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Association Between dietary pattern and Menstrual Health Outcomes in Adolescent Girls from Manipur's Child Care Institutes

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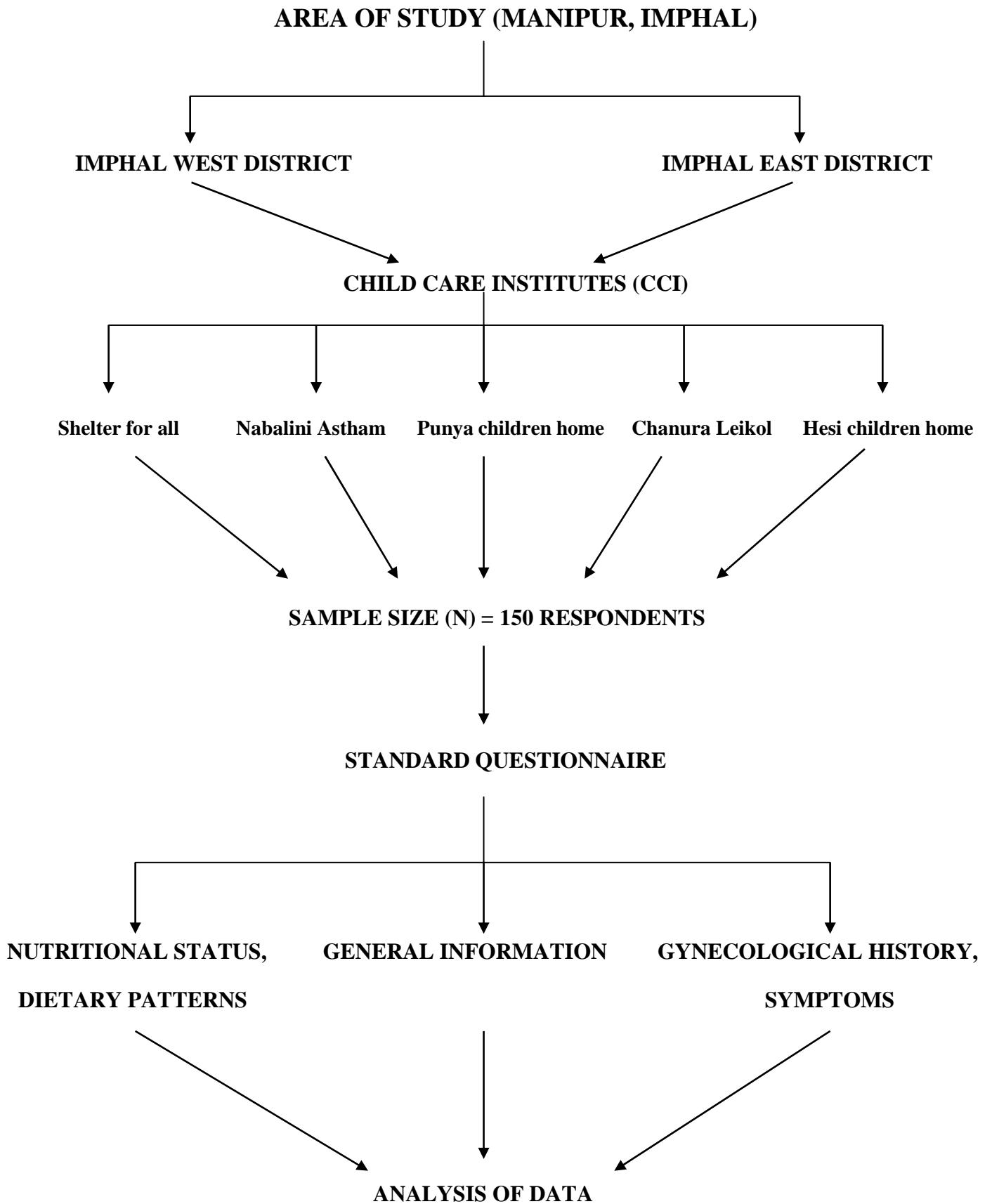
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ABSTRACT: Dietary patterns play an important role in individuals' lives and determine their health status and well-being. The menstrual cycle of a woman is influenced by various factors; however, dietary patterns have the strongest association with menstrual health, that is, menstrual problems and menstrual cycle length. The present study was conducted to assess the impact of dietary patterns on menstrual health among adolescent girls staying in childcare institutions (CCI) of Manipur. The main objective of this study was to determine the nutritional status of adolescent girls, identify the various menstrual health related problems, and study their dietary patterns. The study was undertaken on adolescent girls staying in the childcare institutions of Manipur, that is, Shelter for all: Nabalini Astham, Punya children's home, Chanura Leikol, and Hesi children's home. The data were collected purposively from menstruating girls using a pre-tested questionnaire covering the demographic profile, dietary pattern, nutritional status, and food frequency questions. All data collected via different parameters were statistically analyzed, and the results obtained were tabulated. The means and percentages were calculated using Microsoft Office Excel 2010. From the data presented in this study, it was found that most of the girls (75.3%) attained their menarche aged between 10-13 years. Among the girls, 64.66% had regular periods, whereas 35.33% had irregular periods. Most of the girls used sanitary napkins, and 70.6% of the girls had menstrual problems. It was also found that all the participants ate meals twice a day, most of them did not eat junk food, all the participants were non-vegetarian, and none of them consumed alcohol or tobacco products.

