



CODEN [USA]: IAJPBB

ISSN : 2349-7750

## INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Research Article

### USE OF FOOD DELIVERY APPLICATIONS AND ITS IMPACTS ON OBESITY AMONG SAUDI POPULATION IN RIYADH CITY

<sup>1</sup>Tahani AlShammari, <sup>2</sup>Azzah Alzahrani, <sup>3</sup>Nora Alobodi, <sup>4</sup>Mashaal Alrubaian, <sup>5</sup>Ruaa Alzamil

<sup>1</sup>Family Medicine Academy, King Saud Medical City(KSMC), Riyadh 12746, Saudi Arabia.

**Article Received:** May 2022

**Accepted:** June 2022

**Published:** July 2022

**Abstract:**

*Introduction: Overweight and obesity considered as one of the main predisposing health factors globally and contributed to various chronic and non-communicable diseases, such as heart diseases, hypertension, diabetes, and cancer. Smart technologies and mobile applications (apps) software have become an extensive part of our daily modern life and the intense use of these technologies encourages people to purchase everything through mobile applications including food ordering. Methods and objectives: This descriptive analytical cross-sectional study was conducted at Riyadh city to assess Saudi nationalities intension for ordering foods through mobile applications. Data was collected by using a well-defined and validated questionnaire. The questionnaire covered demographic information, variables related to life style and health characteristics of the participants, eating habits of participants, and variables related to using of food ordering mobile applications and various factors that influences the participants to choose mobile applications for food ordering. Collected data, was analyzed using Statistical Package for Social Sciences (SPSS 24), where descriptive statistics such as frequency and percentage was conducted for qualitative variables and mean and SD for quantitative variables while analytical statistics such as Chi-square and ANOVA was applied to compare between different dependents and independents variables. Results: about 633 individual who fulfilled inclusion criteria and accept to be involved in this study were participated after filling informed consent, 66% of participants were females and 34% were males. The found that the prevalence of overweight, obesity and both overweight obesity was 34%, 23% and 57 respectively. Majority of participants 82% were ordered food using smartphone apps. The current study also arranged main reasons for using smart food delivery applications, where the quick and easy access to restaurants get highest score 85%, followed by saving time 84%, a variety of restaurants options 83%, advertisements 65%, quality of service 64%, long working hours 61%, food menu photos and ways of food demonstration 53% and the impact of social media get the lowest score 44%. For analytical statistics the current study found that there was statistically significant relationship between how participants get their meals, marital status and occupation, p value < 0.05, it also found there was statistically significant relationship between marital status and BMI group, p value < 0.05. Finally the study indicated no any statistical relationship between participants' habits and behavior towards ordering food using smart phone applications and BMI level, p value > 0.05. Conclusion: Still there is currently no research that in the field of ordering food using smart phone applications and its impact on overweight, obesity or BMI, so researchers should fill this critical gaps in the literature.*

**Keywords:** Food delivery applications, overweight, obesity, BMI, Riyadh City, Saudi Arabia

**Corresponding author:**

**Tahani AlShammari,**

Family Medicine Academy, King Saud Medical City(KSMC),

Riyadh 12746, Saudi Arabia.

QR code



Please cite this article in press Tahani AlShammari et al, *Use Of Food Delivery Applications And Its Impacts On Obesity Among Saudi Population In Riyadh City., Indo Am. J. P. Sci, 2022; 09(7).*

**INTRODUCTION:**

Obesity represents one of the significant a predisposing health problems currently facing the world and risk factor for several chronic diseases, such as heart diseases, hypertension, diabetes, and cancer (1, 2). Weight gain is an impact of energy imbalance in which caloric intake is greater than lost (3, 4). Whether the main cause of weight gain due to increasing sedentariness in modern society supported by labor-saving devices, increased television shows and smart devices usage (5, 6), or elevated food consumption (7, 8) has been much debated. Showing that the level of energy lost has hardly changed over the course of obesity (9) and that the energy gap sufficient for causing the epidemic can be illustrated by national changes in food supply (10) strongly implicate elevated food intake rather than reduced lost. In the 21st century, people have entered an “e” generation period. The Internet has generated a tremendous level of excitement through its involvement with all kinds of businesses starting from e-Commerce, eBusiness, eCRM, eSupply Chain, eMarketplace, ePayment, eEntertainment, eTicketing, eLearning, to eCitizenor eGovernment. Today’s accelerated lifestyle and the intense use of higher technologies encourage customers to purchase through mobile applications (11). People search for new alternatives to make everyday tasks easier and adapted to their lifestyles (12). In particular, last-mile logistic services are increasingly offering innovative solutions ranging from home deliveries to logistic service providers placing e-commerce packages in self-collection points. Home delivery services are convenient for online shoppers and are an essential part of urban logistics services (13).

Online food shopping applications are the media through which restaurants deliver food directly to the customers’ homes. This idea of food delivery is quickly spreading due to the increase in number of the working population and their hectic work-life culture in metro cities. Mobile applications are today represent an important part of daily life. High-speed Internet access, the increased proliferation of smartphones, advances in personalized and interactive applications. By using food delivery applications, customers can access food from where they want and order their favorites from a wide range of restaurants at convenient times and locations. Food delivery applications are essential delivery context. So it is important for practitioners and academics to understand customers’ perceptions and motivations to use food delivery applications and to spread word-of-

mouth about them among other customers (14). As mentioned by Zion A, about 66% of the American consumer using a common food-delivery platform, and food delivery was their preferred way of eating dinner. However, what many of these individuals might not realize is that the frequency of eating food from outside of the home is positively associated with a high body mass index. In a study done by Zion et al. (15). Lock S was reported that 40% of people surveyed had used a multi-restaurant food delivery applications (16). Overweight and obesity is a present epidemic in both childhood and adult communities, in U.S (17). Obesity prevalence rates indicating that roughly 40% and 18% of adult and children are overweight or obese, respectively (17). In particular, the prevalence rate for obesity among young adults in U.S. in 2016 was reported to be 35.7% (17). Similarly, teens between 12-19 years of age had reported obesity prevalence rate of 20.6% (17).

It is well-established from longitudinal studies that adolescents who have better diet quality gain less weight in adulthood compared to those with poorer diet quality (18).

**STUDY AIM:**

The aim of this study is to provide valuable data for policy makers regarding Saudi nationality perceptions and knowledge of food ordering mobile applications and its impacts on obesity

**STUDY OBJECTIVES:**

- To identify the using rate of food ordering through mobile applications
- To analyse what are the various factors that influences the Saudis to choose mobile applications for food ordering
- To measure the prevalence of overweight and obesity among participants
- To recognize the majority users (63%) of food-delivery applications among participants.
- To evaluate if there are statistically significant different between obesity and use of food delivery applications.
- To measure if there are statistically significant different between mobile applications for food ordering and gender, age group, profession, income and educational level.

