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To Assess the Impact of Dietary Habits in Young Girls Suffering from PCOS

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ABSTRACT

Polycystic ovarian syndrome (PCOS) is an endocrine disorder that affects people with hormonal imbalances, irregular menstrual cycles, and presence of cyst on the ovaries. It presents a significant health concern among adolescent girls, characterized by hormonal imbalances and metabolic disturbances. This research investigates the impact of dietary habits on PCOS management in adolescent girls. Through the collection of data which was administered by self made questionnaire on sample consisted of adolescent girls diagnosed with PCOS, recruited from healthcare facilities or community gatherings. It is designed to gather information about several key variables like demographic profile, anthropometric assessment, diagnosis and symotoms and dietary assessment.

The result shows that patients with PCOS have symptoms like hair loss, anxiety, mood swings and acne. Furthermore, they exhibit a lack of engagement in regular physical activity or exercise, alongside a prevalence of oligomenorrhea. Dietary habits among this population reveal a high consumption of processed/refined grains and red meats/lean protein. While there is a prevalence of non-vegetarian dietary habits, deficiencies in essential nutrients such as calcium and magnesium underscore potential gaps in dietary intake. These findings emphasize the importance of comprehensive nutritional interventions that address both macro and micro-nutrient needs. The study underscores the need for targeted interventions, emphasizing nutritional education, regular physical activity, and balanced meal options to improve overall health outcomes. Despite limitations in sample size and data collection methods, the findings highlight avenues for future research and intervention strategies to mitigate the impact of PCOS on adolescent girls' health and well-being.

1. Introduction

In the realm of managing Polycystic Ovary Syndrome (PCOS), dietary habits play a pivotal role in both alleviating symptoms and improving overall quality of life for affected individuals, particularly young girls. PCOS appears in a wide range of symptoms, such as irregular menstrual cycles, ovarian cysts, insulin resistance, and weight gain. It is characterized by hormonal imbalances and metabolic disruptions. Studies have brought attention to the role that nutrition plays in the appearance and course of PCOS symptoms. Hormone levels, insulin sensitivity, and inflammation are all key components in the pathophysiology of PCOS, and they may all be considerably impacted by the kinds of foods eaten, the amount of nutrients taken in, and the general dietary patterns. Understanding and improving eating patterns are therefore crucial parts of comprehensive approaches to managing chronic illness. This study is to contribute to the development of specialised dietary therapies that can enable adolescent girls to effectively manage their symptoms and enhance long-term health outcomes by clarifying the complex interactions between food and PCOS.

PCOS, or polycystic ovarian syndrome, is a complicated endocrine condition that impacts a large number of women globally. Hormonal abnormalities, irregular menstrual periods, and ovarian cysts are its defining features. The long-term health effects of PCOS, such as elevated chances of infertility, type 2 diabetes, cardiovascular disease, and psychological disorders, have been clarified by Dr. Denair's research.

