



**STUDIES ON THE DIETARY MANAGEMENT OF ADULTS BETWEEN
THE AGES OF 18 AND 24 YRS IN MIRPUR AREA,
DHAKA, BANGLADESH**

BY

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B.Sc. in Nutrition and Food Engineering

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APPROVAL

This Project titled “**Dietary Management of Young Adults (those between the ages of 18 and 24) using 24-Hour Recall Method in Mirpur**”, submitted by * **Md. Arifur Rahman Rahel** * to the Department of Nutrition and Food Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to its style and contents. The presentation has been held on July,2023.

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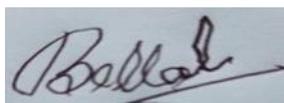
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We hereby declare that this project has been done by us under the supervision of **Professor Dr Md. Bellal Hossain, Dean (In-Charge) & Professor, Department of NFE**, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

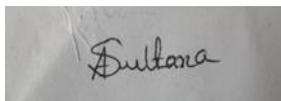
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ABSTRACT

The 24-hour recall method is a dietary assessment tool used to estimate an individual's dietary intake over the previous 24 hours. It involves asking the individual to recall all the foods and beverages they consumed in the past day, including portion sizes, brands, and cooking methods. The procedure entails asking participants to recollect every meal and beverage they have had in the previous 24 hours, along with specifics like the sort of food they ingested and how it was prepared. The data gathered can be used to determine eating trends, estimate nutrient consumption, and create nutrition interventions. The 24-hour recall method can be used in a range of contexts, including clinical and research settings, and is reasonably simple to conduct. However, it is important to note that the method relies on the individual's ability to accurately recall their food intake, which can be influenced by factors such as memory, social desirability, and cultural practices. Therefore, it is important to use the method in conjunction with other dietary assessment tools to ensure the accuracy and validity of the data collected. And Young adults is a crucial period of life where dietary intake plays a significant role in physical and cognitive development. The present study aimed to assess the dietary intake and management of adolescents aged 18-24 years living in the Mirpur area of Dhaka, Bangladesh, using the 24-hour dietary recall method. A total of 50 adolescents were recruited through a convenient sampling method. Data on dietary intake were collected using the 24-hour dietary recall method, and dietary management was assessed using a structured questionnaire. The results showed that the 18 and 20-year-old groups have a good proportion of calories, protein, carbohydrates, and fat. The 19 and 21-year-old groups have a higher calorie intake than recommended, and strategies such as reducing portion sizes, avoiding high-calorie foods, and timing of meals can help. The 20, 22, 23, and 24-year-old groups have a calorie deficit, and increasing intake with healthy fats like coconut and fatty fish can help. These findings highlight the need for targeted interventions to improve the dietary intake and management of young adults in Mirpur, Dhaka. And it is also important to consult with a healthcare professional or registered dietitian for personalized recommendations based on individual factors.

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CHAPTER 1

1.1 Introduction

24hr recall is a retrospective method that monitors and assesses food and drink consumption of an individual during the previous day. It is a commonly used method to assess dietary intake in research studies and can provide valuable information on the nutrient intake of young adolescents in Mirpur. A 24hr recall requires a trained interviewer to ask participants to recall all the food and drink items consumed within 24 hours. The interview can be completed recalling the previous day or the previous 24hrs. It can also either be done online or face to face. This allows to be flexible with data collection. Portion images are used to allow the participant to determine an accurate food intake. Furthermore, if the 24hr recall is done face to face, the interviewer can ask additional and contextual questions e.g., the type of cooking method used, whether the day being recalled reflects a typical day's intake and whether was consumed outside of the home. This allows the interviewer to gather as much information as possible for accurate analysis. We know young adolescence is a crucial stage of human development that involves physical, psychological, and social changes. Adequate nutrition during this period is essential for optimal growth, development, and overall health. However, young adolescents aged 18-24 years often face dietary challenges due to their lifestyle and environmental factors.

Mirpur is a densely populated area in Dhaka, Bangladesh, where access to healthy food choices can be limited. Therefore, the dietary management of young adolescents in Mirpur is crucial to improve their nutritional status and prevent the onset of diet-related diseases.

