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A Study of Fitness and Nutritional Imbalances: Evaluating the Impact of Daily Routines on Demographic BMI Trends

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Abstract: *This paper investigates how physical activity, prolonged sitting, and dietary habits impact Body Mass Index (BMI) and health outcomes. Utilizing survey data, statistical methods evaluate widespread lifestyle imbalances. The mathematical analysis reveals that a limited portion of the population maintains a healthy body weight, while a majority deviates into underweight, overweight, or obese categories. The correlations establish that extended daily sitting hours are directly associated with an unhealthy BMI, an issue compounded by widespread physical inactivity and frequent fast food consumption. Furthermore, a significant segment of the sampled population already suffers from lifestyle-related complications, predominantly led by stress, anxiety, and blood pressure issues. By contrasting these trends against global benchmarks of longevity, such as active living and dietary discipline, this study concludes that consistent exercise, nutritional rebalancing, and routine preventive monitoring are essential to improve community health outcomes and prevent chronic diseases..*

Keywords: Statistical Analysis, Body Mass Index (BMI), Sedentary Behaviour, Data Visualization, Public Health

I. INTRODUCTION

In the modern era, lifestyle-related health problems have increased significantly due to rapid urbanization, sedentary work patterns, unhealthy eating habits, and high stress levels. Issues such as obesity, diabetes, hypertension, and mental stress are no longer limited to older age groups; they are increasingly prevalent among youth as well. Fitness and nutrition play a crucial role in maintaining overall well-being and preventing chronic diseases.

This project focuses on understanding how lifestyle habits, especially exercise frequency, dietary choices, and daily routines, affect Body Mass Index (BMI) and overall health outcomes. By analyzing survey-based data collected from a sample population, the study highlights the direct relationship between physical activity, balanced nutrition, and healthy daily practices across different age groups. Ultimately, the research emphasizes the importance of mathematical data and statistical tracking in identifying health risks and promoting preventive healthcare measures within the community.

II. OBJECTIVES OF THE STUDY

The primary objectives of this project are:

- To analyze the relationship between exercise frequency and BMI.
- To study dietary habits, particularly junk food consumption, and their impact on health.
- To assess the prevalence of health issues such as stress, obesity, diabetes, and blood pressure.
- To compare lifestyle habits across different age groups.
- To create awareness about the importance of fitness, nutrition, and preventive healthcare.

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III. IMPORTANCE OF FITNESS AND NUTRITION

Fitness and nutrition are the two pillars of a healthy lifestyle. Regular physical activity helps maintain a healthy weight, improves cardiovascular health, reduces stress, and enhances mental well-being. Similarly, proper nutrition provides essential nutrients required for body growth, repair, and immunity.

An imbalance between calorie intake and calorie expenditure leads to unhealthy BMI levels, Resulting in underweight, overweight, or obesity. Long-term neglect of fitness and nutrition increases the risk of chronic diseases and reduces quality of life.

IV. UNDERSTANDING BODY MASS INDEX (BMI)

Definition of BMI

Body Mass Index (BMI) is a numerical value derived from an individual's weight and height. It is commonly used to classify individuals into different weight categories.

BMI Calculation Formula: BMI = Weight (kg) / Height (m)²

BMI Categories

Underweight: BMI < 18.5
Normal weight: BMI 18.5 – 24.9
Overweight: BMI 25 – 29.9
Obese: BMI ≥ 30

BMI is a simple yet effective indicator to assess whether an individual has a healthy body weight for their height.

V. METHODOLOGY

The study is based on survey data collected from 100 participants belonging to different age groups. The questionnaire focused on:

Exercise frequency
Junk food consumption
Sitting hours per day
Existing health issues
Height and weight for BMI calculation

The collected data was analyzed using charts and graphs such as pie charts and histograms to understand patterns and relationships between lifestyle habits and health outcomes.

VI. ANALYSIS OF BMI CATEGORY

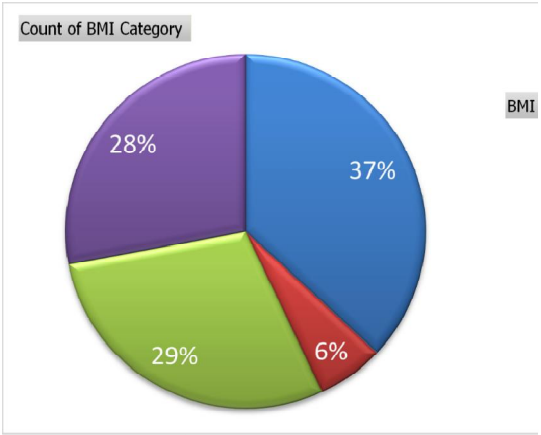

Figure 1: Count of BMI Category (Pie Chart)

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Chart: Count of BMI Category

This pie chart represents the distribution of participants across different Body Mass Index (BMI) categories.