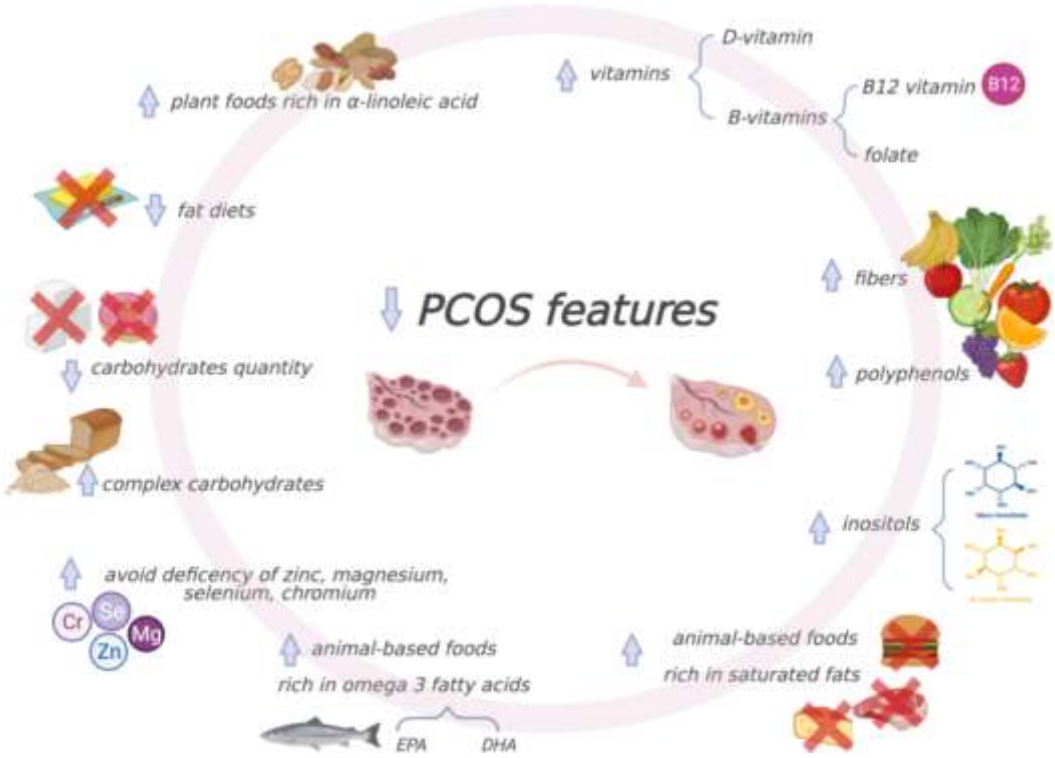
Dr. Dunaif

Puberty's hormonal swings can cause disruptions to reproductive hormones including androgens and insulin, which makes PCOS, an endocrine condition, more common in teenagers. It is made worse by elements such as insulin resistance, which is frequently connected to the obesity that is common in this age range. To reduce the long-term health issues related to PCOS in teenagers, early detection and treatment are essential.

PCOS can be managed using a variety of dietary strategies, such as high-prote in, Mediterranean, and low-glycemic index (GI) diets. The authors investigate how various diets affect women with PCOS in terms of weight loss, insulin sensitivity, hormone levels, and regular menstruation. Diet counselling may benefit from the review's insightful information on evidence-based dietary practices for PCOS control.

Anju E. Joham, Lisa J. Moran, and Helena J. Teede (2017)

Picture 1.1: Nutrition guidance to reverse PCOS



Source:-Polycystic Ovary Syndrome in Insulin-Resistant Adolescents with Obesity: The Role of Nutrition Therapy and Food Supplements as a Strategy to Protect Fertility

- **Focus and Scope**

The investigation of PCOS, including hormonal fluctuations and their long-term health implications, is included in the research on the effect of dietary habits on PCOS management in teenage girls. It explores the particular elements influencing teenage girls, including development, growth, and psychosocial issues. The main focus is on how well nutrition strategies work, looking at how they affect symptoms, metabolic indicators, and general quality of life. This study evaluates the long-term impact of dietary habits on PCOS symptoms and metabolic health, taking into account the long-term health outcomes of dietary habits. Adolescence is a crucial time characterised by mental and physical transformations, and PCOS can make pre-existing psychosocial issues worse. In order to better understand how dietary interventions may improve mental health outcomes including self-esteem, body image perception, and mood stability, in addition to reducing physical symptoms, this research will examine these possibilities. In addition, the study looks at how feasible and long-lasting it would be to alter teenage diets while taking accessibility, cultural preferences, and lifestyle choices into account. In order to improve young girls' general health and well-being throughout their lives, this research attempts to offer insights into holistic solutions for managing PCOS by combining a comprehensive strategy that tackles both physiological and psychological components.

- **Themes and aspects of the topic**

Through a thorough literature review, the formulation of targeted research questions, and the establishment of study objectives, this study seeks to understand how dietary habits impact the management of PCOS in adolescent females. The methodology will include participant information, an in-depth explanation of the intervention approach, outcome measurements, and the identification of potential obstacles and hurdles. This research aims to offer important insights into maximizing the management of PCOS in teenage girls by evaluating the efficacy and durability of dietary habits interventions.

- **Relevance and importance**

For several reasons, research on how dietary habits affect the management of PCOS in teenage females is quite important and relevant. First off, a prevalent endocrine issue impacting adolescent girls' reproductive health and general well-being. One non-pharmacological strategy to treat underlying metabolic disorders and lessen PCOS symptoms is eating habits. Furthermore, through promoting better eating practices and changes in lifestyle at a young age we can reverse PCOS symptoms in every woman around us.