**METHODS AND MATERIALS: STUDY TYPE:**

A cross-sectional descriptive analytical study was conducted for the purpose of this

study. A descriptive cross-sectional study is a study in which the condition and potentially related factors are measured at a specific point in time for a defined population. Cross-sectional studies can be thought of as a "snapshot" of the frequency and characteristics of a condition in a population at a particular point in time.

#### **Study Population and study area:**

This study is a community-based study, so all Saudi nationalities resident in Riyadh city during study period are eligible for this study. Riyadh City is the capital of Saudi Arabia where its population has shown an increase of 6.5 million over the past forty years where 64 percent are Saudi citizens. Riyadh has a unique diversity culture where international workers from all over the world are visiting and living in Riyadh. Many expatriates from all over the world who are engaged to new infrastructure projects. Riyadh is becoming one of the most dynamic cities in the region.

#### **Sampling techniques and Sample size:**

For the purpose of this study a simple random sample technique was used to select participants according inclusion criteria and all participants who accept to participate were involved in the study.

#### **Inclusion criteria:**

- Age above 18 years
- Saudi Nationality
- Resident in Riyadh City
- Exclusion criteria:
  - Age below 18 years
  - Non Saudi Nationality
  - Not resident in Riyadh City

Sample size was calculated by using this equation;  $n = \frac{z^2pq}{m^2}$

Where:

$z = z$  value (1.96 for 95% confidence level)  $p =$  assumed proportion = 50%

$q = 1-p$  (complementary) = 50%  $m =$  margin of error = 0.05

Because there was no similar recent study done we assume the value of ( $p$ ) as 50%, so the expected sample size will be  $(1.96)^2 * 0.5 * 0.5 / (0.05)^2$  equal 385, but to increase the reliability of this study we selected 397 participants who fulfilled inclusion criteria and willing to participate in this study.

#### **Data collection tool:**

Data was collected by the study team using a well-

defined and validated questionnaire. The questionnaire covered three parts; Part one included demographic information, this part has six questions about the demographic characteristics of the participants such as gender, age, educational level, marital status, occupation and monthly income level and body mass index (BMI), part two covered variables related to life style and health characteristics of the participants, part three covered eating habits of participants, while part four covered variables related to using of food ordering mobile applications and various factors that influences the participants to choose mobile applications for food ordering. Collected data was include both primary data such as collected by the researchers and secondary data such as published articles, websites, reports or textbooks.

#### **Data Analysis:**

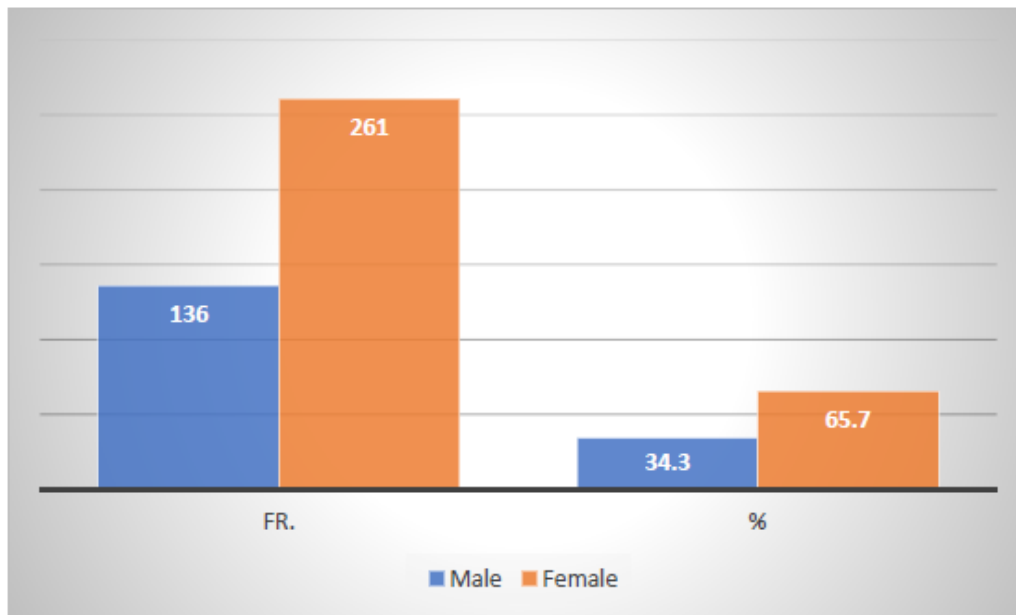
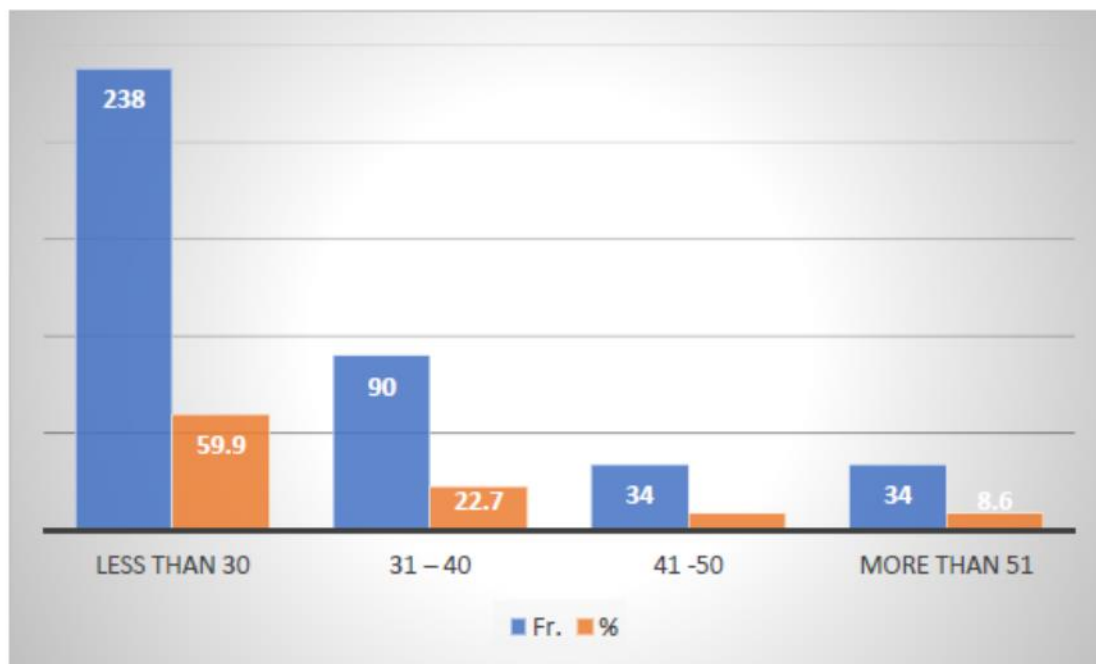
Collected data, was analyzed using Statistical Package for Social Sciences (SPSS 24), where descriptive statistics such as frequency and percentage was conducted for qualitative variables and mean and SD for quantitative variables while analytical statistics such as Chi-square and ANOVA was applied to compare between different dependents and independents variables.

