

# The Impact of Work from Home on Eating Habits

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## ABSTRACT

**Background:** In light of the ongoing COVID-19 pandemic, working environments globally adopted work-from-home practices, including in the higher education sector in Saudi Arabia. The shift changed the dietary habits, affecting everyone's life, including faculty staff.

**Purpose:** To study the association between working from home during the COVID-19 pandemic and eating habits among PNU faculty members in Saudi Arabia.

**Methods:** A cross-sectional study was conducted by distributing a validated survey to the faculty members at Princess Nourah University in Saudi Arabia. Chi-square test, McNemar test, and paired sample t-test were performed to compare the quality and quantity of consumed food and the associations between eating habits and working from the office or from home. A p-value <0.05 was considered statistically significant.

**Results:** A total of 303 faculty members completed the questionnaire. Key results showed that 32% and 18% reported significantly healthier eating habits ( $P < 0.001$ ), 47% and 28% ate home-cooked meals ( $p < 0.001$ ), and there was no difference in the quality of food scores (12.85+2.66 and 12.77+2.65) for working from home and the office respectively.

**Conclusion:** A shift in dietary habits among university faculty members in Saudi Arabia was noted due to the changes in working patterns from an office-based system to working from home and back. These changes were mostly positive for those working from home.

**Keyword:** Work from home, eating habits, Saudi Arabia, Faculty members, COVID-19, food quality, food quantity, pandemic, remote working.

## Introduction

In 2019, COVID-19 was identified in Wuhan, China, and rapidly spread worldwide, infecting 71 million individuals by December 2020 [1]. Symptoms included cough, fever, headache, myalgia, and weariness [2]. The World Health Organization recommended preventative measures, a healthy lifestyle, and a strong immune system.

Saudi authorities halted the outbreak through social distancing measures [4, 6]. The COVID-19 pandemic has led to the adoption of remote work and telework in various sectors, including education [7]. In Saudi Arabia, the Ministry of Education transitioned from in-person courses to virtual learning using online platforms like Blackboard and Microsoft Teams.

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This shift has caused challenges for global educators, with no clear return to normalcy timeline [8, 9]. The shift has impacted the education system, with curriculum revisions, teacher development, and improved learning environments enhancing faculty involvement. The workplace's inherent social networks make it an ideal location for health promotion [10- 13]. Organizations can enhance worker health and productivity by promoting healthy lifestyles, particularly in terms of eating habits. However, Saudi Arabia's high obesity rate of 35% highlights the impact of remote learning on desk workers and educators. The transition to online learning has increased stress among faculty members, leading to a shift in eating patterns. Post-lockdown challenges include maintaining traditional work while adhering to social distancing measures [14- 17]. Wellness initiatives like nutrition education, counseling, and physical activity promotion have been linked to improved job performance, higher production, and lower healthcare expenses. This study investigates the relationship between working from home or the office during the COVID-19 pandemic and the eating habits of Princess Nourah Bint Abdulrahman University faculty members in Saudi Arabia. The research aims to determine the quality and quantity of meals consumed during the pandemic and examine the prevalence of obesity among faculty members [18- 20].

### Methods

#### Research design

##### 1. Study setting

This study was developed as a comparative descriptive cross-sectional study of faculty members at Princess Nourah Bint Abdulrahman University in Riyadh, Saudi Arabia, during the COVID-19 epidemic, which resulted in the adoption of a work-from-home paradigm. Between September and November 2021, data were collected utilizing an online questionnaire version created with Google Forms.

##### 2. Data collection

Data was collected on September 19, 2021, by distributing a questionnaire and sharing a copy with the Deanship of Scientific Research at Princess Nourah Bint Abdulrahman University. It was then circulated via email to all faculty members throughout the specified time period. The questionnaire enabled the gathering of self-reported eating habits, which were essential for this investigation.

##### 3. Population sample

The study surveyed 297 members from various colleges at Princess Nourah Bint Abdulrahman University, including Saudi and non-Saudi faculty members. The sample size was 303 members, with a 23% response rate. The study used convenience sampling and included both Saudi and non-Saudi

faculty members. The demographic breakdown is provided in the results chapter.