Keywords: Menstrual health, Menstrual problems, Adolescent girls, Dietary habits, Manipur, India

AREA OF STUDY (MANIPUR, IMPHAL)

IMPHAL WEST DISTRICT   **IMPHAL EAST DISTRICT**

CHILD CARE INSTITUTES (CCI)

Shelter for all   **Nabalini Astham**   **Punya children home**   **Chanura Leikol**   **Hesi children home**

SAMPLE SIZE (N) = 150 RESPONDENTS

STANDARD QUESTIONNAIRE

NUTRITIONAL STATUS,   **GENERAL INFORMATION**   **GYNECOLOGICAL HISTORY,**

DIETARY PATTERNS   **SYMPTOMS**

ANALYSIS OF DATA

INTRODUCTION

Adolescence is a transitional period from childhood to adulthood (WHO 2002). According to the World Health Organization (WHO), adolescents are any person aged 10 – 19 years. Demographically, adolescents are divided into two groups; they are between ages of 10-14 and 15-19 years. Changes in girls were marked by the onset of menstruation, that is, menarche. Sexual maturation in girls started at the age of 10-11 years started to have menstruation. (Amgain *et al.,*2019)

A girl's first menstrual period, known as menarche, marks a crucial turning point in her life. This phase is characterized by significant physical, emotional, and social changes as she transitions from childhood to womanhood (Khanna, 2021). The timing of menarche can impact long-term health. Early menstruation is linked to a higher risk of adult obesity, while late onset is associated with irregular menstrual cycles, bone density issues, and other health problems. Additionally, factors like height, weight, and body composition are influenced by the age at which a girl begins menstruating. (Mallick *et al.*,2022).

Menstruation is a periodic and cyclical shedding of the pre-gestational endometrium. Menstruation is a universal, normal, unique, and physiological phenomenon experienced by women and adolescent girls every month. (Amgain *et al.,*2019*).* Each woman experiences 400 menstrual cycles in her fertility age and with a mean of 5 days, so women experience approximately 67 months of menstruation. Menstruation accounts for about one-seventh of a woman's lifespan. A normal menstrual cycle occurs every 24 to 38 days, lasting 4 to 8 days, and typically involves a blood loss of 5 to 80 milliliters. (Mohamad irizi *et al.,* 2015)

A regular menstrual cycle is a sign of good reproductive health. However, more than half of young girls, especially those living in rural areas, don't manage their periods well. This can lead to missed school days, dropping out of school, reproductive health issues, urinary tract infections, social isolation, and limitations on daily activities (Shah *et al.*, 2022). Abnormalities in menstruation include dysmenorrhea, amenorrhea, menorrhagia, premenstrual symptoms, and hypomenorrhea. Menstrual cycle abnormalities are commonly observed in college students age group–18-26 years. Dysmenorrhea and premenstrual syndrome (PMS) come on the most common menstrual disorders (Gupta *et al.,* 2021).

