Lifestyle Changes and Food Group/Nutrient Intake amid the COVID-19 Pandemic: Impact of Working from Home

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1. Introduction

Human lives changed drastically after the COVID-19 outbreak in early 2020. Restrictions were imposed on daily activities to prevent the spread of infection. In Japan, all elementary schools, junior high schools, and high schools were shut down from March 2020. Under the state of emergency imposed in April and May of 2020, the Japanese government ordered restrictions on or the suspension of the use of facilities catering to large groups of people, such as restaurants. The government also urged remote work or staggered work hours. As a result, the percentage of those working from home was 27.7% in May 2020, and 21.5% in December 2020, compared with 10.3% in December 2019. This figure increased to 32.2% in September–October, 2021 (Cabinet Office in Japan, 2021).

This study examines the dietary patterns of Japanese people and analyzes how working from home may impact their food group/nutrient intake. The impact is discussed from three perspectives: (1) frequency of the use of various food purchase channels, (2) food group intake, and (3) nutrient intake. Two online surveys regarding dietary patterns were conducted. The first was conducted during the first state of emergency (April 16–May 16, 2020: Phase I), and the second, six months later (October 2020: Phase II). Phase I was the period during which many people stayed home because of the restrictions imposed by the state of emergency. Phase II, six months after the state of emergency was lifted, was the period during which people started to gradually resume their daily activities, while still staying home for the most part.

2. Data

This study used data from an online survey outsourced to Cross Marketing Inc. The survey was conducted among the monitors registered with Cross Marketing. Participants were aged 20–60 years old and living in Tokyo's "special wards" and in 20 "designated cities" nationwide. Of these, 100 people from Tokyo's special wards and 45 people from each designated city were selected, in accordance with their gender and age (they were grouped into 10-year age brackets) to represent each ward and city. The sample for Phase I comprised 1,000 people. Of this sample, the following people were excluded from the final analysis: those who did not participate in the Phase II survey to implement panel data analysis, those whose daily energy intake was less than 500 kcal or 4,000 kcal or higher, those who were on special diets for medical purposes, those who were lactating, and those who were pregnant, and those whose weight differed between Phase I and Phase II by 15 kg or more. The final sample comprised data of 540 people. Food group/nutrient intake was assessed with the brief-type self-administered diet history questionnaire (BDHQ).

3. Analysis method

This study used the First Difference Seemingly Unrelated Regression (FD-SUR) model to minimize endogeneity bias as much as possible. Concurrent determinants for food group/nutrient intake and the frequency of the use of food purchase channels were considered, while the endogeneity related to the time-invariant individual characteristics of these determinants was removed. Explanatory variables included food purchase channels (i.e., fresh food stores, convenience stores, mail-order services, food ingredient delivery services, food delivery services, and restaurants). The food groups consist of grain, potatoes, sugar and sweeteners, vegetables, fruits, seafood, meat, eggs, milk, oil and fats, confectionery, and nonessential beverages. The nutrients comprise protein, fat, carbohydrate, dietary fiber, salt equivalent, and alcohol.

The explanatory variables were determined to facilitate a comparison of lifestyles under the state of emergency with those under normal circumstances. These variables were the number of days worked at home, the number of days children of kindergarten age were at home, whether family members included those attending elementary school, junior high school, or high school, the total hours worked, and monthly income per person for all models. As explanatory variables affecting the frequency of food purchase channel use, this study used people's risk perception toward COVID-19 and the interaction term of risk perception and personal attributes. In addition, as an explanatory variable for food group/nutrient intake, the study used the frequency of the use of food purchase channels.

4. Estimation results

Of the results estimated in this study, the determinants of nutrient intake are presented in Table 1.

The number of days worked from home had a significantly positive impact on carbohydrate intake, and a negative impact

on alcohol intake. The carbohydrate intake may have increased because people ate more frequently at home and increased their consumption of noodles, bread, and rice, which are easily available. In contrast, alcohol consumption may have declined because people had fewer opportunities to drink with their colleagues, as they worked more from home. Survey results confirmed that the number of days people worked from home declined between Phase I and Phase II. This may have contributed to a decline in carbohydrate intake and an increase in alcohol intake in Phase II. Monthly income per person had a significantly positive impact on alcohol intake, because the consumption of alcohol was linked to a person's financial position.