This thesis paper aims to assess the dietary intake of young adolescents aged 18-24 years in Mirpur using the 24-hour recall method. The findings of this study will provide insight into the dietary habits and nutrient intake of young adolescents in Mirpur and inform the development of targeted nutrition interventions to improve their health and well-being.

1.2 Problem statement

Obtaining valid nutritional information from a large group of people has been a challenge for years. Also, the 24-hour recall method of collecting dietary information is costly.

1.3 Background

The 24-hour recall method has been widely used in large-scale and national surveys, including in the United States since 1971. Some of the surveys that have extensively used this method are:

1. National Health and Nutrition Examination Survey (NHANES I, II, and III)
2. Hispanic Health and Nutrition Examination Survey (HANES)
3. Nationwide Food Consumption Survey (NFCS)
4. Continuing Survey of Food Intakes of Individuals (CSFII)

1.4 Significance of the study

The dietary management of young adolescents is an essential aspect of ensuring their optimal growth and development. The 24-hour recall method is a useful tool for assessing the dietary intake of individuals. In the context of Mirpur, Bangladesh, this study is significant for several reasons:

1. Identification of dietary deficiencies: Can help identify the dietary deficiencies prevalent among young adolescents in Mirpur. This information can be used to develop targeted interventions and educational programs to address the identified deficiencies.
2. Improved health outcomes: The study can contribute to improving the health outcomes of young adolescents in Mirpur. By identifying and addressing the dietary deficiencies, the study can help reduce the risk of chronic diseases and improve overall health and wellbeing.
3. Contribution to research: The study can contribute to the body of knowledge on the dietary habits of young adolescents in Bangladesh. The findings can be used as a basis for further research and exploration into the dietary patterns and habits of this population.

Overall, the study can have a significant impact on the health and wellbeing of young adolescents in Mirpur, Bangladesh, and contribute to the broader body of knowledge on nutrition and health in this population.

1.5 Aim of the Study

The 24-hour recall method's main aims for nutritional assessment are as follows:

- 1.To assess whether nutritional intake is sufficient.
- 2.To determine dietary trends.
- 3.To monitor variations in dietary intake throughout time.
- 4.Individual food patterns and habits can be determined using the 24-hour recall method.

CHAPTER 2

Literature Review

The 24-hour recall method is a commonly used dietary assessment tool in nutrition research and clinical practice. It involves individuals recalling and describing their food and beverage intake over a 24-hour period. This method provides valuable insights into an individual's dietary patterns and is relatively practical and cost-effective compared to other assessment tools (1, 2). The nutrient quantities of three groups of individuals—pregnant women, pupils, and college students—were determined using a 24-hour recall, a complete diet history, and a 7-day diet record(8)

Self-reported methods of nutritional assessment are being questioned (9) because of recent negative press surrounding nutritional assessment. According to Foster and Bradley (2018), the accuracy of the nutritional information collected is significantly impacted by people under-reporting their energy intake, having trouble remembering what they ate, altering what they ate because it was difficult to keep track of, and being influenced by what others want to hear.(9)

One of the strengths of the 24-hour recall method is its ability to capture a snapshot of an individual's usual dietary habits. By focusing on a single day's intake, it provides a representation of their overall eating patterns. Additionally, the method is generally well-accepted by participants and can be administered relatively quickly, making it suitable for large-scale studies and clinical settings (3).

However, the 24-hour recall method is not without limitations. One key concern is memory bias, as individuals may have difficulty accurately recalling all the foods and beverages they consumed in the previous day. This can lead to under reporting or over reporting of intake and affect the overall accuracy of the data collected (4).

Diet and lifestyle choices play a significant role in determining an individual's and a community's health (10) The results of a general dietary survey provide vital information about how often and where individuals may not be consuming enough or receiving enough nutrients. It can also be used to develop food and nutrition policies intended to enhance the dietary behaviors and health of a community. (10)

Another challenge is the estimation of portion sizes. Participants may struggle to remember specific quantities or be unfamiliar with standard portion sizes, which can introduce errors in the reported data (2).

Additionally, social desirability bias may influence participants' responses, as they may modify their reported intake to align with perceived social norms, leading to inaccuracies (5).

To assess the validity and reliability of the 24-hour recall method, several studies have compared it with other dietary assessment tools. For example, Basiotis et al. (1987)

examined the agreement between the 24-hour recall method and food records for estimating nutrient intake. They found a high degree of agreement for energy and macronutrient intake, supporting the validity of the 24-hour recall method (6).

