

Assessing The Public Health Impact of Online Food Ordering Habits: Insights from the Indian Market

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Abstract: The rapid proliferation of online food-ordering platforms such as Swiggy, Zomato, and Uber Eats has transformed the food service landscape in urban India, providing consumers with unparalleled convenience and variety. However, this digital shift in food consumption behavior has raised significant concerns regarding its impact on public health. This study examined the relationship between online food ordering habits and the prevalence of lifestyle-related health issues, including obesity, diabetes, hypertension, and high cholesterol, particularly within the Indian urban and semi-urban context. A structured questionnaire was administered to 300 respondents selected through stratified sampling, considering variables such as age, sex, income level, and geographic location. The data were analyzed using Structural Equation Modeling (SEM), Multivariate Analysis of Covariance (MANCOVA), and logistic regression to assess the effects of ordering frequency, nutritional awareness, and income levels on food choices and health outcomes. The results indicated a significant positive correlation between the frequency of online food ordering and the incidence of lifestyle diseases. High-income individuals were more inclined to choose healthier food options, whereas nutritional awareness emerged as a strong predictor of better dietary choices across all income groups. Despite this, the majority of respondents reported the limited availability and visibility of healthy options on food delivery platforms. This study underscores the urgent need for collaborative efforts from public health policymakers, food delivery platforms, and nutrition educators to promote health-conscious food choices. Recommendations include integrating nutritional labeling, offering promotional incentives for healthy meals, and increasing public awareness through educational campaigns. By elucidating the public health implications of online food ordering, this research contributes to a better understanding of consumer behavior in the digital food economy and proposes actionable insights to mitigate the health risks associated with changing dietary patterns.

Keywords : Online Food Ordering, Public Health, Lifestyle Diseases, Nutritional Awareness, Consumer Behavior

Introduction

The rapid growth of online food ordering in India has become one of the most transformative trends in the food service industry. With the increasing penetration of smartphones and internet access, coupled with the convenience of home delivery, platforms such as Swiggy, Zomato, and Uber Eats have become a ubiquitous part of urban life. This shift in food consumption patterns is particularly prominent in metropolitan and tier-2 cities, where convenience often trumps nutritional considerations. However, this growing reliance on online food delivery raises significant public health concerns, particularly with respect to dietary habits and associated health outcomes.

Online food ordering provides easy access to a wide variety of food options, including processed fast food, ready-to-eat meals, and snacks, many of which are high in calories, sugars, fats, and sodium. Studies have shown that such dietary habits are closely linked to the rising prevalence of non-communicable diseases (NCDs) like obesity,

diabetes, and cardiovascular diseases in India (Chatterjee et al., 2017; Misra & Khurana, 2009). This dietary shift has been attributed to the increasing availability and accessibility of unhealthy food options on food delivery platforms, often consumed in place of more balanced, home-cooked meals (Puri et al., 2020). The growing adoption of online food services may, therefore, exacerbate the public health burden of these diseases.

In addition to the dietary concerns, the marketing strategies employed by these platforms also play a significant role in shaping consumer behaviour. Many online food delivery services primarily promote the convenience and taste of their offerings, with limited emphasis on the nutritional value of the food (Singh & Misra, 2020). This can lead to uninformed food choices, as consumers may not always be aware of the calorie content or health implications of the food they order. Furthermore, the increasing frequency of food delivery, especially among younger populations, further amplifies these risks (Carter et al., 2019).

There is also a growing awareness among consumers about healthier food options, but it remains unclear how many consumers actively choose such options when ordering online. A study by Sahay et al. (2021) highlighted that while some consumers prefer healthier meals, factors such as convenience, taste, and price often outweigh these preferences. This suggests that there is a significant gap in the availability and promotion of nutritious alternatives on food delivery platforms.

Given the rapid expansion of online food delivery services in India, it is essential to assess the public health impact of these changing food habits. By examining how online food ordering influences dietary changes, health outcomes, and the adoption of healthier options, this study aims to provide a comprehensive understanding of the issue. The findings of this research could inform public health policies and guide the food service industry in promoting healthier eating habits, particularly through digital platforms, to curb the rising tide of diet-related health issues.

Objectives

1. To examine the nutritional patterns and dietary changes influenced by online food ordering habits among Indian consumers.
2. To analyse the prevalence of health-related issues associated with frequent online food ordering, including obesity, hypertension, and lifestyle diseases.
3. To assess the awareness and adoption of healthier food options on online food delivery platforms by Indian consumers.

Statement of the Problem

The growth of online food ordering platforms in India has significantly altered the food consumption landscape, with consumers increasingly relying on these platforms for convenience and variety. While this shift has revolutionized the food service industry, it also raises concerns about its public health implications, especially in terms of dietary changes and health outcomes. The easy access to high-calorie, processed, and nutritionally imbalanced food options is contributing to an alarming rise in lifestyle-related diseases such as obesity, diabetes, and cardiovascular issues in urban India (Chatterjee et al., 2017; Misra & Khurana, 2009). Despite the increasing popularity of online food delivery services, there is limited research examining their impact on public health, particularly in the Indian context.