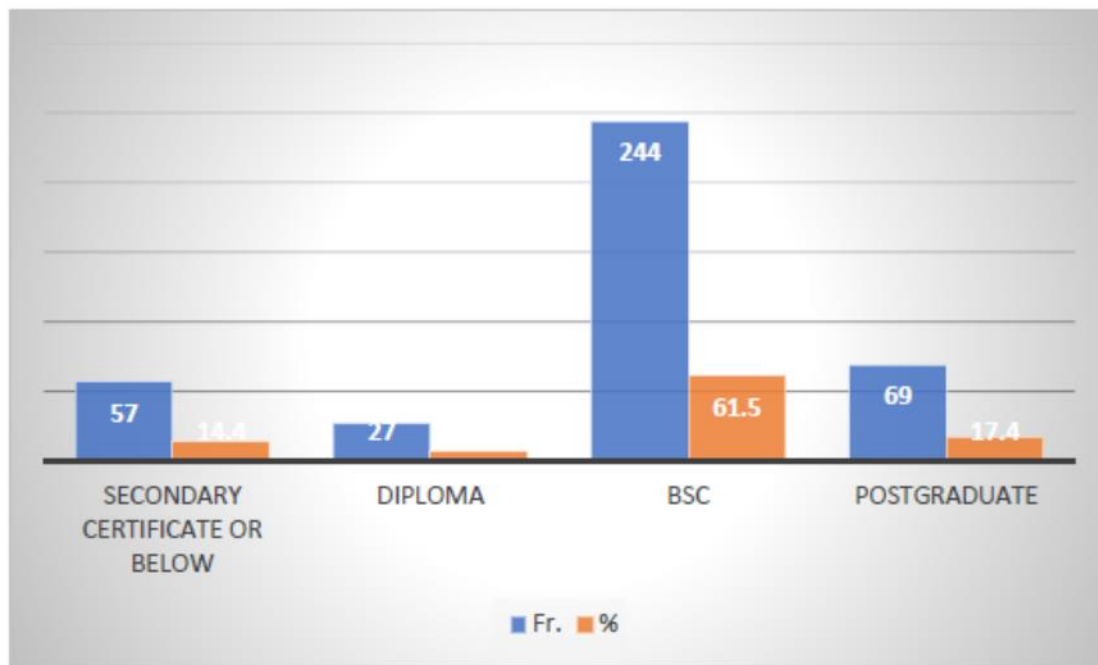
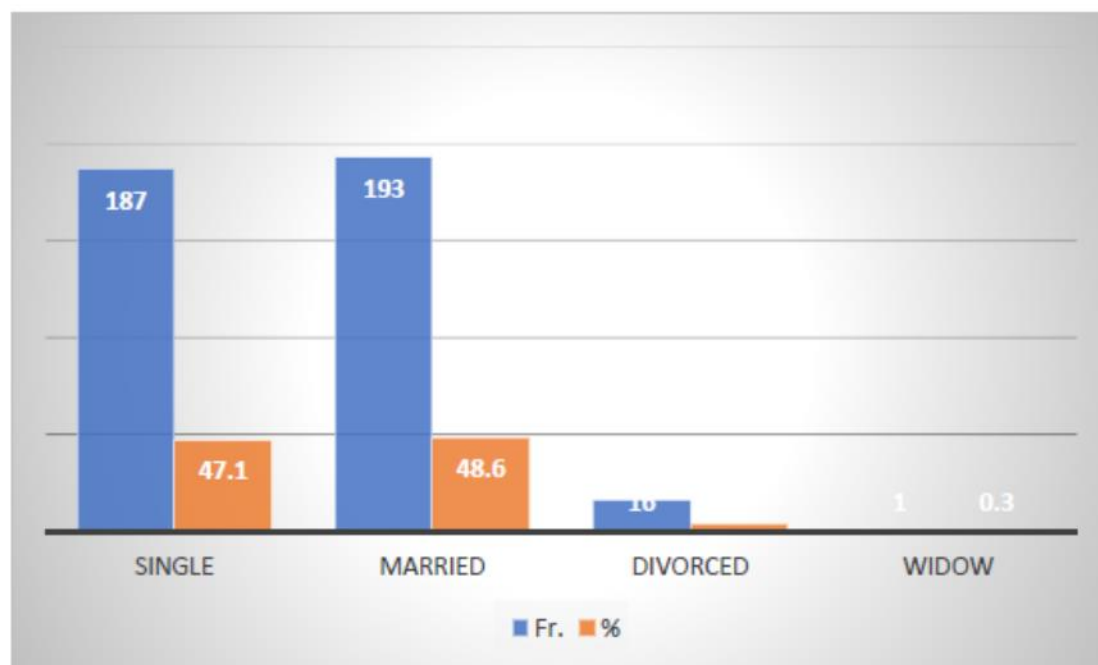
#### **Ethical consideration:**

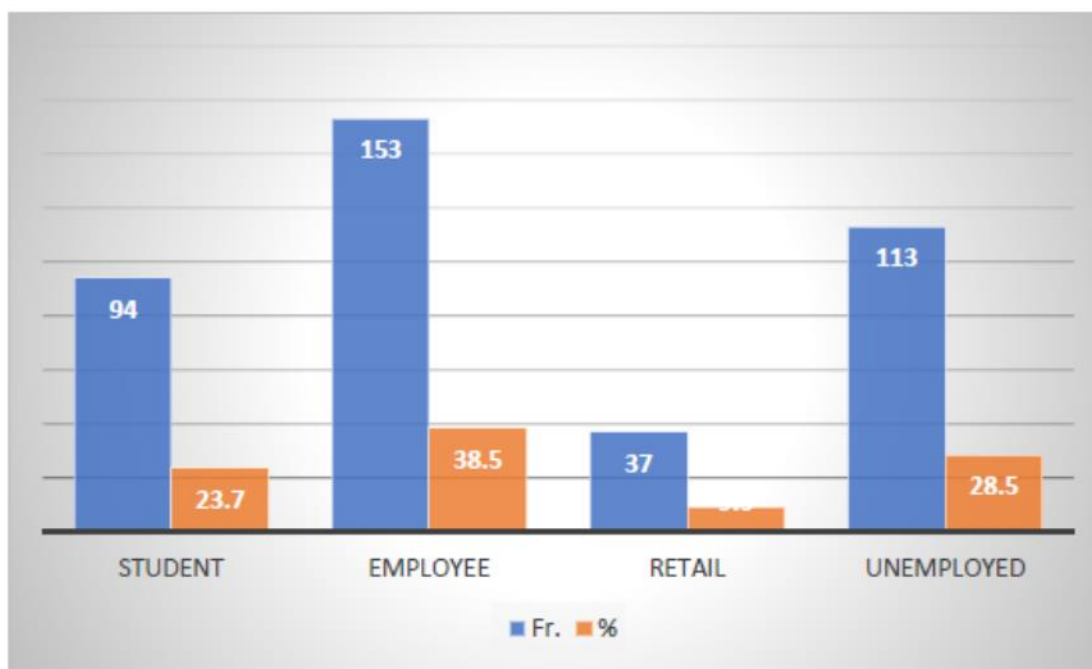
This study proposal was approved from the ethical committee at King Saud Medical City and all ethical issues should were considered during the process of this study and all participants filled the informed consent prior participated and be informed about the objectives of this study and their rights to withdraw from study when needed and they should be informed about the confidentiality of collected information.