Many young women experience painful periods, or dysmenorrhea, which is a common gynecological issue. Dysmenorrhea is characterized by painful cramps in the lower abdomen or pelvis that occur during menstruation. About 70% of young women suffer from this condition (Najafi *et al.,*2018). Dysmenorrhea may be accompanied by backaches, nervousness, headache, fatigue, weight gain, nausea and vomiting and breast tenderness.

Premenstrual syndrome (PMS) is a group of physical and psychological problems females experience one or two weeks prior to menstruation. PMS is the result of the interaction between various genetic and lifestyle behaviors, with dietary factors considered among the most influential. PMS intensity varies among women according to hormonal, psychosocial, and physiological factors. PMS is characterized by irritability, tension, depressed mood, breast tenderness, and bloating (Arafa *et al*. 2018).

Diet, physical activity, and psychosocial factors are the main factors affecting the menstrual cycle. Nutrition pattern is one of the most important factors predicting menstrual distress, which varies among different cultures and countries. Therefore, this study evaluated the effects of dietary patterns on menstrual health among adolescent girls staying in childcare institutions of Manipur to determine their need for further nutritional interventions. The present study "Impact of dietary pattern on menstrual health among adolescent girls staying in Child Care Institutions (CCI) of Manipur" was conducted to study the nutritional status of adolescent girls, identify the various menstrual health-related problems of adolescent girls, and study the dietary patterns of adolescent girls.

Materials and methods:

Study Population and Area

A sample size of 150 (n=150) Child Care Institutions was selected by random sampling from five Child Care Institutions (CCI), that is, Shelter for all: Nabalini Astham, Punya children home, Chanura Leikol, and Hesi children home. Participants were selected based on their i) Agreement to take part in the survey and ii) Their provision of informed consent.

This study is based on primary data collected from the Child Care Institutions of Imphal West District and Imphal East District, Manipur State. The survey was conducted between January 2024 and April 2024. The study area was selected based on the following factors:

a. Accessibility of the CCI study

b. Time constraints on the researcher's part

Data collection:

2.1. Socio-Demographic Profile

The socio demographic profile of the selected respondents was obtained using a standardized pretested questionnaire consisting of relevant questions and an observational study under the following headings: age and educational qualification, etc.

2.2. Nutritional status by Anthropometric measurements

Nutritional anthropometry involves measuring people's bodies at different ages and nutritional levels. This includes measuring height, weight, skin thickness, and body circumference. (Padilla *et al.,* 2021). BMI is a number calculated using a person's height and weight to estimate their overall body fat. (Mohajan *et al.,* 2023). It is calculated by dividing a person's weight in kilograms by the square of their height in meters. BMI is commonly used to assess weight status in adults

2.3 Dietary Assessment

Data on dietary patterns were obtained using a structured questionnaire and an observational study with the help of a food frequency questionnaire (FFQ). The participants were personally interviewed during the study period to report their dietary information on the commonly used food items mentioned in the food frequency questionnaire during the past 1 year. Furthermore, the dietary intake of healthy reproductive women and women with PCOS in Imphal and Manipur was compared.

Statistical analysis:

The collected data was statistically analyzed and summarized in tables. Means and percentages were calculated using Microsoft Office Excel 2010.

Mean

This is the sum of all observations (Xi) divided by the total number of observations (N). The formula for calculating the mean is as follows:.

$$\text{Mean} = \frac{\Sigma xi}{N}$$

Percentage

$$\text{Percentage} = \frac{\text{Total number of responses obtained}}{\text{Total number of respondents}} * 100$$

Result and Discussions

1. Socio-demographic profile

The demographic profile outlines the complex profile of selected adolescent girls in childcare institutions. A total of 150 adolescent girls were surveyed from different CCI (Child Care Institutions (CCIs) of Manipur, which is Shelter for all: Nabalini Astham, Punya children home, Chanura Leikol, and Hesi children home. Information was collected on different parameters, including age, educational qualification, and religion.