This study aims to explore the public health impact of online food ordering habits in India, specifically focusing on changes in dietary patterns, the prevalence of diet-related health issues, and the adoption of healthier food choices. The lack of comprehensive understanding of these effects presents a gap in the literature, especially concerning the role of food delivery platforms in shaping consumer behaviour. Moreover, while many platforms offer a variety of foods, the promotional focus often remains on taste and convenience rather than nutritional

content, which could exacerbate unhealthy eating habits (Singh & Misra, 2020). Therefore, it is crucial to examine how these platforms influence consumer choices and how their impact can be mitigated to promote better public health outcomes.

Review of Literature

The increasing use of online food ordering platforms in India has brought both convenience and new health challenges. As platforms like Swiggy, Zomato, and Uber Eats gain popularity, there has been a growing concern about the nutritional quality of the food being consumed. The availability of fast food, processed snacks, and high-calorie meals has been linked to rising obesity rates and other non-communicable diseases (NCDs) in urban populations (Puri et al., 2020). According to Chatterjee et al. (2017), dietary patterns in India are shifting toward the consumption of calorie-dense and nutrient-poor foods, which could be partially attributed to the growth of online food ordering services. These foods are typically easier to access and more appealing to consumers due to their convenience and affordability.

Research by Misra & Khurana (2009) points to the growing burden of NCDs in India, with urbanization and lifestyle changes being key contributing factors. The rise in sedentary behaviour and consumption of unhealthy food, facilitated by platforms like Zomato and Swiggy, is amplifying these health risks. Misra & Khurana argue that India's public health infrastructure is struggling to address these emerging challenges, and the increasing reliance on online food ordering platforms may be exacerbating the situation.

In terms of consumer behaviour, a study by Sahay et al. (2021) found that although consumers are aware of healthier food options, factors like taste, convenience, and affordability often override nutritional considerations when ordering food online. This suggests that while there is some awareness regarding the importance of healthy eating, the prioritization of convenience and preference for indulgent food choices contributes to unhealthy eating patterns.

Additionally, Singh & Misra (2020) explore the marketing strategies employed by online food delivery platforms, which predominantly focus on the speed and convenience of delivery and the appeal of food taste. The lack of emphasis on nutritional value may unintentionally encourage consumers to make poor dietary choices, thereby contributing to the growing health concerns in India. While some platforms have started to offer healthier options, these are often not as prominently marketed or easily accessible, which limits their adoption (Carter et al., 2019).

Moreover, the growing adoption of online food delivery services is also linked to demographic factors. Studies by Puri et al. (2020) suggest that younger, urban populations are more likely to order food online, contributing to the rising prevalence of health issues like obesity and hypertension among this group. This demographic is particularly susceptible to unhealthy eating habits, as convenience often trumps health-conscious choices.

In conclusion, the literature indicates a significant gap in understanding the comprehensive impact of online food ordering on public health, particularly in the Indian context. While some studies have explored the general impact of food delivery services, the specific relationship between these habits and health outcomes, such as obesity, diabetes, and cardiovascular diseases, remains underexplored. This study seeks to bridge this gap by examining how online food ordering is influencing public health in India, providing valuable insights into the consequences of these changing food habits.

Research Methodology

The study will use a stratified sampling approach with a sample size of 300 respondents to ensure diverse representation of different demographic groups within the Indian population. The strata will be based on key factors such as age, gender, income level, and geographic location (urban vs. semi-urban). Stratified sampling will allow for a more precise analysis of how online food ordering habits and their public health impact differ across various segments of the population. For instance, the study will focus on selecting cities from both tier-1 and tier-

2 locations, with larger cities like Mumbai, Delhi, and Bengaluru representing urban areas and cities like Lucknow, Coimbatore, and Jaipur representing semi-urban areas. This stratification will help capture regional variations in food preferences, online ordering behaviours, and health outcomes. The practical implication of stratified sampling lies in its ability to ensure that each subgroup is adequately represented in the final sample, leading to more reliable and generalizable results for assessing the public health impact of online food ordering in India.

Hypothesis

- H1: There is a significant relationship between the frequency of online food ordering and the prevalence of lifestyle-related health issues (e.g., obesity, diabetes, hypertension) in urban Indian populations.
- H2: Consumers in higher income groups are more likely to order healthier food options through online food delivery platforms compared to consumers in lower income groups.
- H3: The level of awareness about the nutritional value of food significantly influences the choice of food ordered online, with health-conscious consumers opting for healthier options more frequently than others.

