

Food safety knowledge and awareness among stakeholders of the online-food-delivery system in Depok City Indonesia

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Abstract

The online food delivery (OFD) is known to be a fast-growing business in Indonesia, with the largest platforms, namely GoFood and GrabFood. Hence, the level of knowledge and awareness of the stakeholders, including restaurants, delivery partners, and customers on the safety of the ready-to-eat food is important to ensure that the delivery does not rise a potential health hazard. This study aimed to determine the factors affecting the delivery process of ready-to-eat food, via the OFD system, in terms of educational backgrounds, experience, implementation of regulations, as well as knowledge and awareness of safety among the stakeholders. The research location was Depok, a growing city nearby Jakarta, which is known to support the growth of OFD, with a relatively dense population, sufficient internet network, educational level, and employed individuals. The survey was conducted in regard to hot soup and fried/grilled food restaurants, delivery partners, and customers that are members of GoFood and GrabFood, with 110 respondents from each group. The results presented an overview of the OFD system during the COVID-19 pandemic since it was conducted between December 2020 to March 2021. The food safety knowledge profile of the stakeholders in regard to OFD was relatively good. This knowledge was not significantly affected by educational background, experience, training, or practical monitoring. However, their food safety awareness still needs to be improved. It is further suggested that the visitation frequency to restaurants by the local health authority should be increased, the hygiene monitoring team should be reporting via application, regular inspection by the delivery partners, and organizing food safety campaigns for the customers. This study also showed that there are significant differences between food safety knowledge and awareness among the stakeholders. This condition should be mitigated by improving safety awareness, during the process of OFD, involving continuous training delivery partners, consistent visitation of the OFD provider, the improvement of system and facilities, provision of a special container, and promoting the usage.

1. Introduction

The food and beverage sector is one of the most economically affected aspects during the COVID-19 pandemic in Indonesia. According to the results of the social demographic survey on the impact of COVID-19, issued by Statistics Indonesia (SI) in 2020, the accommodation and food/beverage providers recorded a decrease in income of 76.84% (Statistics Indonesia, 2020). Therefore, the implementation of Online Food Delivery (OFD) is one of the initiatives for curtailing this problem, in line with the increasing pattern of online shopping during the COVID-19 pandemic. The data obtained from Statistic Indonesia showed that 31% of

respondents reported an increase in online shopping. The growth rate of OFD in Indonesia from 2020 to 2024 is estimated to reach 11.45% (Statista, 2020a). However, this growth rate is not in line with the increased awareness of the safety aspect (Aprilianti and Amanta, 2020). One of the important steps in OFD's business is the delivery process. Food delivery is carried out by the restaurant directly, or by a third party. The third party plays a role by collaborating and displaying restaurant menus in an application format, as well as managing and delivering orders to consumers (Wibisono *et al.*, 2018). Although in terms of consumer confidence, direct delivery receives a better response. While in terms of e-service quality, sales promotions, the types of food

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delivered, and the third parties services have advantages from the consumer perspective (Benhardy and Ronadi, 2020).

The two largest platforms for ready-to-eat food delivery, via the OFD, are GoFood and GrabFood, with a market share of 57% and 42%, respectively (Trade-off Indonesia, 2019). Although the two platforms have a policy in their partnership clause for the implementation, the safety factor really depends on the level of awareness and obedience of the delivery partners. Many of the delivered food only use plastic packaging and are brought by motorcyclists without any special treatment. OFD mostly has an open order system, where a consumer orders even when there is only one type of food at a restaurant. This condition has the potential of increasing the flow of demand and transportation traffic and affecting the delivery time required. Delivery time is, therefore, longer when the number of requests increases (Chen, 2019)

Several studies related to the OFD have been carried out, especially by the service providers, the customers (Puspitasari *et al.*, 2017; Suhartanto *et al.*, 2019), and also from the partners of GoFood and GrabFood (Wibisono *et al.*, 2018). The delivery process is rarely observed in Indonesia. The delivery of food through the OFD platform needs attention because, poor handling increases the risk of safety, due to the potential bacterial growth or cross-contamination occurrence. As recommended by WHO, the food should be kept in safe conditions, such as no more than 2 hrs at room temperature, refrigerate cooked and perishable food, and serve while hot. The problems encountered in the OFD business, include short shelf life, the influence of temperature and humidity, possible interactions between products, low-profit margins, and high demands from buyers (Akkerman *et al.*, 2010).

This research is expected to provide insight and knowledge to the interested parties involved in the OFD distribution chain, both the government and the service providers, regarding the control factors needed to ensure safety during the delivery process. In addition, it focused on monitoring the delivery process for the hot soup and fried/grilled ready-to-eat food. These foods have been selected due to several characteristics, such as short shelf life, the influence of temperature and humidity, and also the high possibility of interactions between the products. Based on the Statista report released in June 2020, the favourite foods ordered in Indonesia are 74% local cuisine and 64% fast food (Statista, 2020b). The research location was Depok, a growing city nearby Jakarta. The monitoring of ready-to-eat food providers has been carried out by the government, in the form of hygiene-worthy certification, permit, and supervision of Home

Industry Food (PIRT), as well as periodic inspection by the Health Office, especially for restaurants. This underlies the choice of a ready-to-eat food restaurant. With these supervisions, it is assumed that the production system and facilities of ready-to-eat food are in accordance with the principles of safety. Therefore, this is recommended for the interested parties in the OFD distribution chain, since it focused on the delivery aspect.

2. Materials and methods

2.1 Location

The research was carried out from December 2020 to March 2021, in 11 districts of Depok City. Based on the social-demography report, the City supports the growth of OFD, with a relatively dense population, sufficient internet network, educational level, and employed population.