#### **RESULTS:**

As shown in figures 1,2,3,4 and 5 about 66% of participants were females and 34% were males; most of them within the age group less than 30 years (60%) or within the age of 31 to 40 years (23%); near to two-third of participants (62%) had bachelor degree, the rest either had postgraduate (17%), secondary certificate (14%) or diploma (7%); majority of participants either Married (49%) or singles (47%); about 39% were employment, 29% unemployment and 24% were students.

**Figure 1: distribution of participants according to gender****Figure 2: distribution of participants according to age group**

**Figure 3: distribution of participants according to educational level****Figure 4: distribution of participants according to Marital Status**

**Figure 5: distribution of participants according to Occupation****Table 1: Life style and health Characteristics of the participants**

Variable	Sub Variable	Fr.	%
Body Mass Index (BMI)	Underweight < 18.5	25	6.3
	Normal	138	34.8
	Overweight	135	34.0
	Obese	91	22.9
Do you suffer from any health problems or disease?	Yes	82	20.7
	No	315	79.3
Do you do any kind of physical activity?	Yes	209	52.6
	No	188	47.4
How many hours do you spend doing physical activity per week?	< 1 hour	85	21.4
	1 - 3 hours	92	23.2
	More than 3 hours	48	12.1
	Not applicable	172	43.3
How do you get your meals?	Preparing at home	92	23.2
	Ordering from restaurants	54	13.6
	Both	251	63.2

About 34% of participants were overweight and 23% were obese, only 21% were suffering from health problems or diseases, about 209 (53% ) who had done any kind of physical activity, of whom 41% spend doing physical activity per week for less than one hour, 44% spend doing physical activity per week form 1 - 3 hours, and 23% spend doing physical activity per week for more than 3 hours. Only 23% of participants were get their meals by preparing at home, 14% by ordering from restaurants, while 63% get it by both preparing at home and ordering from restaurants,

**Table 2: Eating Habits of the participants**

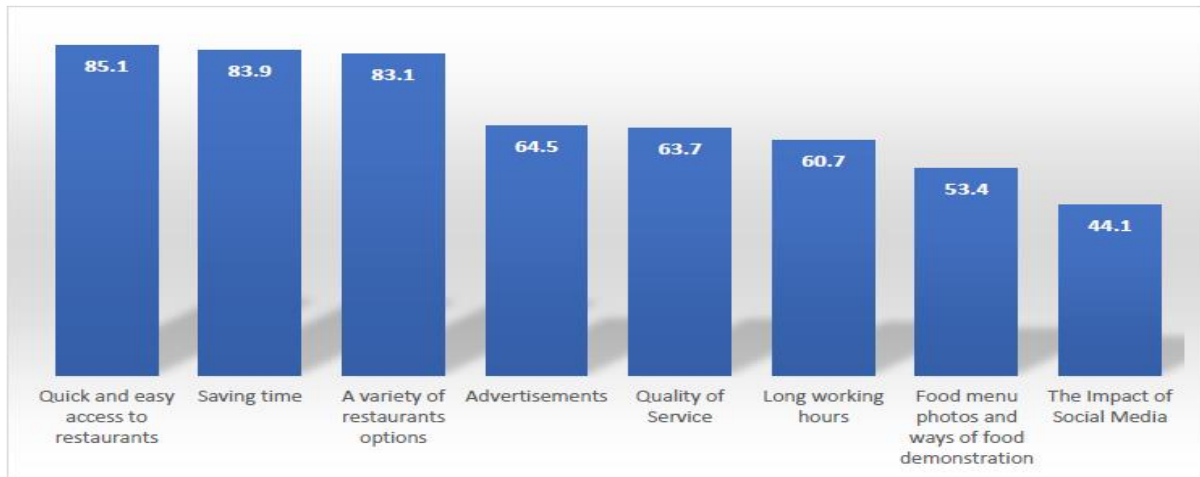
	Never		Some times		Most of times		Always	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%
Eating three or more meals per day	161	40.6	166	41.8	50	12.6	20	5.0
Eating burgers, fries or pizza	24	6.0	207	52.1	115	29.0	51	12.8
Eating fruits and vegetables	29	7.3	192	48.4	132	33.2	44	11.1
Eating sweets and chocolates	22	5.5	172	43.3	126	31.7	77	19.4
Drinking soda/soft drinks beverages	78	19.6	176	44.3	73	18.4	70	17.6

Only 22% who eating three or more meals per day most of times or always, 42% eating burgers, fries or pizza most of times or always, 44% eating sweets and chocolates most of times or always, 51% eating sweets and chocolates most of times or always and 46% eating sweets and chocolates most of times or always.

**Table 3: Participants' habits and behaviour towards ordering food using smart phone applications**

Variable	Sub Variable	Fr.	%
Do you order food using smartphone apps	Yes	327	82.4
	No	47	11.8
	Not applicable	23	5.8
ordering food frequently	Yes	211	53.1
	No	139	35.0
	Not applicable	47	11.8
How many times per week do you order food?	< 3 times	202	50.9
	3 - 6 times	83	20.9
	> 6 times	34	8.6
	Not applicable	78	19.6
When using smart apps for food delivery, what types of food do you order?	Fast food	226	56.9
	Health food	13	3.3
	Both	124	31.2
	Not applicable	34	8.6
How much do you spend on ordering food per week in SRs.	< 100 SRs.	104	26.2
	100 - 200 SRs.	151	38.0
	> 200 SRs.	121	30.5
	Not applicable	21	5.3
Do you think that smart food delivery apps have made it easier to reach restaurants?	Yes	377	95.0
	No	14	3.5
	Not applicable	6	1.5
Are food ordering apps making you more dependent on fast food than before?	Yes	256	64.5
	No	111	28.0
	Not applicable	30	7.6

Majority of participants 82% were ordered food using smartphone apps, more than half of participants 53% were ordering food using smartphone apps frequently, about 51% of participants were ordered food using smartphone apps less than times, 21% were ordered food using smartphone apps from 3 - 6 times and only 9% were ordered food using smartphone apps for more than 6 times per week.