#### A. Questionnaire design:

The questionnaire utilized was adapted from previously published research by Alhusseini and Alqahtani, 2020, and is divided into four sections, each with the identical questions for two periods: work from home and work from the office (after returning to work in person). The first component contains demographic information, the second section covers basic dietary habits, and the third and fourth sections included questions concerning dietary food quality and quantity (Alhusseini & Alqahtani, 2020). A copy of the questionnaire is included in Appendix 1 [21].

##### 1. Validity and reliability

Al-Husseini and Alqahtani, 2020, derived the questionnaire from two previously published and verified surveys (Corallo et al., 2019; Paxton et al., 2011) and adjusted it to match the study goals. A clinical dietician from a nearby hospital in Riyadh assessed the questionnaire to ensure its content validity. Face validity was determined after the survey was composed in English and translated into Arabic by a translator, who validated a match in both languages. The questionnaire, like Alhusseini and Alqahtani's 2020 research, was delivered in Arabic and English to faculty members who spoke Arabic and those who did not. There were no modifications made to the language or substance of the questions, therefore the questionnaire's validity was maintained [21].

##### 2. Variables

The survey was divided into four sections: age groups, dietary habits, food quality, and food quantity. The first section assessed participants' age, gender, nationality, marital status, family size, monthly income, education level, and current career. The second section assessed general dietary habits, including frequency of home-cooked and delivery meals, grocery shopping, and food hygiene. The third section focused on food quality, focusing on priorities, health effects, calorie count, and healthy properties. The final section asked about food quantity, servings, and frequency of consumption.

##### 3. Ethical consideration

On August 30, 2021, Princess Nourah University's Institutional Review Board (IRB Log Number: 21-0336) granted ethical approval. Participation in this study was entirely voluntary, and withdrawal was permitted at any moment. No identifiable information was supplied to maintain anonymity and secrecy, and all replies were encoded. The data was only utilized for research reasons.

#### B. Data analysis

The study analyzed data using Microsoft Excel and SPSS Statistics for Windows, version 24. It compared dietary habits of faculty members working from home

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and in the office, using Chi-squared, McNemar, paired-samples t-test, and independent samples t-test. A p-value less than 0.05 was considered statistically significant, indicating a difference in meal quality scores across demographic characteristics.

### C. The Statistical analysis tool

#### 1. SPSS Statistics for Windows:

Simple descriptive analysis was utilized to sort, key, and analyze the gathered data with the Statistical Package for Social Scientists (SPSS) version 24. The data were analyzed, and the results were represented as percentages and graphs using descriptive statistics. Frequency tables were used to present the data along with narrative analysis of the same.

#### 2. Microsoft Excel 365:

Microsoft Excel version was used for summary statistics and basic visualization. The data was downloaded to Microsoft Excel and exported to SPSS.

### D. The Statistical analytical tests

The study used Chi-square tests to examine the general habits of eating nutritious food when working from home and from the office. The McNemar test was used to compare food consumption between the two periods. The paired t-test was used to compare total scores for food quality between work from home and office, determining the difference in food quality ratings across participants. One-way ANOVA and independent samples t-tests were used to compare group means and determine if group means differ. These tests were used to analyze the data and provide insights into the participants' food habits during the work from home and office periods.

## Results

### A. Demographics:

There was a total of 303 faculty members who responded to the online questionnaire. Almost all, 299 (99%) were females, and 135 (45%) were aged 35 to 45 years, while another 81 (27%) were aged 25 to 35 years. The majority of the respondents were Saudi nationals (81%), and most of the respondents, 253 (83%), were married. (Table 1) also shows that half of the respondents (49%) had 5-8 household members, and another 44% had 2-4 persons; the monthly income was between SAR 10,000 to 15,000 for 117 (39%) of the respondents, while 51% had income above SAR 15,000. There were 197 (65%) Ph.D. holders and another 88 (29%) respondents who had a Master's degree; the majority of the respondents were from the College of Humanities (40%) and the College of Sciences (39%).

### B. Comparison between working from home and from the office:

This upcoming section will look at comparing weight, physical activity, eating habits, habits in grocery shopping, and ordering takeaway or delivery throughout the two types of work settings.

#### 1. Reported weight changes:

(Figure 1) depicts the distribution of body mass index (BMI) based on the height and weight given by respondents. The BMI was relatively evenly divided across the three categories of weight: normal weight, where the BMI is between 18.5 and 24.9 (32%); overweight, where the BMI is between 25 and 29.9 (34%); and obese, where the BMI is between 30 and 39.9 (34%). (Figure 2) shows the changes in weight and physical activity as reported by the respondents during the period of working from home and office. More than half (54%) reported that they had gained weight while working from home and office, and 67% reported that their physical activity reported a decrease in physical activity during the work from home and office period.