Explanation:

37% of participants fall under the normal weight category, indicating that only a limited portion of the population maintains a healthy BMI.

29% of participants are overweight, suggesting a high risk of developing lifestyle-related diseases.

28% are underweight, which may indicate poor nutrition, lack of awareness, or underlying health issues.

6% of participants are obese, representing a smaller yet high-risk group prone to serious health complications.

Inference:

A significant 63% of participants fall outside the healthy BMI range, highlighting widespread nutritional imbalance and insufficient physical activity. This reflects an urgent need for improved fitness awareness, balanced diet practices, and regular health monitoring to prevent long-term health issues.

VII. ANALYSIS OF EXERCISE FREQUENCY

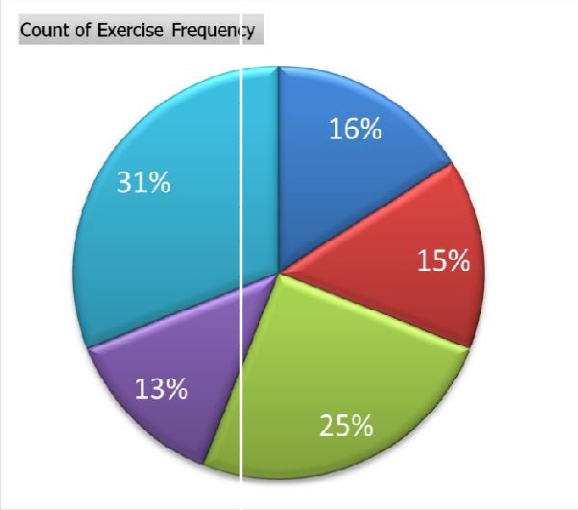

Figure 2: Count of Exercise Frequency (Pie Chart)

Chart: Count of Exercise Frequency

This pie chart represents how frequently participants engage in physical exercise.

Explanation:

31% of participants never exercise, which is a major concern and highlights a sedentary lifestyle trend.

25% exercise 5–6 days a week, indicating a smaller but positive health-conscious group.

16% exercise only 1–2 days per week and **15% exercise 3–4 days per week**, which may be insufficient for maintaining optimal health.

Only **13% exercise daily**, showing that consistent physical activity is limited among the population.

Inference:

A majority of participants do not meet recommended physical activity guidelines, increasing their risk of obesity, stress, and chronic diseases.

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VIII. ANALYSIS OF JUNK FOOD CONSUMPTION

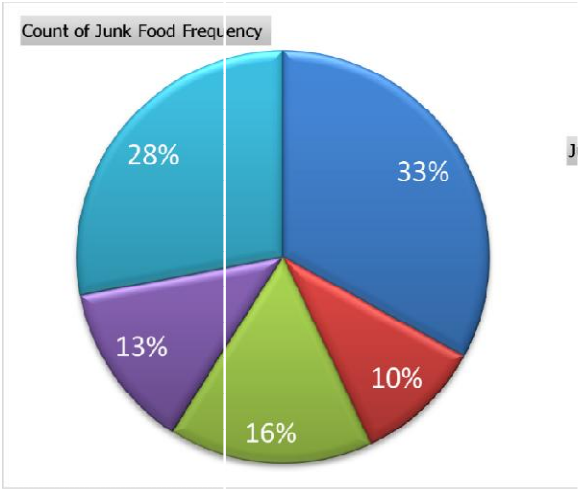

Figure 3: Count of Junk Food Frequency (Pie Chart)

Chart: Count of Junk Food Frequency

This pie chart illustrates how often participants consume junk or fast food.

Explanation:

33% consume junk food 2–3 times a week, making it the most common dietary habit.

10% consume junk food daily, which significantly increases health risks.

13% consume junk food once a week, while **28% consume it rarely**.

Only **16% never consume junk food**, indicating limited adoption of healthy eating habits.

Inference:

Frequent junk food consumption among a large section of participants contributes to unhealthy BMI levels and metabolic disorders.

