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Assessing the Impact of Dietary Habits on Physical Status among Adolescents of Uttar Pradesh, India

Avinash Singh

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Abstract

Objective: Adolescence is a vulnerable period of life as health related behaviours that drive the major chronic degenerative diseases start or are reinforced during this time. Dietary habits of adolescents play a significant role in determining both their present and future health. The present study is an attempt to assess the impact of dietary habits on physical status among adolescents of Uttar Pradesh, India.

Materials and Methods: A cross sectional study using a self administered questionnaire was carried out among 300 adolescents aged 10-19 years from prominent districts of Uttar Pradesh (Lucknow, Prayagaraj, Gorakhpur, Ghaziabad, Varanasi). The socio-demographic profile, anthropometric measurements (height & weight) and dietary habits using simplified dietary gap assessment tool recommeneded by ICMR/NIN were recorded. The physical status of the adolescents was categorized as per WHO-BMI. Based on their BMI, underweight, normal and overweight adolescents were identified. Chi-square test using SPSS 22 software was employed to assess the association between dietary habits and BMI status.

Results: Overall, the adolescents reported poor dietary intakes; over one quarter (38%) reported not consumption of three main meals and (81.3%) reported skipping their regular meals. Nearly one third of the adolescents do not consume any servings of fruits daily. The results revealed that consuming junk food and buying eatables from street shops were considerably high in all the adolescents. More adolescents falling into the overweight/obese category were found to have poor eating habits, such as missing meals, consuming junk food, or buying eatables from street shops. Male adolescents were found to consume fruit and green leafy vegetables more often than female individuals. In general, boys consumed more nutrient-rich diets than girls.

Conclusion: The adolescents reported poor food consumption patterns, and the poor dietary choices significantly impact the physical status of adolescents. The study findings highlight the need to develop strategies for promoting good nutrition and creating awareness to encourage healthy eating in adolescence.

Keywords: BMI, Adolescents, Dietary habits, Physical status, Overweight/obese.

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INTRODUCTION

The nutrition transition has brought about rapid changes in the structure of the Indian diet. The replacement of traditional home cooked meals with ready-to-eat, processed foods has contributed to an increased risk of chronic diseases in Indians. These changing food preferences have contributed to the

increased risk of chronic degenerative diseases, thus affecting the quality of life and health of about 1.2 billion Indians (NIN, 2010).

The WHO defines the individuals in the age group between 10 to 19 years as adolescents. Adolescence (10–19 years) is a vulnerable period of life as health related behaviours that drive the major chronic degenerative diseases start or are reinforced during this time (WHO, 2016). Adolescents experience a number of physical, emotional, cognitive and social changes which bring anticipation and anxiety (Sawyer *et al.* 2018). These changes also contribute towards faulty dietary habits emphasizing the role of parents in promoting healthy eating behaviour among adolescents (Rathi *et al.* 2017).

Due to the rapid urbanisation, there is a change in dietary pattern which contributes to chronic diseases and obesity in the urban areas (Shetty, 2002). Adolescents have high rates of consumption of energy dense, nutrient poor foods and inadequate consumption of fruits and vegetables In addition, adolescents also exhibit unhealthy eating habits such as meal skipping and snacking on fast foods (Deka *et al.* 2015). These food behaviours may set in train unhealthy eating trends for adult life (Wennberg, 2015) and contribute to a number of health problems including overweight and obesity, metabolic syndrome, diabetes and a number of cancers (NIN, 2010). Dietary habits of adolescents play a significant role in determining both their present and future health (Keldar et al., 1994). Improvement of the food habits of adolescents is therefore one avenue to reduce the prevalence of these health problems.

To date, little is known about the food intakes of Indian adolescents. Neither the National Family Health Survey nor the National Sample Survey Office has examined the dietary habits of urban Indian adolescents. This lack of evidence about the food consumption patterns of Indian adolescents is a significant barrier to the development of effective nutrition promotion and disease prevention measures. Therefore, the present study was undertaken to examine the food consumption patterns of a sample of Indian adolescent boys and girls residing in Uttar Pradesh, India.

MATERIALS AND METHODS

A cross sectional study using a self administered questionnaire was carried out among 300 adolescents aged 10-19 years from prominent districts of Uttar Pradesh (Lucknow, Prayagaraj, Gorakhpur, Ghaziabad, Varanasi). Data were collected from Nov 2022 to Mar 2023.

Inclusion criteria: A total of 300 adolescents between 10-19 years of age whose parents gave informed consent were included in the study.

***Exclusion criteria*:** An Adolescent with long-term medication or suffering from chronic disease was excluded from the study.

Data collection: The targeted respondents were approached with a structured self administered questionnaire. The complete information about the study was shared with the respondents. A pre-designed, pretested questionnaire in english and hindi (local language) was used. All the questions included in the socio demographic profile and simplified dietary gap assessement tool based on the dietary recommendation by the Indian Council of Medical Research (ICMR) and the National Institute of Nutrition (NIN) were discussed with each respondent and adequate time was provided to fill the questionnaire. The respondent's age was verified from their identity cards and aadhaar cards.

The heights of the adolescents were measured using a portable stadiometer. Each participant was required to stand with their head held comfortably upright while not wearing any shoes. The subjects' weights were recorded using a calibrated weighing scale. On the weighing scale, participants were instructed to stand with their feet apart, without shoes, and with their heads straight.

Criteria for Adolescent Stage: The WHO classifies adolescence into early, middle, and late phases, which correspond to age groups of 10–14, 15–17, and 18–19 years, respectively.

Criteria for the Assessment of Underweight/ thin, Normal & Overweight/obese.

The WHO-BMI for age and gender specific standards for adolescents was used. The normal BMI range was based on the age and gender specific standards. The criteria used to evaluate the underweight/thin, normal, and overweight/ obese were: below 18.5 (underweight), (18.5-24.9) Normal, and 25 & above (overweight).

STATISTICAL ANALYSES

Statistical analyses were carried out by utilising SPSS version 22. The descriptive analysis was done to determine the frequency of dietary consumption Pattern. The association between dietary intake and BMI levels was examined using cross tabulation and the chi-square test.

RESULTS

Table 1: Profile of Respondents

Variables	Category	Frequency n=300	Percentage
Gender	Male	178	59.3
	Female	122	40.7
Age	10-14 years (early adolescent)	168	56
	15-19 years (mid & late adolescent)	132	44
Religion	Hindu	224	74.7
	Non Hindu	76	25.3
Type of Family	Nuclear	274	91.3
	Joint	26	8.7
Socio Economic Class	Upper (more than 50000)	159	53
(Income INR)	Middle (between 25000 - 50000)	120	40
	Lower (below 25000)	21	7
Father's Education	Illiterate	-	-
	Upto 12th	32	10.7
	Graduation and above	268	89.3
Mother's Education	Illiterate	48	16
	Upto 12th	104	34.7
	Graduation and above	148	49.3
Total		300	100

Source: Survey data

Table 1 depicts that the total number of respondents in the study was 300 out of which 178 (59.3%) were males and 122 (40.7%) were females. The majority of the study subjects 168 (56%) were from the age group of 10-14 years and whereas 132 (44%) were from the age group of 15-19 years. 224 (74.7%) respondents were Hindu, as compared to 76 (25.3%) who were non-Hindu. The majority of the respondents were Hindu 56 (74.7%) and whereas 19 (25.3%) were non- Hindu. The majority of respondents 274 (91.3%) live in nuclear families, while only 26 (8.7%) live in joint families.

