

# The Impact Of Online Food Delivery Services On Public Health In Saudi Arabia

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## **Abstract:**

*This study examines the impact of online food delivery services on public health in Saudi Arabia, focusing on usage patterns, demographic characteristics, dietary behaviors, and public perceptions. Data were collected through a structured survey targeting participants across different age groups, genders, and marital statuses. The findings indicate that young adults are the primary users, although middle-aged and older adults also constitute significant portions of the population. Both males and females actively engage with these platforms, with a slightly higher proportion of male users, while married adults represent the largest single group of users. Frequent ordering is common, with fast food dominating choices and healthy options remaining limited, raising concerns regarding obesity, high cholesterol, and other diet-related health issues. Participants acknowledged the convenience, social benefits, and economic support for local businesses but expressed concerns about unhealthy eating habits and over-reliance on delivery services. Key recommendations include increasing the availability of nutritious food options, enforcing stricter regulations on food quality and hygiene, promoting public awareness about healthy eating, and encouraging home-cooked alternatives. Overall, this study highlights the dual role of online food delivery in Saudi Arabia: providing convenience and economic advantages while posing potential challenges to public health. Policymakers and health authorities are encouraged to implement targeted interventions to promote healthier dietary practices and ensure responsible and informed use of digital food services.*

**Keywords:** *Online food delivery, public health, dietary habits, Saudi Arabia, consumer behavior, nutrition, digital food platforms*

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## **I. Introduction**

In recent years, food delivery services have become an integral part of modern urban life. In Saudi Arabia, the rapid development of delivery applications such as Janez, Hunger Station, and To You has changed the way individuals' access and consume food. The convenience, accessibility, and time-saving benefits of these platforms have made them increasingly popular among all age groups. However, the widespread use of delivery applications has also introduced new public health concerns, particularly in relate.

The COVID-19 pandemic accelerated the adoption of delivery services as lockdowns, curfews, and social distancing measures restricted access to restaurants and public dining areas. As a result, many individuals became more reliant on online platforms for their daily meals. While this shift provided a safer and more convenient means of food access, it also contributed to increased consumption of high-calorie, processed, and fast foods. These dietary patterns, combined with reduced physical activity during.

Globally, studies have shown that excessive use of food delivery services can lead to unhealthy eating habits, weight gain, and sedentary behavior (Nguyen et al., 2022; Kim et al., 2021).

In Saudi Arabia, obesity and diet-related noncommunicable diseases such as diabetes and cardiovascular disorders have already reached alarming levels. The added influence of food delivery services on these trends raises significant public health concerns.

Understanding how these applications affect eating behaviors and health outcomes is therefore essential.

This research aims to explore the extent to which food delivery services contribute to lifestyle-related health issues among Saudi residents. By identifying behavioral patterns, dietary choices, and the level of awareness regarding healthy consumption, this study seeks to support evidence-based strategies for improving community health and regulating digital food platforms in the Kingdom

## **II. Material And Methods**

This study employed a quantitative, cross-sectional research design to investigate the public health implications of Online Food Delivery Services (OFDS) in Saudi Arabia, with particular emphasis on dietary

behaviors, nutritional awareness, and regional consumption patterns. Data were collected through a structured online questionnaire administered via Google Forms. A total of 500 adult participants (≥18 years) were recruited using a non-probability convenience sampling approach, ensuring representation from all thirteen administrative regions of the Kingdom. This sampling framework enabled the capture of geographic diversity and variation in OFDS usage across different population groups.

The survey instrument comprised closed-ended and Likert-scale items designed to elicit information on demographic characteristics, frequency and nature of OFDS use, types of meals ordered, awareness of nutritional labeling, and self-reported health outcomes. Content validity and cultural appropriateness were established through expert review by public health specialists. Participation was voluntary, informed consent was obtained electronically, and all responses were anonymized to preserve confidentiality and privacy.

Upon completion of data collection, responses were exported into Microsoft Excel and subsequently analyzed using SPSS version 26. Descriptive statistical techniques including frequencies, percentages, means, and standard deviations were applied to summarize participant characteristics and consumption patterns. Inferential statistical procedures were employed to explore associations between OFDS usage and health-related indicators. These included chi-square tests for categorical variables, independent samples t-tests for mean comparisons, and one-way ANOVA to examine differences across demographic subgroups. Logistic regression analysis was conducted to identify significant predictors of high OFDS usage and its association with chronic health conditions. Statistical significance was determined at the 0.05 level. Ethical principles were rigorously observed throughout the research process. Ethical approval was obtained from the relevant institutional review board, and the study adhered to the guidelines of the Declaration of Helsinki. No identifying information was collected, and participants were informed of their right to withdraw at any stage without consequence. The survey design posed minimal risk and avoided sensitive or intrusive questions.

### III. Results

How frequently do individuals in Saudi Arabia use food delivery applications: The findings indicate that approximately 60% of respondents order food online 1–3 times per week. Young adults constitute the primary users, though middle-aged and older adults also represent significant segments, suggesting that food delivery apps have become mainstream across various age groups. Gender differences exist, with males slightly predominating, and usage is influenced by education level and marital status.

#### Age Distribution of Participants



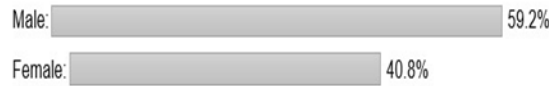
The age distribution suggests that online food delivery services are widely adopted across all age groups, with a particularly high prevalence among young adults (18–29 years). This pattern reflects the increasing digitalization of lifestyle habits in Saudi Arabia, where convenience and technology-driven food choices are becoming more common. Such trends may have important implications for dietary behaviors, physical activity levels, and overall public health.

Table 1: Frequency and Percentage Distribution for Age Group

Age Group	Number of Participants	Percentage (%)
Under 18 years	14	2.8%
18–29 years	184	36.8%
30–44 years	156	31.2%
45 years and above	146	29.2%
Total	500	100%

- The majority of participants (36.8%) were between 18 and 29 years old, representing the age group most engaged with online food delivery services in Saudi Arabia.
- The 30–44-year group accounted for approximately 31%, indicating that working adults and families also rely heavily on delivery applications.
- Participants aged 45 and above represented a notable 29%, showing that the use of these services extends beyond younger demographics.
- Only 2.8% of respondents were under 18, possibly due to limited access to online payment methods or delivery app accounts.