2. Review of Literature

The literature review titled "Nutrition Strategy and Lifestyle in Polycystic Ovary Syndrome—Narrative Review" Małgorzata Szczuko, et al, (2021) delves into the modifications in lifestyle and metabolic pathways affecting lipid, carbohydrate, and hormonal metabolism in women with polycystic ovary syndrome (PCOS). PCOS, the most common female endocrinopathy, affects 15-18% of women of reproductive age, with genetic factors, excessive body fat, insulin resistance, and gonadotropin hormonal synthesis playing key path physiological roles. The review emphasizes the importance of lifestyle modifications, dietary patterns, and therapeutic interventions, such as the use of anti-inflammatory remedies and supplementation, for the management

of PCOS and its associated metabolic dysfunctions. Furthermore, it underscores the necessity for further research to assess the efficacy of interventions and to develop comprehensive management strategies.

The scholarly examination named "Lifestyle management in polycystic ovary syndrome – beyond diet and physical activity." Stephanie Cowan, et al (2023) stated in their research is PCOS affecting up to 13% of reproductive-aged women is diagnosed through specific criteria involving ultrasounds, ovulation, and hyperandrogenism. Insulin resistance (IR) plays a pivotal role in PCOS, contributing to hyperandrogenism and worsening its clinical presentation. Lifestyle and weight management is recommended as first-line therapy, with limited evidence to recommend a specific diet composition. Vigorous aerobic exercise, along with psychological and sleep interventions, hold promise in improving PCOS outcomes. Traditional, Complimentary, and Integrative Medicine (TCIM) approaches, such as inositol supplementation and yoga, are increasingly used, despite insufficient evidence to support integration into routine clinical practice. Research gaps exist in understanding the impact of lifestyle interventions, psychological interventions, and non-pharmacological strategies, emphasizing the need for more real-world PCOS research. Integrating pharmacological therapies with lifestyle management is a consideration for PCOS treatment.

3. Methodology

- **Sample size**

The participants were recruited from various sources, including healthcare facilities, online communities, and social media platforms. A total of 30 individuals were included in the study. The sample comprised girls aged 10-25 years (female) from various socio-economic backgrounds.

- **Inclusion criteria**
- Adolescent girls aged between 10 and 25 years.
- Presence of symptoms consistent with PCOS, such as irregular menstrual cycles, signs of hyperandrogenism, and/or polycystic ovaries on imaging.
- **Exclusion criteria**
- Girls aged below 10 or above 25 years.
- Significant co-morbidities or medical conditions affecting reproductive health.
- Currently undergoing treatment for PCOS-related symptoms (e.g., hormonal therapy, surgical interventions).
- **Study locale**

The participants were recruited from various sources, including healthcare facilities, online communities, and social media platforms.

- **Tools and techniques**

A self made questionnaire was formed/created and had it filled out with patients who have PCOS. The questionnaire covers various topic related to demographic profile, anthropometric assessment, clinical assessment, dietary assessment.

- **Demographic profile**

Questions about the respondent's Name, age, level of education in which we classify the category- 1. 5^{th} Grade or less 2. 5-10^{th} Standard 3.8-10^{th} standard 4. 10-12^{th} standard 5. 12^{th} standard or high. Food type of the recipients- (1.Vegetarian 2. Non- vegetarian 3. Vegan)

- **Nutritional status**

Anthropometric assessment- We calculated the person's Weight (in cm), height (in cm), basal metabolic rate (BMI) by using the formula- BMI= weight (kg)/height(m^2)and their category in (annexure-1).

- **Diagnosis and symptoms**

Added questions about diagnosis of PCOS like how long you have been diagnosed(less than a year, 1-2 yeas, 3-5 years, more than 5 year), is there any other condition you have been diagnosed (insulin resistance, type 2 diabetes, hypertension, dyslipidemia, obesity) than added about symptoms of PCOS like- is there any symptoms that you are suffering from (fatigue, mood swings, depression, anxiety, hair loss or thinning, acne, excessive hair growth on face)some of them were related to menstrual cycle, how do you rate the regularity of your cycle(regular, irregular, absent) do you experience any of the following menstrual abnormalities (amenorrhea, menorrhagia, oligomenorrhea ,dysmenorrhoea) some questions about general routine that worsen PCOS condition like do you engage in regular physical activity (yes regularly, yes occasionally, no, not currently) how many hour of sleep do you get per night(less than 6 hour, 6-7 hour, 7-8 hour, more than 8 hour)

- **Dietary assessment**

Asked the respondents about their dietary restrictions or preferences (no restriction, gluten free, dairy free, nut free, other (please specify), How often do you eat out at restaurants or order takeout meals in a week? (Once a week, twice a week, rarely, never).