2.2 Material

The main tool used was a set of questionnaires, in the form of short questions that focused on the delivery process starting from the preparation (packaging of ready-to-eat food in restaurants), the conveying, and the receiving process. Therefore, the questionnaire is divided into 3 parts, each for restaurants, delivery partners, and customers. Each of the groups was surveyed with respect to 3 types of questions, namely general, basic knowledge, and food safety awareness.

The part of the questionnaire is in the form of general questions, which aims to gather information related to the background, identity, and condition of the respondents. For the aspects of basic knowledge and awareness, there were two questions that used a Likert scale as the measuring medium. Questions with the type of respondent's perception were divided into strongly disagree, disagree, undecided, agree, and strongly agree, for levels 1, 2, 3, 4, and 5, respectively. Meanwhile, for questions with differences in the frequency of occurrence, they were divided into: never, rarely (less than 25% of the amount), sometimes (25 - 50% of the amount), often (more than 50% of the amount), and always for level 1, 2, 3, 4, and 5, respectively.

2.3 Determination of questionnaire instrument test for respondents

Respondents involved in questionnaire testing purposes are usually those in a different location, however, have the same characteristics as the research site (Janti, 2014). In this study, the questionnaire test was conducted openly using Google Form, with the respondents of the OFD distribution in the Bogor City area, and its surroundings, considering the demographic

characteristics of the population almost the same as Depok City.

Many statistical studies do not specify the minimum number of respondents required for validation and reliability testing. The general standard used was based on the number of variables/question items and a minimum of 5 respondents for one variable (5: 1 ratio) (Budiastuti and Bandur, 2018). With a ratio of 5: 1, the number of respondents that should be analyzed is 50 restaurants, 90 delivery partners, and 70 consumers. In this instrument test stage, the number of respondents involved was 55 restaurants, 100 delivery partners, and 100 consumers.

2.4 Determination of the respondents for the main research

The questionnaire used passed the validation and reliability tests, while the invalid or unreliable parameters were eliminated. The number of respondents is assumed to be unknown due to security data considerations, fluctuations in figures, and also the activeness of participants, especially the restaurant group and delivery partners. Therefore, the number of respondents to be observed is determined using the Lemeshow formula, which is commonly used to ascertain the number of samples with an unknown population (Andriany and Arda, 2019). The Lemeshow formula is described as:

$$n = \frac{Z^2 1 - \frac{\alpha}{2} P(1 - P)}{d^2}$$

Where n is the number of samples, z is the level of confidence, p is the maximum estimate, and d is the sampling error rate.

The estimated proportion is determined based on the demographic data of Depok City in 2020. The respondents were selected from 15 to 59 years, which is the age of employment (more than 15 years) as well as active internet users. Based on the demographic data of Depok City in 2020, the total population aged 15 to 59 years is 1,704,561. It is also approximately 71.52% of the total 2,484,186 population of Depok City (Statistic Depok City, 2021).

By using an error rate of 10% and an estimated proportion of 71.52%, the minimum number of respondents that should be identified as the delivery partners and consumers is 79.02, or approximately 80. The respondents for the restaurant group were calculated with an estimated maximum proportion (0.5). Applying an error rate of 10%, the minimum number of samples that should be observed is 96.04 or approximately 100 samples.

The respondents involved were 110 respondents for each group which were selected evenly from 11 districts, by taking 10 restaurants in each district. Also, they were picked based on the 10 best-selling criteria and provided a menu of hot soup and fried/grilled gravy. The best-selling criteria referred to are the superpartners for GoFood and a best seller for GrabFood. No specific criteria for the packaging material used by the restaurant have been observed. Therefore, the research focused on the material condition (should be covered and tightened) and the method of the delivery process (using a specific container or hanging to the motorcycle)

Meanwhile, the delivery partners and consumers were the driver and customers around the restaurant involved. For the delivery partner, there were no specific criteria for the distance of the order. The environmental aspect that was observed from the delivery time needed and the awareness of the food temperature was based on the danger zone of the food.

2.5 Data analysis

The primary data obtained from the results of the questionnaire were analyzed based on the relationship between the level of education, experience, hygiene, food safety knowledge, and awareness. The education background, experience in OFD business and frequency of regulation/monitoring application were analyzed using the one-way ANOVA method with the IBM SPSS version 21.0 program. The level of confidence was determined at 0.05. The ANOVA data analysis result that showed the significant difference value ($p < 0.05$), was followed by the Tukey HSD test (Honest Significant Difference). This was performed to find out in detail the differences between the groups as reflected in the questions on the questionnaire. Meanwhile, the experience of food safety training was analyzed using the t-test, with the SPSS version 21.0 program. The level of confidence was set at 0.05. The demographic information of Depok City was used as the secondary data.

3. Results and discussion

3.1 Profile of restaurant owners, delivery partners, and customers

Most of the restaurant owners, delivery partners, and customers have an educational background at Senior High school and have no experience related to safety training (Table 1). Generally, no specific food safety lessons at the Senior High School in Indonesia, except the vocational school of the culinary department. The most visited restaurants (58.2%) have run the business for more than 3 years, and most of them (89.1%) were visited by the local health authority less than 3 times.

Table 1. Profile of the restaurant owners, delivery partners, and customers.