Table 2 revealed that 96 (32%) respondents had normal BMI as per the criteria used while 60 (20%) respondents were underweight/thin and 144 (48%) respondents were in overweight/obese category. The physical status of male respondents revealed 24.7% were underweight and 37.1% were overweight. Among female respondents, 13.1% were underweight and 78% were overweight/obese. This difference between male and female was statistically significant.

Table 2: Physical Status of Respondents

Variables	Category	BMI (Underweight/ *thin) n=60*	BMI *(Normal)* n=96	BMI *(Overweight/ obese) n=144*	*Chi- square* (X^2)	p-Value
Gender	Male (n =178)	44 24.70%	68 38.20%	66 37.10%	21.012	*0 0.05>0.000**
	Female (n = 122)	16 13.10%	28 23.00%	78 63.90%		
Age	10-14 years (n=168)	38 22.60%	64 38.10%	66 39.30%	11.783	0.003 0.05>0.003*
	15-19 years (n=132)	22 16.70%	32 24.20%	78 59.10%		

*Note: * p< 0.05 significant*

A 22.6% of respondents belonged to early adolescent age were underweight and 39.3% were overweight while 16.7% of respondents from late adolescent age were thin and 59.1% were overweight. This difference between age group was also statistically significant.

Table 3 depicts the distribution and pattern of eating food habits among adolescents. Adolescents had relatively low habit of taking daily mid-morning and evening snacks (31%) and very high habits of skipping meals (81.3%), consuming junk food (92.7%) and buying eatables from street shops (87.3%).

Table 3: Pattern of Food Habits of Respondents

S.No.	Pattern of food habits	n=300 (%)
1	Do you have 3 main meals of cereals?	186 (62.0%)
2	Do you have mid-morning and evening snack daily?	93 (31%)
3	Do you take at least one of these items along with your meals [pulses/non vegetarian food (fish, chicken, mutton, egg)] daily?	205 (68.3%)
4	Do you take a cup of milk/coffee/tea/flavoured milk or curd daily?	168 (56.0%)
5	Do you take green leafy vegetables daily?	126 (42.0%)
6	Do you take other vegetables along with your meals daily?	198 (66%)
7	Do you take a fruit daily?	199 (66.3%)
	General faulty dietary habits	
8	Do you skip any meal?	244 (81.3%)
9	Do you eat junk food?	278 (92.7%)
10	Do you buy eatables from the street shops?	262 (87.3%)

*Note: * p< 0.05 significant*

Table 4: Association of Food Habits with Adolescent Stage

Pattern of food habits	10-14 yrs (n=168)	15-19 yrs (n=132)	Chi-square (X^2)	p-Value
Do you have 3 main meals of cereals?	118 -70.20%	68 -51.50%	10.998	0.001 0.05>0.001*
Do you have mid-morning and evening snack daily?	51 -30.40%	42 -31.80%	0.073	0.785 *0.05*<0.785
Do you take at least one of these items along with your meals [pulses/non vegetarian food (fish, chicken, mutton, egg)] daily?	96 -57.10%	109 -82.60%	22.096	0 *0.05*>0.000*
Do you take a cup of milk/coffee/tea/flavoured milk or curd daily?	105 -62.50%	63 -47.80%	6.547	0.011 *0.05*>0.011*
Do you take green leafy vegetables daily?	84 -50.00%	42 -31.80%	10.031	0.002 *0.05*>0.002*
Do you take other vegetables along with your meals daily?	126 -50.00%	72 -54.50%	13.782	0 *0.05*>0.000*
Do you take a fruit daily?	92 -55.50%	107 -81.10%	22.892	0 *0.05*>0.000*

table cont...

General faulty dietary habits				
Do you skip any meal?	135 -80.40%	109 -82.60%	0.239	0.624 *0.05*<0.624
Do you eat junk food?	155 -92.30%	123 -93.20%	0.092	0.761 *0.05*<0.761
Do you buy eatables from the street shops?	143 -85.10%	119 -90.20%	1.692	0.193 *0.05*<0.193

*Note: * p< 0.05 significant*

Table 4 demonstrates that Chi-square was applied to determine whether there was any significant difference in the dietary habits between age group. Except for consuming mid-morning & evening snack daily, skipping meals, eating junk foods and buying of eatables from the street shops which were found to be insignificant, rest other food habits were found to be significant between the age group 10-14 years (early adolescents) and 15-19 years (mid and late adolescents).

According to Table 5, Chi-square was applied to determine whether there were any gender specific dietary differences that were statistically significant. While the faulty dietary habits of skipping meals,

Table 5: Association of Food Habits with Gender

Pattern of food habits	**Male (n=178)**	**Female (n=122)**	***Chi- square* (X^2)**	**p-Value**
Do you have 3 main meals of cereals?	122 -68.50%	64 -52.50%	7.944	0.005 *0.05*>0.005*
Do you have mid-morning and evening snack daily?	46 -25.80%	47 -38.50%	5.442	0.019 *0.05*>0.019*
Do you take at least one of these items along with your meals [pulses/ non vegetarian food (fish, chicken, mutton, egg)] daily?	116 -65.20%	89 -65.60%	2.025	0.154 *0.05*<0.154
Do you take a cup of milk/coffee/tea/flavoured milk or curd daily?	96 -53.90%	72 -59.00%	0.759	0.383 *0.05*<0.383
Do you take green leafy vegetables daily?	92 -51.70%	34 -27.90%	16.855	0 *0.05*>0.000*
Do you take other vegetables along with your meals daily?	134 -75.30%	64 -52.50%	16.801	0 *0.05*>0.000*
Do you take a fruit daily?	107 -60.10%	92 -75.40%	7.585	0.005 *0.05*>0.005*
General faulty dietary habits				
Do you skip any meal?	143 -80.30%	101 -82.80%	0.286	0.592 *0.05*<0.592
Do you eat junk food?	162 -91.00%	116 -95.10%	1.765	0.184 0.05<0.061
Do you buy eatables from the street shops?	156 -87.60%	106 -86.90%	0.037	0.846 0.05<0.846

*Note: * p< 0.05 significant*

consuming junk food, and buying eatables from street shops were found to be insignificant, the other food habits of eating fruit and green leafy vegetables, as well as morning and evening snacks, were found to be significant for both male and female adolescents.

