

Convenience Food Consumption and BMI: A Comparative Study Among Millennials in Dehradun and Haridwar

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Abstract: Millennials' dietary habits have changed significantly due to urbanization, lifestyle changes, and the proliferation of convenience foods. This study examines the relationship between convenience food consumption and Body Mass Index (BMI) among millennials in Dehradun and Haridwar, focusing on city-wise and age-wise comparisons. A sample of 400 respondents (200 from each city) was analysed using a structured questionnaire. The BMI data was categorized into underweight, normal weight, overweight, and obese, and statistical analyses, including chi-square tests and correlation analysis, were applied. The findings reveal that millennials in Haridwar have a higher BMI on average than those in Dehradun, with significant differences in the normal-weight and obese categories. Young millennials (23-32 years) show a stronger correlation between convenience food consumption and BMI than older millennials (33-42 years), indicating a growing risk of obesity in younger generations. The chi-square test results highlight significant city-wise differences in BMI, whereas age-wise differences are less pronounced. According to the study, convenience food is an important contributor to rising BMI, and the main causes of its high consumption are time constraints, aggressive promotion, and ease of access. This study adds to the expanding body of research on the dietary patterns and health hazards of millennials, highlighting the necessity of focused public health initiatives, education campaigns, and policy measures to support a healthy diet. To reduce the rising prevalence of obesity among millennials in urban and semi-urban settings, future research can examine longitudinal trends and behavioural treatments.

Keywords: Convenience food, BMI, millennials, Dehradun, Haridwar, dietary habits, obesity, nutrition

1. Introduction

Dietary habits have changed dramatically in the twenty-first century, especially among millennials. Convenience food consumption is now a necessary component of modern living due to factors like growing urbanization, shifting work schedules, and the emergence of digital food culture. Although convenience meals are convenient and easily accessible, their high-calorie density, high levels of sugar, salt, and bad fat have sparked worries about their potential effects on general health. Their association with Body Mass Index (BMI), a commonly utilized measure of nutritional status and health hazards, is among the most notable issues.

Overweight and obesity have become more common in India in recent decades. According to the National Family Health Survey (NFHS-5), obesity rates have gone up in both urban and rural areas, with millennials living in cities being especially at risk because of their sedentary lifestyles and changing eating habits. Millennials, who were born between 1981 and 2000, are a generation who grew up in a world where fast food and processed foods are more accessible than ever. This study aims to examine the effects of convenience food intake on BMI among millennials in Dehradun and Haridwar, two Uttarakhand cities with different sociocultural origins.

Dehradun, the capital of Uttarakhand, is an educational and commercial hub with a rapidly growing urban infrastructure. The city's millennials are highly exposed to fast-food culture due to the presence of multinational food chains, restaurants, and food delivery services. In contrast, Haridwar, a religious

and pilgrimage city, has traditionally emphasized simple, vegetarian diets rooted in cultural and spiritual beliefs. However, even Haridwar has seen an influx of convenience food due to globalization and changing consumer preferences.

This study investigates whether there is a significant difference in BMI among millennials in these two cities based on their consumption of convenience food. The research further examines whether age-related variations within millennials (23-32 years vs. 33-42 years) influence BMI patterns. By analysing the BMI of 400 respondents (200 from each city), this study aims to provide a comparative perspective on dietary habits and their impact on health risks.

1.1 Objectives of the Study

- 1) To analyse the relationship between convenience food consumption and BMI among millennials in Dehradun and Haridwar.
- 2) To compare the BMI distribution across the underweight, normal weight, overweight, and obese categories.
- 3) To determine which city's millennials are at higher risk of obesity-related health issues.
- 4) To identify generational differences in dietary behaviour within the millennial group (23-32 years vs. 33-42 years).

1.2 Significance of the Study

The findings of this study will help us to better understand how dietary patterns in the modern world affect health consequences. Through a comparison of two demographically different locations, the study will provide

insight into how urbanization, food accessibility, and cultural elements influence millennial eating patterns. Health policymakers, dietitians, and public health experts can use this information to create focused initiatives focused on lowering obesity and encouraging millennials to eat healthily.