Table 1: **Percentage distribution of adolescent participants according to age, religion and qualifications***.*

Characteristics	Category	Total	Percentage
Age	10 – 14 years	82	56.6%
	15 – 18 years	68	45.3%
Qualification	Primary	125	83%
	Secondary	25	16%

The demography of adolescent girls staying in Child Care Institutions (CCI) of Manipur comprises 56.6% young girls (10 – 14 years) and 45.3% adolescent girls. All participants were female.   When their educational qualification was analyzed, it was found that 83% of the participants were girls attending primary school (125), and 16% of participants were higher secondary students.

2.2. **Nutritional status by Anthropometric measurements**

Table 2: Percentage distribution of respondents according to height, weight, and BMI.

Parameters	Number	Percentage
Height		
3'9"to 4'9"	99	66%
5 to 5'5"	51	34%
Weight		
30 to 45 kg	73	48.6%
46 to 55 kg	64	42.6%
56 to 65 kg	13	8.6%

Body Mass Index (BMI)		
Underweight	37	24.66%
Normal	94	62.66%
Overweight	11	7.33%
Obese	8	5.33%

From Table 2, it is observed that 66% of the respondents were between heights ranging from 3'9' to 4'9" and 34% of the respondents were between heights ranging from 5'to 5'5.' Weight wise, 48.6% of the participants' weight ranged from 30 to 45 kg, 42.6% of the participants' weight ranged from 46 to 55 kg, and 8.6% of the participants' weight ranged from 56 to 65 kg. Maintaining a healthy weight is important for health, as it is associated with a low risk of weight-related diseases and health issues, such as diabetes, stroke, and heart disease.

According to the BMI data, 24.66% of the participants were underweight, 62.66% had normal BMI, 7.33% were overweight, and 5.33% were obese. According to the present study, more than half of the adolescent girls staying in childcare institutions of Manipur were found to have normal BMI, which reflects their good health condition. BMI plays a vital role in the regularity and flow of a woman's menstrual cycles. A higher BMI is often associated with menstrual problems in adolescents (Singh *et al*., 2019).

2. Dietary and Food Consumption Pattern

An individual's food habits are the way in which they select the food they want to eat, which depends on the availability in nature or the market and knowledge about the food. People usually eat foods that are readily available nearby. A person's food habits are strongly associated with their health status.

Table 3: Percentage distribution of respondents according to dietary pattern

Parameters	Total number	Percentage
Number of meals per day		
2 meals	120	80%
3 meals	30	20%
Fussy eater?		
Yes	61	41.6%
No	89	58.4%
Vegetarian	-	-
Non-vegetarian	150	100%

Skip meals		
Yes	71	47.3%
No	62	41.3%
Sometimes	17	11.3%
Consumption of preserved food		
Yes	134	98.3%
No	16	10.6%
Consumption of alcohol		
Yes	-	-
No	150	100%
Consumption of tobacco products		
Yes	-	-
No	150	100%

From Table 3, it can be seen that more than half of the participants, that is, 80% of the participants (120) had meals twice a day and only a few participants (30) had meals three times a day. From Table 4, it can be observed that 41.6% of the participants were fussy eaters (61) and 58.4% of the participants (89) were not fussy eaters. Fussy eating habits are not good eating habits because they can be a risk factor for obesity, which is again related to the onset of various health issues. Almost all respondents (98.3 %) consumed preserved food in the form of fermented food. This is because traditional fermented ethnic foods are essential to the diet and cultural identity of all ethnic groups (Wahengbam *et al.,* 2020). None of the respondents had a habit of consuming alcohol or tobacco according to the present survey. No association was found between alcohol consumption and menstrual cycle abnormalities such as dysmenorrhea (Zafra,2020).