Similarly, Livingstone and Black (2003) compared the method with weighed food records in children and reported reasonably good agreement for macronutrient intake (7).

To address the limitations of the 24-hour recall method, researchers often combine it with other assessment methods, such as food frequency questionnaires or food records. This approach helps cross-validate the data and obtain a more comprehensive understanding of an individual's dietary habits (2).

CHAPTER 03

Materials and Methods

3.1 Materials

The materials required for conducting a 24-hour recall typically include:

3.1.1 Interview guide or questionnaire: This is a structured form or guide that helps the interviewer collect detailed information about the types and quantities of foods and beverages consumed. It helps the interviewer collect consistent and comprehensive information from the individual.

3.1.2 Food record forms: These forms are used to record the details of each food and beverage item consumed, including brand names, preparation methods, and cooking oils used.

3.1.3 Food portion visuals: These are tools that assist in estimating portion sizes. They may include photographs or drawings of common food items in various portion sizes.

3.1.4 Nutrient database or software: A nutrient database or software program is used to analyze the collected dietary data and calculate nutrient intake. These databases contain information on the nutrient content of various foods and beverages.

3.2 Methods

3.2.1 Introduction: The interviewer explains the purpose of the recall and assures confidentiality. They may also provide a brief overview of the process to the participant.

3.2.2 Food and Beverage List: The interviewer provides a list of different food categories, such as grains, fruits, vegetables, dairy, protein, and fats/oils. The participant is asked to recall all the items they consumed from each category.

3.2.3 Detailed Recall: The participant is asked to recall specific details about each food or beverage item consumed. This includes the portion size (e.g., cups, ounces, tablespoons), brand names (if available), cooking methods, and any added ingredients or condiments.

3.2.4 Probing Questions: The interviewer asks probing questions to gather more accurate and detailed information. They may inquire about forgotten or overlooked foods, eating occasions, specific recipes, or additional snacks consumed.

3.2.5 Clarification and Portion Estimation: The interviewer clarifies any unclear responses and helps the participant estimate portion sizes. They may use aids such as food models, portion size visuals, or household measurement tools to assist with portion estimation.

3.2.6 Nutrient analysis: The information is input into nutrition analysis software, which determines the amount of nutrients in the consumed foods.

3.2.7 Final Review: Once the participant completes the recall, the interviewer reviews the information obtained, checking for accuracy, completeness, and any inconsistencies or missing details.

3.3 Important note:

1. Depending on the research, several materials could be used in the 24-hour recall approach. Researchers and practitioners may customize the tools and resources based on their requirements and the resources at hand.

- The 24-hour recall method relies on accurate and reliable reporting from the participant. However, it may be subject to recall bias, where individuals tend to overestimate or underestimate their food consumption, forget certain items, or provide socially desirable responses.

3.4 Determination of age ratio :

Here is the formula for calculating the age ratio:

$$\text{Age Ratio} = (\text{Number of individuals aged 18 to 24} / \text{Total sample size}) * 100$$

For example, from 200 individuals' data and found that 40 of them fall 18 years old. The age ratio would be:

$$\text{Age Ratio} = (40 / 200) * 100 = 20\%$$

3.5 Form for Data Collection on Dietary management of young adults (those between the ages of 18 and 24) using the 24-hour recall method in Mirpur

3.5.1 Socio Demographic status-

- What is your age?
- Are you male or female?
- what is your highest level of education completed?
- What is your occupation?
- What is your annual income?
- Do you have any religious or cultural dietary restriction?

ID Number:	Date of Recall:
Serving Size 	Tbsp-tablespoon c-cup Tsp -teaspoon Kg Gm/ml sl-slice
Mealtime- 1.Morning (7 to 9 a.m.) 4. Afternoon (4 to 5p.m.) 2.Mid-Morning (10 to 11 a.m.) 5. Dinner (7 to 8 p.m.) 3.Lunch (1 to 2p.m.) 6. Late Night (10 to 11 p.m.)	Takes Nutritional Supplements? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, list type-

3.5.2 Survey information

What did you eat and drink in the last 24 hours? (Fill in below)

Mealtime	FOOD ITEMS AND DESCRIPTION (List foods and beverages. List separately main ingredients in mixed dishes)	Amount Eaten

3.5.3 Physiological obstacle

- Memory limitation-
 - Yes No.....
- Intake alcohol/drug-
 - Yes No
- Variation in dietary habit-
 - Yes NO

3.5.4.Any Endurance Exercise?