#### 2. Dietary habits - consumption:

The comparison between the overall habits of eating healthy food during the periods of working from home and the office is shown in (Figure 3). This result showed a significant difference ( $p < 0.001$ ), with a greater proportion of respondents reporting that their food habit was healthier during the period of working from home (32%) as compared to (18%) while they were working from the office.

#### 3. Dietary habits - Purchases:

(Table 2) shows the comparison of the food and grocery habits between the work from home and work from office periods. During the period of working from home, a greater proportion (47%) ate home-cooked meals as compared to 28% while working from the office ( $p < 0.001$ ). The proportion of respondents who ordered takeaway or delivery from a restaurant 4-6 times per week was 20% for the work from office period as compared to 10% while working from home ( $p = 0.003$ ). A greater proportion ordered delivery of groceries while working from home (37%), while 16% did so while working from the office ( $p < 0.001$ ). The proportion of respondents who answered yes to having anxiety when buying food from any source was greater during work from home (44%) as compared to 29% during the work from office period ( $p < 0.001$ ). There was no difference between the two periods with regards to how often the respondents bought groceries per week ( $p = 0.83$ ).

#### 4. Quality and amount of food:

The 'Quality of Food score' (max = 25) was calculated by adding the five Likert-scale statements (1-5) for food quality and the eight statements (1-3) for food quantity (max = 24). There was no difference in food quality scores between working from home (12.85+2.66) and working from the office (12.77+2.65) ( $p = 0.34$ ), as illustrated in (Figure 4).

(Table 3) compared the quality of food scores by subcategories in demographic variables for the work from home and work from office periods. There were

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no significant differences ( $p>0.05$ ) in food quality scores by age, gender, nationality, marital status, and the number of members in the household for either period. Income level showed borderline significance for both work from home ( $p=0.08$ ) and work from office ( $p=0.06$ ) periods, with those earning less than SAR 10,000 having slightly higher scores than other income groups. The level of education had a significant impact, with those holding Bachelor's or Master's degrees scoring higher in food quality than those with Ph.D. degrees ( $p=0.03$  and  $p=0.04$  for the two periods). Teaching assistants had higher food quality scores than professors in both work from home and work from office periods ( $p=0.02$ ). Professors from the College of Community scored better on food quality than professors from the Colleges of Humanities and Sciences ( $p=0.006$  and  $p=0.047$ , respectively). The study compared the self-reported food consumption habits of respondents during periods of working from home and working from the office. A greater proportion of respondents ate fruit 1-3 times/day during the period of working from home (55%) compared to 42% during the period of working from the office ( $p<0.001$ ). The proportion of respondents who consumed vegetables less than once per day was significantly higher in the work from office group (37%) compared to 29% in the work from home group ( $p=0.003$ ). The consumption of meat four or more times per week was reported by 42% in the work from home group compared to 37% in the work from office group ( $p=0.003$ ). The "working from office" group had a higher percentage (66%) of respondents consuming snacks less than once per day compared to the "working from home" group (60%) ( $p=0.02$ ). There was no significant difference in the consumption of other unhealthy foods such as fried/fast food, sweetened drinks, sweets/desserts, and sodas between the two periods ( $p>0.05$ ).

### Discussion

This study examines global research on the impact of work from home (WFH) on dietary habits among university faculty members during and after the COVID-19 pandemic [22]. The survey shows a diverse population of university staff, with 71% reporting weight changes, with 54% gaining and 17% decreasing weight while working from home [23]. Research shows 67% of respondents reported less physical activity during work-from-home periods compared to office hours, indicating a need for further investigation into factors like physical exercise and mental health [24]. On-site instruction requires walking and jogging, while faculty personnel sit for hours at computers. COVID-19 has altered food patterns globally, with 32% of respondents reporting healthier eating habits while working from home