2. Literature Review

2.1 Convenience Food Consumption and Its Impact on BMI

Numerous studies have examined the connection between BMI and convenience food use, and the results show a substantial link between higher obesity rates and frequent consumption of processed foods.

Fraser et al. (2012) evaluated the association between the availability of fast food and the prevalence of childhood obesity in the United Kingdom through a spatial study. According to the study, teenagers who lived in neighbourhoods with more fast-food restaurants had a BMI that was 28% higher than that of those who lived in regions with fewer restaurants. Additionally, neighbourhoods with greater access to fast food had a 21% higher rate of obesity. According to the study's findings, the accessibility and close proximity greatly increase the risk of obesity and BMI.

Bowman et al. (2004) examined how fast-food consumption affected American adults' calorie intake and body mass index. According to the study, those who ate fast food consumed 187 more calories per day than those who did not. Additionally, people who ate fast food frequently were more likely to be obese (BMI > 30). The study made clear that frequent intake of convenience foods is associated with a worse quality diet and a higher risk of obesity.

2.2 Fast Food Accessibility and Urbanization

Food accessibility and availability are important determinants of dietary patterns.

Burgoine et al. (2014) looked into the relationship between body weight and exposure to takeaway restaurants in Cambridgeshire, UK. After analysing data from 5,442 participants, the study discovered that those who were most exposed to fast-food restaurants had a BMI that was 1.21 kg/m² greater than those who were least exposed. Additionally, compared to rural areas, fast-food consumption was 27% more common in metropolitan areas. The study concluded that fast food accessibility and urbanization are major factors in increased BMI.

Colozza et al. (2023) investigated how food habits are affected by urbanization. Utilizing information from the Indonesia Family Life Survey, which covered more than 30,000 people in many waves between 2000 and 2015, the researchers discovered that urbanization had a big impact on dietary preferences. According to the study, people who moved from rural to urban regions consumed 15% fewer vegetables and 20% more fast food. The increased availability and accessibility of fast food in cities, as well as the lifestyle changes brought about by city living, were blamed for this nutritional shift. The study emphasized how urbanization

raised the risk of obesity and diet-related disorders by promoting less healthful eating habits that were marked by increased consumption of processed and high-calorie foods. The results highlighted the necessity of public health measures to mitigate the adverse nutritional effects of urban growth.

2.3 Age and Generational Differences in BMI Patterns

Research suggests that weight growth may be influenced by age-related metabolic changes, even within the same generation.

Ogden et al. (2012) examined BMI trends in the US population across various age categories. Based on data from 2009–2010, the study found that as people aged, the prevalence of obesity rose. The prevalence of obesity among individuals aged 20–39 years was 32.6%, whereas the prevalence among adults aged 40–59 years was 36.6%. The study found that older persons had a higher BMI than younger adults, indicating a definite generational trend.

Gordon-Larsen et al. (2010) carried out longitudinal research on trends in BMI from adolescence to adulthood in the United States. Over the course of 13 years, the study monitored 14,000 participants and discovered that as participants transitioned from youth (ages 12–18) to adulthood (ages 25–32), their BMI increased by an average of 6.4 kg/m². The study found that BMI variances among age groups were influenced by generational disparities in eating habits, physical activity, and lifestyle choices.

2.4 The Role of Social and Economic Factors

Factors like money, education, and nutrition awareness have a big impact on dietary choices. According to research, those who earn more money typically spend more on convenience foods because of things like rigorous work schedules and the perceived worth of time-saving options.

USDA Economic Research Service (2018) conducted an extensive study on the relationship between income levels and convenience food expenditure in the United States. Data from 4,826 families in the National Household Food Acquisition and Purchase Survey (FoodAPS) were analysed for the study. According to the research, convenience foods, such as prepared meals, frozen foods, and dining out, accounted for a bigger share of the food budgets of higher-income households. The preference for time-saving food options was also reflected in the 2.5 times higher weekly frequency of dining out among higher-income groups. The study found that the use of convenience foods is highly influenced by time limitations linked to higher-paying jobs and more disposable income.