Profile of Restaurant owner (n = 110)		Profile of Delivery Partner (n = 110)		Profile of Customers (n = 110)	
Parameter	Percentages (%)	Parameter	Percentages (%)	Parameter	Percentages (%)
Educational background		Educational background		Educational background	
Elementary	5.5	Elementary	1.8	Elementary	0
Junior high school	10.9	Junior high school	7.3	Junior high school	0.9
Senior high school	70	Senior high school	80.9	Senior high school	76.4
Diploma	5.5	Diploma	6.4	Diploma	16.4
Bachelor	8.2	Bachelor	3.6	Bachelor	6.4
Food safety training		Food safety training		Food safety training	
Ever	23.6	Ever	35.5	Ever	3.6
Never	76.4	Never	64.5	Never	96.4
Joined to the OFD system		Joined as delivery partner		OFD experience/order frequency	
<1 year	18.2	<1 year	1.8	Once / week	19.1
1-3 years	49.1	1-3 years	26.1	1-3 / week	48.2
>3 years	32.7	>3 years	71.8	>3 /week	32.7
Visitation by Local Health Authority		Hygiene monitoring by reporting via application		Profession	
< 3 times	89.1	Daily	14.5	Employees	72.7
2-3 times	8.2	Weekly	85.5	Entrepreneur	11.8
> 3 times	2.7	Hygiene monitoring by inspection by provider		Housewife	6.4
Visitation by OFD provider		Daily	16.4	College student	9.1
< 3 times	87.3	Weekly	81.2		
2-3 times	8.2	Once in 2 weeks	0.9		
> 3 times	4.5	Others	0.9		
Business operational period					
<1 year	11.8				
1-3 years	30				
>3 years	58.2				

Interestingly, most of them (67.3%) have joined the OFD system in <1-3 years, within the period of the COVID-19 pandemic. This data indicated that the pandemic has changed the business strategy. A lot of them switch their sales network to online in order to accommodate customer needs (Prakoso, 2020).

Most delivery partners (71.8%) have joined the OFD system for more than 3 years. They used to report their hygienic implementation via application weekly, as well as monitored by inspection. The frequent customers were the selected respondents (72.7%). As described by Puspitasari *et al.* (2017), the employees' age (born in 1980 – 1999) was the most contributing party to the OFD business via usability, interactivity, online trust, aesthetics, and marketing mix.

3.2 Knowledge and awareness of food safety of restaurant owner

The restaurant owners have good knowledge with respect to the related aspects shown in Figure 1A, however, they lack awareness of food safety (Figure 1B). The factors that affect the food safety knowledge of restaurant owners are presented in Table 2. The

experience of joining the OFD system and the frequency of visitation by the local health authority have contributed significantly to the knowledge of the restaurant owners on food safety. Significant differences have been observed, in respect to the experience of joining the OFD system for the aspect of RTE food packaging (sig. value 0.003). There was a significant difference observed between the restaurant owners with the experience of joining the OFD system less than 1 year compared with more than 3. Another aspect that has a significant difference in the experience of joining the OFD system is the knowledge that the hot RTE food should not be more than 2 hrs at room temperature (sig. value 0.017). The difference between the restaurant owner with the experience of joining the OFD system is more than 3 years compared with those less than 1 and between 1-3 years' experience. This significant difference was also observed for the parameter visitation frequency by the local health authority. The aspect that shows the difference is the aspect of RTE food packaging (sig. value 0.013), and the hot RTE food should not be more than 2 hrs at room temperature (sig. value 0.044). There were significant differences for the restaurant groups that visited 2-3 times compared with

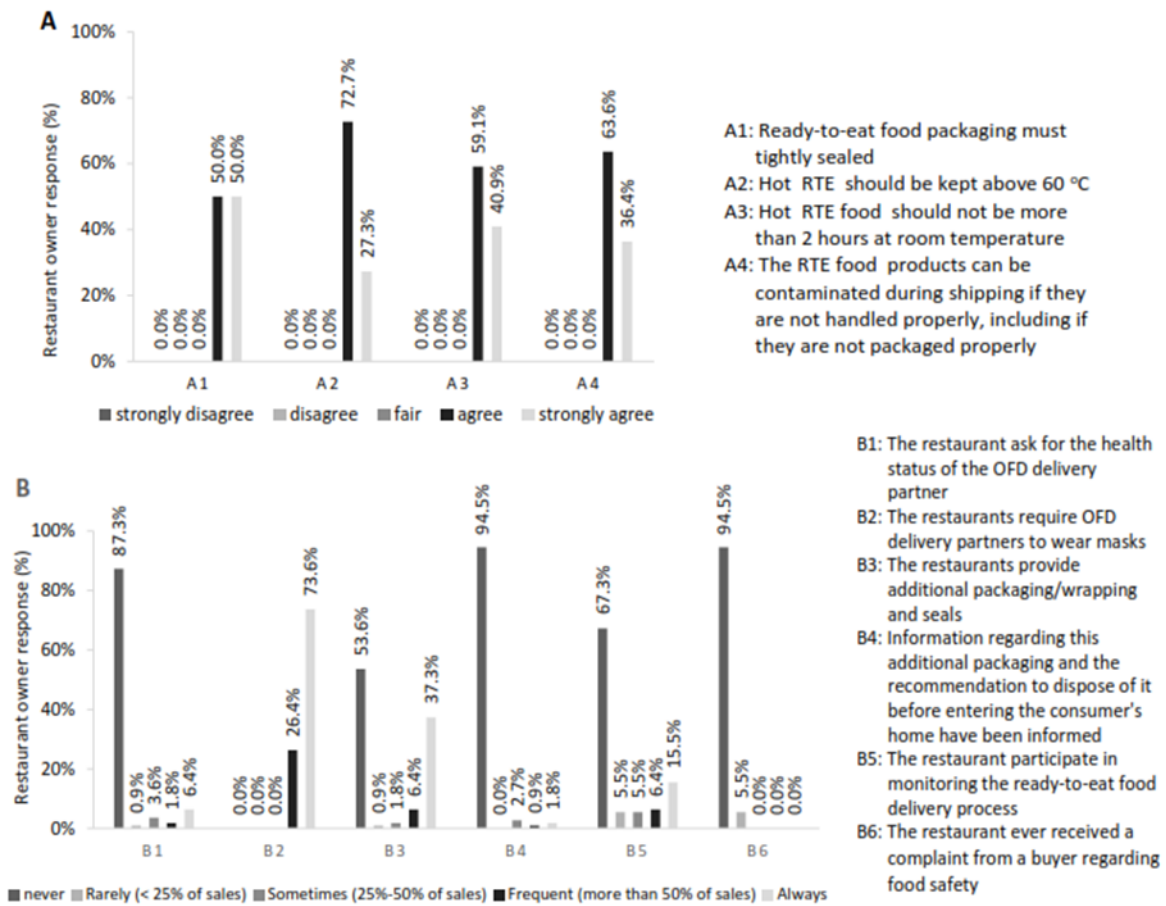


Figure 1. Feedback from restaurant owner respondents (n = 110) for (A) food safety knowledge and (B) awareness aspects.

