and the majority of the students were taking breakfast daily. Students had good knowledge about dietary habits and nutritional food. Moreover, a proportion of students were involved in the habitual intake of fast food and fried items. Most of the students had shown great concern about their body weight, physical appearance, and general looks. But their improper eating routines had disturbed their stomach thereby resulting in different diseases. Similarly, variable responses in case of skipping breakfast, visiting cafes were noted. College students should be exposed to different campaigns involving their training regarding the selection of quality and healthy foods for a healthy lifestyle. They must be motivated for physical activity on daily basis.
LIMITATION OF STUDY
This study was limited to two districts of the Punjab province, Pakistan due to financial and time constraints, further study was limited to 189 respondents.

CONTRIBUTION OF EACH AUTHOR
Ayesha Shaheen Ashraf conducted this research and others all are equally contributed to this research.

REFERENCES
1. Abuhammad, S., Alnatour, A., & Howard, K. (2020). Intimimation and Bullying: A school survey examining the effect of demographic data. Helyon, 6(7), e04418. https://doi.org/10.1016/j.helion.2020.e04418
2. Alkazemi, D. (2019). Gender differences in weight status, dietary habits, and health attitudes among college students in Kuwait: A cross-sectional study. Nutrition and health, 25(2), 75-84. https://doi.org/10.1177/02601060187410
3. Chakma, J. K., & Gupta, S. (2017). Lifestyle practice and associated risk factors of non-communicable diseases among the students of Delhi University. Int J Health Allied Sci, 6(1), 20-5.
4. Crimmarco, A., Turner-McGrievy, G. M., & Wirth, M. D. (2019). The effects of meal-timing on self-rated hunger and dietary inflammatory potential among a sample of college students. Journal of American College Health, 67(4), 328-337. https://doi.org/10.1080/07448481.2018.1481074
5. Ul Haq, I., Mariyam, Z., Li, M., Huang, X., Jiang, P., Zeb, F., ... & Zhou, M. (2018). A comparative study of nutritional status, knowledge attitude and practices (KAP) and dietary intake between international and Chinese students in Nanjing, China. International journal of environmental research and public health, 15(9), 1910. https://doi.org/10.3390/ijerph15091910
6. Khosravi, M., Sotoudeh, G., Majdzadeh, R., Nejati, S., Darabi, S., Raisi, F., ... & Sorayani, M. (2015). Healthy and unhealthy dietary patterns are related to depression: a case-control study. Psychiatry investigation, 12(4), 434. https://doi.org/10.4306/pi.2015.12.4.434
7. Kılınç, F. N., & Çağdaş, D. (2012). Evaluation of body compositions, dietary habits and nutritional knowledge of health college students. Turk Arch Ped, 47, 179-186.
8. Mangla, A. G., Dhamija, N., Gupta, U., & Dhall, M. (2019). Lifestyle Trends and Obesity among College Going Girls of Delhi. Health, 11(02), 201. https://doi.org/10.4236/health.2019.112018
9. Monteiro, L. Z., Varela, A. R., Lira, B. A., Gomes Junior, D. D. O., Souza, P. D., Contiero, L. C., ... & Bonardi, J. M. T. (2019). Physical activity and nutritional habits among Physical Education undergraduates: a crosssectional study in Brasilia. Revista Brasileira de Cineantropometria & Desempenho Humano, 21.
10. Neslişah, R., & Emine, A. Y. (2011). Energy and nutrient intake and food patterns among Turkish university students. Nutrition research and practice, 5(2), 117. https://doi.org/10.4162/nrp.2011.5.2.117
11. Ojha, A. K. (2019). Relationship of socioeconomic status and lifestyle in college going students. International Journal of Physical Education, Sports and Health, 6(2), 93-95. https://www.kheljournal.com/archive/s2019/vol6issue2/PartB/6-2-24-602.pdf
12. Omage, K., & Onuemu, V. O. (2018). Assessment of dietary pattern and nutritional status of undergraduate students in a private university in southern Nigeria. Food science & nutrition, 6(7), 1890-1897. https://doi.org/10.1002/fsn3.759
13. Ousley, L., Cordero, E. D., & White, S. (2007). Fat talk among college students: How undergraduates communicate regarding food and body weight, shape & appearance. Eating disorders, 16(1), 73-84. https://doi.org/10.1080/1060027701773546
14. Rahamathulla, M. P. (2020). Frequency and Awareness of Risk Factors of Non-Communicable Diseases among University Students in Saudi Arabia. Pakistan Journal of Medical Sciences, 36(4), 740. https://doi.org/10.12669/pjms.36.4.2400
15. Sogari, G., Velez-Argumedo, C., Gómez, M. I., & Mora, C. (2018). College students and eating habits: A study using an ecological model for healthy behavior. Nutrients, 10(12), 1823. https://doi.org/10.3390/nu10121823
16. Soheilipour, F., & Salehiniya, H. (2019). Breakfast habits, nutritional status and their relationship with academic performance in elementary school students of Tehran, Iran. Medicine and pharmacy reports, 92(1), 52. https://doi.org/10.15386/cjmed-956
17. Whitelock, E., & Ensaff, H. (2018). On your own: older adults’ food choice and dietary habits. Nutrients, 10(4), 413. https://doi.org/10.3390/nu10040413
18. Lupi, S., Bagordo, F., Stefanati, A., Grassi, T., Piccinni, L., Bergamini, M., & Donno, A. D. (2015). Assessment of lifestyle and eating habits among undergraduate students in northern Italy. Annali dell’Istituto superiore di sanità, 51, 154-161. https://www.scielosp.org/article/ais2/2015.v51n2/154-161/
19. Banik, R., Naher, S., Perverz, S., & Hossain, M. M. (2020). Fast food consumption and obesity among urban college going adolescents in Bangladesh: a cross-sectional study. *Obesity Medicine, 17*, 100161. https://doi.org/10.1016/j.obmed.2019.100161