Jabs and Devine (2006) conducted a qualitative study investigating the impact of time scarcity on food choices across different socio-economic groups. Forty working adults participated in in-depth interviews for the study. The findings showed that people with greater incomes were more likely to buy convenience foods because of their hectic work schedules. Households making over \$75,000 a year spent 35% more on convenience food than middle- and low-income

groups, and 72% of those with higher incomes said they usually bought ready-to-eat meals and takeout because they don't have enough time. The study underlined that higher earnings prioritize convenience over home cooking, highlighting the significant influence of time opportunity cost on food choices.

3. Methodology

3.1 Research Design

The research design for this study follows a descriptive approach based on primary data collection. This study is quantitative and cross-sectional.

3.2 Sample Selection

- **Sample Size:** 400 millennials (200 from Dehradun, 200 from Haridwar)
- **Age Groups:** 23-32 years (Young Millennials) and 33-42 years (Old Millennials)
- **Sampling Technique:** Quota sampling

3.3 Data Collection

A structured questionnaire was used to collect data on:

- 1) Frequency of convenience food consumption
- 2) Dietary habits and lifestyle
- 3) Self-reported weight and height (to calculate BMI)

3.4 BMI Classification

Based on WHO guidelines, BMI was classified as:

- Underweight: <18.5
- Normal weight: $18.5-24.9$
- Overweight: $25-29.9$
- Obese: ≥ 30

3.5 Data Analysis

Statistical analysis was performed using:

- Mean BMI comparison between Dehradun and Haridwar
- Chi-square tests to determine significant differences
- Correlation analysis between convenience food consumption and BMI

4. Results and Discussion

4.1 BMI Comparison Between Dehradun and Haridwar

Table 1: BMI (Dehradun vs Haridwar millennials)

BMI Category	Dehradun (Avg. BMI)	Haridwar (Avg. BMI)
Underweight	17.36	17.63
Normal Weight	21.64	22.64
Overweight	27.31	27.16
Obese	30.60	31.32

The data suggests that millennials in Haridwar have a slightly higher average BMI across all categories except overweight, where Dehradun scores marginally higher. The obesity rate in Haridwar is also higher, indicating a potential risk for lifestyle-related health disorders.

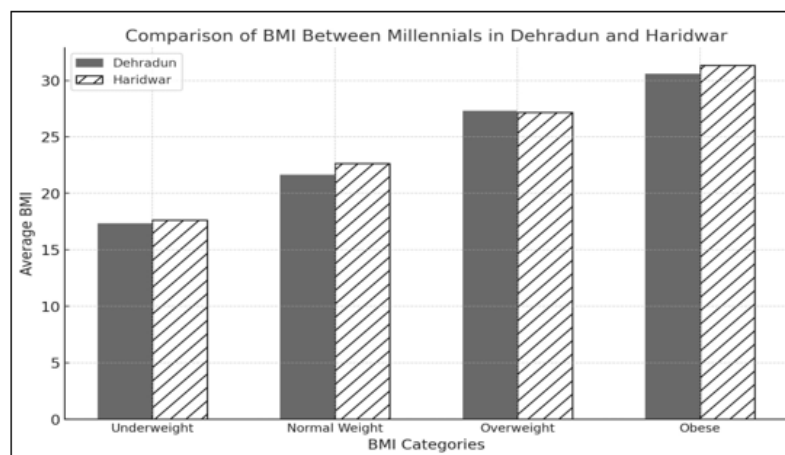


Figure 1: BMI (Dehradun vs Haridwar millennials)

Statistical Analysis:

a) Chi-Square Test (Dehradun vs. Haridwar):

- The significant p-values suggest that there is a statistical difference in BMI categories between the two cities.
- Higher normal-weight and obese BMI levels in Haridwar indicate that millennials there are at higher risk of weight-related health issues.

b) Correlation Between Convenience Food and BMI:

- A positive correlation exists between the consumption of convenience food and BMI in both cities.

- Millennials who frequently consume convenience food have a higher BMI, particularly in the overweight and obese categories.