Table 2. Significance-value of the factors affecting food safety knowledge of restaurant owners (n = 110).

Parameter	Significance-value of food safety knowledge for restaurant owner corresponding to various aspects			
	A1	A2	A3	A4
Educational background	0.104	0.091	0.703	0.847
Business operational period	0.473	0.823	0.250	0.234
Joined to the OFD system	0.003*	0.349	0.017*	0.217
Visitation by Local Health Authority	0.013*	0.099	0.044*	0.233
Visitation by OFD provider	0.290	0.964	0.737	0.293
Food safety training experience	0.074	0.964	0.285	0.475

*Significance-value <0.05; A1: RTE food packaging should be tightly sealed; A2: Hot RTE food should be kept above 60°C; A3: Hot RTE food should not be more than 2 hrs at room temperature; A4: RTE food products are susceptible to contamination during shipping when not handled/packaged properly.

those that recorded more than 3 visitations.

Although there was a significant difference observed for the several groups internally. Overall, the knowledge of the restaurant owners was at a fairly high level (Figure 1). Since almost all respondents have no experience in food safety training, this factor has not contributed to the knowledge. The difference in result has been reported by Marklinder *et al.* (2020) who concluded that the experience in food safety education was significantly correlated with the knowledge as well as awareness to implement the operation.

Based on the discussion above, it is concluded that the educational background, business operational period, joined to the OFD system, visitation of the Local Health

Authority, the service providers, and also the food safety training has no direct influence on the knowledge for restaurant owners. A previous study reported that professional experiences correlate with knowledge regarding the self-life of food at the danger zone temperature (Jianu and Chiş, 2012). The study by Webb and Morancie (2014) in Trinidad and Tobago, however, showed that there was no correlation of the educational background with the food safety knowledge of the services provider.

Despite there being no evidence that the outbreaks of COVID-19 are transmitted via food and packaging (WHO 2020), mitigation action has been recommended to use additional packaging, which is disposable at the entrance of the customer's house. The packaging is

discarded after the useful information needed is verified (Olaimat *et al.*, 2020), and has been implemented by several fast-food restaurants in Indonesia with good feedback from the customer (Calista *et al.*, 2020). The use of the additional packages and seals including the information for disposal before entering the house has not been adequately implemented (Figure 1B). Packaging has been designed as the physical and barrier protection, and preservation of the food product (Nérin *et al.*, 2016). Damage packaging leads to the perception of food safety in relation to contamination (White *et al.*, 2015).

The restaurant owner's safety awareness has significant changes in the addition of packaging material and the visitation of the Local Health Authority (sig. value 0.01) as presented in Table 3. There was a significant difference observed for the restaurant group that has not visited those patronized once. Another aspect that has a significant difference for the visitation of the Local Health Authority was the data for the additional packaging handling (sig. value 0,01), with the difference between the restaurant that has not been visited and those patronized more than 3 times. For the OFD provider, a significant difference was observed for the additional packaging (sig. value 0,026) between the restaurant that has been visited and those that were patronized 2-3 times. Based on Figure 1B, although the difference was observed among the group of educational backgrounds, the Local Health Authority has no impact on food safety awareness. The influence defined for the experience of the OFD system was in relation to the additional packaging method.

The National Agency of Drug and Food Control of Indonesia has also issued guidelines for the production and distribution of processed food during the Pandemic, with extra attention to personnel hygiene and health status as factors that should be monitored. Temperature monitoring and screening are one of the steps of precautionary measures for curtailing the spread of COVID-19 (Shahbab and Zubair, 2020) to ensure food

safety. This aspect has a significant difference in the educational background (sig. value 0.001), between the bachelor's degree compared with the senior high school and diploma educational level. The other aspect that has a significant difference for health verification is the visitation of the OFD application (0,005), between the restaurants that were visited 2-3 times compared to those patronized for less than 1 time or none. However, as presented in Figure 1B, most of the restaurants (87.3%) have not verified the health status of the delivery partner that pick-up the order, in terms of measuring the body temperature. The educational background has no influence on food safety awareness as a single factor. Supporting the training experience, the educational background has a significant impact on the awareness of the delivery partner's health status. The awareness increase in line with the increasing educational background

3.3 Knowledge and awareness of food safety of delivery partner

As shown by the restaurant owners, the delivery partners have also a good knowledge with respect to the related aspects shown in Figure 2A. Generally, the delivery process has been conducted properly (Figure 2B), i.e., including the additional cover when conveying, as carried out during the rainy season. This is needed to prevent the splashed of foreign substances and also the accidental opening of packaging material. The delivery partners have also shown adequate hygiene, such as wearing a mask, washing their hands with soap every day, and applying physical distancing in daily activities.

From the results of the questionnaire, it was found that most respondents (71.8%) made deliveries within a time span of 30–60 mins, and 94.5% had never delivered food with a travel time of more than 2 hrs. However, as mentioned above, 27.3% never pay attention to the temperature of the food they send. Although in the survey of safety knowledge, delivery partners that did not pay attention to the temperature of the food,

Table 3. Significance-value of factors affecting food safety awareness of restaurant owners (n = 110).