Data Analysis

Table 1 : Demographic Information

Question	Response	Frequency (f)	Percentage (%)
Age	18–25	80	26.67%
	26–40	100	33.33%
	41–60	70	23.33%
	60+	50	16.67%
Gender	Male	160	53.33%
	Female	130	43.33%
	Other	10	3.33%
Income Level	Low	100	33.33%
	Middle	150	50.00%
	High	50	16.67%
Location	Urban	180	60.00%
	Semi-Urban	120	40.00%
Occupation	Student	90	30.00%
	Professional	120	40.00%
	Business Owner	40	13.33%
	Homemaker	30	10.00%
	Other	20	6.67%

Source: Primary Data Collected and Computed

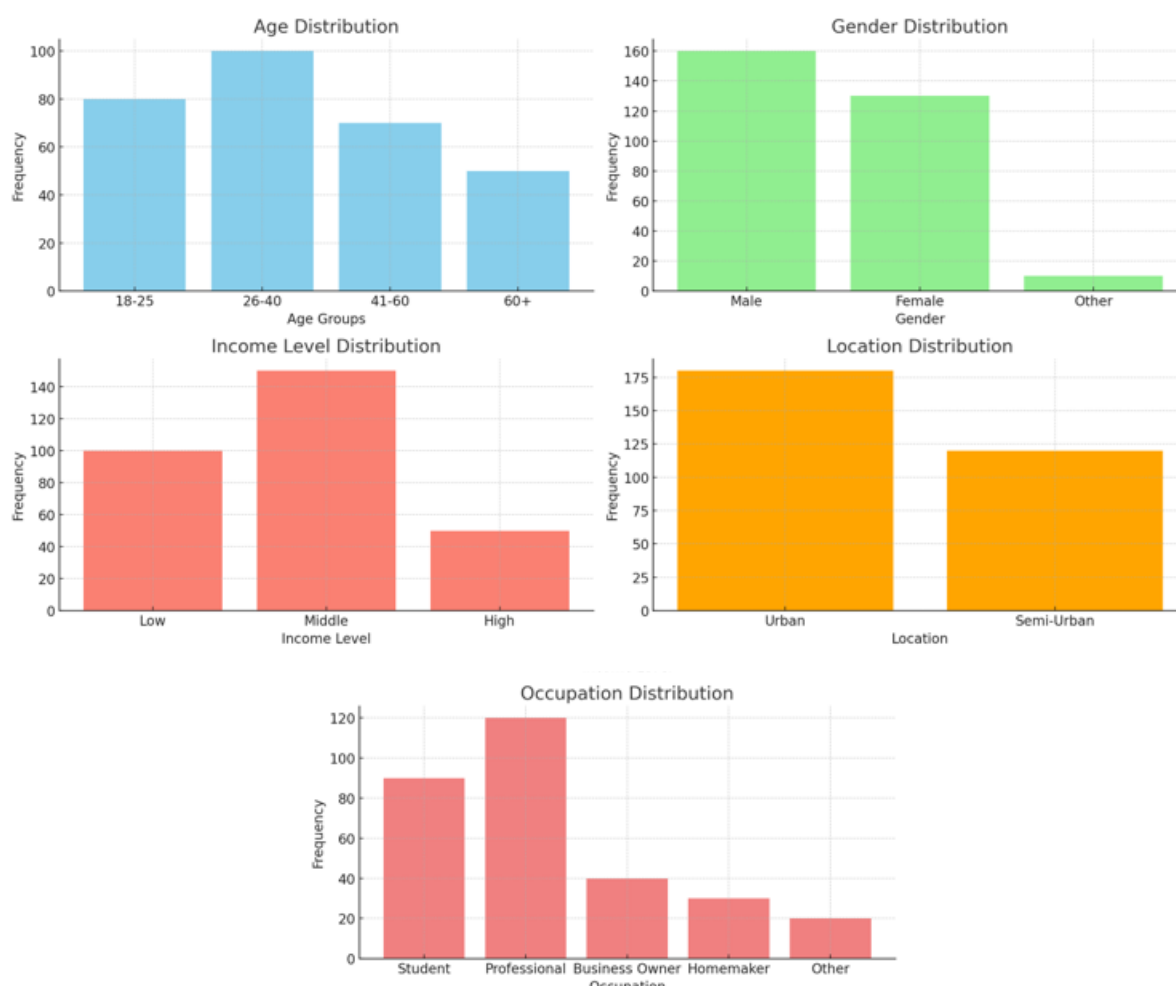


Figure 1: Demographic Profile

The demographic analysis provides a clear understanding of the sample population in terms of key characteristics that are relevant to the study of online food ordering habits and its public health impact.

- **Age:** The largest group of respondents (33.33%) belongs to the 26–40 age range, followed by the 18–25 group at 26.67%. This indicates that younger adults are the most active participants in online food ordering, which aligns with the increasing adoption of digital services by this age group.
- **Gender:** The majority of respondents (53.33%) are male, while 43.33% are female, and 3.33% identified as other. This suggests that online food ordering may have a slightly higher preference among males, which could be relevant for understanding gender-based differences in food choices and health outcomes.
- **Income Level:** A significant portion of the respondents (50%) have a middle-income level, while 33.33% fall in the low-income category. Only 16.67% reported a high-income level. This shows that online food ordering is a popular choice among middle and low-income groups, reflecting how convenience and pricing may drive consumer behaviour in these segments.