Table 6 reveals that Chi-square was applied to measure the association between the pattern

Table 6: Association of Food Habits with BMI Status

Pattern of food habits	BMI (underweight/*thin*) *n=60*	*BMI (normal)* n=96	*BMI (overweight/ obese) n=144*	*Chi- square* (X^2)	p-Value
Do you have 3 main meals of cereals?	28 -46.70%	70 -72.90%	88 -61.10%	10.892	0.004 *0.05*>0.004*
Do you have mid-morning and evening snack daily?	11 -18.30%	36 -37.50%	46 -31.90%	6.456	0.193 *0.05*<0.039*
Do you take at least one of these items along with your meals [daily pulses/ dal/non vegetarian food (fish, chicken, mutton, egg)] daily?	29 -48.30%	70 -72.90%	106 -73.60%	13.876	0 *0.05*>0.000*
Do you take a cup of milk/coffee/tea/ flavoured milk or curd daily?	22 -36.60%	71 -73.90%	75 -52.10%	22.563	0 *0.05*>0.000*
Do you take green leafy vegetables daily?	19 -31.60%	55 -57.30%	52 -36.10%	13.895	0 *0.05*>0.000*
Do you take other vegetables along with your meals daily?	36 -60.00%	69 -71.90%	93 -64.60%	2.567	0.276 *0.05*<0.276
Do you take a fruit daily?	29 -48.30%	82 -85.40%	88 -61.10%	26.118	0 *0.05*>0.000*
General faulty dietary habits					
Do you skip any meal?	49 -73.30%	73 -20.80%	122 -55.60%	2.864	0.238 *0.05*<0.238
Do you eat junk food?	53 -92.90%	87 -90.60%	138 -95.80%	4.371	0.112 0.05<0.112
Do you buy eatables from the street shops?	47 -78.30%	81 -84.40%	134 -93.10%	9.415	0.009 *0.05*>0.009*

of food habits and the BMI status of adolescents. Faulty dietary habits of skipping meals and eating junk foods which were found to be insignificant whereas majority of other food habit patterns were significantly associated with the BMI levels among adolescents. It was also observed that faulty dietary habits of skipping meals, eating junk foods & buying eatables from the street shop were associated with higher prevalence of overweight/obese adolescents. Additionally, adolescents who fell into the underweight/thin category had a strong association with the habit of non consumption of healthy 3 main cereals, healthy mid morning and evening snacks, green leafy vegetables and fruit in daily diet.

DISCUSSION

As per the present study, 44 (24.7%) boys and 16 (13.5%) girls were thin. These under nutrition findings are in line with the findings of survey conducted by the national family health survey 2015-16 where the prevalence of thinness in boys were more common as compared to girls.

It was discovered that the prevalence of overweight and obesity was significantly higher among girls than boys. The findings of the study conducted among school children from Delhi (Marwaha *et al.* 2006) are consistent with the fact that girls have the highest prevalence of obesity.

In the present findings, 186 (62%) adolescents consumed three main meals a day. It is observed that girls had substantially lower propensity to have three main meals in a day as compared to boys. The behaviour behind not taking the main meals among adolescent girls is their ambition to be thin and the unhappy feeling about their weight (Chacko & Ganesan, 2018) the other possible reasons can be lack of interest in the diet, time or appetite (Schur, 2000).

It is observed in the present study that 244 (81.3%) adolescents had a propensity to skip meals and become prone to poor eating habits. Nearly 73% from the thin category and 56% from the overweight/obese category tends to skip one of their daily meals. This tendency among adolescents pushes them towards the double burden of malnutrition where the prevalence of underweight and prevalence of overweight/obesity among the adolescent population is increasing rapidly in India (Datta *et al.* 2019). According to Rodrigues *et al.* (2017) skipping meals is frequently linked to poor diet quality and a large intake of low nutritious foods. It was also recommended that regular meal habits among adolescents can help them to enhance the quality and pattern of diet intake.

It has been found that only 93 (31%) adolescents had the habit of consuming midmorning and evening snack daily. Reicks *et al.* (2015) found that mid morning and mid-evening healthy snacks bridged the nutritional gap. Benton & Jarvis (2007), also noted that adverse effects of low quantity and quality breakfast were reversed by mid morning snack intake.

As per the Comprehension National nutrition survey conducted by the Ministry of Health and Family Welfare of India in 2016-18 on 11,00,000 preschooler, school-age children and adolescents suggested that more than 80% of the study population consumed pulses in their weekly diet chart though the intake of meat/fish/egg consumption was less frequent. In the current study, we also discovered that 205 (68.3%) of the study participants included non-vegetarian and pulses in their daily diets. Additionally, the majority of the study's adolescents consumed pulses or non-vegetarian foods on a daily basis, regardless of their gender, adolescent stage, or BMI levels.

In the current study, 168 (56%) adolescents had a daily routine of consuming milk and milk products. The boys were substantially more likely than the girls to regularly consume milk and other dairy products. The habit of consuming milk or milk products differs noticeably between the adolescent age groups of 10–14 years (105) and 15–19 years (63) of age. The study results are also aligned with Rathi et al. (2017) where approximately 60 % of the respondents reported consuming milk or milk-related items. *Milk* and *milk* products are *rich in* protein and *calcium.* These 2 nutrients *have* been linked to *growth* status *in* adolescence.

In the present study, 126 (42%) consumed green leafy vegetables and 199 (66.3%) adolescents consumed fruits in their dietary pattern. Fruit and vegetable intake is an important part of a healthy diet and is associated with numerous positive health outcomes. These outcomes include reduced risk for chronic diseases and benefits to weight management.

According to Table 6, only 31.6% of adolescents under the thin BMI category included green leafy vegetables and 48.3% included fruits in their daily diet. The quantitative analysis of micronutrients was not carried out in our study. However, inadequate consumption provides indirect evidence of adolescent micronutrient deficiency. Meenakshi (2016) further asserted that the Indian population suffers from nutritional deficiencies due to a low intake of fruits and vegetables. The hidden hunger of micronutrient deficiencies among adolescents causes a kind of triple burden of malnutrition.

The present study found no discernible gender differences in junk food consumption. Compared to mid and late adolescents, early adolescents had a more regular practice of eating fast food and purchasing snacks from street shops. The dietary influences of parents on mid and late adolescents may be responsible for this change in behaviour (Reicks, 2015).

The percentage of overweight/obese adolescents was only 144 (48%) in the present study and out of them 138 (95.8%) adolescents were consuming junk foods and 134 (93.1%) bought eatables from street shops. Likewise, it is also evident from another study done in Maharashtra, that BMI was higher in the subjects who consumed junk food item more frequently (chincholikar & Sohani, 2016). Additionally, it is in line with the findings of Mohammadbeigi et al. (2018), who found that eating fast food is closely linked to weight increase and obesity. According to survey results of 1,999 secondary school students, 81.2% of those who consumed sweetened carbonated beverages were overweight or obese (Zalewska, 2007)

Limitations and Future Research Directions

The study was conducted among adolescents of Uttar Pradesh therefore the findings cannot be generalized to other geographical areas. The data on dietary habits was based on recall memory of the adolescents, so there may be recall bias. The quantitative measurements of the recommended portions of food groups were not recorded. Further studies can be designed to detect the clinical manifestation of micronutrient deficiency and socioeconomic status and its correlation with the consumption pattern of food items.

CONCLUSION

Consumption of junk foods and buying eatables from street shops were remarkably high in all the adolescents. Regardless of adequate knowledge on harmful consequences of junk foods, adolescents are consuming junk foods due to its easy availability and ready to use packaging. Female adolescents had a larger dietary gap than their male counterparts. The current study has found that adolescents' consumption of milk and milk products, green leafy vegetables, and fruits is considerably low. Low consumption of milk/milk products, green leafy vegetables and fruits among adolescents may lead to micronutrient deficiency.

Adolescents' dietary patterns suggest that the frequency of intake of fast foods is more than desired that needs to be curtailed. There is an urgent need to spread awareness among adolescents about adverse effects of junk food. Awareness about the consequences of faulty dietary habits must start during childhood and nutritional interventional programs should be designed based on the gap in the diet of adolescents. In schools, the awareness about healthy eating habits among adolescents should be encouraged to reduce the gap of nutrition in the daily diet. This kind of approach can be inculcated to increase the consumption of milk, green vegetables and fruits to minimise the micronutrient deficiency among the adolescents. There is a need for nutrition counselling to bridge the gap between knowledge and practice. Adolescents knew what is regular and good food but their practice showed that they did not follow the dietary pattern that they considered good because of the social factors on one side and less perceived importance of the regular and quality food on the other.