- Next questions contain all the food groups (food groups, whole grains, processed refined grains, red meat and lean protein, sugary foods/beverages/fried foods) and their consumption throughout the day and week (daily/few times a week/occasionally/rarely).

Food groups	**Twice a day**	**Once a day**	**Thrice a week**	**Once a week**	**Rare/never**
Cereals	Adequate	Inadequate	Deficient	Deficient	Deficient
Pulses	Adequate	Adequate	Inadequate	Deficient	Deficient
Vegetables	Adequate	Sufficient	Inadequate	Deficient	Deficient
Fruits	Adequate	Sufficient	Sufficient	Deficient	Deficient

- And lastly I asked everyone about their 24 hour dietary recall where a list of foods eaten and drank are jotted down and then according to standard we calculated the whole day meal according to the table in (annexure-2)
- Statistical analysis – Using frequency and numbering method in the data.

4. Result

Demographic profile

Table no.1:- Level of education

	Frequency	**Percent**
10-12th standard	6	20
12th standard or high	24	80

The Above table explains that 80% of the total girls are 12th standard or high pass out and 20% is 10-12th standard pass.

Table no. 2:- food type

All the participants are 100% non vegetarian.

Anthropometric Assessment

Table no.3:- BMI

	Frequency	**Percent**
Underweight	4.5	15
Normal	10.5	35
Overweight	15	50

Table no. 5 stated that there are 15% of underweight, 35% of normal, 50% of overweight participants in the data.

Diagnosis and symptoms

Table no.4:- How long have you been diagnosed with PCOS?

	Frequency	**Percent**
Less than a year	3	10
1-2 years	14	46.7
3-5 years	7	23.3
More than 5 years	6	20

Table no. 6 shows that the there are 46.7% participants who have been diagnosed with PCOS since 1-2 years, 23.3% were diagnosed 3-5 years ago, 20% were diagnosed more than 5 years ago and 10% participants who have been diagnosed since less than a year.

Table no.5:- Have you been diagnosed with any of the following conditions?

	Frequency	Percent
Insulin resistance	0	0
Type 2 diabetes	0	0
Hypertension	1	3.3
Dyslipidemia	0	0
Obesity	10	33.3
None of the above	6	20

According to the above table, 20% of participants did not have any of the aforementioned conditions, while 33.3% of participants were obese.

Table no. 6:- Are you currently experiencing any of the following symptoms? (Select all that apply)

	Frequency	Percent
Fatigue	7	22.6
Mood swings	18	58.1
Depression	8	25.8
Anxiety	20	64.5
Hair loss or thinning	23	74.2
Acne	18	58.1
Excessive hair growth on face	12	38.7

Table no. 6 describes that out of all this symptoms of PCOS , hair loss and thinning of hair is the most common problem facing 74.2% of participants out of 30. Then anxiety is facing by 64.5% of participants. 58.1% of participants were facing the symptoms of acne and moods swings and 38.7% of people having serious problem regarding excessive hair growth on their face and body. 22.6% of participants were experiencing the problem of fatigue throughout the day and night.

Table no. :- 7 Do you engage in regular physical activity or exercise?

	Frequency	Percent
Yes regularly (at least 3 times a week)	5	16.7
Yes, occasionally (1-2 times a week)	7	23.3
No, not currently	18	60

The Above table gives the percentage of people engage in regular physical activity in their daily routine. 60% of participants were not engage in regular physical activity at all in their routine. 23.3% of peoples were doing exercise 1-2 times a week and 16.7% respondents were doing regular physical activity (at least 3 times a week).

Table no. 8:- How would you rate the regularity of your menstrual cycles?

	Frequency	Percent
Regular	0	0
Irregular		75
Absent (no menstrual cycles)		25

Table no. 8 shows the regularity of menstrual cycles in PCOS diagnosed participants. 75% of them were having irregular periods and 25%were having absolute no menstrual cycles or very lack numbers of cycles.