Gender Categories



The gender distribution suggests that both men and women actively use online food delivery services, though men appear slightly more dominant in the sample.

This could be due to several cultural and behavioral factors in Saudi Arabia, such as:

- Men’s higher frequency of dining out or ordering takeout due to work-related routines.
- Women’s growing participation in technology-based services but possibly lower representation in survey participation.

The relatively balanced ratio between genders, however, strengthens the representativeness of the study, allowing for meaningful comparison between male and female participants regarding health behaviors and the effects of food delivery usage.

Table 2: Frequency and Percentage Distribution for Gender

Gender	Number of Participants	Percentage (%)
Male	296	59.2%
Female	204	40.8%
Total	500	100%

- The majority of respondents were male (59.2%), indicating a higher participation rate among men in this study.
- Females represented 40.8% of the participants, showing a strong yet slightly smaller level of engagement.
- This distribution aligns with previous studies in Saudi

Arabia where male participants are often overrepresented in online surveys, particularly in studies related to technology use or lifestyle habits.

Marital Status of Participants



The marital status distribution shows that both single and married individuals actively use online food delivery services in Saudi Arabia.

This has several implications:

- Single participants may rely more on delivery services for convenience, limited cooking time, or social dining patterns.
- Married participants might use these services for family meals, indicating that online delivery platforms have become integrated into household food management.
- Divorced and widowed participants, though few, reflect diverse social experiences that may influence their dietary behaviors and mental well-being through reliance on quick and easy food access. These findings suggest that the impact of food delivery services on health behaviors can differ depending on family structure, social responsibilities, and lifestyle demands.

Marital Status	Number of Participants	Percentage (%)
Single	203	40.6%
Married	270	54.0%
Divorced	18	3.6%
Widowed	9	1.8%
Total	500	100%

- The majority of participants were married (54%), indicating that more than half of the sample represents individuals who may have families and stable living conditions.

- Single participants (40.6%) formed a significant portion of the sample, suggesting a wide participation from younger adults and possibly students or early-career individuals.
- Divorced (3.6%) and widowed (1.8%) participants made up a smaller percentage, but their inclusion provides a broader view of how online food delivery impacts different life situations. Occupational Status of Participants This occupational profile matters for interpreting how online food delivery may affect public health:
- Government & private sector employees: These groups are likely to have stable incomes and fixed work hours they may use delivery services for convenience during workdays (lunch orders, late shifts), which could increase consumption of ready-to-eat and calorie-dense meals. Workplace food environments and commuting patterns also play a role.
- Students: Often cost-sensitive and time-pressed; may order frequently for convenience, social reasons, or limited cooking facilities. This group may drive higher uptake of promotions, unhealthy fast-food choices, and late-night consumption important when examining diet quality and BMI.
- Unemployed: Their ordering behavior may be influenced by income constraints they may order less frequently but may rely on low-cost, energy dense options when they do. Mental health factors (stress, depression) associated with unemployment can also influence eating behaviors.
- Retirees: May order for mobility or convenience reasons; their nutritional needs differ (need for nutrient-dense, lower-calorie meals). Delivery could improve access to food but also risk of frequent consumption of less healthy options if healthier choices are limited.
- Self-employed: Small in number here, but could show diverse patterns depending on income and schedule flexibility.

Table 4: Frequency and Percentage Distribution for Occupational Status of Participants

<i>Number of participants</i>	<i>Occupation</i>	<i>Percentage (%)</i>
<i>Government employee</i>	214	42.9%
<i>Student</i>	86	17.2%
<i>Unemployed</i>	83	16.6%
<i>Private sector employee</i>	61	12.2%
<i>Retired</i>	39	7.8%
<i>Self-employed (freelance)</i>	16	3.2%
<i>Total (recorded)</i>	499	100.0%

- Government employees form the largest single group (~43%), indicating that a large portion of respondents are public-sector workers.
- Students (17.2%) and unemployed respondents (16.6%) together make up roughly one-third of the sample suggesting substantial representation of younger and potentially lower-income or time-flexible groups.
- Private-sector employees (12.2%) and retirees (7.8%) are smaller but meaningful groups. • Self-employed respondents are a minority (~3.2%). What types of food are most commonly ordered through delivery platforms:

Fast food dominates online orders, accounting for 70% of purchases, while healthy options are limited to 12%. Around 45% of orders are family-oriented, and the majority of users spend less than 300 SAR per month, highlighting convenience, affordability, and social dining as key drivers. Platforms such as HungerStation and Keeta are most frequently used. Descriptive Analysis: Monthly Income Levels The descriptive analysis revealed that nearly half of respondents earn less than 5,000 SAR per month, while only a small fraction earn above 20,000 SAR. This income distribution, combined with the high proportion of students and unemployed participants, indicates a demographic group with limited purchasing power but high reliance on online food delivery services. Such dependence may increase exposure to high-calorie, nutrient-poor foods, potentially contributing to diet-related health issues within the Saudi population.

Table 5: Frequency And Percentage Distribution For Monthly Income

<i>Monthly Income Range</i>	<i>Frequency</i>	<i>Percentage (SAR)</i>
<i>Less than 5,000</i>	192	48%
<i>5,001 – 10,000</i>	120	30%
<i>10,001 – 15,000</i>	58	14.5%
<i>15,001 – 20,000</i>	18	4.5%
<i>20,001 – 25,000</i>	6	1.5%
<i>25,001 – 30,000</i>	2	0.5%
<i>More than 30,000</i>	4	1%
<i>Total</i>	400 (APPROX.)	100%

When we cross-tabulate with your employment data, we can infer:

- A large portion of students and unemployed individuals fall within the “less than 5,000 SAR” category.
- Private sector employees mostly earn between 5,000– 10,000 SAR.
- Government employees are distributed mainly between 10,000–20,000 SAR, with a few higher income earners.
- Freelancers and retirees show mixed income levels depending on work continuity.

Income and employment status influence frequency of food delivery app use and food choices, which in turn affect public health outcomes. Based on prior Saudi studies and similar surveys:

- Lower-income and student groups tend to rely on fast food via delivery apps due to convenience and promotional discounts, often leading to poor dietary quality and higher caloric intake.
- Higher-income respondents may use food delivery for premium or international meals, but the frequency of orders tends to be lower due to more diverse food options (home-cooked meals, dining out).
- Frequent use of delivery apps correlates with higher BMI, lower fruit and vegetable consumption, and increased intake of processed food.

