

## THE PROTECTIVE MEASURES AGAINST SARS-COV-2 INFECTION IN THE SEAFOOD COMPANY FROM THE PERSPECTIVE OF THE EMPLOYEES

Małgorzata Z. WIŚNIEWSKA<sup>1\*</sup>, Tomasz GRYBEK<sup>2</sup>, Piotr GRUDOWSKI<sup>3</sup>

<sup>1</sup> The University of Gdańsk, Faculty of Management, Sopot, Poland; malgorzata.wisniewska@ug.edu.pl,  
ORCID: 0000-0002-5193-2153

<sup>2</sup> The University of Gdańsk, Faculty of Management, Sopot, Poland; tomasz.grybek@phdstud.ug.edu.pl,  
ORCID: 0000-0001-7994-8280

<sup>3</sup>Gdańsk University of Technology, Faculty of Management and Economics, Gdańsk, Poland;  
pgrudowski@pg.edu.pl, ORCID: 0000-0003-0283-7544

\* Correspondence author

**Purpose:** To identify and discuss the protective measures implemented to prevent SARS-CoV-2 infection among employees.

**Design/methodology/approach:** The four-stage course of research. Case study and structured interviews with all employees, directly and indirectly, involved in food processing. Research questions: (R1) What measures have been taken to prevent the risk of infection among employees? (R2) What activities and responsibilities were the most difficult and easiest for employees to follow when implementing these measures?

**Findings:** Administrative protective measures dominate in the organization. Wearing additional protective equipment, keeping distance, and following new hygienic procedures are the most difficult issues. Temperature self-measurement and signing of health declarations are not a problem for employees. It is a need to listen to employees about the protective measures.

**Research limitations/implications:** The results refer to one unique case and should not be generalized. However, it is clear that protective measures and their implementation seem to make employees more aware of potential hazards. Therefore, the questions included in our interview can be recommended for use in other organizations, not only in food companies.

**Originality/value:** The article fills in the research gap. According to the authors' knowledge, this is the first study in Poland that is based on the experience of a food company.

**Keywords:** COVID-19, human resources, safety, protective measures.

**Category of the paper:** Research paper.

## 1. Introduction

Coronavirus SARS-CoV-2 (causing COVID-19) was first reported in December 2019 in China. On 11 March 2020, WHO (World Health Organization) recognized it as a pandemic (Shahbaz et al., 2020; Poudel et al., 2020). SARS-CoV-2 was probably initiated in a seafood market in Wuhan, Hubei. The disease spread from human to human, initiating infections between family members and healthcare personnel attending victims (Han et al., 2020; Aday and Aday, 2020). The pandemic has caused irreparable losses to people and the global economy (Chaudhary et al., 2020). To reduce infection rates, both private and public sector organisations have been shut down/reorganized. ‘Stay-at-home’ policies and restrictions have affected different industries, including the food sectors (Peterson and Thankom, 2020; Bouey, 2020). According to Rezoua et al. (2020), the COVID-19 pandemic has generated a new era. The food supply chain (FSC) is no exception, because COVID-19 has affected the whole logistics process from ‘farm to table’ (Aday and Aday, 2020; Poudel et al., 2020). As Nakat and Bou-Mitri (2021) present, food is considered part of a nation's critical infrastructure along with healthcare, energy, communication sector, among others; therefore, normal operations should be maintained to feed the people during the pandemic. During the global pandemic, this sector continues to combat new challenges, from supply chain disruption and its consequences on food systems, to meeting the high market demand, to protecting its workforce, absenteeism, while maintaining a high level of food safety and consumer trust.

Safety at work, both physical and psychological, plays a central in human resources management and for the organization during the ongoing outbreak of COVID-19 (Falco et al., 2021). It can be defined as a set of conditions that must be maintained in the workplace so that employees can perform their tasks safely and without harming health (Studenski, 2000). As Ambarwati et al. (2022) convince every operating company to prevent COVID-19 from spreading to employees and the surrounding community through various activities and completing the necessary facilities and infrastructure, such as providing masks, hand washing facilities, hand sanitizers, gloves, and face shield, etc. These COVID-19 protocols need to be implemented in various work programs. The gradual transition to the post-pandemic period requires the maintenance of many preventive measures in this regard. It should be emphasized that each organization, especially the one whose functioning has an impact on food security, becomes a resilient organization. Ensuring resilience and business continuity depends on the type of employee protection measures, as well as whether they are followed by employees.

The purpose of the paper is to identify and discuss the protective measures implemented to prevent SARS-CoV-2 infection among employees. An organization operating in the seafood supply chain was selected as the research subject.

The research questions are as following: (R1) What measures have been taken to prevent the risk of infection among the employees? (R2) What activities and responsibilities were the most difficult and easiest for employees to follow when implementing these measures?

According to the authors' knowledge, this is the first article in Poland on this subject, and based on the experience of a food company. Regardless of the sector, to date there is too little work on this issue. Among these few, one can indicate, e.g. the article written by Józefowicz et al. (2020). The research aimed to determine how enterprises operating in the production and service sector react to the pandemic, and four aspects were taken into consideration: employment, remuneration, working time, and work mode. Although one of the companies analyzed was a dairy enterprise, the issue of protection measures was treated by the authors very generally, without their detailed identification. For this reason, the results presented by us fill the research gap in this area.