4.2 Age-Wise BMI Trends: Young vs. Old Millennials

Table 2: BMI (Young vs. Old Millennials)

BMI Category	Young Millennials (Avg. BMI)	Old Millennials (Avg. BMI)
Underweight	17.42	17.58
Normal Weight	21.82	22.23
Overweight	27.12	27.15
Obese	31.08	31.00

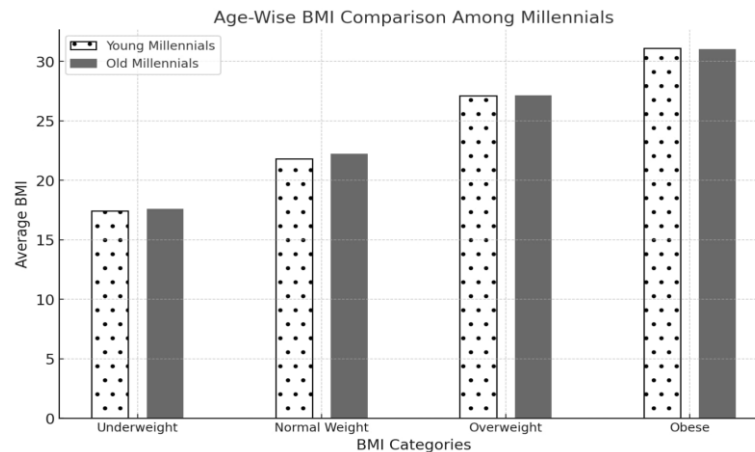


Figure 2: BMI (Young vs. Old Millennials)

Older millennials show a slight increase in BMI, which could be attributed to decreased physical activity and metabolic changes with age.

Statistical Analysis:

a) Chi-Square Test (Young vs. Old Millennials):

- The p-values suggest that there is no major significant difference in BMI between young and old millennials for most categories.
- However, the normal weight and overweight categories show some variation, meaning that as millennials age, they tend to move towards the overweight category.

b) Correlation Between Convenience Food and BMI (Age-Wise):

- Young millennials show a stronger correlation between BMI and convenience food consumption than older millennials.
- This suggests that younger individuals are more influenced by convenience food marketing and availability, leading to higher obesity risks in the future.

5. Conclusion and Recommendations

This study highlights that convenience food consumption significantly affects BMI among millennials in Dehradun and Haridwar. While Dehradun millennials show higher overweight trends, Haridwar millennials have a higher obesity rate. These findings suggest that urbanization and changing dietary habits contribute to rising BMI levels.

5.1 Recommendations Based on the Findings

Based on the analysis of BMI trends among millennials in Dehradun and Haridwar, several recommendations can be proposed to address the increasing prevalence of obesity and unhealthy dietary habits.

a) Nutritional Awareness Campaigns

- Launch focused nutrition education initiatives that highlight the relationship between convenience food intake and BMI as well as long-term health hazards.
- Organize awareness workshops and seminars in institutions and workplaces to encourage healthy eating practices and balanced diets.

b) Policy Interventions and Food Regulations

- Government and food regulatory agencies ought to enforce more stringent rules on the promotion of fast food, especially to young millennials.
- Encourage changes to product labels that will make it easier for millennials to make educated food choices by giving them more precise information about nutritional value.

c) Promotion of Local and Organic Food Consumption

- Encourage programs that provide access to organic, locally produced, and fresh food options in urban and semi-urban regions.
- To make healthy food options more affordable, small-scale farmers should be given financial incentives or subsidies.

d) Workplace and Institutional Health Programs

- Schools and businesses should implement wellness initiatives that promote physical exercise, arrange nutritious meals, and track body mass index.
- Employers should discourage an over-reliance on processed or convenience foods and provide healthier food options in workplace cafeterias.

e) Digital and Social Media Influence

- Use social media to combat false food trends and provide evidence-based nutrition instruction.
- Encourage dietitians and health influencers to advocate for sustainable, scientifically supported eating practices rather than fad diets.

f) Behavioural Interventions

- Millennials should be encouraged to use digital tools and mobile health applications to monitor their food intake and BMI.
- Using psychologically based strategies, such as habit formation techniques, might help make healthy decisions more long-lasting.

g) Accessibility to Healthy and Affordable Food

- Expand the number of food markets and supermarkets with a health-conscious focus in both urban and semi-urban locations.

- Promote the availability of reasonably priced, healthful meals that are already cooked in supermarkets to lessen reliance on highly processed convenience foods.

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