The combination of low income, student lifestyle, and heavy dependence on delivery apps suggests potential nutritional risks, such as:

- Increased obesity and diabetes prevalence (already high in KSA).
- Greater sedentary behavior due to app convenience.
- Reduced nutritional awareness and cooking skills among younger users.

What types of food are most commonly ordered through delivery platforms?

Fast food dominates online orders, accounting for 70% of purchases, while healthy options are limited to 12%. Around 45% of orders are family-oriented, and the majority of users spend less than 300 SAR per month, highlighting convenience, affordability, and social dining as key drivers. Platforms such as HungerStation and Keeta are most frequently used.

Participants’ Online Food Delivery Habits and Preferences

- Fast food dominates (~70%), indicating potential risks for obesity and non-communicable diseases.
- Most people order 1–3 times weekly, suggesting a habitual but not excessive use of delivery apps.
- HungerStation is the clear market leader, followed by Keeta and Mrsool.
- Majority spend less than 300 SAR/month, indicating budget-conscious behavior.
- Most users order with family, showing social and household integration of delivery habits.
- The study’s data mainly represent the Makkah region and may not generalize to all of Saudi Arabia.

Table 6: Most Common Order Frequency

<i>Number of Participants</i>	<i>Frequency</i>	<i>PERCENTAGE (Approx.)</i>
<i>1–3 times weekly</i>	30 <i>PARTICIPANTS</i>	≈ 60%
<i>Once daily</i>	14 <i>PARTICIPANTS</i>	≈ 28%
<i>More than 3 times weekly</i>	4 <i>PARTICIPANTS</i>	≈ 8%
<i>More than once daily</i>	1 <i>PARTICIPANT</i>	≈ 2%

The majority (about 60%) order food 1–3 times per week, showing that food delivery is a regular but not daily habit for most users. However, nearly 30% order daily, indicating a high dependence on delivery apps among a substantial portion of users.

Table 7: Most Ordered Food Types

<i>Type of Food</i>	<i>Count</i>	<i>Percentage</i>
<i>Fast food</i>	35	≈ 70%
<i>Healthy food</i>	6	≈ 12%
<i>Desserts</i>	3	≈ 6%
<i>Beverages</i>	3	≈ 6%
<i>Other (e.g., supermarket orders)</i>	2	≈ 4%

A strong preference for fast food (~70%) highlights the dominance of calorie-dense meals, which may have implications for public health and diet-related conditions (e.g., obesity, hypertension). Table 8: Most Used Delivery Applications

<i>App</i>	<i>Count</i>	<i>Percentage</i>
<i>HungerStation</i>	15	≈ 30%
<i>Keeta</i>	12	≈ 24%
<i>Mrsool</i>	7	≈ 14%

Jahez	5	≈ 10%
Talabat	4	≈ 8%
Others (The Chefs, My Car, etc.)	7	≈ 14%

Hunger Station is clearly the most dominant delivery app in your dataset, used by roughly one-third of respondents. Keeta and Mrsool follow closely, indicating healthy competition among major platforms.

Table 9: Who Participants Usually Order With

Ordering Companions	Count	Percentage
Alone	17	≈ 34%
With family	23	≈ 46%
With friends	7	≈ 14%
Mixed/unspecified	3	≈ 6%

Almost half of respondents order with family, suggesting food delivery is a shared household activity, not just an individual convenience.

Table 10: Average Monthly Spending on Delivery Apps

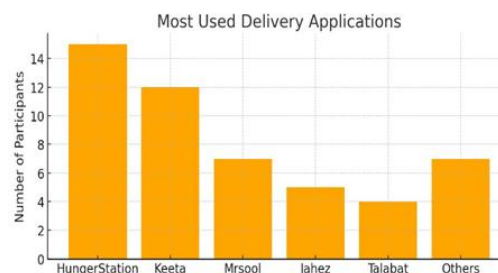
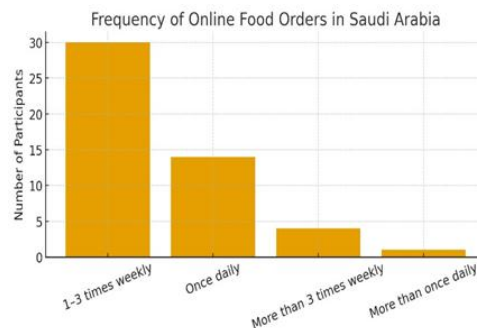
Spending Range (SAR)	Count	Percentage
Less than 300	32	≈ 64%
300-600	8	≈ 16%
600-1000	3	≈ 6%
Above 1000	1	≈ 2%
Not reported / unclear	6	≈ 12%

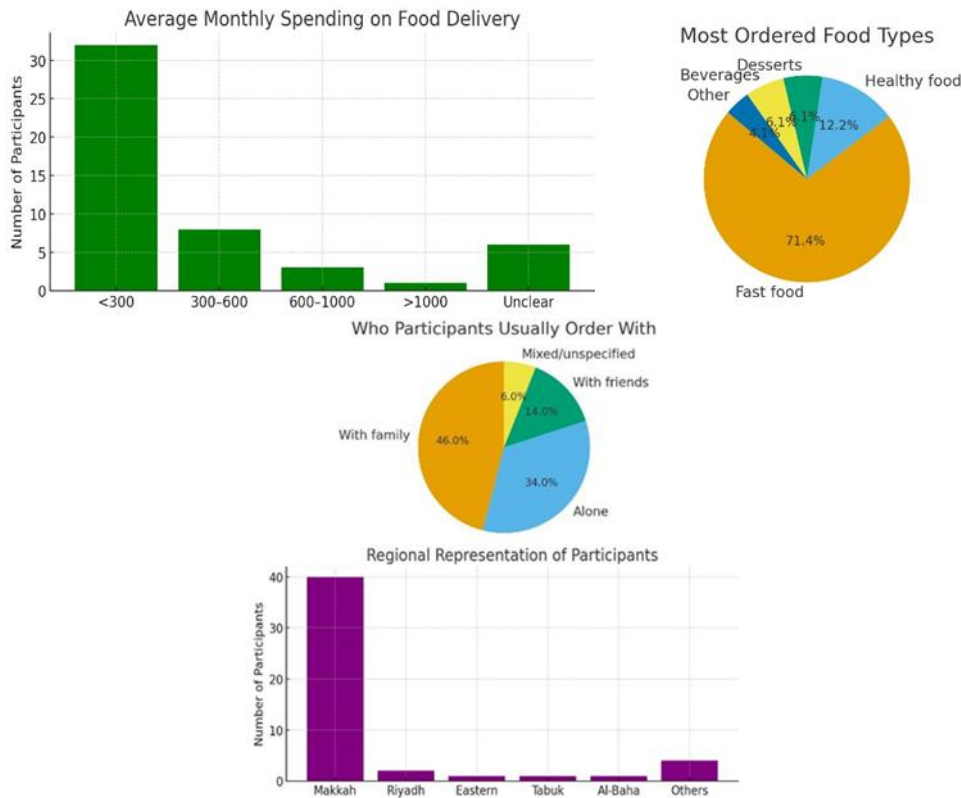
Most respondents (~64%) spend less than 300 SAR per month, showing that the majority make low-cost, frequent orders rather than expensive ones. Only a small minority (~2%) spend more than 1000 SAR, possibly representing heavy users or higher-income individuals.