compared to 18% during office hours. Despite unfavorable eating patterns in India, COVID-19 has led to good dietary practices in the US and the Netherlands [25]. The US has not seen improvements in dietary practices to prevent chronic illnesses and COVID-19-related issues. A survey found 47% of working-from-home employees prefer home-cooked meals, compared to 28% at the office. Research shows a rise in homemade recipe consumption during lockdowns, but office workers still order takeaway or delivery [26]. A Portuguese university survey found that 96.7% of respondents eat lunch daily, but 64% eat outside due to food hygiene concerns and changes in grocery store hours [27]. A study found no significant difference in food quality evaluations between home and office hours, but significant differences based on education, experience, and career. High nutritional quality ratings were linked to improved mental health in the Middle East and North Africa [28]. The study found that working from home led to increased consumption of fruits, vegetables, and meat, with less snacking, primarily due to improved food, physical activity, and relaxation [29]. Studies in Portugal and Japan reveal that inadequate water intake and workplace stress can significantly impact daily sugar consumption, possibly due to time constraints and cautious meal choices [30].

### Limitations of the Study

Recall bias is expected while answering the questionnaire; furthermore, using detailed food frequency questionnaires is better as the study aims to understand the changes in food patterns during the epidemic. The cross-sectional nature of the study limits any causal inferences. Since this study targeted a single university in Saudi Arabia (PNU), generalizability cannot be achieved for the entire Saudi university faculty members. Despite these limitations, this study emphasizes the necessity of investigating the influence of WFH on eating habits among Saudi university faculty members, which can help shape future policy in this area.

**Table 1:** Demographic characteristics of the respondents (N=303).

		n	%
Age (years)	25-35	81	27%
	36-45	135	45%
	46-55	71	23%
	56-65	16	5%
Sex	Male	4	1%
	Female	299	99%
Nationality	Saudi	244	81%
	Non-Saudi	59	19%
Marital Status	Single (never married)	33	11%
	Married	253	83%
	Divorced / Widowed	17	6%
Number of family members in the household	None (live alone)	12	4%
	2-4	134	44%
	5-8	147	49%
	>8	10	3%
Monthly Income (SAR)	≤ 10,000	32	11%
	>10,000 - 15,000	117	39%
	>15,000 - 20,000	76	25%
	>20,000	78	26%
Level of Education	Bachelor's degree	18	6%
	Masters	88	29%
	PhD	197	65%
Current Profession	Teaching Assistant	20	7%
	Lecturer	91	30%
	Assistant Professor	143	47%
	Associate Professor	34	11%
	Professor	15	5%
College	Humanities	121	40%
	Sciences	119	39%
	Health Sciences	32	11%
	Community	31	10%

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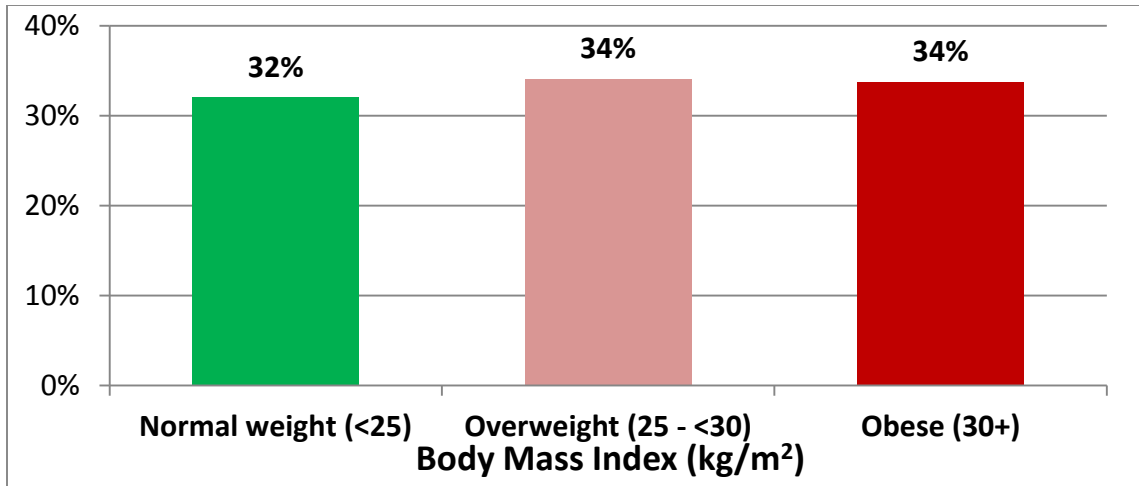


Figure 1: Distribution of Body Mass Index of the respondents at the time of completing the survey (N=303).