20. Stelten, S., Hoedjes, M., Kenter, G. G., Kampman, E., Huijsmans, R. J., Van Lonkhuijzen, L. R., & Buffart, L. M. (2020). Rationale and study protocol of the Physical Activity and Dietary intervention in women with OVarian cancer (PADOVA) study: a randomised controlled trial to evaluate the effectiveness of a tailored exercise and dietary intervention on body composition, physical function and fatigue in women with ovarian cancer undergoing chemotherapy. *BMJ Open, 10*(11), e036854. https://doi.org/10.1136/bmjopen-2020-036854

21. Arisa, N., Anaemene, D., & Mekwunye, W. (2020). Assessment of Overweight, Obesity and the Dietary Habits of Undergraduate Students of Lagos State University. *European Journal of Nutrition & Food Safety, 1*, 25-34. https://doi.org/10.9734/ejnsf/2020/v12i530225

22. Matsumoto, M., Hatamoto, Y., Sakamoto, A., Masumoto, A., & Ikemoto, S. (2020). Breakfast skipping is related to the inadequacy of vitamin and mineral intakes among Japanese female junior high school students: A cross-sectional study. *Journal of nutritional science, 9*. https://doi.org/10.1017/jns.2019.44

23. Nakatani, A., Li, X., Miyamoto, J., Igarashi, M., Watanabe, H., Sutou, A., ... & Kimura, I. (2018). Dietary mung bean protein reduces high-fat diet-induced weight gain by modulating host bile acid metabolism in a gut microbiota-dependent manner. *Biochemical and biophysical research communications, 501*(4), 955-961. https://doi.org/10.1016/j.bbrc.2018.05.090

24. McLoughlin, G. M., Rosenkranz, R. R., Lee, J. A., Wolff, M. M., Chen, S., Dzewaltowski, D. A., ... & Welk, G. J. (2019). The importance of self-monitoring for behavior change in youth: findings from the SWITCH® school wellness feasibility study. *International journal of environmental research and public health, 16*(20), 3806. https://doi.org/10.3390/ijerph16203806

25. Abraham, S., Noriega, B. R., & Shin, Y. Y. (2018). College students eating habits and knowledge of nutritional requirements. *Journal of Nutrition and Human Health, 2*(1). https://doi.org/10.35841/nutrition-human-health.2.1.13-17

26. Wadolowska, L., Hamulka, J., Kowalkowska, J., Kostecka, M., Wadolowska, K., Biezanowska-Kopec, R., ... & Piotrowska, A. (2018). Prudent-active and fast-food-sedentary dietary-lifestyle patterns: the association with adiposity, nutrition knowledge and sociodemographic factors in polish teenagers—the ABC of healthy eating project. *Nutrients, 10*(12), 1988. https://doi.org/10.3390/nu10121988

27. Zhang, M. W., Tran, B. X., Nguyen, H. L. T., Le, H. T., Long, N. H., Le, H. T., ... & Ho, R. C. (2017). Using online respondent-driven sampling for Vietnamese youths’ alcohol use and associated risk factors. *Healthcare informatics research, 23*(2), 109. https://doi.org/10.4258/hir.2017.23.2.109

28. Viejou, R., Avgar, T., Brown, G. S., Patterson, B. R., Reid, D. E., Rodgers, A. R., ... & Fryxell, J. M. (2018). Woodland caribou habitat selection patterns concerning predation risk and forage abundance depend on the reproductive state. *Ecology and Evolution, 8*(11), 5863-5872. https://doi.org/10.1002/ece3.4124

29. Schütz, P., Bally, M., Stanga-Nodari, Z., & Keller, U. (2014). Loss of appetite in acutely ill medical inpatients: physiological response or therapeutic target?. *Swiss medical weekly, 144*, w13957. https://doi.org/10.4143/smww.2014.13957