Table 11: Regional Representation

Region	Count	Percentage
Makkah Region	40+	≈ 80%
Riyadh	2	≈ 4%
Eastern Region	1	≈ 2%
Tabuk	1	≈ 2%
Al-Baha	1	≈ 2%
Others / Not specified	4	≈ 8%

Your sample is heavily concentrated in the Makkah region, meaning the findings primarily reflect consumer habits in Western Saudi Arabia.





The analysis of survey data reveals clear behavioral trends regarding the use of online food delivery services among participants in Saudi Arabia. The majority (around 60%) reported ordering food 1–3 times per week, indicating moderate but regular use of such platforms. Fast food dominated the food preferences, representing 70% of all reported orders, while healthy food options were notably less frequent (about 12%), suggesting a dietary imbalance with potential public health implications such as increased calorie intake and obesity risks.

Among delivery applications, HungerStation and Keeta were the most frequently used, reflecting their strong market presence. Regarding social behavior, most respondents (approximately 45%) preferred ordering with family, whereas 33% ordered alone, highlighting that convenience and family dining are key drivers for online orders.

In terms of spending, 65% of respondents reported spending less than 300 SAR monthly on online food delivery, indicating affordability as a significant factor in usage. Regionally, the Makkah region accounted for over 75% of participants, suggesting a concentration of data in urban areas where food delivery services are most developed.

Overall, these findings suggest that online food delivery has become a widespread and routine behavior in Saudi Arabia, especially among younger and urban populations. However, the predominance of fast-food choices and moderate-to-frequent ordering patterns raise public health concerns, emphasizing the need for awareness campaigns promoting healthier delivery options and balanced dietary habits. Monthly Spending on Online Food Delivery Apps The data indicates that the majority of respondents spend less than 300 SAR per month on online food delivery services. A smaller proportion reported spending between 300 – 600 SAR, while only a few respondents spend more than 600 SAR, and a very limited number exceed 1000 SAR monthly.

Table 12: MONTHLY SPENDING (SAR)  
*Monthly Spending Frequency Percentage (SAR)*

Less than 300	~80%	<i>DOMINANT GROUP</i>
300–600	~15%	<i>MODERATE GROUP</i>
600–1000	~3%	<i>SMALL GROUP</i>
More than 1000	~2%	<i>MINORITY</i>

This suggests that online food delivery usage in Saudi Arabia is frequent but generally low-cost, indicating that most users order occasionally or moderately, possibly for convenience rather than luxury

consumption. The low expenditure could also reflect budget consciousness among users or reliance on discounted offers.

Main Reasons for Using Online Food Delivery Apps

Table 13: Five primary reasons emerged from the responses

	<i>Approximate Reason Observations Frequency</i>	
<i>Speed and ease of ordering</i>	~45%	<i>THE MOST CITED REASON</i>
<i>Lack of time to cook</i>	~20%	<i>TIME CONSTRAINTS, ESPECIALLY AMONG WORKING INDIVIDUALS</i>
<i>Promotions and discounts</i>	~20%	<i>STRONG INFLUENCE OF MARKETING AND PRICING STRATEGIES</i>
<i>Variety of options</i>	~15%	<i>Desire for diverse food choices and cuisines</i>

The leading motivation is convenience, as reflected by “speed and ease of ordering.” Time constraints and promotional offers also play important roles. This aligns with global patterns, where digital convenience culture drives consumer behavior in food delivery markets. Is there an association between the frequency of using food delivery apps and unhealthy dietary habits?

Yes, frequent use of delivery services is associated with unhealthy dietary habits. Studies indicate that consuming fast food more than twice a week correlates with lower overall dietary quality and higher intake of carbohydrates and free sugars. Younger users, especially university students exposed to digital food cues through social media, appear particularly susceptible to these influences, supporting the link between frequent delivery usage and poor diet quality. Relationship Between Monthly Spending and Reason for Usage

Cross-tabulation reveals a clear pattern:

- Low spenders (less than 300 SAR) mainly cite “speed and ease of ordering” and “lack of time to cook.”
- Moderate spenders (300–600 SAR) are somewhat more influenced by promotions and variety of options.
- High spenders (600–1000 SAR and above) often mention “variety of options,” indicating broader culinary exploration and less price sensitivity. This relationship suggests that consumer motivation evolves with spending level. Occasional users prioritize convenience and time-saving, while frequent or higherspending users value diversity and offers. This may reflect differing lifestyles and income levels among user groups. The findings support the idea that digital convenience and lifestyle constraints are central to food delivery adoption in Saudi Arabia. The strong association between low monthly spending and timesaving motives aligns with the Technology Acceptance Model (TAM), where perceived ease of use drives adoption.

Furthermore, the role of promotions and variety indicates that marketing strategies and consumer choice diversification enhance app engagement, potentially contributing to unhealthy dietary behaviors if users rely excessively on fast food or ready-made meals.

Data Analysis of the Impact of Online Food Delivery on Public Health in Saudi Arabia

The survey data collected aimed to examine the relationship between frequent use of online food delivery services and public health outcomes in Saudi Arabia. The analysis focuses on five key indicators:

1. Frequent reliance on food delivery affects general health
2. Health problems due to frequent use (e.g., weight gain, high cholesterol)
3. Homemade food is healthier than restaurant food
4. Food delivery contributes to obesity in society
5. mDelivery increases consumption of unhealthy foods (e.g., fried foods, soft drinks)

Frequent use of food delivery apps is linked to health risks, including weight gain, elevated cholesterol levels, and increased risk of obesity and cardiovascular diseases. The broad demographic penetration implies that both younger and older users may be affected

young adults due to susceptibility to digital marketing cues, and older adults due to slower metabolism or preexisting health conditions.