**Figure 6: reasons for using smart food delivery applications**

Regarding to reasons for using smart food delivery applications, the quick and easy access to restaurants get highest score 85%, followed by saving time 84%, a variety of restaurants options 83%, advertisements 65%, quality of service 64%, long working hours 61%, food menu photos and ways of food demonstration 53% and the impact of social media get the lowest score 44%.

**Table 4: chi-square test to compare between how participants get their meals, gender and educational level**

			How do you get your meals			Total	P Value
			Preparing at home	Ordering from restaurants	Both		
Gender	Male	Count	35	23	78	136	.185
		% within gender	25.7%	16.9%	57.4%	100.0%	
		% of Total	8.8%	5.8%	19.6%	34.3%	
	Female	Count	57	31	173	261	
		% within gender	21.8%	11.9%	66.3%	100.0%	
		% of Total	14.4%	7.8%	43.6%	65.7%	
Total	Count	92	54	251	397		
	% within gender	23.2%	13.6%	63.2%	100.0%		
	% of Total	23.2%	13.6%	63.2%	100.0%		
Educational level	Secondary certificate or below	Count	12	10	35	57	.113
		% within Educational level	21.1%	17.5%	61.4%	100.0%	
		% of Total	3.0%	2.5%	8.8%	14.4%	
	Diploma	Count	8	4	15	27	
		% within Educational level	29.6%	14.8%	55.6%	100.0%	
		% of Total	2.0%	1.0%	3.8%	6.8%	
	BSc	Count	50	27	167	244	
		% within Educational level	20.5%	11.1%	68.4%	100.0%	
		% of Total	12.6%	6.8%	42.1%	61.5%	
	Postgraduate	Count	22	13	34	69	
		% within Educational level	31.9%	18.8%	49.3%	100.0%	
		% of Total	5.5%	3.3%	8.6%	17.4%	
Total	Count	92	54	251	397		
	% within Educational level	23.2%	13.6%	63.2%	100.0%		
	% of Total	23.2%	13.6%	63.2%	100.0%		

There was no statistical relationship between how participants get their meals and gender or educational level, p value > 0.05.



**Table 5: chi-square test to compare between how participants get their meals and marital Status**

Marital Status		How do you get your meals			Total	P Value
		Preparing at home	Ordering from restaurants	Both		
Single	Count	27	40	120	187	.000
	% within Marital Status	14.4%	21.4%	64.2%	100.0%	
	% of Total	6.8%	10.1%	30.2%	47.1%	
Married	Count	60	13	120	193	
	% within Marital Status	31.1%	6.7%	62.2%	100.0%	
	% of Total	15.1%	3.3%	30.2%	48.6%	
Divorced	Count	4	1	11	16	
	% within Marital Status	25.0%	6.2%	68.8%	100.0%	
	% of Total	1.0%	.3%	2.8%	4.0%	
Widow	Count	1	0	0	1	
	% within Marital Status	100.0%	.0%	.0%	100.0%	
	% of Total	.3%	.0%	.0%	.3%	
Total	Count	92	54	251	397	
	% within Marital Status	23.2%	13.6%	63.2%	100.0%	
	% of Total	23.2%	13.6%	63.2%	100.0%	

**Table 6: chi-square test to compare between how participants get their meals and occupation**

Occupation		How do you get your meals			Total	P Value
		Preparing at home	Ordering from restaurants	Both		
Student	Count	13	15	66	94	.000
	% within Occupation	13.8%	16.0%	70.2%	100.0%	
	% of Total	3.3%	3.8%	16.6%	23.7%	
Employee	Count	30	28	95	153	
	% within Occupation	19.6%	18.3%	62.1%	100.0%	
	% of Total	7.6%	7.1%	23.9%	38.5%	
Retail	Count	25	0	12	37	
	% within Occupation	67.6%	.0%	32.4%	100.0%	
	% of Total	6.3%	.0%	3.0%	9.3%	
Unemployed	Count	24	11	78	113	
	% within Occupation	21.2%	9.7%	69.0%	100.0%	
	% of Total	6.0%	2.8%	19.6%	28.5%	
Total	Count	92	54	251	397	
	% within Occupation	23.2%	13.6%	63.2%	100.0%	
	% of Total	23.2%	13.6%	63.2%	100.0%	

There was statistically significant relationship between how participants get their meals and occupation, p value < 0.05.

**Table 7: chi-square test to compare between gender, age group and BMI group**

			BMI Group				Total	P Value
			Under weight	Normal	Over weight	Obese		
Gender	Male	Count	9	42	47	36	134	.558
		% within Occupation	6.7%	31.3%	35.1%	26.9%	100.0%	
		% of Total	2.3%	10.8%	12.1%	9.3%	34.4%	
	Female	Count	16	96	88	55	255	
		% within Occupation	6.3%	37.6%	34.5%	21.6%	100.0%	
		% of Total	4.1%	24.7%	22.6%	14.1%	65.6%	
	Total	Count	25	138	135	91	389	
		% within Occupation	6.4%	35.5%	34.7%	23.4%	100.0%	
		% of Total	6.4%	35.5%	34.7%	23.4%	100.0%	
Age Group	Less than 30	Count	25	98	72	40	235	.000
		% within Occupation	10.6%	41.7%	30.6%	17.0%	100.0%	
		% of Total	6.4%	25.3%	18.6%	10.3%	60.6%	
	31 - 40	Count	0	29	37	23	89	
		% within Occupation	.0%	32.6%	41.6%	25.8%	100.0%	
		% of Total	.0%	7.5%	9.5%	5.9%	22.9%	
	41 -50	Count	0	5	12	16	33	
		% within Occupation	.0%	15.2%	36.4%	48.5%	100.0%	
		% of Total	.0%	1.3%	3.1%	4.1%	8.5%	
	More than 51	Count	0	6	14	11	31	
		% within Occupation	.0%	19.4%	45.2%	35.5%	100.0%	
		% of Total	.0%	1.5%	3.6%	2.8%	8.0%	
	Total	Count	25	138	135	90	388	
		% within Occupation	6.4%	35.6%	34.8%	23.2%	100.0%	
		% of Total	6.4%	35.6%	34.8%	23.2%	100.0%	

There was no statistical relationship between gender and BMI group, p value > 0.05, while there was statistically significant relationship between age group and BMI group, p value < 0.05.