Parameter	Significance-value of food safety awareness for restaurant owner corresponds to various aspects					
	B1	B2	B3	B4	B5	B6
Educational background	0.001*	0.436	0.58	0.229	0.229	0.727
Business period	0.401	0.716	0.706	0.539	0.175	0.41
Period of joining OFD	0.754	0.368	0.67	0.76	0.355	0.169
Visitation Local Health Authority	0.407	0.277	0.010*	0.010*	0.135	0.151
Visitation OFD provider	0.005*	0.256	0.026*	0.4	0.346	0.78
Food safety training	0.025*	0.349	0.185	0.96	0.725	0.683

*Significance-value <0.05; A1: RTE food packaging should be tightly sealed; A2: Hot RTE food should be kept above 60°C; A3: Hot RTE food should not be more than 2 hrs at room temperature; A4: RTE food products are susceptible to contamination during shipping when not handled/packaged properly.

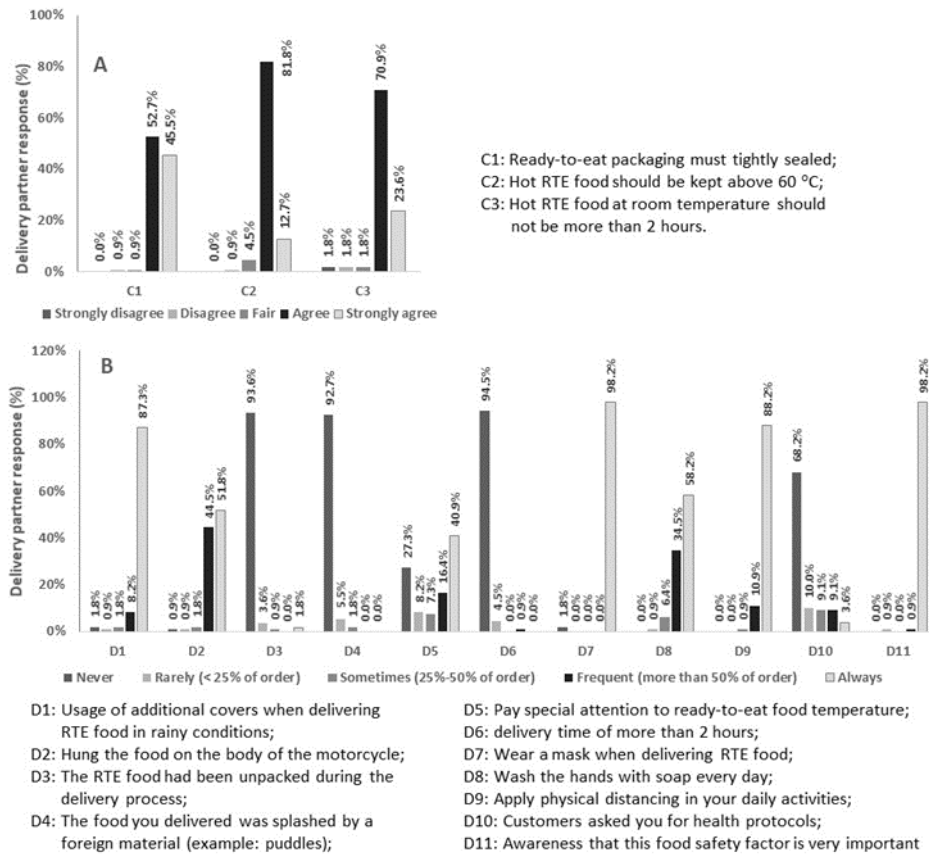


Figure 2. Feedback from delivery partner respondents (n = 110) for (A) food safety knowledge and (B) awareness aspects.

answered 76.67% agreed and 16.67% strongly agreed that hot food should be kept above 60°C. Based on this, there is a significant difference between food safety knowledge and the application of awareness. This condition was also identified by Web and Morancie (2014) in their study. As reported by Goh (2017), one of the factors that hinder restaurants in the use of third-party delivery partners is food freshness. Other differences also observed in the delivery partner’s habits, include to hung the food on the motorcycle. A total of 44.55% of delivery partners often, and another 51.82% always hung the food on their motorbike. From the data of the questionnaire, the delivery partner that often and always hung the food gave an answer of 53.77% agree and 45.28 strongly agree, respectively, that ready-to-eat food packaging tightly closes food to consumers.

Referring to Table 4, a significant correlation with

the food safety knowledge was observed when reporting the hygiene implementation via application, in relation to the handling hot ready-to-eat food above 60°C (sig. value 0.033). The hot ready-to-eat food should not remain at room temperature for more than 2 hrs (sig. value 0.000). There was no relationship between educational background and experience in food safety training knowledge, in line with the finding by Web and Morancie (2014).

For the food safety awareness, as presented in Table 5, a significant difference was observed in the use of additional cover when it rains, for the educational backgrounds (sig. value 0.003), work experiences (sig. value 0.024), responsibility to reporting the hygiene implementation via application (sig. value 0.005), and also the monitoring by the OFD provider (sig. value 0.023). The Tukey HSD test showed a significant

Table 4. Significance-value of factors affecting food safety knowledge of delivery partners (n = 110).

Parameter	Significance-value of food safety knowledge for delivery partner corresponding to various questions		
	C1	C2	C3
Educational background	0.770	0.702	0.739
Joined as delivery partner	0.465	0.979	0.940
Hygiene monitoring by reporting via application	0.046	0.033*	0.000*
Hygiene monitoring by inspection by provider	0.459	0.554	0.671
Food safety training	0.171	0.309	0.058

*Significance-value <0.05; A1: RTE food packaging should be tightly sealed; A2: Hot RTE food should be kept above 60°C; A3: Hot RTE food should not be more than 2 hrs at room temperature; A4: RTE food products are susceptible to contamination during shipping when not handled/packaged properly.

Table 5. Significance-value of factors affecting food safety awareness of delivery partners (n = 110).