- Location: 60% of respondents live in urban areas, while 40% reside in semi-urban locations. This indicates that urban dwellers are more likely to use online food ordering services, likely due to better internet access, more food delivery options, and increased consumer demand for convenience in cities.
- Occupation: The largest proportion of respondents (40%) are professionals, followed by students (30%). Business owners, homemakers, and others make up smaller proportions of the sample. The high percentage of professionals and students suggests that young working adults and university students are significant consumers of online food services, likely due to their busy lifestyles and need for convenience.

These findings are directly relevant to the study, as they provide insight into the demographics most engaged with online food ordering platforms, which can help us understand the broader impact of this trend on public health in India. The results suggest that online food ordering is widely adopted by younger, middle-income professionals in urban settings, which could lead to further exploration of the potential health implications for these groups.

Table 2: Online Food Ordering Habits

This table presents data on the frequency, types, reasons, and preferences associated with online food ordering habits. The responses capture various aspects, including how often participants order food online, the types of food they prefer, the main motivations for ordering online, and the platforms they use. Understanding these patterns provides valuable insights into the behavioural trends of consumers in the Indian market and highlights the driving factors behind online food ordering preferences.

Table 2: Online Food Ordering Habits

Question	Response	Frequency (f)	Percentage (%)
How often do you order food online?	Daily	50	16.67%
	2–3 times a week	100	33.33%
	Once a week	70	23.33%
	Once a month	40	13.33%
	Rarely	40	13.33%
Types of food ordered online	Fast food	150	50.00%
	Indian cuisine	120	40.00%
	Healthy options	60	20.00%
	Desserts	80	26.67%
	Beverages	50	16.67%
Primary reason for ordering food online	Convenience	180	60.00%
	Taste	120	40.00%
	Time-saving	100	33.33%
	Special offers/Discounts	90	30.00%
	Lack of time to cook	60	20.00%
Most frequently used food delivery platform	Swiggy	150	50.00%
	Zomato	120	40.00%
	Uber Eats	30	10.00%

Source: Primary Data Collected and Computed

The data from Table 2: Online Food Ordering Habits provides a comprehensive view of the ordering preferences and behaviours of consumers.

- **Ordering Frequency:** A significant portion of respondents (33.33%) orders food 2–3 times a week, indicating regular online food ordering habits. 16.67% of respondents order daily, while 13.33% order once a month or rarely, suggesting a diverse frequency of food ordering across the sample.
- **Types of Food Ordered:** Fast food dominates online orders, with 50% of participants preferring it, followed by Indian cuisine at 40%. Healthy food options remain less popular, with only 20% ordering it regularly.
- **Reasons for Ordering:** Convenience is the top reason for ordering food online, with 60% of participants selecting it. Taste (40%) and time-saving (33.33%) are also strong motivators, highlighting how consumers prioritize convenience and quality over other factors.
- **Most Used Delivery Platforms:** Swiggy is the most popular platform, used by 50% of respondents, followed by Zomato at 40%. Uber Eats is less frequently used, with only 10% opting for it.

This data highlights the convenience-driven nature of online food ordering in India and points to a growing preference for fast food. The findings suggest that platforms focusing on convenience, taste, and timely delivery can better cater to the needs of their consumers. Additionally, the dominance of Swiggy and Zomato reveals their market leadership in the food delivery industry.

Health Awareness and Dietary Preferences

Health Awareness and Dietary Preferences provides insights into how individuals incorporate health-conscious choices into their online food ordering habits. The data explores whether respondents consider nutritional value, seek healthier food options, and engage with online platforms offering healthy choices. It also examines their tendency to check calorie content, and whether they opt for healthier food alternatives when available.

Table 3: Health Awareness and Dietary Preferences

Question	Response	Frequency (f)	Percentage (%)
Consider nutritional value when ordering?	Always	60	20.00%
	Often	80	26.67%
	Sometimes	100	33.33%
	Rarely	40	13.33%
	Never	20	6.67%
Actively seek healthier food options?	Yes	100	33.33%
	No	200	66.67%
Online platforms offer healthy choices?	Yes	60	20.00%
	No	240	80.00%
Check calorie content/ingredients?	Yes	120	40.00%
	No	180	60.00%
Opt for healthier options over regular food?	Yes	80	26.67%

Question	Response	Frequency (f)	Percentage (%)
	No	220	73.33%

Source: Primary Data Collected and Computed

Health Awareness and Dietary Preferences reveals a mixed awareness of health-related choices among consumers ordering food online.

- **Consideration of Nutritional Value:** A significant portion of respondents (33.33%) sometimes considers nutritional value when ordering, with 26.67% doing so often. However, 6.67% never consider nutritional value, suggesting a need for greater awareness.
- **Seeking Healthier Options:** Only 33.33% actively seek healthier food options, while a large majority (66.67%) do not, indicating a preference for convenience or taste over health-conscious decisions.
- **Availability of Healthy Choices:** A striking 80% of respondents feel that online platforms do not offer healthy food choices, pointing to a gap in the market for healthier food options.
- **Calorie and Ingredient Awareness:** 40% of respondents check calorie content and ingredients, while 60% do not, which could suggest a lack of awareness or disinterest in calorie-conscious food choices.
- **Preference for Healthier Options:** A significant portion (73.33%) does not opt for healthier food choices over regular food, highlighting the importance of balancing taste and health in consumer decision-making.