Table 1. Determinants of the amount of nutrient intake (FD-SUR model) (n=540)

		Protein%E		Oil and fats%E		Carbohydrates%E		Dietary fiber		Salt equivalent		Alcohol	
		Coefficient	Z value	Coefficient	Z value	Coefficient	Z value	Coefficient	Z value	Coefficient	Z value	Coefficient	Z value
Number of days worked from home/week		0.023	0.33	-0.152	-1.01	0.343	1.76 +	0.066	1.50	0.014	0.40	-0.301	-1.74 +
Number of days children of kindergarten age stayed at home		0.275	1.45	0.251	0.60	-0.265	-0.49	0.052	0.43	0.008	0.08	-0.364	-0.76
Existence of family members who attended elementary school, junior high school, or high school		0.377	0.93	0.415	0.46	0.081	0.07	0.042	0.16	0.286	1.40	-1.386	-1.35
Work hours (20 hours/week)		-0.031	-0.18	-0.311	-0.85	0.369	0.78	-0.124	-1.15	-0.112	-1.35	-0.075	-0.18
Monthly income per person (50,000 yen)		-0.093	-0.98	-0.187	-0.89	-0.025	-0.09	-0.056	-0.90	-0.019	-0.39	0.423	1.75 +
Frequency of use/week	Fresh-food stores	0.252	2.72 **	0.185	0.91	-0.382	-1.44	0.118	1.96 *	0.095	2.04 *	-0.042	-0.18
	Convenience stores	0.237	1.95 +	0.301	1.13	0.022	0.06	0.014	0.18	0.072	1.17	-0.754	-2.45 *
	Mail-order services	-0.012	-0.06	-0.138	-0.30	0.459	0.77	0.113	0.83	0.079	0.75	-0.403	-0.76
	Delivery services of food ingredients	0.092	0.41	0.170	0.35	-0.468	-0.74	-0.166	-1.14	-0.041	-0.36	0.218	0.39
	Food delivery services	-0.180	-0.94	0.390	0.92	-0.806	-1.48	0.096	0.77	0.049	0.50	0.958	1.98 *
	Restaurants	0.280	1.92 +	0.232	0.72	-0.740	-1.78 +	-0.091	-0.97	0.015	0.20	0.283	0.77
Constant term		0.100	0.61	0.132	0.36	0.247	0.52	0.151	1.41	0.070	0.84	-0.633	-1.51
R sq.		0.040		0.017		0.036		0.019		0.022		0.042	

Note: "**," "*," and "+" indicate that they are statistically significant at the 1%, 5%, and 10% levels or less, respectively.

With respect to food purchase channels, the frequency of the use of fresh food stores had a positive impact on the intake of protein, fiber, and salt equivalents. Those who used fresh food stores less frequently between Phase 1 and Phase II had to be careful about a decline in their intake of protein and fiber. However, protein intake was positively impacted by the use of restaurants and the like, which increased in Phase II (as discussed below). Owing to this, protein intake may not have necessarily declined in people's overall diet. The use of convenience stores had a positive impact on protein intake and a negative impact on alcohol intake. Convenience stores sell many meat products, such as chicken salad, as well as *bento* meals with lots of meat. The use of these products increased the overall intake of protein. In contrast, the negative impact on alcohol consumption may have been due to the relatively high prices of alcoholic beverages sold at convenience stores. The use of food delivery services had a significantly positive impact on alcohol intake. This was probably because food delivery services were often used by high-income earners, and because monthly income per person significantly and positively impacted alcohol intake, as explained earlier. Finally, the use of restaurants had a positive impact on protein intake and a negative impact on carbohydrate intake. The use of restaurants increased significantly from Phase I to Phase II. Those who increased their use of restaurants also increased their protein intake and reduced carbohydrate intake.

The analysis of the frequency of food purchase channel use also showed that people working from home tended to choose food ingredient delivery services that allowed them to obtain fresh foods easily. The analysis of the frequency of restaurant use showed that those in their 40s and 50s tended to avoid the use of restaurants if they believed that there was a strong likelihood that they could be infected with COVID-19. However, those in their 20s and 30s who were reluctant to use restaurants were limited in number. This indicates that the policy measures aimed at lowering infection risks were less effective among younger people.

The analysis of food group intake showed that working from home had a positive impact on eggs intake. It also showed that monthly income per person had a positive impact on milk intake and negative impact on potato intake. In particular, it was confirmed that those whose income declined because of a stagnation of economic activities due to the emergency reduced their intake of milk.

5. Conclusion

This study used FD-SUR to examine how changes in lifestyle, such as working from home amid the COVID-19 pandemic, may affect the food group/nutrient intake, and examined changes in individuals' dietary patterns and the background to such changes.

The study provides valuable insights. For example, it was found that working from home leads to a dietary pattern centered on carbohydrates. However, this study only used the data collected in the early stages of the COVID-19 pandemic and did not examine subsequent developments. Lifestyles and dietary patterns have continued to change significantly since, as they are still affected by the pandemic. Therefore, future research should examine these subsequent developments.

[References]

Cabinet Office in Japan (2021). *Dai yonkai shingata korona uirusukansensho no eikyo ka ni okeru seikatsu ishiki kodo no henka ni kansuru chosa* (4th survey on changes in lifestyle awareness and behavior amid COVID-19)
https://www5.cao.go.jp/keizai2/wellbeing/covid/pdf/result4_covid.pdf (accessed March 22, 2022).