Aspects	Significance value				
	Educational background	Working experiences	Hygiene monitoring reporting via application	Hygiene monitoring inspection by provider	Food safety training
D1	0.003*	0.024*	0.005*	0.023*	0.088
D2	0.534	0.495	0.000*	0.006*	0.095
D3	0.955	0.576	0.942	0.591	0.185
D4	0.906	0.916	0.731	0.573	0.960
D5	0.651	0.981	0.760	0.604	0.725
D6	0.927	0.747	0.860	0.596	0.616
D7	0.977	0.058	0.176	0.005*	0.149
D8	0.421	0.098	0.551	0.561	0.083
D9	0.326	0.033*	0.038*	0.143	0.099
D10	0.26	0.882	0.023*	0.001*	0.249
D11	0.985	0.378	0.003	0.015*	0.196

*Significance-value <0.05, D1: Usage of additional covers when delivering RTE food in rainy conditions; D2: Hung the food on the motorcycle; D3: The RTE food had been unpacked during the delivery process; D4: The food delivered was splashed by a foreign material (example: puddles); D5: Giving special attention to ready-to-eat food temperature; D6: delivery time of more than 2 hrs; D7: Wear a mask when delivering RTE food; D8: Washing of hands with soap every day; D9: Applying physical distancing in daily activities; D10: Customers asking for health protocols; D11: Awareness of the importance of food safety factor.

difference in the level of primary education compared with the other educational background. And also the level of work experience of more than 3 years compared with those of 1 to 3 years. Another parameter that influenced the working experience was the social distancing implementation (sig. value: 0.033), and there was a significant difference observed for the group with work experience of more than 3 years compared to those of 1 to 3 years. The work experience of the delivery partner has contributed to safety awareness.

The correlation of food safety awareness and the responsibility of reporting hygiene have a significant difference in relation to the habit of hanging ready-to-eat food on the motorcycle during the delivery process (sig. value 0.000), the social distancing implementation (sig. value 0.038), verification of health status by consumers (sig. value 0.023), as well as the awareness of food safety for health and business sustainability (sig. value 0.003). The monitoring of hygiene implementation, both in the reporting and inspection from the provider contributed to the safety awareness. Although they have similar safety knowledge, a significant difference was observed in the daily and weekly reporting of hygiene implementation (and also the inspection). Delivery partners with weekly monitoring systems (both reporting and inspection of OFD application providers), showed relatively better awareness compared with delivery partners that were inspected on a daily basis. Therefore, it is suggested that weekly monitoring is an appropriate and optimum inspection time and increases awareness of food safety.

3.4 Knowledge and awareness of food safety of the customer

Basically, the increase in the safety knowledge of the customer leads to rising in their awareness (Figure 3). Considering the knowledge, there was no significant correlation between educational background experiences in the OFD system, and food safety knowledge (Table 6). However, the correlation was only observed during the professional and training experiences. Based on the Tukey HSD test, the difference in training experiences observed was in relation to the knowledge of ready-to-eat food hazard zones, hot food that was maintained at a temperature of more than 60°C (sig. value 0.006). While for the profession, the difference was observed in the packaging type and condition of the employees compared with the housewife group. This result was in line with the research by Septiani *et al.* (2021) in Cirebon, another region of Indonesia. Based on the research, 43.3% of housewives have bad food security behaviour, due to inadequate knowledge. A similar study also reported in regard to women in Saudi Arabia, that 30.4% have poor knowledge of food handling (Ayaz *et al.*, 2018). Other research in Thailand reported that most parents and health personnel required knowledge of the plastic usage of food packaging (Kasemsup and Neesanan, 2011).

For safety awareness (Table 7), the correlation was observed in educational backgrounds in relation to the verification of mask usage by the delivery partner (sig. value 0.046), the experience of the OFD personnel with respect to the contactless policy implementation (sig. value 0.024), and the verification of health status of