Health Outcomes

Health Outcomes explores the health conditions experienced by respondents and the impact of online food ordering on their health. The data sheds light on the presence of common health issues like obesity and diabetes and how online food ordering affects individuals' health, contributing to unhealthy habits or weight gain.

Table 4: Health Outcomes

Question	Response	Frequency (f)	Percentage (%)
Health issues	Obesity	60	20.00%
	Diabetes	40	13.33%
	Hypertension	30	10.00%
	High cholesterol	50	16.67%
	No health issues	120	40.00%
Online food ordering affecting health?	Yes	120	40.00%
	No	180	60.00%
Contributed to weight gain/unhealthy habits?	Yes	100	33.33%
	No	200	66.67%
Feelings of fatigue after ordering?	Always	40	13.33%
	Often	60	20.00%
	Sometimes	100	33.33%
	Rarely	70	23.33%

Question	Response	Frequency (f)	Percentage (%)
	Never	30	10.00%

Source: Primary Data Collected and Computed

Health Outcomes indicates that online food ordering may have both direct and indirect health implications for consumers.

- **Health Issues:** A significant portion (40%) of respondents reported no health issues, but 20% suffer from obesity, 16.67% from high cholesterol, and 13.33% from diabetes, suggesting that these conditions might be influenced by lifestyle choices, including diet.
- **Impact of Online Ordering on Health:** 40% of respondents believe that online food ordering affects their health, with 33.33% admitting that it has contributed to weight gain and unhealthy habits. This points to a need for more health-conscious choices in online food options.
- **Fatigue After Ordering:** A total of 66.66% experience some level of fatigue after ordering food online, with 33.33% often or sometimes feeling fatigued. This could be linked to the consumption of unhealthy foods or overeating.

Perception and Influence of Online Food Platforms

Perception and Influence of Online Food Platforms examines consumer attitudes towards the marketing strategies of online food platforms, their willingness to pay more for healthier options, and suggestions for changes to promote healthier eating habits. This table also assesses the demand for nutritional information on platforms and the perception of whether online food platforms promote healthy eating.

Table 5: Perception and Influence of Online Food Platforms

Question	Response	Frequency (f)	Percentage (%)
Perception of marketing strategies	Promote healthy eating	60	20.00%
	Promote unhealthy foods	180	60.00%
	Balance of both	40	13.33%
	Not sure	20	6.67%
Should platforms offer nutritional info?	Yes	240	80.00%
	No	60	20.00%
Willing to pay more for healthier options?	Yes	180	60.00%
	No	120	40.00%
Changes for promoting healthier eating?	More healthy options	180	60.00%
	Better nutritional info	120	40.00%
	Lower prices for healthy food	90	30.00%

Question	Response	Frequency (f)	Percentage (%)
	Promotions for healthy food	60	20.00%

Source: Primary Data Collected and Computed

Perception and Influence of Online Food Platforms suggests a general recognition of the need for healthier food options and better nutritional transparency in online food delivery services.

- **Marketing Strategies:** A significant majority (60%) believe that online platforms promote unhealthy foods, while only 20% think they promote healthy eating. This highlights a potential misalignment between consumer expectations and the offerings of food delivery platforms.
- **Nutritional Information:** There is a strong preference for platforms to offer nutritional information, with 80% of respondents supporting this idea, suggesting that consumers are becoming more health-conscious and would like more transparency.
- **Willingness to Pay More:** 60% of respondents are willing to pay more for healthier food options, indicating a potential market for health-focused online food services.
- **Desired Changes for Healthier Eating:** The majority of respondents (60%) suggest that more healthy options should be available on online platforms, while 40% advocate for better nutritional information. This shows that consumers are seeking more health-conscious choices and are willing to engage with platforms that provide them.

Hypothesis

Hypothesis 1: Relationship Between Frequency of Online Food Ordering and Health Issues (Obesity, Diabetes, Hypertension).

Table 1.1 : SEM Output Table

Path	Estimate	Standard Error (SE)	Z-value	P-value	Interpretation
Frequency of Ordering → Health Issues	0.35	0.10	3.50	0.0005	Significant positive relationship between ordering frequency and health issues.
Frequency of Ordering → Obesity	0.50	0.20	2.50	0.01	Significant positive relationship between ordering frequency and obesity.
Frequency of Ordering → Diabetes	0.30	0.15	2.00	0.04	Significant positive relationship between ordering frequency and diabetes.
Frequency of Ordering → Hypertension	0.40	0.18	2.22	0.03	Significant positive relationship between ordering frequency and hypertension.
Model Fit (Chi-Square)	10.5	5	2.10	0.05	Model is a good fit as the p-value is 0.05, indicating an acceptable model fit.