IX. PREVALENCE OF HEALTH ISSUES

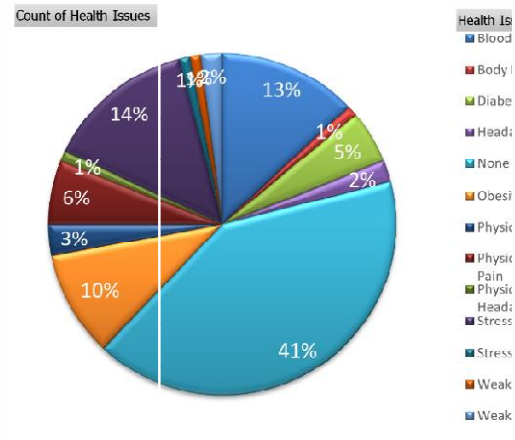

Figure 4: Count of Health Issues (Pie Chart)

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Chart: Count of Health Issues

This pie chart displays the distribution of health problems reported by participants.

Explanation:

41% of participants report no health issues, indicating a relatively healthy segment.

14% suffer from stress or anxiety, making it the most common reported issue.

13% have blood pressure problems, while **10% are affected by obesity**.

Other issues include diabetes, headaches, physical weakness, and body pain, each affecting smaller percentages.

Inference:

Mental stress and lifestyle-related conditions are prevalent, emphasizing the need for physical activity, stress management, and preventive care.

X. BMI VS SITTING HOURS

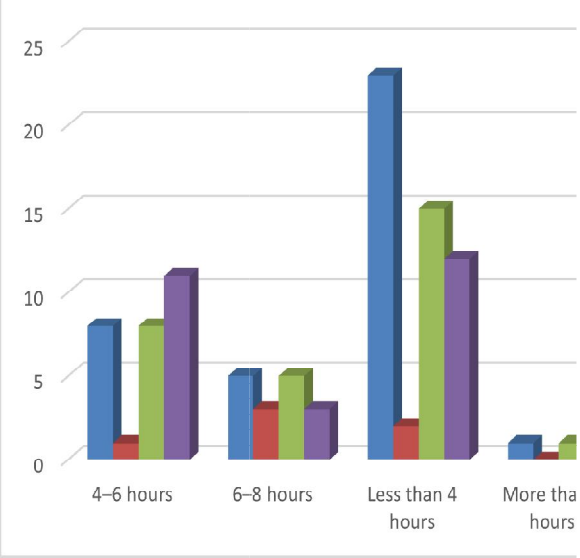

Figure 5: BMI vs Sitting Hours per Day (Bar Chart)

Chart: BMI vs Sitting Hours per Day

This bar chart compares BMI categories with average daily sitting hours.

Explanation:

Participants sitting **less than 4 hours per day** show the highest count of normal BMI, indicating an active lifestyle.

Those sitting **4–6 hours** show increased cases of underweight and overweight.

Individuals sitting **6–8 hours or more than 8 hours** tend to show higher overweight and obese counts.

Inference:

Prolonged sitting is directly associated with unhealthy BMI, highlighting the risks of sedentary behavior.

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X(a). Age-wise Exercise Frequency

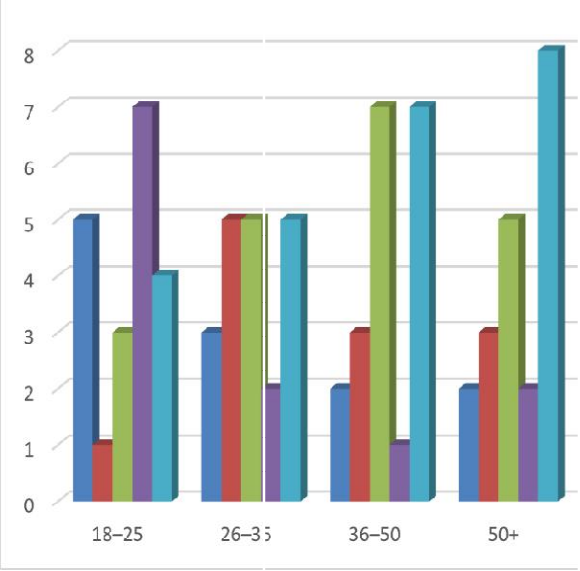

Figure 6: Age-wise Exercise Frequency (Bar Chart)

Chart: Age-wise Exercise Frequency
Explanation:
The **18–25 age group** shows higher daily exercise compared to other groups but also a noticeable number who never exercise.
The **26–35 and 36–50 age groups** show a decline in daily exercise due to work and family responsibilities.
The **50+ age group** shows higher inactivity levels, increasing health risks.

Inference:
Exercise frequency decreases with age, stressing the need for age-appropriate fitness programs.