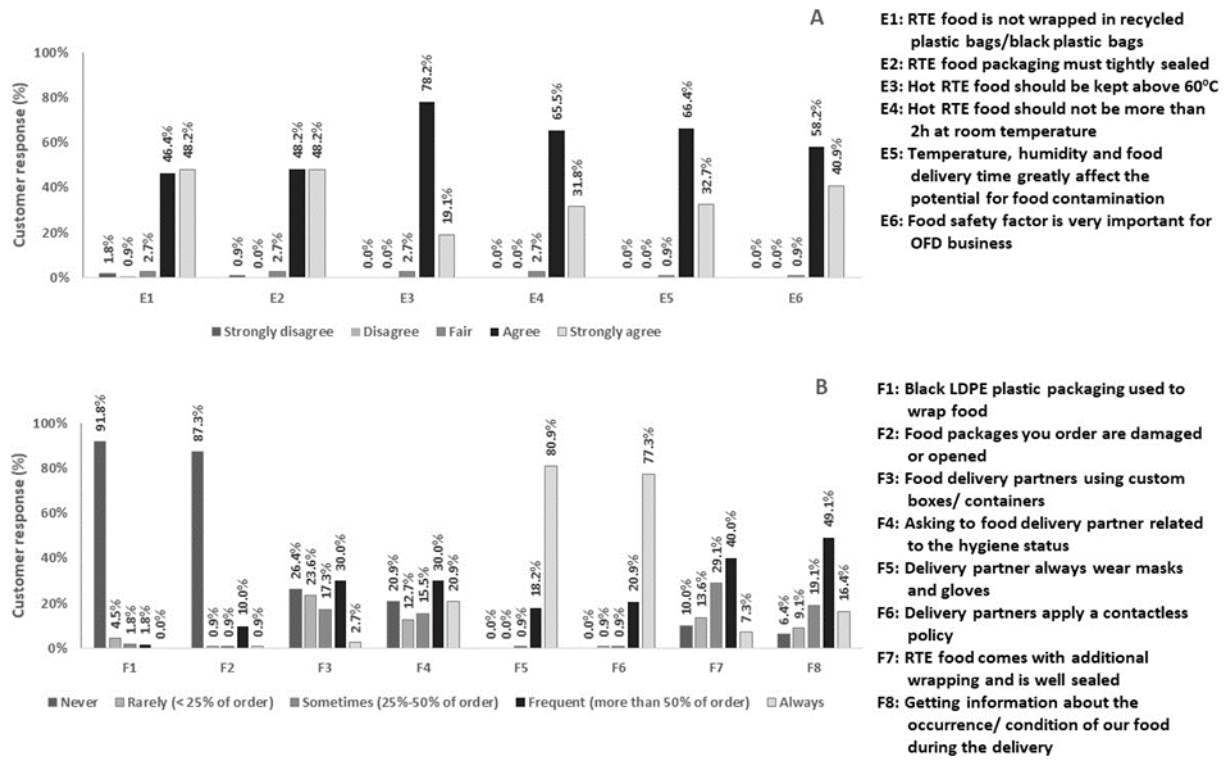


Figure 3. Feedback from customer respondents (n = 110) for (A) food safety knowledge and (B) awareness aspects.

Table 6. Significance-value of factors affecting food safety knowledge of customers (n = 110).

Parameter	Significance-value of food safety knowledge for customers corresponding to various questions					
	E1	E2	E3	E4	E5	E6
Educational background	0.082	0.147	0.191	0.400	0.385	0.302
Profession	0.005*	0.001*	0.143	0.117	0.147	0.161
OFD experience/order frequency	0.395	0.050	0.877	0.671	0.335	0.415
Food safety training	0.322	0.308	0.006*	0.475	0.450	0.163

*Significance-value <0.05; E1: RTE food is not wrapped in recycled bags/black plastic bags; E2: RTE food packaging should be tightly sealed; E3: Hot RTE food should be kept above 60°C; E4: Hot RTE food should not be more than 2 hours at room temperature; E5: Temperature, humidity, and food delivery time greatly affect the susceptibility of food to contamination; E6: Food safety factor is very important for Online Food Delivery business.

Table 7. Significance-value of factors affecting food safety awareness of customers (n = 110).

Parameter	Significance-value of food safety awareness for customers corresponding to various questions							
	F1	F2	F3	F4	F5	F6	F7	F8
Educational background	0.895	0.2	0.613	0.89	0.046*	0.163	0.525	0.946
OFD experience/order frequency	0.279	0.060*	0.253	0.634	0.25	0.024*	0.352	0.525
Food safety training	0.015*	0.454	0.882	0.914	0.811	0.334	0.59	0.85

*Significance-value <0.05, the difference identified; F1: Black LDPE plastic packaging used to wrap food; F2: Food packages ordered are damaged or opened; F3: Food delivery partners using custom boxes/containers; F4: Inspection of the food delivery partner in relation to hygiene; F5: Delivery partner always wear masks and gloves; F6: Delivery partners apply a contactless policy; F7: RTE food incorporate additional wrapping and well sealed; F8: Obtaining information based on the occurrence/ condition of food during the delivery

delivery partner (sig. value 0.015). Tukey HSD test for the purchasing experience using the OFD application obtained data on differences between groups with experience of more than 3 times a week and ordering using the OFD system compared to the groups with the frequency of purchasing through OFD once a week. The customer knowledge acquired from the education, training, and experience in the use of OFD, increases the

awareness of food safety. During the pandemic, the awareness of customers in reducing perceived risks also increased (Mehroliya et al., 2020). In the food safety awareness analysis as presented in Figure 3B, verification of the health status of the delivery partner was conducted frequently (30.0%), as well as the inspection of the face mask and glove (80.9%).

Referring to the safety awareness aspect, educational

background, OFD experience, and training showed a significant correlation. A significant difference was observed between the verification of mask usage by the delivery partner (sig. value: 0.046), educational background aspect as well as food packaging damage and contactless (sig. value: 0.060; 0.024). The Tukey HSD test showed the differences between groups with experience of more than 3 times a week, buying using the OFD system compared to those purchasing once a week. Contactless and packaging conditions increased during the pandemic, in relation to the increasing self-protection behaviour (Mehroliya *et al.*, 2020). Although there was no record of the spread of COVID-19 via food, the verification of delivery partners and food conditions has been increased to mitigate the risk, especially for the frequent OFD user. Damage packaging used by several customers is an indicator of unsafe products, although this is not always true (White *et al.*, 2015).

A significant correlation was observed in the training aspect related to the black LDPE plastic packaging (sig. value: 0.015) (Table 6). As presented by the food safety section, the knowledge of the OFD customer, with respect to plastic material type still needs to be improved (Isnawati, 2014; Kasemsup and Neesanan, 2011). However, the customer's reasons to use OFD as an alternative system need to be taken into account (Figure 4A). The biggest reason was the price (95.5%) followed by the promo (86.4%), taste (84.5%), and distance (80.0%). Meanwhile, there was only 27.3% of the respondents included the food safety factor as a consideration for choosing the OFD. This result correlated with the previous study which reported that food safety and health concerns were not the driving factors for using the OFD system (Kaur *et al.*, 2020). Based on the customer profile that was observed in Figure 4A, the price was the more important factor in choosing the online food delivery system, as also found by Aprilianti and Amanta (2020).

Although, the safety knowledge and awareness of the customer were adequate, and the customers have

high requirements on food conditions, however, they have no choice for the accomplishment of safety. Therefore, customers were forced to accept the criteria and the process that have been provided by the OFD provider. The requirements were mostly presented via the OFD application policy and regulation. This led to customer dependency on the application (Putra *et al.*, 2020).