**Table 8: chi-square test to compare between Marital Status and BMI group**

Marital Status		BMI Group				Total	P Value
		Under weight	Normal	Over weight	Obese		
Single	Count	24	81	47	33	185	.000
	% within Occupation	13.0%	43.8%	25.4%	17.8%	100.0%	
	% of Total	6.2%	20.8%	12.1%	8.5%	47.6%	
Married	Count	1	52	83	52	188	
	% within Occupation	.5%	27.7%	44.1%	27.7%	100.0%	
	% of Total	.3%	13.4%	21.3%	13.4%	48.3%	
Divorced	Count	0	5	5	5	15	
	% within Occupation	.0%	33.3%	33.3%	33.3%	100.0%	
	% of Total	.0%	1.3%	1.3%	1.3%	3.9%	
Widow	Count	0	0	0	1	1	
	% within Occupation	.0%	.0%	.0%	100.0%	100.0%	
	% of Total	.0%	.0%	.0%	.3%	.3%	
Total	Count	25	138	135	91	389	
	% within Occupation	6.4%	35.5%	34.7%	23.4%	100.0%	
	% of Total	6.4%	35.5%	34.7%	23.4%	100.0%	

There was statistically significant relationship between Marital Status and BMI group, p value < 0.05.

**Table 9: chi-square test to compare between educational level occupation and BMI group**

			BMI Group				Total	P Value
			Under weight	Normal	Over weight	Obese		
Educational level	Secondary certificate or below	Count	6	19	17	14	56	.652
		% within Occupation	10.7%	33.9%	30.4%	25.0%	100.0%	
		% of Total	1.5%	4.9%	4.4%	3.6%	14.4%	
	Diploma	Count	0	9	10	8	27	
		% within Occupation	.0%	33.3%	37.0%	29.6%	100.0%	
		% of Total	.0%	2.3%	2.6%	2.1%	6.9%	
	BSc	Count	16	89	79	53	237	
		% within Occupation	6.8%	37.6%	33.3%	22.4%	100.0%	
		% of Total	4.1%	22.9%	20.3%	13.6%	60.9%	
	Postgraduate	Count	3	21	29	16	69	
		% within Occupation	4.3%	30.4%	42.0%	23.2%	100.0%	
		% of Total	.8%	5.4%	7.5%	4.1%	17.7%	
	Total	Count	25	138	135	91	389	
		% within Occupation	6.4%	35.5%	34.7%	23.4%	100.0%	
		% of Total	6.4%	35.5%	34.7%	23.4%	100.0%	
Occupation	Student	Count	18	35	24	15	92	
		% within Occupation	19.6%	38.0%	26.1%	16.3%	100.0%	
		% of Total	6.4%	35.5%	34.7%	23.4%	100.0%	

		% of Total	4.6%	9.0%	6.2%	3.9%	23.7%	
Employee	Count		4	55	57	36	152	
	% within Occupation		2.6%	36.2%	37.5%	23.7%	100.0%	
	% of Total		1.0%	14.1%	14.7%	9.3%	39.1%	
Retail	Count		0	6	14	14	34	.000
	% within Occupation		.0%	17.6%	41.2%	41.2%	100.0%	
	% of Total		.0%	1.5%	3.6%	3.6%	8.7%	
Unemployed	Count		3	42	40	26	111	
	% within Occupation		2.7%	37.8%	36.0%	23.4%	100.0%	
	% of Total		.8%	10.8%	10.3%	6.7%	28.5%	
Total	Count		25	138	135	91	389	
	% within Occupation		6.4%	35.5%	34.7%	23.4%	100.0%	
	% of Total		6.4%	35.5%	34.7%	23.4%	100.0%	

There was no statistical relationship between educational level and BMI group,  $p$  value  $> 0.05$ , while there was statistically significant relationship between occupation and BMI group,  $p$  value  $< 0.05$ .

**Table 10: one way ANOVA test to compare between Participants' habits and behavior towards ordering food using smart phone applications and BMI level**

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
					Lower Bound	Upper Bound		
How do you get your meals	Preparing at home	92	31.4564	30.40220	25.1603	37.7526	.772	.463
	Ordering from restaurants	54	26.5570	6.10353	24.8911	28.2230		
	Both	251	29.0078	22.97482	26.1517	31.8639		
	Total	397	29.2419	23.51122	26.9220	31.5617		
Do you order food using smartphone apps	Yes	327	30.1863	25.68012	27.3925	32.9800	1.517	.221
	No	47	24.4699	6.14681	22.6651	26.2747		
	Not applicable	23	25.5667	4.77937	23.5000	27.6335		
	Total	397	29.2419	23.51122	26.9220	31.5617		
ordering food frequently	Yes	211	29.0801	22.94054	25.9668	32.1934	1.193	.304
	No	139	30.9663	27.62121	26.3338	35.5987		
	Not applicable	47	24.8682	6.22264	23.0412	26.6953		

	Total	397	29.2419	23.51122	26.9220	31.5617		
How many times per week do you order food	< 3 times	202	27.1984	14.71489	25.1569	29.2399	1.090	.353
	3 - 6 times	83	31.9848	30.78548	25.2626	38.7070		
	> 6 times	34	31.7088	32.59803	20.3348	43.0828		
	Not applicable	78	30.5400	28.09758	24.2050	36.8750		
	Total	397	29.2419	23.51122	26.9220	31.5617		
What types of food do you order	Fast food	226	30.0592	26.73518	26.5547	33.5636	.588	.623
	Health food	13	23.8638	3.66499	21.6491	26.0786		
	Both	124	29.3137	21.34416	25.5196	33.1078		
	Not applicable	34	25.6036	5.22912	23.7791	27.4281		
	Total	397	29.2419	23.51122	26.9220	31.5617		
How much do you spend on ordering	< 100 SRs.	104	27.9386	24.33531	23.2059	32.6712	.466	.706
	100 - 200 SRs.	151	29.0987	23.65630	25.2949	32.9026		
	> 200 SRs.	121	31.0669	24.60562	26.6380	35.4957		

food per week in SRs.	Not applicable	21	26.2101	5.15428	23.8639	28.5563		
	Total	397	29.2419	23.51122	26.9220	31.5617		
	Yes	377	29.4414	24.08669	27.0021	31.8806	.299	.742
	No	14	24.6293	4.55698	21.9982	27.2604		
	Not applicable	6	27.4684	5.56595	21.6273	33.3095		
	Total	397	29.2419	23.51122	26.9220	31.5617		
Are food ordering apps making you more dependent on fast food than before?	Yes	256	30.8132	27.44649	27.4350	34.1913	1.701	.184
	No	111	26.8138	14.83762	24.0228	29.6047		
	Not applicable	30	24.8176	4.96608	22.9633	26.6720		
	Total	397	29.2419	23.51122	26.9220	31.5617		

By using one way ANOVA test to compare between participants' habits and behaviour towards ordering

food using smart phone applications and BMI level, there was no any statistical relationship between participants' habits and behaviour towards ordering food using smart phone applications and BMI level, p value > 0.05.