X(b). Age-wise Junk Food Frequency

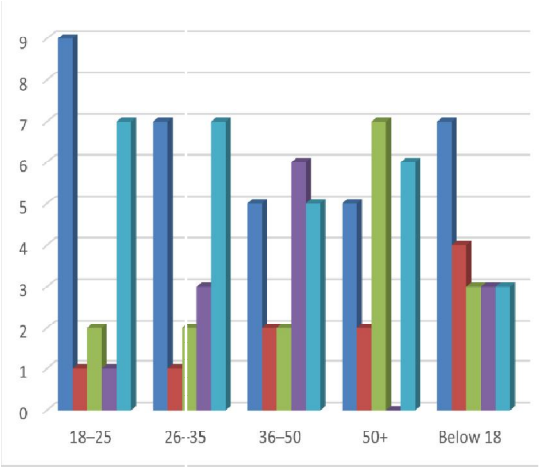

Figure 7: Age-wise Junk Food Frequency (Bar Chart)

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Chart: Age-wise Junk Food Frequency
Explanation:
Younger age groups consume junk food more frequently due to lifestyle and convenience.
Older age groups show reduced junk food intake but still lack balanced nutrition.

Inference:
Early unhealthy eating habits can lead to long-term health complications.

X (C) Age-wise Health Issues

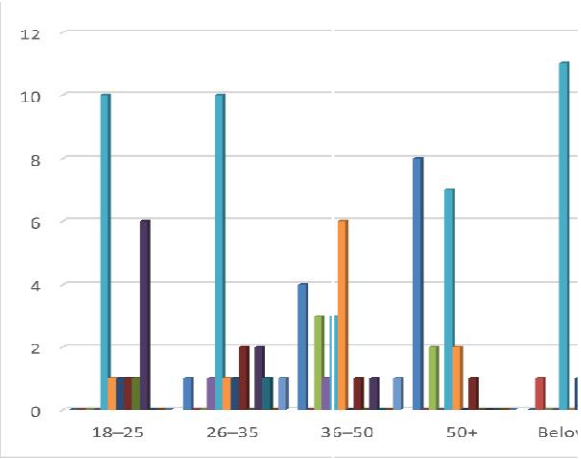

Figure 8: Age-wise Health Issues (Bar Chart)

Chart: Age-wise Health Issues
Explanation:
Health issues such as stress, blood pressure, and diabetes increase with age.
Early signs of stress and weakness are visible even in younger age groups.

Inference:
Preventive health measures must start early to reduce long-term disease burden.

XI. GLOBAL PERSPECTIVE: THE JAPAN LONGEVITY EXAMPLE

Japan has set a remarkable global example in healthy living. Nearly **1 lakh (100,000) citizens in Japan have crossed 100 years of age**, showcasing the country's exceptional life expectancy.

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The key factors contributing to Japan's longevity include:
Balanced and portion-controlled nutrition
Regular physical activity such as walking
Strong social connections
A culture that values health, discipline, and active living
This example proves that consistent healthy habits can significantly enhance lifespan and quality of life.

XII. FINAL RESULTS OF THE STUDY

The key findings of the study are:
Only **37% of participants fall within a healthy BMI range**.
63% are underweight, overweight, or obese.
62% lack sufficient physical activity.
43% frequently consume junk food.
59% already suffer from health-related issues.
These results clearly indicate an unhealthy lifestyle trend among the population.

XIII. SOLUTION DIRECTIONS AND RECOMMENDATIONS

Based on the analysis, the following solutions are recommended:

13.1 Increase Physical Activity

At least **150 minutes of moderate exercise per week**.
Activities such as walking, yoga, cycling, and sports should be encouraged.

13.2 Promote Balanced Diet

Reduce junk food intake.
Increase consumption of fruits, vegetables, whole grains, and proteins.

13.3 Stress Management

Practice mindfulness, meditation, and relaxation techniques.
Access counseling and mental wellness programs.

13.4 Regular Health Checkups

Monitor BMI, blood pressure, and blood sugar levels.
Early detection can prevent serious health complications.

13.5 Supportive Environment

Provide healthier food options in canteens.
Organize wellness weeks, fitness challenges, and awareness campaigns.

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XIV. FINAL CONCLUSION

The paper clearly demonstrates that physical inactivity and poor dietary habits have a significant negative impact on health. Individuals with limited exercise and frequent junk food consumption are more prone to obesity, stress, and chronic illnesses.

In contrast, regular physical activity, balanced nutrition, and proper hydration strongly correlate with a healthy BMI and reduced health risks. Promoting awareness about fitness and nutrition at an early stage can substantially improve community health outcomes and prevent lifestyle-related diseases. Balanced living is not a short-term goal but a lifelong commitment to health, discipline, and well-being.

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