Name of the exercise	Duration Time	
	Days	Hours
1.Swimming		
2.Gym		
3.Cycling		
4.Running		

3.6 Analysis of Macronutrient Intake

3.6.1 Percentage of Carbohydrate Intake:

To calculate carb calories, you must first know how many grams of carbohydrates are in the food and how many calories are in one gram of carbohydrates.

Because carbohydrates contain 4 calories per gram, you can multiply the number of grams of carbs in a food item by 4.

For example, if a food contains 50 grams of carbohydrates, the carb calories can be calculated as follows:

Carb calories are calculated as 50 grams of carbs multiplied by 4 calories per gram of carb.

Carbohydrate calories = 200 calories

As a result, the food item has 200 carb calories.

We can use the following formula to calculate the percentage of carbohydrates in total calories:

$(\text{Total calories from carbohydrates} / \text{Total daily calories}) \times 100 = \text{Percentage of calories from carbohydrates}$

Here is an illustration: Assume you are on a 2000-calorie diet and want to know what percentage of those calories come from carbohydrates.

To calculate your carbohydrate intake, use the recommended range of 45% to 65%.

Step 1: Determine the total number of calories derived from carbohydrates.

To get 65% of your calories from carbohydrates, multiply your total daily calories (2500) by 0.65.

Total carbohydrates calories = $2500 \times 0.65 = 1625$ calories

Step 2: Determine the percentage of calories derived from carbohydrates

Now that you know the total, number of calories from carbohydrates, you can divide that number by your total daily calories and multiply by 100 to get the percentage.

Percentage of calories from carbohydrates = $(1625 / 2500) \times 100 = 65\%$

3.6.2: Percentage of Protein Intake:

Determine the total protein consumption in grams: Request that the person recall all foods and beverages consumed in the previous 24 hours and estimate the amount of each food consumed. Determine the protein content of each food item using a food composition database or nutrition analysis software. Total the amount of protein consumed in grams.

Convert your protein consumption from grams to calories: The number of calories per gram of protein is calculated by multiplying the total amount of protein consumed in grams by 4. This will provide you with the total number of calories derived from protein.

For example, if the person ate 200 grams of protein in the previous 24 hours, the calculation would be:

$(200 \text{ grams of protein} \times 4 \text{ calories per gram}) = 800$ calories. As a result, the person consumed 800 calories from protein in the previous 24 hours.

3.6.3: Percentage of Fat Intake:

These steps are followed to calculate individual fat intake in calories using the 24-hour recall method:

Determine the total amount of fat consumed in grams by doing the following: Request that the person recall all foods and beverages consumed in the previous 24 hours and estimate the amount of each food consumed. Determine the fat content of each food item using a food composition database or nutrition analysis software. Total the amount of fat consumed in grams.

Convert your fat consumption from grams to calories: To calculate the number of calories per gram of fat, multiply the total amount of fat consumed in grams by 9. This will give you the total number of fat calories.

For instance, if the person consumed 30 grams of fat in the previous 24 hours, the calculation would be:

(270 calories from fat = 30 grams x 9 calories/gram)As a result, the person consumed 270 calories from fat in the previous 24 hours.

3.6.4: Total Calories Intake:

To calculate a person's total consumption of calories from their diet, these steps are followed:

First, I have used a food diary or the 24-hour recall method, to record all foods and beverages have consumed by the person over a 24-hour period

Then to determine the calorie content of each food and beverage consumed using a food composition database or nutrition analysis software. These tools will provide data on the macro nutrient and micronutrient content of foods, as well as the number of calories in each serving.

To determine the person's total calorie intake for that day, add up the total calorie intake for all foods and beverages consumed over the 24-hour period.

Chapter 4 Results and Discussion

4.1 Results

I gathered 50 data numbers during the research from people I encountered, asking them about their daily or 24-hour caloric consumption. The 50 data included all ages between 18 and 24. I have divided the data into seven age groups, ranging from 18 to 24 years old.