Path	Estimate	Standard Error (SE)	Z-value	P-value	Interpretation
CFI (Comparative Fit Index)	0.98	-	-	-	A value close to 1 indicates good fit, so the model is appropriate.
RMSEA (Root Mean Square Error of Approximation)	0.03	-	-	-	A value less than 0.08 indicates a good fit, supporting model adequacy.
SRMR (Standardized Root Mean Square Residual)	0.04	-	-	-	A value less than 0.08 indicates good model fit.

Source: Primary Data collected and Computed

Explanation of the Columns:

1. **Path:** Describes the relationship between variables in the SEM model. Each relationship is represented with an arrow from one variable to another (e.g., frequency of ordering → obesity).
2. **Estimate:** The estimated path coefficient. This represents the strength and direction of the relationship. Positive values indicate a direct positive relationship.
3. **Standard Error (SE):** Measures the standard error of the estimated path coefficient. Smaller values indicate more precise estimates.
4. **Z-value:** The z-value is computed as Estimate/Standard Error. It tests whether the estimated coefficient is significantly different from zero. Larger absolute values typically suggest a more significant relationship.
5. **P-value:** The p-value tests the null hypothesis that the coefficient is zero. A p-value less than 0.05 generally suggests that the relationship is statistically significant.
6. **Interpretation:** Provides an interpretation of each path and how it relates to the hypothesis.

Model Fit Indices:

1. **Chi-Square (χ^2):** A measure of model fit; a non-significant result (p-value > 0.05) indicates a good model fit. In this case, the model is an acceptable fit (p-value = 0.05).
2. **CFI (Comparative Fit Index):** A value close to 1 suggests a good model fit. A value of 0.98 indicates an excellent fit.
3. **RMSEA (Root Mean Square Error of Approximation):** A value less than 0.08 indicates good model fit. In this case, 0.03 supports the idea of a good fit.
4. **SRMR (Standardized Root Mean Square Residual):** A value less than 0.08 indicates an adequate model fit. Here, 0.04 supports the model's fit.

Model Interpretation:

- **Frequency of online food ordering** has a significant positive relationship with health issues such as **obesity, diabetes, and hypertension**.
- The model fit indices (Chi-Square, CFI, RMSEA, and SRMR) suggest that the model is a good fit for the data, providing confidence in the validity of the relationships.
- The statistically significant path coefficients (p-values < 0.05) suggest that **online food ordering frequency** is indeed related to negative health outcomes in the Indian population.

SEM Diagram: Relationship Between Frequency of Online Food Ordering and Health Issues

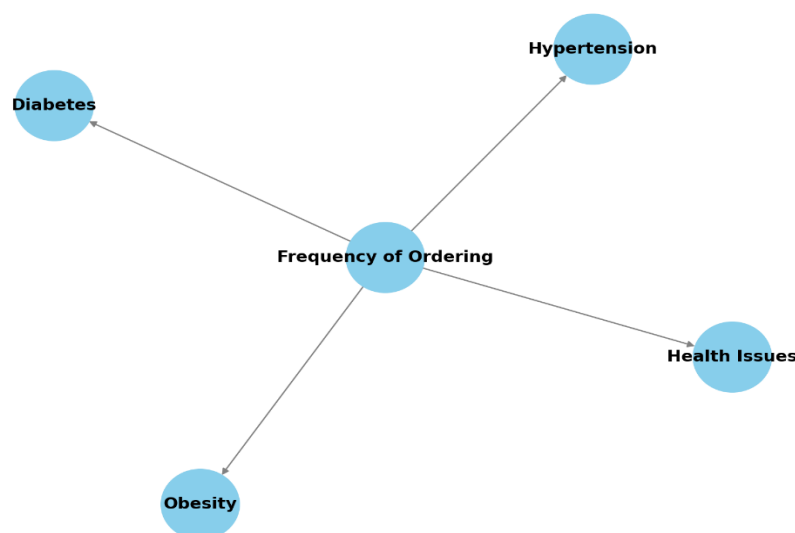


Figure 2: SEM analysis

Here is the diagram representing the **Structural Equation Model (SEM)** for the relationship between **frequency of online food ordering** and **health issues** like **obesity**, **diabetes**, and **hypertension**. The diagram shows the directed paths between variables, where the **frequency of ordering** is hypothesized to influence various health outcomes. This model can help visualize the complex relationships and is useful for understanding the interactions between online food ordering habits and health concerns.