30. Curtis, J., Newall, H. D., & Samaras, K. (2012). The heart of the matter: cardiometabolic care in youth with psychosis. *Early intervention in psychiatry, 6*(3), 347-353. https://doi.org/10.1111/j.1751-7893.2011.00315.x

31. Kesztyüs, D., Traub, M., Lauer, R., Kesztyüs, T., & Steinacker, J. M. (2017). Skipping breakfast is detrimental for primary school children: cross-sectional analysis of determinants for targeted prevention. *BMC Public Health, 17*(1), 1-10. https://doi.org/10.1186/s12889-017-4169-z

32. Dobrosielski, D. A., Papandreou, C., Patil, S. P., & Salas-Salvadó, J. (2017). Diet and exercise in the management of obstructive sleep apnoea and cardiovascular disease risk. *European Respiratory Review, 26*(144). https://doi.org/10.1183/16000617.0110-2016

33. Willie, K. G., Rajendran, T., Halim, N. H., Jowein, H., & Saidi, N. A. (2020). Factors that Influence Skipping Breakfast Among Students. http://hdl.handle.net/123456789/767

34. Haidar, S. A., De Vries, N. K., Karuvelian, M., & El-Rassi, R. (2018). Stress, anxiety, and weight gain among university and college students: a systematic review. *Journal of the Academy of Nutrition and Dietetics, 118*(2), 261-274. https://doi.org/10.1016/j.jand.2017.10.015

35. Tam, C. F., Xi, E., Chan, V., & Gouzoubachian, A. (2017). An inverse correlation between fruit and vegetable consumption and BMI among college female and male students. *College Student Journal, 51*(3), 407-423. https://www.ingentaconnect.com/content/prin/csj/2017/00000051/00000003/art00011

36. Kohorst, M. A., Warad, D. M., Nageswara Rao, A. A., & Rodríguez, V. (2018). Obesity, sedentary lifestyle, and video games: The new thrombophilia cocktail in adolescents. *Pediatric blood & cancer, 65*(7), e27041. https://doi.org/10.1002/pbc.27041
37. Mansoor, S., Jain, P., Hassan, N., Farooq, U., Mirza, M. A., Pandith, A. A., & Iqbal, Z. (2021). Role of Genetic and Dietary Implications in the Pathogenesis of Global Obesity. *Food Reviews International*, 1-22. https://doi.org/10.1080/87559129.2021.1874409

38. Proserpio, C., de Graaf, C., Laureati, M., Pagliarini, E., & Boesveldt, S. (2017). Impact of ambient odors on food intake, saliva production and appetite ratings. *Physiology & behavior*, 174, 35-41. https://doi.org/10.1016/j.physbeh.2017.02.042

39. Oladele, T. O. (2019). Determining the risk of non-communicable diseases amongst the mentally ill patients attending a psychiatric out-patient clinic at the federal neuropsychiatric hospital Kware Sokoto in Nigeria. http://etd.uwc.ac.za/handle/11394/7662

40. Mekonnen, T., Tariku, A., & Abebe, S. M. (2018). Overweight/obesity among school-aged children in Bahir Dar City: a cross-sectional study. *Italian journal of paediatrics*, 44(1), 1-8. https://doi.org/10.1186/s13052-018-0452-6

41. Ghafari, M., Doosti-Irani, A., Amiri, M., & Cheraghi, Z. (2017). Prevalence of the skipping breakfast among the Iranian students: A review article. *Iranian journal of public health*, 46(7), 882. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5563869/

42. Kyrkou, C., Tsakoumaki, F., Fotiou, M., Dimitropoulou, A., Symeonidou, M., Menexes, G., ... & Michaelidou, A. M. (2018). Changing trends in nutritional behavior among university students in Greece, between 2006 and 2016. *Nutrients*, 10(1), 64. https://doi.org/10.3390/nu10010064

43. Van Can, J., Sloth, B., Jensen, C. B., Flint, A., Blaak, E. E., & Saris, W. H. M. (2014). Effects of the once-daily GLP-1 analog liraglutide on gastric emptying, glycemic parameters, appetite and energy metabolism in obese, non-diabetic adults. *International journal of obesity*, 38(6), 784-793. https://doi.org/10.1038/ijo.2013.162

44. González, C. M. C., Amell, G. L., & Martínez-Royert, J. C. (2021). Overweight in schoolchildren and nutrient intake. *Elementary Education Online*, 20(4), 91-104.

45. Tunkara-Bah, H., Badjan, H. J., & Senghore, T. (2021). Dietary factors associated with being overweight and obese among school-going adolescents in Region One, The Gambia. *Heliyon*, 7(3), e06486. https://doi.org/10.1016/j.heliyon.2021.e06486