The Percentage of Age group is as below :

Table 4.1: Percentage of Age group

Percentage	Sample size	Age Group
12%	6	18
16%	8	19
18%	9	20
14%	7	21
22%	11	22
12%	6	23
6%	3	24

Distribution of Annual Household Income is as below :

Table 4.2: Distribution of Annual Household Income

Annual Household Income	Sample size	Age Group
3,24,000BDT	6	18
4,56,000BDT	8	19
3,98,000BDT	9	20
3,30,000BDT	7	21
2,52,000BDT	11	22
2,67,000BDT	6	23
2,81,000BDT	3	24

The percentage of protein intake by each age group is as below:

Table 4.3: Percentage of protein intake

Percentage of protein Intake	Sample size	Age Group
15.28%	6	18
17.23%	8	19
19.37%	9	20

20.12%	7	21
16.03%	11	22
16.61%	6	23
25.53%	3	24

The percentage of Carbohydrate intake by each age group is as below:

Table 4.4: Percentage of Carbohydrate intake

Percentage of carbs Intake	Sample size	Age Group
53.66%	6	18
54.85%	8	19
55.84%	9	20
50.55%	7	21
57.73%	11	22
56.46%	6	23
46.53%	3	24

The percentage of Fat intake by each age group is as below:

Table 4.5 : Percentage of fat intake

Percentage of Fat Intake	Sample size	Age Group
31.58%	6	18
28.22%	8	19
24.09%	9	20
28.58%	7	21
26.23%	11	22
27.24%	6	23
28.04%	3	24

The average intake of total calories by each age group is as follows:

Table 4.6: Average intake of total calories

Average intake of total calories	Sample size	Age Group
2423	6	18
2902.5	8	19
2099	9	20
2519.34	7	21
2379	11	22
1999.34	6	23

1990.5	3	24
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Table 4.7: Bivariate correlation analysis

Factors	Mean \pm SD	Correlation	<i>P</i> values
Age group	21.08 \pm 1.893	0.967	0.006
Protein	396.00 \pm 144.462	0.711	0.000
Carbohydrates	1202.24 \pm 281.006	0.446	0.001
Fat	599.220 \pm 196.859	0.699	0.000
Calories	2195.68 \pm 545.298	0.770	0.000
Household Income	47760.00 \pm 9639.544	-0.379	0.007

Data is significant at the CI 0.05 ,

Discussion: From the statistics, we can say that the number of calories, protein, carbohydrates, and fat of these two groups of 18 and 20 years old are in the right proportion.(tab 4.6) They can ensure good health by following their regular diet.

However, the number of calories in the body is more in the age group of 19 and 21 years. According to the information of (Dietary Guidelines for Americans), daily (2400-2800) caloric energy is needed at this age, where these two groups have 2902.5 kcal. To reduce calorie intake for a Sedentary lifestyle (little or no exercise), there are a few strategies that can be employed-

- **Reduce portion sizes:** Eating smaller portions can help to reduce overall calorie intake. Using smaller plates and bowls and measuring out portions can be helpful in controlling calorie intake.
- **Avoid high-calorie foods and drinks:** Foods that are high in added sugars and saturated or trans fats should be limited or avoided altogether. Beverages like sugary sodas, sports drinks, and alcohol should also be limited or avoided.
- **Timing of meals:** Eating smaller, frequent meals throughout the day can help to keep hunger and cravings at bay and prevent overeating.

And while performing endurance exercises, there are also a few strategies that can be employed:

- **Choose low-calorie, high-nutrient foods:** Filling up on fruits, vegetables, and whole grains (Like lentils, spinach, papaya, carrots, cabbage, tomatoes, etc.) can provide the nutrients needed for endurance exercise while keeping calorie intake in check.

- **Tracking calorie intake:** Keeping track of what is eaten and how much can be helpful in controlling calorie intake. There are many apps and websites available that can help with this, such as MyFitnessPal and Lose It.(apps reference)
- **Increase physical activity:** Exercise can help you burn calories and increase your metabolism, which can aid in weight loss.