3.5 Some proposed recommendations

According to Table 8, the factors affecting the low monitoring frequency were in terms of visitation of the local health authority, OFD provider, hygiene monitoring reporting via application, and hygiene inspection agent. Considering the feedback in which there were significant differences between the safety knowledge and awareness, the suspected reasons that underlined this condition were the attitude and behaviour among the interested parties (restaurant owners, delivery partners and also customers), and the prevailing food safety culture in the OFD business. The food safety culture is improved with the consideration of 6 indicators, namely management system, leadership, communication, commitment, environment, risk awareness, perception and risk-taking behaviour. Communication needs to be improved to increase food safety behaviour and performance. The safety performance also needs to be assessed to ensure compliance with the requirements (Griffith *et al.*, 2010). This research proposed comprehensive communication in the form of increased visitation by the local health authority and also the OFD system provider. Meanwhile, the food safety performance assessment has been proposed in the form of hygiene monitoring reporting via an application.

In the customer group, where the visitation and inspection were usually not conducted, awareness was increased by continuing the food safety campaign. Health communication campaigns that included the use of mass media have succeeded in increasing food safety behaviour (Losasso *et al.*, 2012). Customers' knowledge

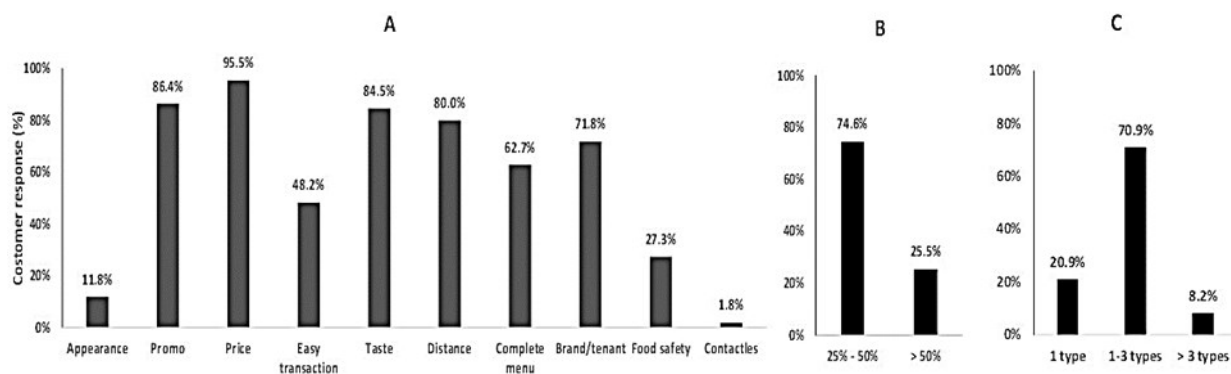


Figure 4. Customer's profile (n = 110) based on (A) reason to choose OFD; and (B) inclusion of hot soup, fried/grill food, and (C) the type and quantity in each order.

Table 8. Significant factors that needed to be improved and some recommendations.

Aspects having significant factors	Significant Factors	Proposed Recommendation
Food safety awareness of restaurant owner		
B1: The restaurant checks the health status of the delivery partner (87.3% never)	Educational background; Visitation of OFD provider (95.45% < 3 times); Food safety training (76.4% never)	Increasing the regular visitation by OFD providers and encouraging the restaurant owner to join the food safety training
B3: The restaurants provide additional packaging/wrapping and seals (53.6% never)	Visitation of the Local Health Authority (97.27% <3 times); Visitation OFD provider (95.45% <3 times)	Increasing the regular visitation by the local health authority and OFD provider
B4: Have been informed regarding additional packaging and recommendation to dispose of it before entering the consumer's home (94.5% never)	Visitation of the local Health Authority 97.27% <3 times)	Increasing the regular visitation by the Local Health Authority
Food safety awareness of delivery partner		
D2: Hung the food on the motorcycle (51.8% always)	Hygiene monitoring reporting via application (84.55% weekly); Hygiene monitoring inspection by the provider (81.82% weekly)	Monitoring the consistency and effectiveness of the daily report; Increasing the regular inspection by provider, for the hygiene implementation of delivery partner; Providing the specific container for food delivery
D10: Customers asked for health protocols (68.2% never)	Hygiene monitoring reporting via application (84.55% weekly); Hygiene monitoring inspection by the provider (81.82% weekly)	Monitor the consistency and effectiveness of the daily report; Increasing the regular inspection by the provider for the hygiene implementation of delivery partner; Increasing customer awareness by training or other knowledge transfer method
Food safety awareness of customer		
F6: Delivery partners apply a contactless policy (77.3% always)	OFD experience/order	Increasing safety awareness by continuing the food safety campaign

related to the packaging material and condition should be improved, especially for housewives, since they have primary roles in handling food at home. Housewives had better knowledge, however, few showed good behaviour. The awareness of housewives on personal hygiene, purchasing, and storage was comparatively lower than the food preparation and cooking (Sarita and Bhawana, 2019). Information related to plastic packaging types was mostly obtained by housewives from the television and radio (Isnawati, 2014), in line with the recommendation proposed by the health campaign using mass media.

4. Conclusion

High food safety knowledge and low behaviour have been observed and tend to become the conventional culture in Depok City and beyond. Several significant aspects that create the behavioural features were educational background, joint OFD system, visitation of the Local Health Authority, an inspection of the OFD provider, hygiene monitoring reporting via application, and training.

This research proposed some recommendations to increase the food safety culture of the OFD business in Depok City. Comprehensive communication has been found to increase the visitation of the local health authority and the OFD system, provider. Hygiene monitoring reporting via the application and the inspection by the service providers should be conducted frequently to ensure the implementation of the safety requirement, as well as building the customers' trust. For the customer group, increase awareness was achieved via training and organizing food safety campaigns using the mass media.

Conflict of interest

The authors declare no conflict of interest.

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