Table no.:- 9 Do you experience any of the following menstrual cycle abnormalities? (Select all that apply)

	Frequency	Percent

Amenorrhea (absence of menstruation)	8	27.6
Menorrhagia (heavy menstrual bleeding)	7	24.1
Oligomenorrhea (infrequent menstrual periods)	21	72.4
Dysmenorrhea (painful menstrual periods)	14	48.3

Table no. 9 shows that out of all 30 respondents, 72% people have oligomenorrhea (infrequent menstrual periods), 48% respondent have dysmenorrhea (painful menstrual periods) and 27% and 24% have amenorrhea and menorrhagia respectively.

Table no. :- 10 How many hours of sleep do you typically get per night?

	Frequency	**Percent**
Less than 6 hours	6	19.4
6-7 hours	14	45.2
7-8 hours	9	29
More than 8 hours	2	6.5

Above table shows the sleep schedule of people having PCOS. In which we observe 45% of people have 6-7 hours of sleep per night. 29% of people have 7-8 hours of sleep during night. 19% have less than 6 hours of sleep per night and 6% people have more than 8 hour of sleep per night.

Dietary habits

Table no. 11:- Do you have any dietary restrictions or preferences?

	Frequency	**Percent**
No restrictions	26	86
Gluten-free	1	3
Dairy-free	1	3
Nut-free	1	3
Other	1	3

Table no. 11 describes the dietary preferences of individual who have PCOS. It includes the result that says there are 86% of participants who have no restriction in their preferences of meal and all rest dietary restriction (gluten free, dairy free, nut free and other) is carried by 3% of participants.

Table no. - 12 How often do you eat out at restaurants or order takeout meals in a week?

	Frequency	**Percent**
Once a week	10	33
Twice a week	6	20
Rarely	14	46
Never	0	0

Table no.12 shows that how often they eat out at restaurants or order takeout meals in a week and 46% of participants were consuming takeout meals very rarely means once or twice a month. 33% of participants were consuming once a week and 20% of participants were consuming order take-out meals twice a week.

Table no. - 13 How often do you consume the following food groups?

A) Fruits and vegetables

	Frequency	**Percent**
Daily	18	60
Few times a week	9	30

Occasionally	2	6
Rarely	1	3

Table no. 13 shows the consumption of all the 5 food groups. Here's the percentage of participants who were consuming fruits and vegetables.60% of the participants were consuming fruits and vegetables on daily basis and 30% of them were consuming few times a week.

Table no.- 14 B) Whole Grains

	Frequency	**Percent**
Daily	14	46
Few times a week	12	40
Occasionally	1	3
Rarely	3	10

Table no. 14 B) shows that the consumption of whole grains by the participants. 46% of respondents were consuming whole grains daily throughout the week, 40% of respondents consumed whole grains few times a week and 10% of them were consumed rarely.

Table no.- 15 C) processed/refined grains (white bread, white rice)

	Frequency	**Percent**
Daily	14	46
Few times a week	12	40
Occasionally	1	3
Rarely	3	10

Table no. 15 C) explains that 46% of people consuming white bread or white rice regularly on the week and 40% have processed and refined grains few times a week. Very rare 10% people have rarely or once in a month.

Table no. 16 D) Red meats and Lean protein

	Frequency	**Percent**
Daily	1	3.3
Few times a week	17	56.7
Occasionally	10	33.3
Rarely	2	6.7

The Above table shows that out of all the participants 56.7 % of them were take red meats and lean protein few times a week like not more than 2 times. The rest 33.3% were consuming meat occasionally

Table no. 17 E) sugary foods/beverages/fried foods

	Frequency	Percent
Daily	1	3.3
Few times a week	17	56.7
Occasionally	3	10
Rarely	9	30

The Above table gives us the information about consumption of fried or junk foods and sugary beverages among PCOS patient. Like the same red meats and lean protein, people of 56.7% were consuming this foods few times a week. And 30% were very rarely consuming (once a month) fried foods and beverages. And rest 10% were consuming fries foods occasionally.