**DISCUSSION:**

About 633 individual who fulfilled inclusion criteria and accept to be involved in this study were participated after filling informed consent, 66% of participants were females and 34% were males; most of them within the age group less than 30 years (60%) or within the age of 31 to 40 years (23%); near to two-third of participants (62%) had bachelor degree, the rest either had postgraduate (17%), secondary certificate (14%) or diploma (7%); majority of participants either Married (49%) or singles (47%); about 39% were employment, 29% unemployment and 24% were students. Only 22% who eating three or more meals per day most of times or always, 42% eating burgers, fries or pizza most of times or always, 44% eating sweets and chocolates most of times or always, 51% eating sweets and chocolates most of times or always and 46% eating sweets and chocolates most of times or always. This current study found that the prevalence of overweight, obesity and both overweight obesity was 34%, 23% and 57 respectively, These findings are consistent with the study conducted by Al-Ghamdi and his colleagues in 2018 (19).

Many studies showed that high BMI can be the root cause for many of non-communicable diseases (NCDs) in the world, which has become an increasing trend around the world with increasing prevalence rates in the USA (36.5%) (20), Spain (29%) (21), Greece (23%) (22), Lebanon (17%) (23), and Kuwait (43%) (24), Saudi Arabia (35%) (25), and Qatar (33%) (26).

Our study also revealed that about (53% , n = 209) had done any kind of physical activity, of whom 41% spend doing physical activity per week for less than one hour, 44% spend doing physical activity per week form 1 - 3 hours, and 23% spend doing physical activity per week for more than 3 hours. Only 23% of participants were get their meals by preparing at home, 14% by ordering from restaurants, while 63% get it by both preparing at home and ordering from restaurants.

The WHO new guidelines address children, adolescents, adults, older adults. All adults

should undertake 150-300 min of moderate-intensity, or 75-150 min of vigorous-intensity physical activity, or some equivalent combination of moderate-intensity and vigorous-intensity aerobic physical activity, per week. Among children and adolescents, an average of 60 min/day of moderate-to-vigorous intensity aerobic physical activity across the week provides health benefits. The guidelines recommend regular muscle-strengthening activity for all age groups. Additionally, reducing sedentary behaviours is recommended across all age groups and abilities, although evidence was insufficient to quantify a sedentary behaviour threshold (27).

Food delivery applications have seen a surge in growth over the past decade. Digital represents half of all food delivery visits, expanding beyond traditional dinner delivery to encompass breakfast and lunch delivery. Digital orders, ordered via a mobile app, Internet, or text message, have grown 23% over the past 4 years (28).

This present study found that majority of participants 82% were ordered food using smartphone apps, more than half of participants 53% were ordering food using smartphone apps frequently, about 51% of participants were ordered food using smartphone apps less than 3 times, 21% were ordered food using smartphone apps from 3 - 6 times and only 9% were ordered food using smartphone apps for more than 6 times per week.

Abundant growth of technology and mobile devices nowadays is creating a great impact on the hospitality sector in general and in restaurants in particular especially in the form of ordering food. Although ordering food through mobile applications considered an active role in the overall restaurant sector, little is known about customer perception about using mobile food applications (29).

The current study also arranged main reasons for using smart food delivery applications, where the quick and easy access to restaurants get highest score 85%, followed by saving time 84%, a variety of restaurants options 83%, advertisements 65%, quality of service 64%, long working hours 61%, food menu photos and ways of food demonstration 53% and the impact of social media get the lowest score 44%.

Over the past few decades, the food and home environments have changed tremendously. Environmental influences that affect eating

behaviors include the changing nature of the food supply; increased reliance on foods consumed away from home; food advertising, marketing, and promotion; and food prices. Furthermore, there are more families in which both parents work, and time limitations have become an important factor in determining the types of foods consumed (30).

For analytical statistics the current study found that there was no statistical relationship between how participants get their meals and gender or educational level,  $p$  value  $> 0.05$ , while there was statistically significant relationship between how participants get their meals, marital status and occupation,  $p$  value  $< 0.05$ . When comparing relationship between gender, between educational level and BMI group, There was no statistical relationship

them,  $p$  value  $> 0.05$ , while there was statistically significant relationship between Marital Status and BMI group,  $p$  value  $< 0.05$ . By using one way ANOVA test to compare between participants' habits and behavior towards ordering food using smart phone applications and BMI level, our study demonstrated no any statistical relationship between

#### DISCUSSION:

A worldwide number of 82 (65 – 106) million contaminations were tested for absolute viral HCV diseases. As shown in Fig 29 countries accounted for 82% of absolute Virus diseases and their engagement order. The bulk of absolute diseases is endemic to China, Pakistan, Nigeria, Egypt, India, and Russia [6]. The vulnerabilities that account for more than 92 percent of the measured fluctuation of viral contamination of 67-105 million were found in the number. 5. In Nigeria, China, and Pakistan, viraemic vulnerability accounts for more than 50% of the observed fluctuation, which is characterized by vulnerability to HCV among youth to the young adults [7]. The effect study indicates that in African countries (Ethiopia, Cameroon and the Voting Republic of the Congo), the deficiencies in commonness gages will contribute to a greater assessment of Viraemic illnesses if the actual occurrence is lower to the high end. This research takes exemplary account not to over-rely on open knowledge, but rather to reflect on the dissecting the details that occurs [8]. For instance, HCV pervasiveness among blood givers is accessible in many countries and speaks to an appealing information source because of the huge test size. Nonetheless, this populace frequently compares to solid screened grown-ups who are not agent of the

participants' habits and behaviour towards ordering food using smart phone applications and BMI level,  $p$  value  $> 0.05$ . Our study could not find significant association between job status and high BMI. Whereas, a previous study from the same region demonstrated an increased BMI associated with increased monthly income (30).

#### CONCLUSION:

Today's accelerated lifestyle and the intense use of technologies encourages customers to purchase through mobile applications. This descriptive analytical cross-sectional study was conducted at Riyadh city to assess Saudi nationalities intension for ordering foods through mobile applications, about 633 individual were participated in this study, 66% of them were females and 34% were males. The study found that the prevalence of overweight, obesity and both overweight obesity was 34%, 23% and 57 respectively. Still there is currently no research that in the field of ordering food using smart phone applications and its impact on overweight, obesity or BMI, so researchers should fill this critical gaps in the literature.

aggregate populace. Different examinations have determined a public gauge by applying a gross-up factor to HCV commonness among blood contributors [9]. All endeavors to recreate public appraisals in nations that detailed both a public reconnaissance study and blood contributor information were ineffective. In this work, HCV pervasiveness among blood contributors was utilized as a low-end gauge for the vulnerability investigation [10].