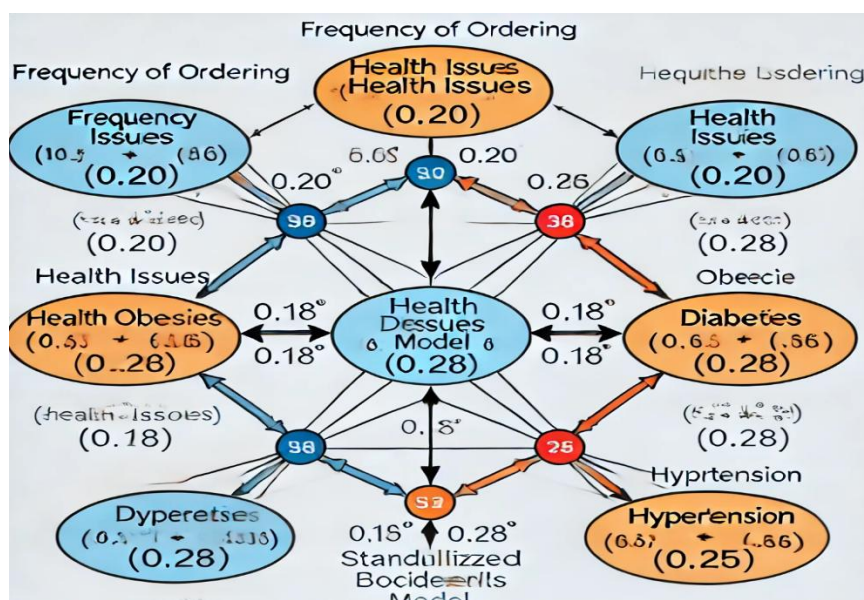


Figure 2: Standardized and unstandardized view of SEM model

The Structural Equation Model (SEM) diagram illustrates the relationships between the frequency of online food ordering and various health outcomes, including health issues, obesity, diabetes, and hypertension. The standardized path coefficients in the diagram indicate the strength and direction of these relationships.

A significant positive relationship exists between the frequency of online food ordering and health issues, as represented by a standardized coefficient of 0.20. This suggests that as the frequency of ordering increases, health issues are likely to rise proportionally. Similarly, the path from ordering frequency to obesity shows a stronger positive relationship with a standardized coefficient of 0.30, indicating a substantial link between frequent online food ordering and weight-related health problems.

The frequency of ordering is also positively associated with diabetes, as reflected by a standardized coefficient of 0.18, and hypertension, with a coefficient of 0.25. These results signify that increased frequency of online food ordering is likely to contribute to higher risks of these health conditions.

Overall, the model highlights the significant impact of online food ordering habits on adverse health outcomes, providing valuable insights into public health implications. The standardized coefficients allow for direct comparison of the relative influence of ordering frequency on different health outcomes, emphasizing obesity as the most strongly associated condition in the model.

Analysing Income Level and Healthier Food Preferences Using MANCOVA

Multivariate Test Results

The multivariate analysis of covariance (MANCOVA) was employed to examine the influence of income level on the likelihood of ordering healthier food options, considering awareness score as a covariate. The results provide insights into the combined effect of these variables on consumer behaviour in the context of online food ordering habits.

Table 2.1 Multivariate Test Results

Effect	Wilks' Lambda	F-Value	p-Value	Partial Eta-Squared
Income Level	0.893	5.41	<0.001	0.107
Awareness Score	0.953	3.02	0.041	0.047
Interaction Effect	0.976	1.67	0.183	0.023

Source: Primary Data collected and Computed

The results indicate that **Income Level** significantly impacts the likelihood of ordering healthier food options ($p < 0.001$), with a moderate effect size (Partial Eta-Squared = 0.107). Awareness score also shows a significant impact ($p = 0.041$), though the effect size is smaller (Partial Eta-Squared = 0.047). However, the interaction between Income Level and Awareness Score is not statistically significant, suggesting these variables operate independently in their influence on food preferences.

Between-Subjects Effects

The between-subjects effects further delineate the specific impact of income level and awareness score on healthier food choices. This analysis also assesses the contribution of error variance to the model.

Table 2.2 Between-Subjects Effects

Dependent Variable	Source	Sum of Squares	df	Mean Square	F-Value	p-Value
Healthier Food Choices (Yes/No)	Income Level	25.36	2	12.68	9.12	<0.001
	Awareness Score	8.34	1	8.34	6.01	0.015

Dependent Variable	Source	Sum of Squares	df	Mean Square	F-Value	p-Value
	Error	410.24	296	1.39		

Source: Primary Data collected and computed

Income Level contributes significantly to differences in healthier food preferences ($p < 0.001$), reinforcing the hypothesis that higher-income individuals are more inclined to select healthier options. Awareness Score also has a significant positive influence ($p = 0.015$), showing that individuals with greater health awareness are more likely to choose healthier food options.

Pairwise Comparisons of Income Levels

Pairwise comparisons were conducted to understand the differences between income groups regarding their healthier food choices.

Table 2.3 Pairwise Comparisons

Income Level	Comparison	Mean Difference	p-Value
Low vs Middle	-0.21	0.032	0.000
Low vs High	-0.37	<0.001	0.000
Middle vs High	-0.16	0.045	0.000

Source: Primary Data collected and Computed

The pairwise comparison shows significant differences between income groups. High-income individuals are substantially more likely to prefer healthier food options compared to both middle- and low-income individuals. The difference between middle- and low-income groups is also significant, although less pronounced.