Table 4: Percentage distribution of food frequency pattern of the respondents

Food group	Daily		Weekly		Monthly		Once		Never	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cereals	150	100%								
Pulse	150	100%								
Milk and its Product			114	76%	14	9%	22	14.6%		
Meat and its Products			150	100%						
Fruits	60	40 %	90	60%						
Green leafy vegetables	144	96%	6	4%						
Roots and Tubers	146	97%	4	3%						
Beverages	105	70%	23	15%						
Sugar	144	96%	6	4%						
Fast food					36	24.2%	102	67.8%		

Table 4 shows that all participants were non-vegetarian (100%). According to a study conducted by Amgain (2019), the occurrence of menstrual problems was significantly higher in participants on a non-vegetarian diet, especially in chickens. From the survey, it was observed that 47.3% of the participants (71) frequently skipped their meals, 41.3% of the participants (62) did not skip meals, and 11.3% of the participants (17) sometimes skipped meals. Frequent skipping of meals may lead to various health problems, such as problems with blood sugar levels. Around half of the participants skipped meals during their menstrual period, which was not a good step. Meal-skipping habits have been found to be significantly associated with menstrual problems (Amgain, 2019). From the above table, it is revealed that 98.3% of the participants (134) ate preserved food and 10.6% of the participants (16) did not eat any preserved food. In the present study, almost all participants consumed at

least one variety of preserved food. Having preserved food on a daily basis or very frequently may lead to health issues because commercially preserved food contains substances that are harmful to the body, such as artificial food color and monosodium glutamate. There are evidences more severe menstrual cramps with consumption of more salty cucumber pickles (Molazem,2011).

The study showed that 100% of the participants ate cereals and their products daily. One hundred% of the participants (n = 150) ate pulses daily. All participants had rice and dal every day, which are the main sources of energy and protein, respectively, for the adolescent girls staying in childcare institutions in Manipur. Six% of the participants (114) ate milk and its products on a weekly basis, 9% of the participants (14) ate milk and milk products on a monthly basis, and 14.6% of the participants (22) occasionally ate milk and milk products. Milk is a good source of calcium and other vital nutrients that are required by the body. It is necessary to drink at least one glass of milk per day, but most participants do not drink milk on a daily basis instead of milk and milk products on a weekly basis, which may lead to health issues in adolescent girls in the future.

One hundred% of the participants (150) ate meat and meat products weekly on a regular basis. Forty% of the participants (60) ate fruits daily, and 60% of the participants (90) ate fruits weekly. 96% of the participants (144) ate green leafy vegetables daily, and only 4% of the participants (6) ate green leafy vegetables on a weekly basis. According to this study, 97% of the participants (146) ate roots and tubers on a daily basis, and 3%of the participants (4) ate roots and tubers on a weekly basis. Seventy% of the respondents (105) consumed beverages daily, 15% (23) consumed beverages weekly, and 14.6% (22) consumed beverages occasionally. The study also revealed that 96% of the participants consumed sugar on a daily basis, and only 4% of the participants consumed sugar on a weekly basis. Consuming sugar on a daily basis may lead to increased body weight, as sugar is a rich source of calories that are responsible for obesity. Eating a lot of sugary treats is linked to a higher chance of experiencing painful periods in young women (Najafi, 2018).

Table 4 also shows that 24.2% of the participants ate fast food on a monthly basis, and 67.8% ate fast food once occasionally. Junk food contains unhealthy fats that can disrupt the hormone progesterone, which is crucial for ovulation. This can lead to irregular or delayed periods. (Akhila *et al*., 2020).

Physical activity and personal hygiene

Physical activity is the voluntary movement of the body produced by skeletal muscles. This is an important aspect of a person's life, and regular physical activities such as walking and cycling provide significant benefits to the body.

Personal hygiene is the practice through which people maintain good health. It is one of the important keys to preventing harmful germs in the body. Poor personal hygiene can lead to various health problems.

Table 5: Percentage distribution of the participants regarding physical activity and personal hygiene

Parameters	Number	Percentage
Exercise regularly		
Yes	134	89.33%
No	16	10.66%
Duration of exercise		
15 minutes	43	28.66%
30 minutes	105	70%
60 minutes	2	1.33%
Habits of practicing yoga regularly		
Yes	104	69.8%
No	28	18.1%
Sometimes	18	12.1%
Do you wash hands after using toilet?	150	100%
Do you wash hands before eating?		
Always	107	70.66%
Frequently	43	28.66%
Do you take proper medical care whenever sick?		
Yes	109	72.6%
No	41	27.3%
Type of house		
Pukka	150	100%
Kutcha	-	-