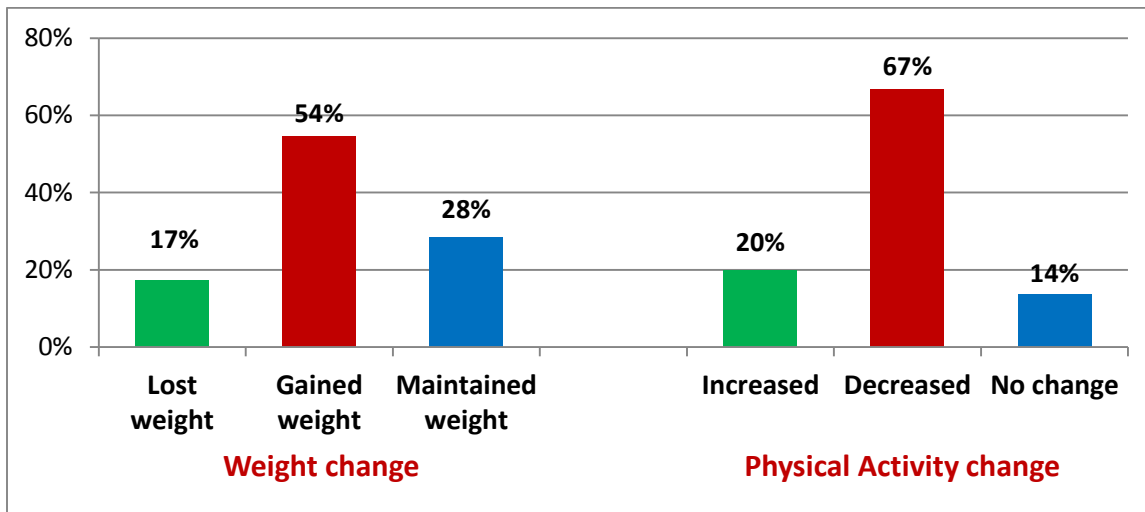


Figure 2: Changes in Weight and Physical Activity as reported by the respondents during work from home and office.

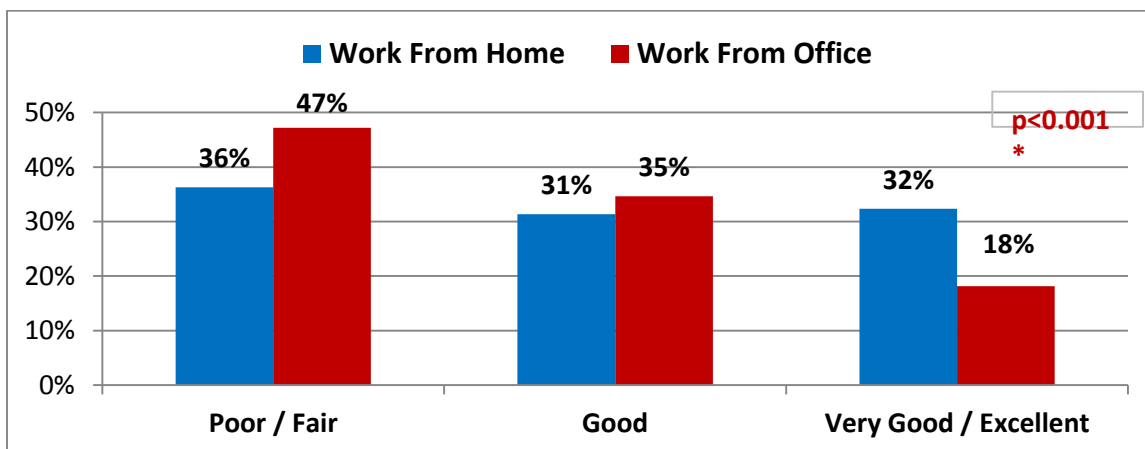


Figure 3: Respondents perceptions of their overall habits of eating healthy food comparison between working from home and office - Significant at  $p < 0.05$  (estimated using Chi-Square test).

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**Table 2:** Comparison of food and grocery habits between work from home and office.