#### CONCLUSION:

This knowledge is focused on the new HCV toxicity and genotype dispersion measurements. The range of HCV parameters is significantly smaller than in previous programs. The possibility that HCV exposure is much more insane than expected lately is alarming since a smaller number that viral disease is the product of the volume of watched passages. The general significance and genotype analyses can be updated as new evidence is made available which will undoubtedly radically change over the long run with the acquisition of extraordinarily viable therapies. Past examination has demonstrated that despite the fact that the all-out number of contaminations might be declining in certain nations, the ailment weight of HCV is required to increment. The outcomes feature the requirement for more strong reconnaissance

studies to evaluate the HCV infection trouble all the more precisely.

#### REFERENCES:

1. Must A, Spadano J, Coakley EH, Field AE, Colditz G, Dietz WH. The disease burden associated with overweight and obesity. *JAMA* 1999;282:1523-9.
2. Calle EE, Thun MJ. Obesity and cancer. *Oncogene* 2004;23:6365-78.
3. Popkin BM, Duffey K, Gordon-Larsen P. Environmental influences on food choice, physical activity and energy balance. *Physiol Behav* 2005;86:603-13.
4. Hall KD, Heymsfield SB, Kemnitz JW, Klein S, Schoeller DA, Speakman JR. Energy balance and its components: implications for body weight regulation. *Am J Clin Nutr* 2012;95:989-94.
5. Fulton JE, Wang X, Yore MM, Carlson SA, Galuska DA, Caspersen CJ. Television viewing, computer use, and BMI among U.S. children and adolescents. *J Phys Act Health* 2009;6(Suppl 1):S28-35.
6. Mendoza JA, Zimmerman FJ, Christakis DA. Television viewing, computer use, obesity, and adiposity in US preschool children. *Int J Behav Nutr Phys Act* 2007;4:44.
7. St-Onge MP, Keller KL, Heymsfield SB. Changes in childhood food consumption patterns: a cause for concern in light of increasing body weights. *Am J Clin Nutr* 2003;78:1068-73.
8. Prentice AM, Jebb SA. Obesity in Britain: gluttony or sloth? *BMJ* 1995;311:437-9.
9. Westerterp KR, Speakman JR. Physical activity energy expenditure has not declined since the 1980s and matches energy expenditures of wild mammals. *Int J Obes (Lond)* 2008;32:1256-63.
10. Swinburn BA, Sacks G, Hall KD, McPherson K, Finegood DT, Moodie ML, Gortmaker SL. The global obesity pandemic: shaped by global drivers and local environments. *Lancet* 2011;378:804-14.
11. De Kerviler, G.; Demoulin, N.T.; Zidda, P. Adoption of in-store mobile payment: Are perceived risk and convenience the only drivers? *J. Retail. Consum. Serv.* 2016, 31, 334-344. [CrossRef]
12. Cortiñas, M.; Chocarro, R.; Elorz, M. Omni-Channel users and omni-channel customers: A segmentation analysis using distribution services. *Span. J. Mark.- ESIC* 2019, 23, 415-436. [CrossRef]
13. Wang, X.; Yuen, K.F.; Wong, Y.D.; Teo, C.C. Consumer participation in last- mile logistics service: An investigation on cognitions and affects. *Int. J. Phys. Distrib. Logist. Manag.* 2019, 49, 217-238.[CrossRef]
14. Kim, J.; Lee, K.H. Influences of motivations and lifestyles on intentions to use smartphone applications. *Int. J. Advert.* 2018, 37, 385-401. [CrossRef]
15. Zion A, Spangler J, Hollmann T. Food delivery applications : usage and demographics- winners, losers and laggards (2019). Available online at: <https://www.zionandzion.com/research/food-delivery-applications-usage-and-demographics-winners-losers-and-laggards/> [Ref list]
16. Lock S. Food Delivery Industry in the U.S.- Statistics & Facts. (2018). <https://www.statista.com/topics/1986/food-delivery-industry-in-the-us/> (accessed December 17, 2019) [Ref list]
17. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of Obesity Among Adults and Youth: United States, 2015-2016. *NCHS Data Brief.* 2017 Oct; (288):1-8. [PubMed] [Ref list]
18. Hu T, Jacobs DR Jr, Larson NI, Cutler GJ, Laska MN, Neumark-Sztainer D *J Pediatr.* 2016 Higher Diet Quality in Adolescence and Dietary Improvements Are Related to Less Weight Gain During the Transition From Adolescence to Adulthood. *Hu T, Jacobs DR Jr, Larson NI, Cutler GJ, Laska MN, Neumark-Sztainer D J Pediatr.* 2016 Nov; 178():188-193.e3. [PubMed] [Ref list]
19. Al-Ghamdi, S., Shubair, M. M., Aldiab, A., Al-Zahrani, J. M., Aldossari, K. K., Househ, M., ... & El-Metwally, A. (2018). Prevalence of overweight and obesity based on the body mass index; a cross-sectional study in Alkharj, Saudi Arabia. *Lipids in health and disease, 17*(1), 1-8.
20. May AL, Freedman D, Sherry S, Blanck HM. Obesity—United States, 1999-2010 In: morbidity and mortality weekly report: division of nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion. CDC. 2013:120-8.
21. ALNohair S. Obesity in gulf countries. *Int J Health Sci.* 2014;8(1):79.
22. Tzotzas T, Vlahavas G, Papadopoulou SK, Kapantais E, Kaklamanou D, Hassapidou M. Marital status and educational level associated to obesity in Greek adults: data from the National Epidemiological Survey. *BMC Public Health.* 2010;10(1):732.
23. Soriguer F, Rojo-Martínez I, de Antonio IE, de Adana R, Catalá M, Merelo MJ, Beltrán M,



- Tinahones FJ. Prevalence of obesity in south-East Spain and its relation with social and health factors. *Eur J Epidemiol.* 2004;19:33-40.
24. Sibai M, Hwalla N, Adra N, Rahal B. Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. *Obes Res.* 2003;11(11):1353-61.
  25. Alharbi MM, Robert T. Jackson. Physical Activity and the Prevalence of General and Abdominal Obesity among Saudi Women of Reproductive Age in Jeddah City. *J Obes Overweig.* 2017;3(1):104.
  26. Caspersen CJ, Powell KE, Christenson G. Physical activity, exercise and physical fitness: definitions and distinctions for health-related research. *Public Health Rep.* 1985;100(2):126-31.
  27. Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., ... & Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British journal of sports medicine*, 54(24), 1451-1462.
  28. NPD Group. Food Service Delivery Among Fastest Growing U.S. Restaurant Industry Trends. (2018).
  29. Hussien, F. M., & Mansour, N. M. (2020). Factors Affecting Customer Satisfaction towards Mobile Food Ordering Applications (MFOAs). *The Scientific Journal of the Faculty of Tourism and Hotels, Alexandria University*, 17(1), 17-35.
  30. St-Onge, M. P., Keller, K. L., & Heymsfield, S. B. (2003). Changes in childhood food consumption patterns: a cause for concern in light of increasing body weights. *The American journal of clinical nutrition*, 78(6), 1068-1073.