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A Comparative Study to assess the Body Mass Index among Working Women and Homemakers in Indore City Madhya Pradesh

Dipali Saxena[1], Manisha Trivedi[2]

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Abstract

Background and Aim: Women are the powerhouse of every household, filling many duties within the family. Lack of time and workload at workplace and home might have an impact on their health. They won't give proper attention to their diet and health. Therefore, present study was taken to assess the body mass index status of working women and homemakers in Indore city. Body Mass Index (BMI) is considered as a major determinant of health. Materials and ***Methods:*** A random sample of 150 women were chosen from Indore of age group between 25 - 35 years and comparison was done between these two groups. It is assumed that both study groups may have different job demands, resulting in various dietary choices. This can affect health status particularly in relation to obesity in women. Obesity, thyroid, diabetes, hypertension, and hormonal disorders were also identified as frequent concerns among Indore women. To collect data from the respondents, a self-administered questionnaire was created. ***Results:*** According to the findings of this study, the health condition of homemakers and working women differed substantially in terms of BMI. A BMI comparison revealed that most working women were overweight, whereas homemakers were normal weight. ***Conclusion:*** Conclusion were drawn healthier BMI, active lifestyle and better dietary habits were witnessed in homemakers as compared to working women.

Keywords: Body Mass Index; Health; Obesity; Working Etc.

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INTRODUCTION

Dietary habits are the key factor in maintaining good health. Numerous environmental factors, including age, schooling, employment, income level, family situation, and place of residence, have an impact on an individual's diet.[1] Due to their usual homemaking responsibilities, such as looking after children and maintaining the family diet, homemakers frequently don't have as much time as they'd like to take care of their health.[2]

The present scenario of Indian society has been changing due to women education. Women plays strong role in economic contribution in family. The health and employment status of a women are directly related to each other. Homemakers have a regular disciplined schedule for household work. They have more time to maintain their health along with maintaining familial dietary life and childcare. In other hand working women have double responsibilities so they won't be able to give so much time for their health. Regular consumption of high calorie, instant processed food leads to health-related problems. Imbalanced diet and sedimentary lifestyle have increase diseases like obesity and it causes many other health problems. The problem of obesity in working women is due to change in dietary intake and less physical activity. Obesity is caused because of genetic, social economic and environmental factors and various other factors including physique, physical form, and concept of health.[3]

Women's productivity and participation in economic system is adversely affected by malnutrition. The dual responsibility workload, poor nutritional status and due to culture of eating last leads to fatigue and results in depression, irritation and mood swing etc. To improve the quality of life it is necessary to maintain a good nutritional status which will increase the working capacity of women. The fundamental element which affects health maintenance is dietary life.[4] Various environmental factors such as age residence, education, job, economic level influence individual dietary life.[5,6]

Family health and the quality of life is centrally related to educational level, position, health and nutritional status. The health status and fitness level of each group of women differs in lifestyle and workload. Many recent studies have been conducted to evaluate familial dietary management, purchasing habits of food, preparation of side dishes, nutrition status, and food preferences, but studies on health status of homemakers and working women after childbirth are insufficient so far.[7,8] The main aim of the study to assess the body mass index among working women and homemakers in Indore city Madhya Pradesh.

MATERIAL & METHOD

A comparison between these two groups (homemakers and working women) was conducted using a random selection of 150 women in Indore who were between the ages of 25 and 35. There were categorized 75 homemakers and 75 working women. The subject's age was estimated to the closest whole figure. Google forms were used to gather information on the socio-demographic profile (type of work, family structure, age, educational level, family type, size, and anthropometric measurements like height and weight and medical history. To collect data from the respondents, a self-administered questionnaire was created. The questionnaire was distributed at different locationsof Indore between November 2021 and January 2022.

Body Mass Index (BMI): Body mass index (BMI) is a person's weight in kilograms divided by the square of height in meters. The number generated from this equation is then the individual's BMI number. The National Institute of Health (NIH) now uses BMI to define a person as underweight, normal weight, overweight, or obese instead of traditional height vs. weight charts.[9] BMI is an inexpensive and easy screening method for

Fig. 1: Diagrammatic representation of BMI Category

weight category underweight, healthy weight, overweight, and obesity. BMI appears to be as strongly correlated with various metabolic and disease outcome as are these more direct measures of body fatness. The BMI ranges are based on the effect excessive body fat has on disease and death and are reasonably well related to adiposity. BMI was developed as a risk indicator of disease; as BMI increases, so does the risk for some diseases. Some common conditions related to overweight, and obesity include premature death, cardiovascular diseases, high blood pressure, osteoarthritis, some cancers and diabetes.

Table 1: WHO Body mass index (BMI) Classification

Classification	BMI (kg/m²)	Risk of comorbidities
Underweight	<18.5	Low (but risk of other clinical problems increased)
Normal range	18.5-24.9	Average
Overweight (preobese)	25.0-29.9	Mildly increased
Obese	≥30.0	-
Class 1	30.0-34.9	Moderate
Class 11	35.0-39.9	Severe
Class 111	≥40.0	Very severe

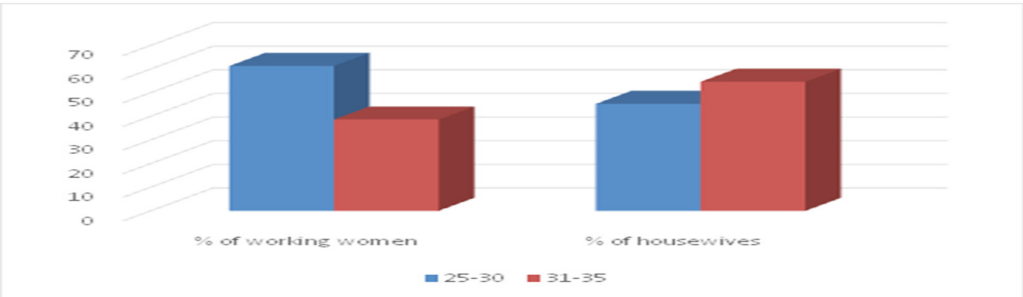
DATA ANALYSIS

Demographical data were calculated in percentage and for results of body mass index status data were statistically analyzed by chi-square by Statistical Package for Social Sciences (SPSS) program software. The **p-value** determines whether the relationship is significant. If the p-value is greater than 0.05, then the null hypothesis is retained: there is indeed no relationship between the two variables. Since no significant relationship exists between the variables, then no further interpretation is necessary. If the p-value is less than 0.05, then the null hypothesis is rejected, meaning that there is a significant relationship between the two variables.