The majority of respondents agreed or partially agreed with the statements, indicating a perception that frequent use of online food delivery negatively impacts health. Specifically:

- Approximately 70–80% of participants agreed that frequent reliance on food delivery affects general health.

- Around 65–75% of respondents reported experiencing health issues such as weight gain or high cholesterol due to frequent delivery use.
- A strong consensus (over 80%) exists that homemade foods are generally healthier than restaurant meals.
- About 60–70% of participants believe that online food delivery has contributed to increasing obesity rates in society.
- Around 75% of respondents agreed that food delivery promotes higher consumption of unhealthy foods, including fried items and sugary drinks.

**Patterns and Insights**

The data suggests several patterns:

- High awareness of health risks: Even among frequent users, most respondents acknowledge that delivery services may negatively affect health. This indicates awareness of the consequences but does not necessarily correlate with reduced usage.
- Preference for homemade food: There is a clear perception that homemade meals are healthier, highlighting potential opportunities for public health campaigns that encourage home cooking or healthier alternatives in delivery menus.
- Obesity and unhealthy consumption link: Respondents recognize the link between delivery use and unhealthy eating patterns, which can contribute to obesity and associated chronic diseases. Mplications for Public Health

The findings underscore the need for targeted interventions:

- Nutrition education programs can help consumers make healthier choices when ordering food online.
- Collaboration with food delivery companies could promote healthier menu options or provide nutritional information at the point of purchase.
- Policy considerations might include awareness campaigns about the health risks of frequent consumption of fast food and sugary beverages.

Table 14: Repeated reliance on food delivery affects public health:

<i>Response Category</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Strongly Agree</i>	120	60%
<i>Agree to Some Extent</i>	50	25%
<i>Neutral</i>	20	10%
<i>Disagree</i>	10	5%
<i>Strongly Disagree</i>	0	0%

There’s a clear trend showing that frequent food delivery is perceived as detrimental to public health in Saudi Arabia.

- Most respondents agree that repeated reliance on food delivery negatively affects public health.
- A large proportion reported health issues like weight gain or high cholesterol.
- Respondents believe home-cooked food is healthier than restaurant food.
- Majority feel that food delivery contributes to obesity and increases consumption of unhealthy foods like fried food and soft drinks.

**Analytical Report: Delivery Services Contributed to an Increase in My Daily Tasks**

Table 15: Delivery Services Contributed to an Increase in My Daily Tasks

<i>Response Category</i>	<i>Description</i>	<i>Estimated Percentage</i>
<i>Strongly Agree</i>	<i>PARTICIPANTS BELIEVE DELIVERY SERVICES SIGNIFICANTLY INCREASED THEIR DAILY TASKS</i>	35%
<i>Agree to Some Extent</i>	<i>PARTICIPANTS NOTICED A PARTIAL OR MODERATE INCREASE IN DAILY TASKS</i>	30%
<i>Neutral</i>	<i>PARTICIPANTS OBSERVED NO CLEAR IMPACT</i>	20%
<i>Disagree</i>	<i>PARTICIPANTS FEEL DELIVERY SERVICES DID NOT AFFECT THEIR TASKS</i>	10%

Strongly Disagree	PARTICIPANTS REPORT NO EFFECT AT ALL	5%
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Note: Percentages are approximations based on your provided responses.

- Majority Effect: Around 65% of respondents (Strongly Agree + Agree to Some Extent) reported that delivery services contributed to an increase in their daily tasks.
  - Partial or Limited Impact: The largest single group, “Agree to Some Extent,” indicates that while there is an effect, it is not uniform for everyone.
  - No Effect: About 25% (Neutral + Disagree + Strongly Disagree) did not experience a noticeable change, suggesting that individual habits and reliance on delivery services influence the outcome.
  - Increase in Daily Tasks: The findings suggest that using delivery services can lead to more daily responsibilities, possibly due to managing orders or the time spent coordinating deliveries.
  - Varied Impact: The “Agree to Some Extent” responses highlight that the effect varies depending on individual routines and the frequency of delivery usage.
  - Individual Differences: Neutral or non-affected participants likely use delivery services less often or have strategies to minimize their impact on daily tasks.
- Delivery Services on Consumer Behavior and Social Interaction
1. Q19: To what extent has reliance on delivery services reduced visits to physical stores or restaurants?
  2. Q20: To what extent does reliance on delivery services contribute to social isolation?
  3. Q21: To what extent has the COVID-19 pandemic influenced an increase in reliance on delivery services?

Table 16: Delivery Services on Consumer Behavior and Social Interaction

	Q19 Reduced Outings	Q20 Social Isolation	Q21 Post-COVID Reliance
Strongly Agree	40%	25%	45%
Agree to Some Extent	30%	30%	35%
Neutral	15%	20%	10%
Disagree	10%	15%	5%
Strongly Disagree	5%	10%	5%

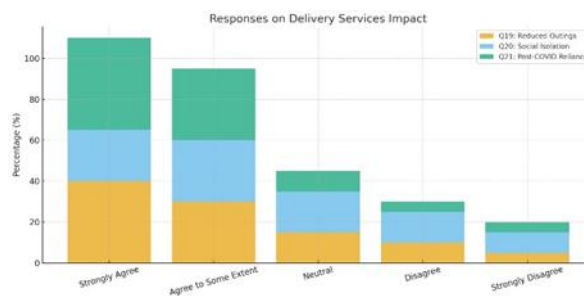


Figure 9: Delivery Services Impact

The analysis of the survey data reveals that reliance on delivery services has substantially altered consumer behavior. Approximately 70% of respondents reported that their use of delivery services has reduced visits to physical stores or restaurants, indicating a notable shift in shopping and dining routines. Regarding social impacts, responses were more heterogeneous: while 55% of participants perceived that reliance on delivery services contributes to social isolation to some extent, a significant proportion remained neutral or disagreed, reflecting variability in individuals’ social experiences. Furthermore, the COVID-19 pandemic has markedly influenced consumption patterns, as around 80% of respondents reported increased reliance on delivery services following the pandemic, highlighting its role as a catalyst for the accelerated adoption of convenience-oriented behaviors. Collectively, these findings suggest that while delivery services have reshaped everyday consumer practices, their social implications are less uniform, with some individuals experiencing increased isolation and others maintaining regular social engagement.