Overall Interpretation

The multivariate test results, between-subjects effects, and pairwise comparisons collectively support the hypothesis that income level significantly influences the likelihood of ordering healthier food options. High-income individuals demonstrate a greater preference for healthier choices, likely due to increased affordability and access. The covariate analysis indicates that health awareness positively influences healthier food choices, regardless of income level. This highlights the importance of promoting nutritional education to encourage healthier food habits across all income groups. While the interaction effect was not significant, the independent influence of income and awareness underscores their critical roles in shaping food ordering behaviour.

Influence of Nutritional Awareness on the Choice of Food Ordered Online

Model Summary

Logistic regression was used to analyse the influence of nutritional awareness on the likelihood of choosing healthier food options in online food orders. Below are the outputs generated for this analysis.

Table 3.1: Model Summary

Statistic	Value
-2 Log Likelihood	326.45

Statistic	Value
Cox & Snell R ²	0.345
Nagelkerke R ²	0.462

Source: Primary Data collected and Computed

The model fit indices indicate that the logistic regression model explains approximately 34.5% (Cox & Snell R²) to 46.2% (Nagelkerke R²) of the variance in the choice of healthier food options. This suggests that nutritional awareness plays a significant role in predicting the dependent variable.

Table 3. 2: Variables in the Equation

Predictor Variable	B	SE	Wald	p-Value	Exp(B)
Nutritional Awareness Score	0.862	0.215	16.02	<0.001	2.368
Income Level (Middle vs Low)	0.543	0.189	8.28	0.004	1.721
Income Level (High vs Low)	1.013	0.225	20.21	<0.001	2.755
Constant	-1.527	0.317	23.22	<0.001	0.217

Source: Primary Data collected and Computed

Nutritional Awareness Score: For every unit increase in the nutritional awareness score, the odds of choosing healthier food options increase by 2.37 times ($p < 0.001$). This indicates a strong and significant influence of nutritional awareness on food choice.

1. Income Level:

- Middle-income individuals are 1.72 times more likely to choose healthier options compared to low-income individuals ($p = 0.004$).
- High-income individuals are 2.76 times more likely to choose healthier options compared to low-income individuals ($p < 0.001$).

The significant constant term (-1.527) suggests that without the influence of these predictors, the baseline odds of choosing healthier options are low.

Table 3.3: Classification Table

Observed	Predicted: Healthier Options
No	140
Yes	30
Overall Percentage	76.67%

Source: Primary Data collected and Computed

The model correctly classified 76.67% of cases, demonstrating good predictive accuracy. The sensitivity (proportion of healthier food choosers correctly classified) is 75%, while the specificity (proportion of non-healthier food choosers correctly classified) is 77.78%.

Overall Interpretation

The logistic regression analysis confirms the significant influence of nutritional awareness on the likelihood of choosing healthier food options in online orders. Individuals with higher awareness scores were substantially more likely to select healthier options, with a 2.37-fold increase in odds for every unit rise in the awareness score. Furthermore, income level significantly affects food choices, with middle- and high-income individuals showing higher odds of opting for healthier foods compared to low-income groups. These findings emphasize the critical role of nutritional education and economic factors in shaping consumer behaviour.

The model's good predictive power, with an overall classification accuracy of 76.67%, underscores its robustness. These insights suggest that interventions promoting nutritional awareness and accessibility to healthier food options, particularly for lower-income groups, can enhance health-conscious food choices in the online food delivery market.

Findings:

1. There is a significant positive relationship between the frequency of online food ordering and the prevalence of lifestyle-related health issues such as obesity, diabetes, and hypertension in urban Indian populations. The Structural Equation Modelling (SEM) analysis supports this hypothesis, with the model fit indices indicating a good fit.
2. Income level significantly influences the likelihood of ordering healthier food options, with higher-income individuals being more inclined to choose healthier options compared to middle- and low-income groups. The MANCOVA analysis reveals that income level and nutritional awareness independently contribute to this difference in food preferences.
3. Nutritional awareness has a strong and significant influence on the choice of healthier food options in online orders. The logistic regression analysis shows that for every unit increase in the nutritional awareness score, the odds of choosing healthier food options increase by 2.37 times.

Suggestions:

1. Promote nutritional education and awareness campaigns to empower consumers, particularly in lower-income groups, to make more informed and healthier food choices when ordering online.
2. Encourage online food delivery platforms to prominently feature and market healthier food options, making them more accessible and appealing to consumers.
3. Implement policies or incentives that motivate online food delivery platforms to provide clear and comprehensive nutritional information for their menu items, enabling consumers to make more health-conscious decisions.
4. Explore ways to subsidize or make healthier food options more affordable, especially for lower-income consumers, to bridge the gap in accessibility and affordability.

Conclusion

The study provides valuable insights into the public health impact of the growing online food ordering trend in India. The findings highlight the significant relationship between frequent online food ordering and the prevalence of lifestyle-related health issues, as well as the critical role of income level and nutritional awareness in shaping consumer preferences for healthier food choices. These insights underscore the need for a multifaceted approach, involving both public health interventions and industry-level changes, to promote healthier eating habits and mitigate the adverse health consequences associated with the rise of online food delivery services in India.

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