OBSERVATIONS

Table 2: Age distribution of respondents

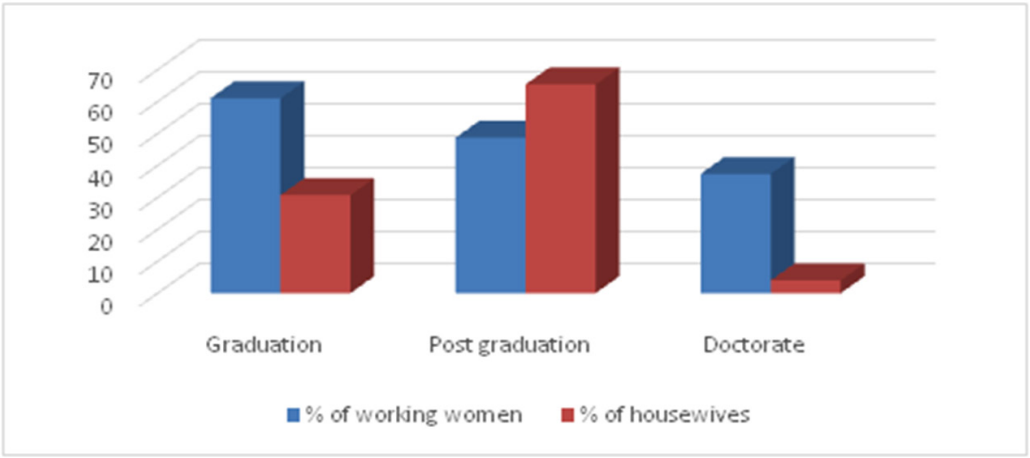
Age distribution	Number of working women	% of working women	Number of homemakers	% of homemakers
25-30	46	61.33	34	45.33
31-35	29	38.67	41	54.67
Total	75	100	75	100



Graph 1: Graphical representation of age distribution of respondents

Table 3: Education level of respondents

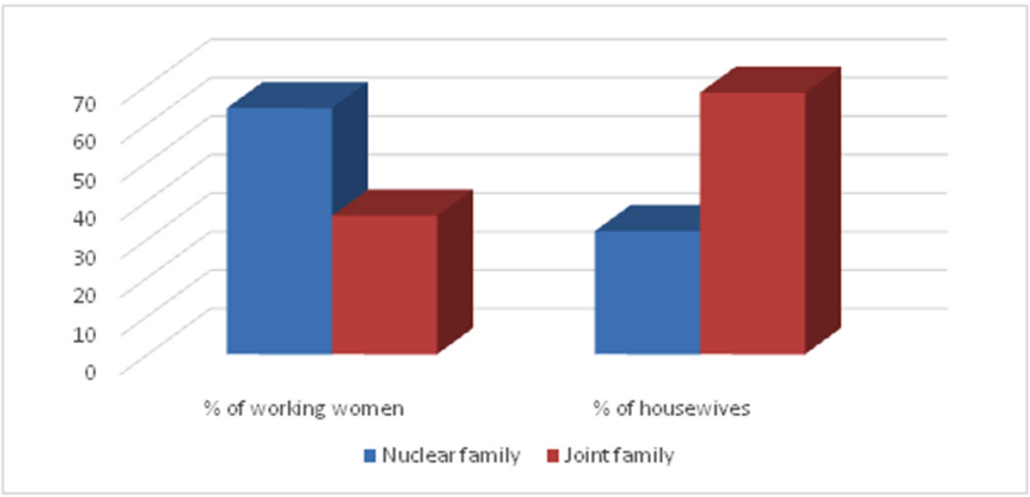
Education level	Number of working women	% of working women	Number of homemakers	% of homemakers	Total	%
Graduation	12	61	23	30.67	35	23.33
Post graduation	35	48.67	49	65.33	84	56
Doctorate	28	37.33	03	4	31	20.67
Total	75	100	75	100	150	100



Graph 2: Graphical representation of education level of subjects

Table 4: Family structure of subjects

Family structure	Number of working women	% of working women	Number of homemakers	% of homemakers
Nuclear family	48	64	24	32
Joint family	27	36	51	68
Total	75	100	75	100



Graph 3: Graphical representation of distribution of family structure of subjects

Table 5: Comparison of body mass index of the both the groups

BMI category	Number of working women	% of working women (%)	BMI category	Number of homemakers	% of homemakers	Total	%	P value
Underweight	5	6.66	Underweight	8	10.66	13	8.67	
Normal	35	46.66	Normal	44	58.66	79.0	52.67	
Pre- obese	24	32	Pre-obese	15	20	39.0	26	
Obese Class I	11	14.66	Obese Class I	4	5.33	15.0	10	P<0.05
Obese Class II	0	0	Obese Class II	4	5.33	4	2.67	
Obese Class III	0	0	Obese Class III	0	0	0	0	
Total	**75**	**100**	**Total**	**75**	**100**	**150**	**100**	

RESULTS AND DISCUSSION

The current study investigated body mass index (BMI) of working women and homemakers. We found that homemakers are more conscious than working women although working women have knowledge about healthy diet but because of workload of home and working place they are unable to take meal on time sometimes they skip the meal.

Table 2 shows the distribution of respondents according to age. In the 25–30 age group, forty-six respondents were working women, and 34 subjects were homemakers, whereas in the 31–35 age group, twenty-nine respondents were working women, and seventy-five respondents were homemakers. Table 3 shows the education level of respondents in total 175 respondents, 35 were graduated, 84 were postgraduate, and 31 had doctorate degrees, indicating that the highest percentage of postgraduate women were found in the Indore during the research.

Table 5 shows, that working women 14.66% were belongs to obese Class I category and 32% were belongs to pre obese category whereas inhomemakers only 5.33% were belongs to obese class I and only 20% were belongs to pre obese category. 58.66% homemakers were having normal BMI whereas 46.6% of working women are belongs to normal category (p>0.05) supported by Yunus *et al.*, 2004.[10]

This result shows that working women are more pronounced to obesity as compared to homemakers. It was found that overweight individual consumes more fried food then normal diet. Exercise along with balance diet is helping to maintain a healthy body composition. Taking an imbalanced diet may cause obesity and another medical problem like thyroid, Blood pressure and hormonal imbalance etc. There were certain limitations in the current study first the response rate is low. Women don't want to show age, medical problems. Second the study cannot be done with all the women of Indore City.

CONCLUSION

Food is necessity of life. Now a day's nutrition are the constituents of food which help us to maintain our body functions, to grow and protect our organs. Health means the well-being of an individual in physical, emotional, and social condition.Working women as well as homemakers both have a special position in society. If women have knowledge of nutrition than they can impart this knowledge very well to their family. Healthier BMI, active lifestyle and better dietary habits were witnessed in homemakers as compared to working women.

This study concludes that health status by body mass index of homemakers and working women has significantly differences between each other. It can be concluded that homemakers should choose their meal wisely and nutritional awareness program for healthy food choices need to be introduced in

the society. Self-assessment of diet quality was comparable as it was mentioned moderate by most of the participants, however more working females accepted that they need to improve their diet and would need expert advice.

Therefore, working women should choose their meal wisely while purchasing it from the market or should add some food item for fiber and calcium needs while replacing unhealthy item. It can be concluded that working women should choose their meal wisely and nutritional awareness program for healthy food choices need to be introduced in the society.