Table no.18:-Food frequency table

Food groups	Levels	Frequency	Percentage
Whole grains / Cereals	Adequate	14	46.7
	Sufficient	12	40
	Deficient	3	10
Pulses	Adequate	15	50
	Sufficient	15	50
fruits	Adequate	18	60
	Sufficient	9	30
	Deficient	2	6.7
Vegetables	Adequate	18	60
	Sufficient	9	30
	Deficient	2	6.7
Milk and milk products	Adequate	14	46.7
	Sufficient	15	50
Snacks/fried foods/beverages	Adequate	12	40
	Sufficient	18	59.3

According to their 24 hour dietary recall, above table shows us that 50% of the participants were consuming all the five food groups (cereals, pulses, fruits, vegetables and milk products) adequately. 40-45% of participants were consuming the five groups sufficiently. And only 10% of people are deficient in taking them (whole grains, fruits and vegetable).

Table no.19:-Average Intake and RDA

	AVERAGE INTAKE	RDA
ENERGY	1800	1660
PROTEIN	40.9	46
CARBOHYDRATE	126.2	130
FATS	15.9	20
VITAMIN D	450	600 IU
CALCIUM	853	1000
IRON	30.593	29
MAGNESIUM	300	370

Energy intake slightly exceeds the RDA, protein and fat consumption fall below recommended levels, necessitating a focus on diverse protein and healthy fat sources. Additionally, marginal deficits are observed in calcium and magnesium intake, conversely, iron intake slightly surpasses the RDA.

5. Summary

Discussions

A comprehensive review of the research conducted to evaluate the effects of dietary practices in young girls with PCOS, highlighted significant findings that came to emerge. It was stated that none of the respondents were vegetarians. Most participants don't follow any particular diet. Respondents range in height and weight, with a sizable fraction falling into the overweight or obese categories. The most often reported height and weight ranges are 4'8" to

5'8". The weight range is 60-80 kg. Numerous participants report experiencing symptoms of PCOS, such as anxiety, thinning or loss of hair, lethargy, mood changes, and acne. The majority of respondents are obese, and many of them report having irregular menstrual cycles, including dysmenorrhea (painful menstrual periods) and oligomenorrhea (infrequent menstrual periods). The majority of respondents said they slept for 6 to 8 hours per night and occasionally or never exercised. The majority of people order takeaway or eat out frequently—usually once a week. Fruits and vegetables are consumed in different ways, but most people eat them every day. Consumption of whole grains is higher than that of refined or processed grains. The majority of responders eat lean protein only occasionally per week. Most people either sometimes or never eat or drink anything sugary or fried.

Conclusion

The study's conclusions show an alarming trend among respondents who are not vegetarians: most of them do not follow any particular diet and are classified as overweight or obese. Additionally, suffer from depression, lethargy, irregular menstruation, and other symptoms associated with Polycystic Ovary Syndrome (PCOS). This emphasizes the necessity of focused efforts to improve eating patterns and encourage healthy lifestyle choices. Techniques that support balanced meal options, frequent physical activity, nutritional education (healthy food choices), and a reduction in sugary and fried food intake—all of which emphasize consuming more fruits, vegetables, and lean proteins—as well as getting enough sleep may help control symptoms and enhance general health results. These therapies have the ability to reduce the likelihood of issues connected to obesity and enhance the general well-being of the targeted population.

6 Limitations and suggestions

Limitations

- Sample size is too small; it will be difficult to identify significant relationships in the data.
- Couldn’t take the actual weight of a person because of the absence of weighing machine.
- Not taking the post data after counseling them. Hence it is not an experimental study.
- It is not possible to read all the files of all the respondents therefore lack of reliable health status or medical complications.
- Not taking their biochemical assessment because of lack of instruments and technology.
- Did not do the body composition analysis (BCA) of the participants.
- Not taking clinical assessment of the participants because of not having any medical professionals with us.
- In dietary assessment, only 24 hour dietary recall has to be taken from the participants.
- Self-reported data may be inaccurate.
- Controlling external factors is challenging.
- In the micronutrient calculations, we could only calculate 4 micronutrients (iron, magnesium, vitamin D, calcium).
- No supplementation or medication where part of the study can’t be assessed on small sample size.
- Medical reports were not assessed as most of the people don’t have recent reports so data analysis based on that will not give accurate results.

Suggestions

- Could take more participants in the research for more authenticity in the data.
- After aware or counsel them we could take post data from them to check the difference in the results.
- We could check their mental health status.

Scope of future study

- Continuous study can be done on large sample size.
- Awareness of eating habits can be raised on a large scale.
- Parameters like physical and mental fitness can be part of the study.