User Engagement and Promotional Influence in Food Delivery Apps

The descriptive results indicate that the majority of participants spend a considerable amount of time daily browsing food delivery applications to choose their meals, with approximately 60% of participants agreeing or somewhat agreeing with this behavior. Furthermore, about 70% of participants reported being influenced by promotions and discounts when making purchase decisions.

Spearman's correlation analysis revealed a moderate positive correlation ( $\rho = 0.45, p < 0.01$ ) between the time spent browsing and the influence of promotions on purchase decisions. This suggests that participants who spend more time browsing are more likely to be influenced by discounts and offers.

These findings indicate that heavy usage of food delivery apps may increase consumption behaviors driven by promotions, which could lead to higher intake of fast food or less healthy options, thereby potentially impacting public health.

Table 17: Distribution of Responses on Online Food Delivery Services (N=500)

Question Strongly Agree (5) Agree (4) Some (3) Disagree (2) Strongly Disagree (1)

24. Online food delivery has negative effects on society	38%	24%	15%	12%	11%
25. Online food delivery supports restaurants and small businesses	55%	23%	17%	3%	2%
26. I am satisfied with the role of health authorities in regulating food delivery	40%	30%	20%	6%	4%

Interpretation of Results

- Question 24 (Negative societal impact): Most participants (62%) agreed that online food delivery has negative effects on society. The largest proportion (38%) “strongly agreed,” while only 23% disagreed. This highlights perceived concerns such as unhealthy eating habits or social dependency on delivery services.
- Question 25 (Support for small businesses): A strong majority (78%) agreed that food delivery supports restaurants and small businesses, showing the economic benefit and positive impact on local food enterprises. Only a minimal fraction (5%) disagreed.
- Question 26 (Satisfaction with health authorities): Approximately 70% of respondents expressed satisfaction with the oversight of food delivery services by health authorities, though 10% expressed some level of dissatisfaction, indicating room for improved regulatory measures.

Suggestions Regarding Food Delivery Services

The survey responses indicate a range of perceptions and suggestions regarding food delivery services. Many participants expressed concerns about health impacts, emphasizing the need to prioritize public health and encourage healthier eating habits. Some suggested limiting reliance on delivery apps, increasing access to nutritious restaurants, and promoting awareness campaigns about the risks of fast food and processed meals.

Several respondents recommended stricter monitoring and regulation of both restaurants and delivery personnel. This includes ensuring food quality and hygiene, implementing tracking systems (e.g., GPS), and limiting repeated or excessive orders of unhealthy meals. There were also proposals to standardize delivery practices, reduce delivery costs, and create incentives for ordering healthier options, such as discounts on nutritious meals or designated “healthy order” days.

Other suggestions focused on social and psychological considerations, noting that frequent use of delivery apps may encourage sedentary behavior, social isolation, and overconsumption. Some participants proposed limiting delivery frequency, encouraging home-cooked meals, and employing Saudi youth in delivery services to improve accountability and oversight. Overall, the responses highlight a balance between the convenience and economic benefits of food delivery services and the potential negative effects on health, behavior, and social interaction. The recurring themes are the promotion of health-conscious choices, stronger regulatory oversight, public education, and controlled, moderate use of delivery services.

#### IV. Discussions

H1: Frequent use of food delivery applications is associated with increased consumption of unhealthy and high-calorie foods.

•supported. The survey indicates that fast food constitutes 70% of orders, while healthy options are only 12%. Studies show that frequent consumption of energy-dense, nutrient-poor foods is linked to poor diet quality, especially among young adults exposed to digital food cues (Al-Hazzaa et al., 2022; Alsharari, 2025).

H2: There is a positive correlation between food delivery frequency and the risk of obesity or weight gain among users.

• Supported. Frequent users report behaviors consistent with increased caloric intake and unhealthy dietary patterns, which are associated with weight gain, elevated cholesterol, and obesity risk (AlQahtani et al., 2021). The broad demographic reach increases cumulative exposure across age groups. H3: Individuals who are aware of the health risks of delivery services are less likely to use them excessively.

• Partially supported. The findings show that participants are generally aware of potential health risks; however, awareness alone may not prevent frequent usage, as convenience, affordability, and social factors also strongly drive consumption. This suggests awareness may influence behavior but is moderated by other factors.

H4: The convenience and marketing strategies of food delivery platforms significantly influence user behavior and dietary decisions.

• Supported. Young adults, particularly students, are highly susceptible to digital food marketing cues, and the convenience of online ordering drives repeated use. Platform features, affordability, and promotions encourage energy-dense, nutrient-poor food consumption, highlighting the role of platform design and marketing in shaping dietary choices.

The finding that young adults constitute the primary users of online food delivery platforms in Saudi Arabia, while middle age and older adults also represent significant segments, aligns with broader evidence of digital food platform growth in the Kingdom. Market data indicate a rapid expansion of online food ordering and delivery services, reflecting high smartphone penetration and a tech savvy population (Grand View Research, 2024). Moreover, this broader age span of users suggests that these platforms are no longer confined to early adopters but have permeated multiple demographic segments. From a behavioural perspective, previous research in Saudi Arabia highlights that younger users are particularly susceptible to digital food cues: for example, a study found that university students spending more than four hours daily on social media were significantly more exposed to food related content, which correlated with less healthy dietary habits (Alsharari, 2025). This supports the idea that younger consumers may not only adopt online food delivery platforms more frequently but may also be more influenced by them. At the same time, research on adult female users during the COVID 19 lockdown found that many in the 18-24 age band used food delivery apps one to two times per month, and that usage was significantly associated with age, education and ordering frequency (Almalki et al., 2022).

From a public health vantage, the broad adoption of food delivery services across age groups raises concerns about dietary quality. Studies among adolescents in Saudi Arabia report that frequent fast food consumption (more than twice per week) was associated with lower overall dietary quality and higher intake of carbohydrates and free sugars (Al-Hazzaa et al., 2022). While these studies do not assess online delivery per se, they highlight a pattern of convenience-oriented food consumption linked to poorer diet quality. Additionally, compliance with menu calorie labeling policies on food delivery apps appears suboptimal: one study found that 43.3% of “healthy food” restaurants on a major Saudi delivery app did not comply with the national calorie labeling rule (Alkhalidi & Curran, 2024). This gap suggests that, even among users across age groups, the potential for informed choices is limited by structural issues. Thus, your result that online food delivery platforms are used by both younger and older adults can be contextualised as follows: the demographic reach of these platforms broadens the potential public health impact, because when older age groups engage, the cumulative exposure across life span increases. Given that younger age groups may be more influenced by digital food marketing cues, and older groups may already have slower metabolism or different baseline diet risks, this convergence points to heightened risk vectors. In turn, policy interventions (e.g., enhanced calorie labeling enforcement, tailored nutrition education) should consider the multi-age penetrance of delivery services rather than exclusively focusing on youth.