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Review Article

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The Impact of Therapeutic Counseling on Hospitalized Cancer Patients

Nilima Varma[1], Fehmida Hayat[2]

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Abstract

Cancer is a complex and challenging illness that not only affects the physical well-being of individuals but also takes a toll on their psychological and emotional health. Hospitalized cancer patients, in particular, face unique stressors associated with the illness, treatment protocols, and the uncertainty of their prognosis. Recognizing the importance of addressing the holistic needs of cancer patients, therapeutic counseling has emerged as a valuable intervention in the healthcare setting. This literature review aims to explore existing research on the effects of therapeutic counseling on the well-being of hospitalized cancer patients. This article is a narrative review and the included article was retrieved from electronic data hubs: NCBI liberty only; Google scholar; ResearchGate and PubMed, published in previous 10 years in the English language only and synthesized by thematic analysis mathod. literature supporting the positive effects of therapeutic counseling on the psychological well-being and overall quality of life of hospitalized cancer patients. However, further research is needed to explore the optimal timing, frequency, and specific modalities of counseling interventions to maximize their benefits. Understanding the nuances of therapeutic counseling in the context of cancer care is crucial for healthcare professionals to provide comprehensive support for patients facing the complex challenges of cancer and hospitalization.

Keyword: Therapeutic; Counseling; Hospitalized; Cancer and diet; Patients; Counseling impact.

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INTRODUCTION

Cancer is a global health challenge that affects millions of people across the world. It is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells, often leading to the formation of tumors. The impact of cancer is profound, affecting individuals, families, and communities. In 2020, there were an estimated 19.3 million new cancer cases and almost 10 million cancer related deaths worldwide, according to the International Agency for Research on Cancer (IARC), a part of the WHO.[1]

The most common types of cancer globally include lung, breast, colorectal, stomach, and liver cancers. However, the prevalence of specific types can vary by region and population. The burden of cancer is not evenly distributed globally.[2] High-income countries generally report higher incidence rates, but certain cancers are more prevalent in specific regions. For example, liver cancer is more common in some parts of Asia, while lung cancer rates are higher in parts of Eastern Europe. Lifestyle factors, such as tobacco use, unhealthy diets, lack of physical activity, and exposure to environmental carcinogens, contribute significantly to the global cancer burden. Efforts to reduce the impact of cancer include prevention strategies, early detection through screening programs, and advancements in cancer treatment modalities.[3]

Therapeutic Counseling: Therapeutic counseling, often referred to as psychotherapy or counseling, is a professional and collaborative process that involves a trained therapist or counselor working with an individual, couple, family, or group to address and explore emotional, psychological, or behavioral challenges. The primary goal of therapeutic counseling is to improve well-being, alleviate distress, and enhance overall mental health.[4]Key Features of Therapeutic Counselingare:

Client-Centered Approach: Therapeutic counseling is centered around the individual's needs, experiences, and perspectives. The client actively participates in the therapeutic process, and the counselor creates a supportive and non-judgmental environment.[5]

Confidentiality and Trust: Confidentiality is a fundamental principle in therapeutic counseling. Clients can openly discuss their thoughts and feelings in a safe and confidential space, fostering trust between the client and counselor.[6]

Various Therapeutic Modalities: Therapeutic counseling encompasses a wide range of modalities and approaches, such as cognitive-behavioral therapy (CBT), psychodynamic therapy, humanistic therapy, and others. The choice of modality depends on the individual's needs and the counselor's expertise.[7]

Exploration and Insight: The counselor assists clients in exploring their emotions, thoughts, and behaviors. Through this exploration, clients gain insights into patterns, coping mechanisms, and underlying issues contributing to their challenges.[8]

Goal-Oriented and Solution Focused: Therapeutic counseling often involves setting goals and working collaboratively toward positive outcomes. In some cases, the focus is on problem-solving and developing practical strategies for managing difficulties.[6]

Crisis Intervention and Support: Therapeutic counseling is valuable during times of crisis or significant life changes. Counselors provide support, coping strategies, and a space to process emotions during challenging periods.[7]

Emotional Regulation and Coping Skills: Clients learn and practice emotional regulation and coping skills to manage stress, anxiety, and other emotional challenges. The acquisition of these skills can contribute to long-term well-being.[6] Culturally sensitive counseling acknowledges and respects the diversity of clients. Effective counselors are attuned to cultural differences, ensuring that interventions are relevant and respectful of individual backgrounds. Therapeutic counseling encourages self-reflection, helping clients gain a deeper understanding of themselves, their relationships, and their life circumstances. This increased self-awareness can lead to positive personal growth.[6]

Therapeutic counseling involves continuous assessment of progress and adjustments to the therapeutic approach as needed. This ensures that the counseling process remains tailored to the evolving needs of the client.[8]Therapeutic counseling is utilized for a wide range of concerns, including mental health disorders, relationship issues, grief and loss, stress management, and personal development. It is provided by licensed and trained professionals, such as psychologists, counselors, social workers, or psychiatrists, who adhere to ethical standards and codes of conduct in their practice.

METHOD AND MATERIAL

This article is a narrative review and the included article was retrieved from electronic data hubs: NCBI liberty only; Google scholar; ResearchGate and Pubmed, published in previous 10 years in the English language only. Literature is synthesized thematically by theamatic analysis methods.

RESULT AND DISCUSSION

Globally, cancer stands as a significant contributor to mortality and morbidity, causing approximately 8.8 million deaths in 2015. According to the World Health Organization (WHO), 70% of cancer related deaths are observed in low and middle-income countries.[1] While conventional cancer treatments such as chemotherapy and radiotherapy contribute to enhanced survival rates among patients, they are concurrently associated with severe side effects and detrimental impacts on their Quality of Life (QOL). In the realm of cancer patient care, it is imperative not only to reduce mortality rates, prevent cancer recurrence, and address complications experienced by caregivers but also to enhance the overall QOL of cancer patients.[9]

QOL is defined as an individual's perception of their well-being, encompassing various facets of functioning, including psychological, physical, cognitive, and social aspects. Recently, QOL has emerged as a primary endpoint for evaluating the standard of care and management in oncology medicine, demonstrating its significance as a crucial predictor of survival in global studies, including those conducted in Scotland, Malaysia, and China. Consequently, physicians must take into account the QOL of cancer patients before initiating treatment.[10]

The provision of chemotherapy counseling to patients before commencing treatment is pivotal and yields a positive impact on the QOL of cancer patients. Counseling equips patients with knowledge about the treatment process, and potential side effects, and aids in alleviating distress associated with chemotherapy. Presently, the role of pharmacists is evolving from traditional drug services to more patient-centric services, including providing information on chemotherapy regimens and potential side effects for cancer patients. A note worthy development in Malaysia occurred in 2021 with the publication of "Managing Patients on Chemotherapy" (MPCH), the first book of its kind in the country, focusing on counseling cancer patients undergoing chemotherapy through pharmacists.[1]

Building upon the insights gained from a preliminary study, we have designed a randomized controlled trial to implement and evaluate the efficacy of chemotherapy counseling by pharmacists, based on the principles outlined in the MPCH book, on the QOL of cancer patients. This trial will be conducted in selected public hospitals in Peninsular Malaysia.[11]

Approaches for cancer management

Numerous studies have investigated the role of psycho-oncology interventions in improving the mental health of cancer patients. Therapeutic counseling, as a key component of these interventions, has been shown to mitigate symptoms of anxiety and depression in hospitalized cancer patients.[12]

Several studies have explored the impact of therapeutic counseling on the overall quality of life of cancer patients. Posluns et al. 2020, found that patients who received counseling reported higher levels of life satisfaction and improved relationships with their families and caregivers.[11]

Integrative care, combining medical treatment with psychosocial support, has gained recognition in cancer care. Therapeutic counseling as part of integrative care has shown promising results in enhancing patients' ability to cope with the challenges of their illness and treatment.[10]