Now, the calories of age groups 20, 22, 23, and 24 are 2099, 2379, 1999.34, and 1990.5, respectively. As we can see, there is a calorie deficit in these groups. When people need more calories, there are several ways to increase calorie intake-

- **Add more healthy fats:** Healthy fats such as –

Coconut-Coconut is a versatile food that is rich in healthy fats, fiber, and antioxidants.

Fatty fish- Hilsa, Rohu, and Katla are good sources of omega-3 fatty acids, which are important for heart health and brain function. These items can increase calorie intake without increasing carbohydrate or protein intake.

Now, if we look at Table 4.2, we can see that the annual income of the age groups of 22, 23, and 24 years is relatively low. As a result, their nutritional needs need to be met properly. However, the 20-year-old age group still has adequate annual income, but the nutritional deficit is still there.

In today's world, middle-class families are also struggling due to rising food prices.

According to the published by the World Bank in 2018, the middle class in Bangladesh was defined as those living on incomes approximately \$730 to \$7,300 annually or 73,000 BDT to 7,30,000 BDT.

And lastly, important to note that reducing calories or increasing calorie intake too drastically can negatively affect performance and overall health. It is recommended to consult with a registered dietitian or physician to determine a safe and effective calorie reduction and increase plan.

CHAPTER 5

Conclusion

In conclusion, the implementation of dietary management for young adults using the 24-hour recall method in Mirpur holds significant potential for promoting healthier eating habits and overall well-being among this age group. Through the 24-hour recall method, individuals between the ages of 18 and 24 can accurately assess their dietary intake, identify areas of improvement, and receive personalized guidance for making positive changes.

The 24-hour recall method offers a practical and convenient approach to collect detailed information about an individual's food and beverage consumption over a 24-hour period. By capturing the dietary patterns of young adults in Mirpur, this method enables nutritionists, dieticians, and healthcare professionals to gain valuable insights into the nutritional status and eating behaviors of this specific population. The main advantage of using the 24-hour recall approach is that it provides an accurate assessment of a person's food choices and nutrient intake.

This information can be used to identify potential nutritional deficiencies or excesses, allowing for tailored interventions and recommendations to address specific needs. By understanding the unique dietary requirements of young adults in Mirpur, interventions can be designed to support optimal growth, development, and long-term health outcomes.

Furthermore, the 24-hour recall method allows for the identification of common dietary patterns and habits among young adults in Mirpur. This knowledge can help in the development of targeted educational programs and interventions aimed at promoting healthier food choices, portion control, and meal planning. By empowering young adults with the knowledge and skills necessary to make informed dietary decisions, we can foster a culture of lifelong healthy eating habits.

It is important to recognize that the success of dietary management using the 24-hour recall method in Mirpur relies on collaboration and engagement from various stakeholders. Government agencies, healthcare providers, educational institutions, and community organizations should work together to raise awareness about the importance of nutrition and provide the necessary resources and support for young adults to adopt and maintain healthier eating habits.

In conclusion, the implementation of dietary management using the 24-hour recall method in Mirpur can contribute significantly to the well-being of young adults aged 18 to 24. By promoting awareness, education, and personalized guidance, this approach has the potential to empower young adults to make positive changes in their dietary choices and lead healthier lives. Through collective efforts and a holistic approach, we can support the nutritional needs of young adults in Mirpur and pave the way for a healthier future generation.

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APPENDICES

APPENDIX A

Survey questionnaire

Here is a survey questionnaire using the 24-Hour Recall Method:

1. What time did you wake up yesterday?
2. What did you eat yesterday? Please provide a detailed description of all the food and drinks you consumed from the time you woke up until you went to bed.
3. Did you eat any meat, poultry, or fish yesterday? If so, please describe what you ate and how much.
4. Did you eat any grains or bread products yesterday? If so, please describe what you ate and how much.
5. Did you eat any snacks or have any drinks between meals yesterday? If so, please describe them.
6. Did you eat any fast food or restaurant meals yesterday? If so, please describe what you ate and where you ate it.
7. Did you eat any fruits or vegetables yesterday? If so, please describe what you ate and how much.
8. Did you consume any beverages with added sugar yesterday? If so, please describe what you drank and how much.
9. Did you take any vitamins or supplements yesterday? If so, please describe what you took and how much.
10. Did you eat any nuts or seeds yesterday? If so, please describe what you ate and how much.