		Work from Home		Work from Office		
		n	%	n	%	p-value
How often do you eat home-cooked meals per week?	Daily	142	47%	84	28%	<b>&lt;0.001*</b>
	4-6 times / week	116	39%	123	42%	
	1-3 times / week	43	14%	90	30%	
How often do you order from a restaurant, takeaway, delivery per week?	Daily	7	3%	11	5%	<b>0.003*</b>
	4-6 times / week	21	10%	49	20%	
	1-3 times / week	193	87%	184	75%	
How often do you buy groceries per week?	Daily	36	12%	33	11%	0.83
	4-6 times / week	62	21%	56	20%	
	1-3 times / week	196	67%	198	69%	
How do you mostly buy groceries?	Market	187	63%	244	84%	<b>&lt;0.001*</b>
	Online / Delivery	111	37%	46	16%	
Do you have any anxiety about food hygiene when you buy food from markets, online, restaurants, take away, or delivery?	Yes	132	44%	87	29%	<b>&lt;0.001*</b>
	No	54	18%	77	25%	
	Sometimes	117	39%	139	46%	

\* Significant at  $p < 0.05$  (estimated using Chi-Square test)

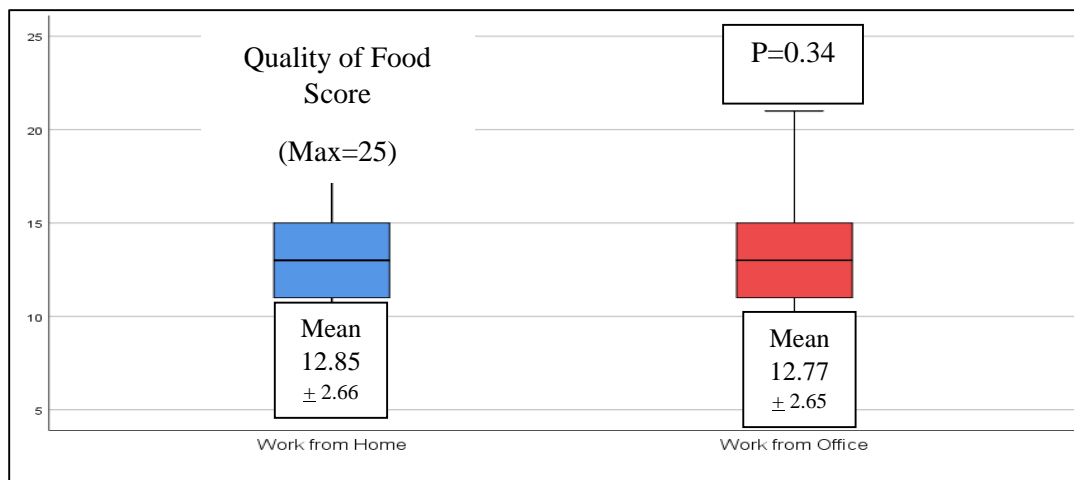


Figure 4: Comparison of total scores for quality of food between work from home and work from office - p-value estimated using paired t-test.

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**Table 3:** Comparison of quality of food scores by demographic variables.

		Quality of Food Score (Max=25)						
		n	Work from Home			Work from Office		
			Mean	sd	p-value	Mean	sd	p-value
Age	25-35 years	81	13.2	3.0	0.13 <sup>a</sup>	13.0	2.9	0.21 <sup>a</sup>
	36-45 years	135	13.0	2.6		13.0	2.6	
	46-55 years	71	12.4	2.3		12.3	2.5	
	56-65 years	16	12.0	2.6		12.3	2.6	
Sex	Male	4	13.3	1.7	0.67 <sup>b</sup>	13.3	1.7	0.61 <sup>b</sup>
	Female	299	12.8	2.7		12.8	2.7	
Nationality	Saudi	244	12.9	2.7	0.48 <sup>b</sup>	12.8	2.7	0.89 <sup>b</sup>
	Non-Saudi	59	12.6	2.6		12.7	2.6	
Marital status	Single (never married)	33	13.2	2.8	0.46 <sup>a</sup>	13.0	2.4	0.53 <sup>a</sup>
	Married	253	12.8	2.7		12.8	2.7	
	Divorced / Widower	17	12.6	2.3		12.6	2.6	
# Members in Household	None (live alone)	12	11.8	2.3	0.39 <sup>a</sup>	12.1	1.9	0.81 <sup>a</sup>
	2-4 persons	134	12.7	2.7		12.8	2.8	
	5-8 persons	147	13.0	2.6		12.8	2.5	
	>8 persons	10	12.7	3.2		12.5	3.3	
Income	<= 10,000 SAR	32	13.8	2.7	0.08 <sup>a</sup>	13.2	2.5	0.06 <sup>a</sup>
	>10,000 - 15,000 SAR	117	12.9	2.7		13.0	2.8	
	>15,000 - 20,000 SAR	76	12.8	2.6		12.9	2.6	
	>20,000 SAR	78	12.4	2.5		12.1	2.5	
Level of Education	Bachelor's degree	18	13.7	2.7	<b>0.03</b> <sup>a*</sup>	13.3	2.5	<b>0.04</b> <sup>a*</sup>
	Masters	88	13.3	2.9		13.3	2.8	
	PhD	197	12.6	2.5		12.5	2.5	
What is your current profession	Teaching Assistant	20	13.8	2.5	<b>0.02</b> <sup>a*</sup>	13.7	2.6	<b>0.02</b> <sup>a*</sup>
	Lecturer	91	13.3	2.9		13.3	2.8	
	Assistant Professor	143	12.7	2.4		12.7	2.4	
	Associate Professor	34	12.4	2.8		12.0	2.8	
	Professor	15	11.5	2.7		11.5	2.8	
College	Humanities	121	12.6	2.7	<b>0.006</b> <sup>a*</sup>	12.5	2.7	<b>0.047</b> <sup>a*</sup>
	Sciences	119	12.6	2.5		12.7	2.6	
	Health Sciences	32	13.4	2.6		13.3	2.1	
	Community	31	14.2	2.8		13.8	2.9	