Drainage system Open Close	150 -	100% -
Having proper toilet facility Yes No	150 -	100% -
Type of toilet Pukka Kutcha	150 -	100% -
Frequency of trimming nail Once a week Twice a week	123 27	82% 18%
Type of drinking water Boiled water Tap water Filtered water	74 6 70	49.3% 4% 46.7%

Table 5 shows that 89% of the participants (134) exercised regularly and 10.66% of the participants (16) did not exercise. It is evident from the above table that 28.66% of the participants exercised for 15 minutes, 70% exercised for approximately 30 minutes and participants1.33%exercise for approximately 60 minutes a day. The absence of physical activity or a sedentary lifestyle in 61% of respondents was related to a higher occurrence of dysmenorrhea **(**Ahmad *et al.***,** 2021).

Table 5 also reveals that more than half of the respondents (69.8 %) practiced yoga on a daily basis, 12.1% sometimes practiced yoga, and 18.1% did not practice yoga. It was also observed that childcare had made yoga a part of their daily routine, which fostered good health and physical well-being.

Regarding hygiene, 100% of the participants washed their hands after using the toilet. All participants performed their personal hygiene correctly under the guidance of a warden. The study also showed that 70.66% of the participants (107) always washed their hands before eating food and 28.66% of the participants (43) frequently washed their hands before eating. Of the participants, 72.6% (109)tooke proper medical care whenever they fell sic,k and 27.3% (41) did not take proper

medical care. 82% of the participants (123) cut their nails once a wee, and 18% of the participants (27) cut their nails twice a week. All participants (100%) were living in a Pukka house, and the drainage system of all the participants was found to be open type. All participants 150 had a well-maintained pukka toilet.

From Table 5, it was also revealed that almost half of the participants (46.7 %) drink filtered water, 49.3% of the adolescent girls staying in childcare institutions drink boiled water provided by their respective homes, and only 4% of the participants drink tap water. Drinking water safely is necessary to prevent various diseases that can be transmitted through water. Most of the participants were free from waterborne diseases, as most of them drank boiled or filtered water.

Gynecological history and symptoms

Gynecological history is an assessment of a woman's health status. Gynecological history is very important for analyzing women's health status. Observing the symptoms that are faced by women helps to identify the disease.

Table 6: Percentage distribution of the participants regarding gynecological history

Parameters	Total number	Percentage
First period 10– 13 years 14 – 16 years	113 37	75.3% 24.6%
Duration of period 2 -4 days 5 -7 days	84 66	56% 44%
Is the period painful Yes No	106 44	70.6% 29.33%
During menses which one is used Sanitary napkins Clothes	150 -	100% -
Is the period heavy flow Yes No	110 40	73.33% 26.66%

Regularity of menstruation Yes No	97 53	64.4% 35.6%
Severity of menstrual pain Mild Moderate Severe	48 55 47	32.1 36.7 31.2
Feeling of tiredness during menstruation? More tired than usual Don't feel tired Extremely tired	66 61 23	44.3% 40.9% 14.8%
Joint pain during menstruation. Yes No Mid	36 84 30	24.2% 55.7% 19.5%

Table 6 shows that most of the adolescent girls attained their menarche between the age of 10-13 years. More than half of the adolescent girls have their menstrual period regularly with the duration ranges from 2 to 7 days. In normal healthy women, menarche occurs between the ages of 10 and 16 years, with a rhythm of 28 days, inclusive of 4-6 days of bleeding, with some common minor variations such as dysmenorrhea, amenorrhea, menorrhagia, and polymenorrhea (Akhila *et al.*, 2020). The table above shows that 70.6% of the participants (106) had painful periods and 29.33% of the participants (44) did not experience menstrual pain. The girls who were observed to be eating fast food were found to experience painful periods. This could be linked to the high levels of saturated fat in junk food, which may interfere with hormone regulation during the menstrual cycle.