Studies utilizing patient reported outcomes consistently highlight the positive impact of therapeutic counseling. Patients often report decreased distress, increased self-efficacy, and a better sense of control over their lives following counseling sessions.[13]

Hospital settings provide a unique opportunity for the implementation of counseling programs tailored to the needs of cancer patients. Demonstrated that a structured counseling program within a hospital significantly improved patients' coping mechanisms and emotional well-being during their hospitalization.[14]

Hospital Based Counseling Programs

Patients grappling with medical conditions often experience emotional distress, anxiety, and uncertainty about their health. Recognizing the profound interplay between mental and physical well-being, healthcare providers have increasingly embraced the integration of counseling services within hospital settings. This holistic approach acknowledges that patient recovery is not solely contingent on medical treatments but also on addressing the psychological aspects of illness.[13]

Hospital based counseling programs encompass a range of therapeutic interventions tailored to the unique needs of patients. These may include individual counseling, group therapy, family sessions, and psychoeducational programs. Such programs are designed to offer emotional support, coping strategies, and a safe space for patients to express their concerns and fears.

Benefits of Hospital Based Counseling Programs

Emotional Well-Being: Studies have shown that hospital-based counseling contributes significantly to improving patients' emotional well-being, and reducing symptoms of anxiety and depression.

Enhanced Coping Mechanisms: Counseling equips patients with effective coping mechanisms, fostering resilience in the face of medical challenges.

Improved Treatment Adherence: Patients engaged in counseling programs exhibit better adherence to medical

treatments, potentially leading to improved health outcomes.

In response to the growing recognition of mental health's integral role in overall well-being, hospitals are increasingly integrating counseling services into their standard care protocols. This shift reflects a broader understanding that effective healthcare extends beyond the alleviation of physical symptoms to encompass the psychological and emotional aspects of healing.[14]

Nutrition related chronic diseases, including cancer, diabetes mellitus, chronic kidney disease, and inflammatory bowel disease, significantly impact overall health and healthcare systems by affecting digestion and food absorption. Given that dietary modifications can influence biomarkers of non-communicable diseases and alleviate symptoms of various clinical conditions, nutritional counseling is acknowledged as a primary approach for managing these health issues.[15] Additionally, it is recommended as a crucial intervention in addressing malnutrition in older adults[16] and has demonstrated efficacy in conditions such as chronic kidney disease and cancer.[17]

Nutritional counseling involves a collaborative process where a patient and a member of the medical team analyze nutritional assessments, identify nutritional problems and goals, discuss strategies to meet these goals, and agree on monitoring frequency and future steps. Its focus is on helping patients comprehend the impact of nutrition on health and implementing practical measures to meet nutritional needs, emphasizing behavioral change.[18] However, it may pose a time burden for patients, leading to high drop-out rates, and face-to-face counseling can strain clinic resources in terms of space and facilities. The emergence of e-counseling technology aims to address these challenges and broaden access for patients.[19,20]

The enhanced emotional and mental wellness, coupled with an additional 48 minutes of nightly sleep, offers proof of the positive impact experienced by patients and their families engaging in counseling services. It is recommended that nurses and various professionals within the multidisciplinary team actively initiate conversations about supportive therapies with individuals affected by cancer at any point in the cancer journey, irrespective of social standing, gender, or the specific type of cancer.[20]

Nutrition counselors are typically nutritionists or dietitians, although other healthcare professionals, such as nurses, community health workers, or volunteers, play crucial roles in nutritional counseling. While the role of nurses is recognized in nutrition screening, there is limited evidence regarding their impact or effectiveness in nutrition counseling. Nevertheless, as integral members of the patient care team, nurses are positioned to facilitate positive behavior changes, enhancing the overall effectiveness of nutritional interventions.

The investigation done by Yan et al. (2023), systematically assesses the effects of personalized dietary counseling, tailored to individual calorie and protein requirements, in comparison to standard discharge counseling follow-up. The study aimed to examine the influence of these interventions on nutritional outcomes, the 90-day readmission rate, and the quality of life among patients post-gastric cancer surgery. The result showed a significant positive impact on cancer patient management.[21]

According to Jodkiewicz et al. (2022), a total of 105 assessable patients, 57 were randomized to receive nutritional counseling, and 48 to receive no nutritional counseling and consumption of an ad-lib oral intake. The intervention group was counseled to achieve a daily energy and protein intake according to recommended dietary allowances. Counseling was standardized and performed by a trained dietitian and took place twice monthly for 5 months from the start of chemotherapy.[22] The result of the study showed that therapeutic counseling led to an insignificant in the management of cancer.

CONCLUSION

Addressing the global impact of cancer requires a comprehensive and collaborative approach involving healthcare professionals, researchers, policymakers, and the broader community. By continuing to invest in research, prevention strategies, and accessible and equitable healthcare, the world can make strides in reducing the burden of cancer and improving outcomes for individuals affected by this complex disease. Hospital-based counseling programs play a crucial role in enhancing patient well-being by addressing the psychosocial dimensions of illness. As healthcare continues to evolve towards a patient-centered model, the integration of counseling services within hospitals exemplifies a commitment to comprehensive care that recognizes the interconnectedness of physical and mental health. While the positive impact of hospital-based counseling programs is evident, challenges such as resource allocation, stigma reduction, and the need for specialized training for healthcare professionals remain. Future research should explore innovative models of integrating counseling services seamlessly into the fabric of healthcare delivery.

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Case Report

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Goat Milk: A Boon for Human Health

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Abstract

Goat milk from different European breeds is less fattened in the tropics than it is in temperate regions. Compared to other breeds, dwarf goat milk contains more fat, protein, and lactose. The five primary proteins in goat milk, α-lactalbumin, β-lactoglobulin, κ-casein, β-casein, and α 2-casein, have homolog's that resemble cow equivalents quite a little. Goat milk lacks bovine βs1-casein, the protein most commonly present in cow's milk. Compared to bovine micelles, goat milk caseinate micelles lose β-casein more quickly and are less solvated and heat stable. They also contain increased inorganic phosphorus and calcium. Goat milk contains less orotic acid and N-acetyl neuraminic acid, folate, vitamin B6, and vitamin B12 than cow milk. It also has higher potassium and chloride levels. Three fatty acids capric, caprylic, and caproic have potent therapeutic effects that can help patients with a variety of ailments. Goat milk is good for preventing allergies, cancer, heart disease, and microbes. As the best source of nutrients in a well-balanced ratio, milk also helps the body through a variety of beneficial biological functions that enhance the digestive system, metabolic processes related to ingested nutrients, organ development, growth, and resistance to illness. Higher concentrations of selenium found in goat milk help regenerate blood platelets in patients with dengue illness. Goats are regarded as the poor man's animal and are thought to be the earliest domesticated animals. They were raised for their meat and milk. The closest thing in nature to the ideal diet is goat milk. It was once used to strengthen immunity. Fermented goat milk products containing live probiotic cells have a promising future in terms of their nutritional and therapeutic properties. Due to the presence of tiny lipid globules, goat milk is recognized for having superior digestion when compared to cow milk. Goat milk's ability to prevent cancer is attributed to its poly-unsaturated fatty acids (PUFA).

Keyword: Nutritional value; Medicinal characteristics; Therapeutic properties; Goat milk and PUFA.