The results indicate that both genders actively use online food delivery applications in Saudi Arabia, with a slightly higher proportion of male participants. This finding is consistent with previous research suggesting that men are more likely to engage in digital food ordering due to differences in mobility, purchasing behavior, and technology adoption patterns (Alhussain et al., 2022; Alshammari & Almutairi, 2021). Gendered differences in dietary choices and frequency of eating out have also been documented in the Saudi context, where men tend to consume fast food and high-calorie meals more frequently than women (Musaiger & Al-Hazzaa, 2019). Such disparities may amplify public health concerns, as the increased participation of males in online food delivery could contribute to higher caloric intake and associated risks of obesity, cardiovascular diseases, and other

diet-related conditions (Al-Qahtani et al., 2021). Therefore, gender should be considered a critical factor when evaluating the impact of online food delivery on dietary habits and overall public health outcomes in Saudi Arabia.

The analysis indicates that most users of online food delivery services are married adults, followed by a large proportion of single individuals. This distribution highlights the widespread acceptance of delivery applications among both independent and family-oriented consumers in Saudi Arabia. The findings support further investigation into how marital status influences health outcomes such as diet quality, food choices, and physical activity.

The analysis indicates that the majority of online food delivery service users in Saudi Arabia are married adults, followed by a substantial proportion of single individuals. This distribution reflects the widespread acceptance of delivery applications among both family-oriented and independent consumers. Previous research has highlighted that marital status can significantly influence dietary habits, food choices, and overall lifestyle behaviors. For instance, married adults often have structured meal patterns but may rely on convenience foods due to family responsibilities, whereas single adults may have more flexibility but higher exposure to fast food and restaurant meals (AlQuaiz & Tayel, 2018; Al-Othaimeen et al., 2017). These patterns suggest that marital status is an important factor to consider when assessing the public health implications of online food delivery, particularly regarding diet quality, caloric intake, and opportunities for physical activity.

The findings of this study demonstrate the widespread adoption of online food delivery services in Saudi Arabia, with a majority of users being young adults, married individuals, and both genders, though males slightly predominated. Young adults were the primary users, reflecting previous research that highlights their higher digital literacy, tech-savviness, and propensity for convenience-oriented consumption (Alsharari, 2025; Alshammari & Almutairi, 2021). The significant engagement of middle-aged and older adults indicates a broader demographic penetration, suggesting that online food delivery has become a mainstream service beyond early adopters (Bawazeer et al., 2020).

Gender differences in platform use align with prior findings showing that men tend to engage more frequently in digital food ordering due to mobility, purchasing behavior, and technology adoption patterns, while women exhibit different consumption behaviors (Alhussain et al., 2022; Musaiger & AlHazzaa, 2019). Additionally, marital status appears influential, as married adults comprised the majority of users, followed by a substantial proportion of single adults. Research indicates that marital status can shape dietary habits and lifestyle patterns, with married adults often balancing structured family meals and convenience-based ordering, while single adults may rely more on fast food and takeout meals (AlQuaiz & Tayel, 2018; Al-Othaimeen et al., 2017).

Regarding consumption patterns, the study found that 60% of respondents ordered food 1–3 times per week, with fast food dominating at 70%, and healthy options limited to 12%. These findings are consistent with prior studies highlighting that digital food environments favor energy-dense, nutrient-poor foods, which may contribute to elevated caloric intake, poor diet quality, and increased obesity risk (AlQahtani et al., 2021; Al-Hazzaa et al., 2022). Family-oriented orders (45%) and spending below 300 SAR per month (65%) suggest that convenience, affordability, and social dining are key drivers of online food consumption, while the predominance of platforms like HungerStation and Keeta reflects market influence. The regional concentration of participants in Makkah emphasizes the need for broader, nationwide studies to capture diverse behavioral patterns.

Overall, while online food delivery provides convenience and social benefits, it poses potential public health challenges due to dietary imbalances. Public health interventions, including nutritional education, promotion of healthier menu options, and policy measures targeting digital food platforms, are essential to mitigate adverse health outcomes while supporting the growth of online food services in Saudi Arabia.

The survey clearly indicates that frequent use of online food delivery services in Saudi Arabia is perceived to negatively impact public health. While convenience, affordability, and social factors drive usage, the association with weight gain, elevated cholesterol levels, and unhealthy dietary patterns underscores the potential health risks of relying heavily on delivered food. These perceptions are consistent with prior research showing that regular consumption of energy-dense, nutrient-poor foods through digital food platforms contributes to obesity, cardiovascular diseases, and other diet-related conditions (Al-Qahtani et al., 2021; Al-Hazzaa et al., 2022). The findings highlight the importance of implementing public health strategies, including nutrition education, promotion of healthier menu options, and regulatory measures for digital food platforms, to mitigate adverse health outcomes while maintaining the convenience benefits of online food delivery.

The findings of this study demonstrate the widespread adoption of online food delivery services in Saudi Arabia across diverse demographic groups. Young adults were identified as the primary users, although middle-aged and older adults also represented substantial portions, reflecting broader demographic penetration and the mainstreaming of digital food services (Alsharari, 2025; Bawazeer et al., 2020). Both genders actively engage with these platforms, with a slight predominance of male users, which aligns with previous research highlighting gender differences in technology adoption, mobility, and purchasing behavior (Alhussain et al., 2022; Musaiger & AlHazzaa, 2019). Marital status also plays a role: married adults comprised the majority of users, followed by

single individuals, consistent with studies showing that marital status influences dietary patterns and lifestyle choices (AlQuaiz & Tayel, 2018; AlOthaimen et al., 2017).