<sup>a</sup> p-value estimated using ANOVA <sup>b</sup> p-value estimated using independent samples t-test

\* Significant at p<0.05



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**Table 4:** Comparison of quantities of food consumed working from home and from office using McNemar's test.

		Work from Home (N=303)		Work from Office (N=303)		p-value <sup>a</sup>
		n	%	n	%	
How many times a day did you eat fast/fried food/or packaged snacks high in fat/salt/or sugar?	Less than 1 / day	149	49%	147	49%	0.15
	1-3 times / day	116	38%	130	43%	
	4+ / day	38	13%	26	9%	
How many servings (1 serving = 1/2 cup) of fresh, canned, frozen or dried fruit did you eat each day?	Less than 1 / day	113	37%	153	50%	<0.001*
	1-3 times / day	168	55%	127	42%	
	4+ / day	22	7%	23	8%	
How many servings of fresh, canned, frozen or dried vegetables did you eat each day?	Less than 1 / day	89	29%	111	37%	0.003*
	1-3 times / day	171	56%	160	53%	
	4+ / day	43	14%	32	11%	
How many regular soda, sweet tea, juice, energy/sports drinks, sweetened-coffee or other sugar sweetened beverages did you drink each day?	Less than 1 / day	144	48%	144	48%	0.29
	1-3 times / day	123	41%	133	44%	
	4+ / day	36	12%	26	9%	
How many times a day did you eat regular snack chips or crackers?	Less than 1 / day	182	60%	200	66%	0.02*
	1-3 times / day	99	33%	92	30%	
	4+ / day	22	7%	11	4%	
How many times a day did you eat sweet foods or desserts, like chocolate or ice cream, and other sweets?	Less than 1 / day	124	41%	138	46%	0.15
	1-3 times / day	147	49%	139	46%	
	4+ / day	32	11%	26	9%	
How often do you eat red meat, chicken, or fish per week?	Less than 1 / wk	34	11%	43	14%	0.003*
	1-3 times / wk	143	47%	148	49%	
	4+ / wk	126	42%	112	37%	
How often do you drink sugary beverages like Cola, Pepsi, Sprite etc. per week?	Less than 1 / wk	216	71%	224	74%	0.10
	1-3 times / wk	63	21%	64	21%	
	4+ / wk	24	8%	15	5%	

<sup>a</sup> p-value determined using McNemar's test

\* Significant at p<0.05

## Conclusion

From the issues discussed in Chapter 2 of this paper to the data analysis section, it is possible to conclude that during the COVID-19 pandemic, a shift in dietary habits among university faculty members in Saudi Arabia was observed as a result of changes in working patterns from an office-based system to working from home and back. These changes were mostly positive for those working from home, as their work routine and availability at home allow them to develop good eating habits such as planning and cooking meals at home. This was different for those working from the office, as their eating habits were negatively affected by lack of time for lunch and food preparation.

## Conflict of Interest

None

## Funding

None

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