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INTRODUCTION

According to Park and Heinlein (2006), goats are an essential part of the livestock sector and the socioeconomic structure of the rural poor. This type of business usually sells its goat's milk as whole or processed into cheese, dry milk products, or evaporated milk. The parameters influencing the nutritional value and composition of caprine

milk are important to know because of the growing interest in this product. It is also beneficial to compare the milk from goats and cows and make any notes about advantages or drawbacks that may arise from the variations that are discovered. Human milk's composition places it within the biological range of what babies should eat. A significant portion of its chemical makeup protects against food poisoning, inflammation, and infection while also supplying nutrients, facilitating digestion, and supporting the growth of organs. Nonetheless, time restraints, medical issues, and urbanization could lead to an early end to breastfeeding. During the COVID-19 epidemic, even the Indian government's national guidelines advised against breastfeeding because it is extremely risky and may not be feasible if a person is isolated (Chawla *et. al.* 2020). Goat milk has additional benefits for cancer patients. Goat milk contains oligosaccharides that function as prebiotics and have immunomodulatory qualities that shield the body from dangerous and lethal germs (Peng *et. al.* 2020).

COMPOSITION OF MILK

The different compositions of goat, cow, and human milks are listed in Table 1 (Park *et al.,* 2007). These compositions vary depending on factors such as diet, breed, individuals, parity, season, feeding, management, environmental conditions, locality, lactation stage, and udder health (Park *et al*., 2007; Park, 2006). Since milk is a mammal's first food, it supplies nearly all of the energy and nutrition needed for a newborn to grow, function, and develop normally. All mammals, with the exception of humans, cease to consume milk following the weaning stage. Goat milk has a rather strong taste because it contains short-chain fatty acids, and it is white because beta carotene is converted to vitamin A in full. (2019 Yakan *et. al.;* 2019 Ranadheera *et. al.*).In tropical climates, goat milk is said to have more fat and ash than cow milk, even though the fat content of Holstein cow milk is comparable to Swiss goat milk. Goat milk from French-Alpine and Anglo-Nubian strains had lower amounts of Na and S and greater levels of Ca, P, K, Mg, and Cl than bovine milk. A great substitute for cow's milk is goat milk.

(Source: Lima *et. al*. 2018)

Fat

It has been shown that goat milk fat is more readily absorbed and digested than cow milk fat because MCFA, or medium-chain fatty acids, is easier to break down due to its low molecular weight, the activity of digestive enzymes, and its water solubility (Gallier *et. al.* 2020). Because longer chain fatty acids and medium-chain triglycerides (MCTs) have a special metabolic ability to provide direct energy without depositing in adipose tissues, goat milk has found widespread use in clinical treatment for conditions like infant malnutrition, intestinal rectification, hyperlipo-proteinemia, cystic fibrosis, epilepsy, gallstones, and coronary disease (Prosser, 2021; Mehra *et. al.,* 2021).The major difference between cow and goat milk lies in their calcium content (Mehra *et. al*. 2021). 122 mg/100g Ca is found in cow milk while a higher amount i.e., 134 mg/100g Ca is found in

Table 1: Standard composition of different milks (average values per 100 grams)

Gross	Goat	Cow	Human
Total solids (g)	12.2	12.3	12.3
Fat	4.0-4.5	3.8	4.1
Protein %	3.2	3.3	1.3
Lactose %	4.6	4.7	7.2
Ash (g)	0.8	0.7	0.2
Water %	87.5	87.7	86.7
Energy (K.cal)	70	69	68

Minerals (mg/100gm)			
K	180	150	58
Ca	129	120	34
P	106	95	14
Cl	130	95	42
Vitamins (per 100g)			
Vitamin A(IU)	185	126	241
Folic acid (mg/ L)	6	50	56

goat milk. In the context of mineral bioavailability, goat milk is highly preferred over cow milk (Mehra *et. al*. 2021c)

Like cow milk, goat milk caseins have the same four species of S1, S2, beta and kappa but in different proportions (Table 2). It has been reported that beta casein is the major component of goat milk casein, whereas, S1 is the major component of cow milk casein. Level of S2 casein is relatively higher in goat milk but total of S1 and S2 casein fractions together are lower than S1 fraction alone of cow milk. A unique feature of goat milk is the higher content in CN with respect to s1-CN than in bovine milk, as well as the minor solvation and heat stability of caseinate micelles (Haenlein, 2004; Albenzo *et a*l., 2006)

Table 2: Comparison of proteins of goat and cow milk

Protein Concentration (%)	Goat milk	Cow milk
Total Casein	233-46.3	24.6-28
α-S1 Casien	0-13.0	8-10.7
α-S2 Casien	2.3-11.6	2.8-3.4
β-Lactoglobulin	1.5-5.0	3.2-3.3
α-Lactalbumin	0.7-2.3	1.2-1.3
Immunoglobulins	4.6 -21.4	10..0-25.7

(Source: Roy *et al*. 2020)

Nutritional and therapeutic values of goat milk

Digestibility:

Goat milk has greater digestibility, alkalinity, buffering capacity, and some therapeutic qualities in human nutrition and medicine compared to cow or human milk**.**

Cardiovascular diseases:

The leading cause of death in developed nations is cardiovascular disease, or CVD. Numerous conditions affecting the heart and blood vessels are included in it, such as atherosclerosis, high blood pressure, arrhythmia, and coronary heart disease. Atherosclerotic plaque accumulation in blood vessels, which ultimately results in a cardiovascular event, is the primary cause of CVD.

Effect against cancer:

Goat milk contains a lot of conjugated linoleic acid (CLA) (Jirillo *et. al.,* 2010). In vitro models of human melanoma, colorectal (Palombo *et. al.*, 2002), and breast cancer have all been shown to benefit from CLA's anti-carcinogenic qualities against colon and mammary cancer in animal models.

Reduction of lactose intolerance:

Lactose is present in goat, cow, and human milk. Even so, a large number of lactose intolerant individuals can consume goat milk. One theory suggests that goat milk's greater digestion is the cause. According to Haenlein (2004) and Lopez-Aliaga *et. al.* (2010), goat milk is more easily and thoroughly absorbed than cow milk, leaving less undigested residue in the colon to ferment and result in the painful symptoms of lactose intolerance.

Therapeutic value of goat milk:

Lactic acid bacteria are often used as probiotic starter culture and health effects from these associated with increased lactose intolerance, a well balanced intestinal micro flora, antimicrobial activity, stimulation of the immune system and anti-tumoural, anti cholesterolaemic and anti-oxidative properties in human subjects (Slacanac *et. al*., 2010). From a medicinal perspective, people favor goat milk since it has numerous therapeutic benefits, lower risk of allergy, is easily digested,

and functions as a buffer. Because of this, it can also be recommended for infants because it is easily digested and has a composition comparable to that of human milk (Lund *et al*. 2021; Risko and Csapo *et. al.* 2019).

SUMMARY

A fair survey has been conducted on the nutritional value and potential health consequences of goat milk, which makes it distinctive. Goat milk's typical chemical makeup is not all that different from cow milk's. Research is needed to determine how to lessen the **"goaty flavor"** of goat milk, which is caused by chemical or genetic alteration and lowers its acceptability. Goat milk's higher digestibility, appropriate fatty acid composition, and bioactive component concentration appear to provide benefits for the treatment or prevention of specific medical disorders.

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