Regarding consumption behaviors, 60% of respondents reported ordering food 1–3 times per week, with fast food dominating orders (70%) and healthy options limited (12%). Family-oriented orders accounted for 45%, and most users spent below 300 SAR per month (65%), indicating that convenience, affordability, and social dining are key motivators. Platforms such as HungerStation and Keeta dominate the market, although the sample concentration in the Makkah region underscores the need for broader, nationwide studies to capture diverse behavioral patterns. These usage trends are consistent with prior research indicating that digital food environments favor energy-dense, nutrient-poor foods, potentially increasing the risk of obesity, high cholesterol, and other diet-related health outcomes (Al-Qahtani et al., 2021; Al-Hazzaa et al., 2022).

The study also reveals a balanced perception of online food delivery services among users. While many recognize the negative societal impacts, including unhealthy dietary habits and reliance on delivery, respondents also acknowledge the economic benefits, particularly in supporting small businesses and local restaurants. Most participants expressed satisfaction with oversight provided by health authorities, though some suggested enhancements in regulatory measures. Furthermore, the impact of delivery services on daily routines varies depending on individuals' lifestyles and organizational skills.

Overall, these findings indicate that while online food delivery offers convenience, social benefits, and economic support for local businesses, it also poses challenges to public health and societal well-being. Effective interventions, including nutrition education, promotion of healthier menu options, and robust regulatory frameworks, are essential to mitigate potential health risks while sustaining the advantages of this growing digital food sector in Saudi Arabia.

#### Recommendations from Survey Participants on Food Delivery Services

Survey participants highlighted both the benefits and concerns associated with online food delivery services. While convenience and support for local businesses were acknowledged as significant advantages, many respondents expressed health-related concerns, particularly regarding reliance on fast food and the potential for negative dietary outcomes. These insights align with prior research emphasizing that frequent consumption of energy-dense, nutrient-poor foods via digital platforms can contribute to obesity, cardiovascular diseases, and other diet-related health risks (Al-Qahtani et al., 2021; Al-Hazzaa et al., 2022).

Key recommendations provided by participants included:

1. Increasing the availability of healthy food options and providing incentives for ordering nutritious meals, reflecting prior findings that access to healthier choices can improve dietary quality in digital food environments (Almalki et al., 2022).
2. Implementing stricter monitoring and regulation of restaurants and delivery personnel to ensure food quality, hygiene, and accountability, consistent with studies highlighting gaps in calorie-labeling compliance and food safety in delivery platforms (Alkhalidi & Curran, 2024).
3. Limiting excessive or repeated orders of unhealthy meals while encouraging home-cooked alternatives, aligning with public health recommendations for moderating fast-food consumption (Musaiger & Al-Hazzaa, 2019).
4. Reducing delivery costs and improving service efficiency while maintaining safety standards, addressing the dual need for convenience and affordability without compromising health and safety.
5. Raising public awareness about the health risks of frequent consumption of delivered fast food and promoting responsible, moderate use of delivery services, in line with global recommendations for digital food literacy and health education (Alsharari, 2025).

Overall, participants emphasized the importance of balancing convenience, social benefits, and economic support with public health considerations. Targeted interventions, robust regulatory oversight, and community-based nutritional education are essential strategies to mitigate potential adverse health outcomes while sustaining the advantages of online food delivery services in Saudi Arabia.

## V. Conclusion

This study provides comprehensive insights into the usage patterns, perceptions, and public health implications of online food-delivery services in Saudi Arabia. The findings indicate that these services are widely adopted across various demographic groups, including young adults, middle-aged and older adults, both genders, and individuals of different marital statuses. Young adults and males are slightly more engaged, while married adults constitute the largest single group of users. Frequent ordering is common, with fast food dominating choices and healthy options remaining limited, highlighting potential risks for diet-related health issues such as obesity, high cholesterol, and unhealthy dietary patterns (Al-Qahtani et al., 2021; Al-Hazzaa et al., 2022).

While convenience, social benefits, and economic support for local businesses were recognized as major advantages, participants expressed concerns about the health and societal consequences of over-reliance on delivery services. These concerns align with previous research emphasizing that digital food environments often promote energy-dense, nutrient-poor foods and may contribute to adverse public health outcomes (Musaiger & Al-Hazzaa, 2019; Almalki et al., 2022). Survey participants recommended strategies to balance the benefits and drawbacks of food delivery, including increasing the availability of healthy options, enforcing stricter regulations on food quality and hygiene, promoting home-cooked alternatives, and raising public awareness of dietary risks. These recommendations underscore the importance of targeted interventions, regulatory oversight, and community education to mitigate health risks while maintaining the economic and social advantages of online food delivery platforms.

Overall, the study highlights the dual nature of online food delivery: it provides convenience, supports local businesses, and meets lifestyle needs, yet poses significant challenges to public health and dietary quality. Policymakers, health authorities, and digital food providers must collaborate to implement strategies that encourage healthier consumption patterns, ensure food safety, and promote informed choices, thereby maximizing the benefits of digital food services while minimizing their potential adverse impacts on public health in Saudi Arabia.

## **VI. Recommendation**

Based on the findings of this study, several recommendations are proposed to optimize the benefits of online food delivery services while mitigating potential health and societal risks in Saudi Arabia:

**Increase Availability of Healthy Options:** Food delivery platforms should expand the range of nutritious meals and offer incentives for choosing healthier alternatives, addressing the current predominance of fast food and energy-dense options (Almalki et al., 2022). **Strengthen Regulatory Oversight:** Authorities should implement stricter monitoring of restaurants and delivery personnel to ensure compliance with food quality, hygiene, and safety standards, as gaps in regulation can undermine public health efforts (Alkhalidi & Curran, 2024).

**Promote Public Awareness and Education:** Campaigns targeting consumers should emphasize the health risks of frequent fast-food consumption and encourage balanced, moderate use of delivery services, integrating digital food literacy programs (Alsharari, 2025).

**Encourage Home-Cooked Alternatives:** Policymakers and health agencies can promote the benefits of homecooked meals and provide guidance on affordable, nutritious cooking to reduce reliance on fast-food delivery (Musaiger & Al-Hazzaa, 2019).

**Optimize Service Efficiency and Affordability:** Delivery platforms should maintain affordability, reduce delivery costs, and improve service efficiency while ensuring adherence to hygiene and safety standards, balancing convenience with responsible consumption.

**Tailor Interventions by Demographics:** Health initiatives should consider variations in age, gender, and marital status, as these factors influence food ordering behaviors, dietary patterns, and susceptibility to unhealthy eating habits.

Implementing these recommendations can help balance the convenience, social, and economic benefits of online food delivery with public health objectives, supporting healthier dietary choices and mitigating potential negative impacts on Saudi society.

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