All the adolescent girls staying in Child Care Institutions of Manipur used sanitary napkins as their absorbent during their menstrual period, which is a good indication of good menstrual hygiene practice. However, information and knowledge about menstruation and menstrual hygiene among adolescent girls are inadequate which is observed by other researchers as well (Lahme, 2018). 73.33% of the participants (110) were found to be experiencing heavy flow during menstruation and 26.66% of participants (40) do not have heavy flow during the menstruation.

Table 6 shows that most adolescent girls (64.4%) staying in childcare institutions had regular menstrual cycles, and only 35.6% of the participants faced irregularity during their menstrual period. The regularity of menstruation can be considered a significant indication of good menstrual health among adolescent girls. Table 6 also reveals that 32.1% of the participants had mild pain during menstruation, 36.7% of the adolescent girls staying in childcare institutions faced moderate menstrual pain, and only 31.2% of the participants experienced severe pain during their menses. In a similar cross-sectional study by Sharma *et al* (2016) among adolescent girls in Nepal, it was observed that 71.5% of the respondent were experiencing menstrual pain, among them 53.2% had mild, 37.6% had moderate and 17 (9.1%) were experiencing severe menstrual pain.

Percentage distribution of respondents regarding Symptoms:

Table 7: Percentage distribution of respondents regarding Symptoms related parameters

Symptoms	Total number	Percentage
Night sweats during period		
Yes	32	21.33%
No	78	52%
Mild	40	26.66%
Difficulty to sleep		
Yes	19	13%
No	127	86.9%
Mild	-	-
Depressed moods during period		
Yes	35	23.33%
No	115	76.66%
Mood swings		
Yes	106	70.6%
No	44	29.33%
Abnormal vaginal discharge		
Yes	73	49.6%
No	37	25.1%
Extremely	37	25.1%

Burning sensation while urination		
Yes	8	5.4%
No	124	83.78%
Mild	16	10.8%

Table 7 shows that 21.33% of the participants (32) had night sweats during their menstrual period, 52% of the participants (78) did not have night sweats, and 26.66% of the participants (40) had mild night sweats during their menstrual period. Thirteen % of the participants (19) had difficulty sleeping and 86.9% of the participants (127) did not face any difficulty sleeping. 23.33 Of the participants, 23.33% (35) faced depressed mood during the period and 76.66% (115) did not have depressed mood during the period. The above table reveals that 70.6% of the participants (106) had mood swings during menstruation, and 29.33% of the participants (44) did not face mood swings during menstruation. 49.6. Of the participants, 49.6 % (n = 73) had abnormal vaginal discharge, (n = 37), and 25.1% had extreme abnormal vaginal discharge. 5.4% of the participants were facing a burning sensation while urinating, 83.78% of the participants (124) did not face a burning sensation while urinating, and 10% of the participants were facing a mild burning sensation while urinating. Nearly half of the adolescent girls (44.3%) felt more tired than usual during their menstrual period, 40.9% of the participants did not feel tired than usual during menses, and only a few participants (14.8%) felt extremely tired during menstruation. From the above table, it is observed that more than half of the participants (55.7%) did not have joint pain during menses, only 19.5% of the participants had mild joint pain during their menstrual period, and 24.2% of adolescent girls were facing joint pain during their menstrual periods.

Conclusion:

The present study was conducted on the impact of dietary patterns on menstrual health among adolescent girls staying in childcare institutions of Manipur, showed a negative impact on the menstrual health of adolescent girls due to the effects of poor nutritional status and unhealthy dietary habits. From the data presented in the current study, it was found that a few adolescent girls had unhealthy dietary patterns, poor health conditions, and severe underweight. Lastly, most of them did not get the required nutrients for a day, which leads to poor menstrual health and may ultimately lead to menstrual abnormalities. Moreover, lack of education,

misinformation, and harmful cultural beliefs hinder girls' physical and mental well-being, damaging their self-confidence. These factors negatively impact the transitionto adulthood and reproductive health, ultimately affecting the health of families and the overall progress of society. Despite extensive research, menstruation remains a complex issue, with many unknown aspects.

Conflict of Interest: The authors declare no conflicts of interest.

Author's Contribution: All authors contributed to data collection, analysis, presentation, and discussion.

Data Availability Statement: Not applicable

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