## 2. Theoretical and contextual background

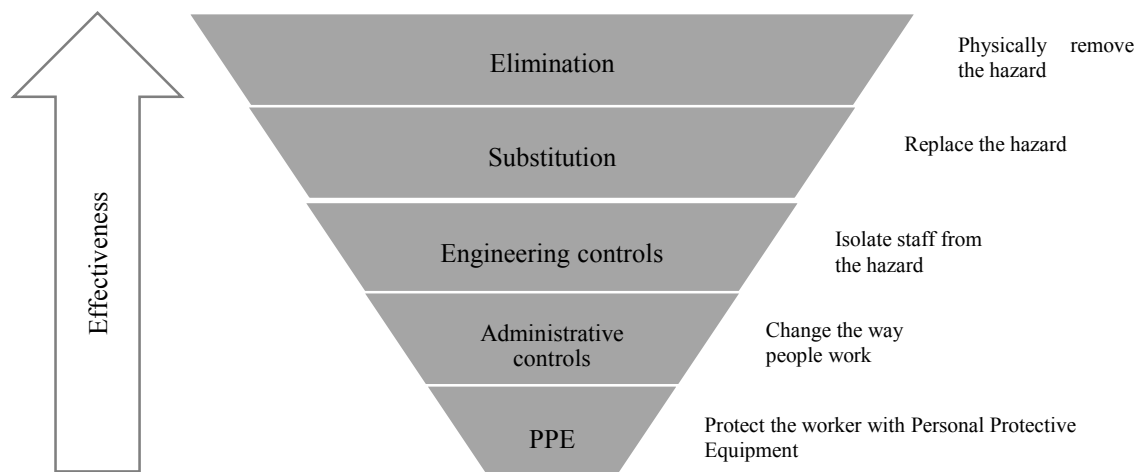
Organisations such as the FAO (Food Agricultural Organization), WHO, Centers for Disease Control and the Prevention, and European Food Safety Authority argue that “so far there is no evidence that food is a source of COVID-19” (COVID-19 and food safety..., 2020; <https://www.cdc.gov...>, 2019; <https://www.efsa.europa.eu...>, 2020). It is assumed that SARS-CoV-2 transmission is mainly from person to person, through direct contact and through respiratory droplets that infected people sneeze, cough, or exhale (<https://www.efsa.europa.eu...>, 2020; <https://www.ecdc.europa.eu...>, 2019).

According to WHO (COVID-19 and food safety. Guidance..., 2020), the food industry should have Food Safety Management Systems (FSMS) based on Hazard Analysis and Critical Control Point (HACCP) principles, including Good Manufacturing Practice (GMP) and Good Hygienic Practice (GHP), to reduce the risk of SARS-CoV-2 transmission (Galanakis, 2020; Olaimat et al., 2020; Rahman et al., 2020). The emergence of SARS-COV-2 is said to be caused by a lack of FSMS implementation (Quality & standards..., 2020). The WHO makes it clear that to eliminate or reduce the risk of contamination, it is critical to ensure compliance with measures to protect human resources from contracting COVID-19. There is a need to prevent exposure to or transmission of the virus; strengthen food hygiene, sanitation practices, and personal hygiene measures; provide refresher training on food hygiene principles; introduce physical distancing and hygienic behaviour at each stage of food processing (COVID-19 and food safety. Guidance..., 2020). Moreover, bearing in mind the need to maintain business continuity, such a difficult situation requires reallocation of human resources to different tasks and related new training (Seoki and Sunny, 2021).

Focusing on ensuring continuity of operations helps build supply chain resilience (Liu and Lee, 2018). This pro-resilience orientation should now be a new paradigm of operational excellence that goes beyond simple compliance to measures (The QEHS Guide ..., 2017). Food supply chain (FSC) is composed of a wide diversity of products and companies operating in different markets involving a long process of production, processing, distribution, storage, and handling, from primary production to consumption (Christopher and Peck, 2004; Bukeviciute et al., 2009). Each stage of the FSC is susceptible to disruption and there are different hazards associated with that problem. Furthermore, as already mentioned, maintaining business continuity is threatened by the emergence of SARS-CoV-2 infection among employees (How is COVID-19..., 2020). Food industry personnel do not have the opportunity to work from home and are required to continue working in their usual workplaces. Keeping all workers in food production and supply chains healthy and safe is critical to surviving the current pandemic. Maintaining food movement along the food chain is an essential function to which all stakeholders along the food chain must contribute. This is also required to maintain trust and consumer confidence in the safety and availability of food (COVID-19 and food safety Guidance..., 2020). Some recent studies argue that while COVID-19 is a catalyst for companies to review their existing business continuity plans, short-term actions can be implemented to respond to or mitigate the spread of the COVID-19 pandemic outbreak and ensure business continuity. Companies must educate their employees on the symptoms of COVID-19, educate their staff to minimize the risk of workers' health, and impose strict screening protocols (Rizou et al., 2020; Butt, 2022). It is also important to take care of the mental condition of employees (Butt, 2022; Honarmand et al., 2022), to introduce additional insurance systems (Côté et al., 2021), and to allow free vaccinations (Zhang et al., 2021). Researchers also emphasize the importance of proper nutrition to strengthen the immune system (Maffoni et al., 2021). This means that the company can promote the consumption of meals of appropriate quality. Such an approach contributes to the improvement of the well-being of employees who, in the situation of introduced restrictions, are exposed to additional stress (Usman et al., 2021), considered one of the most important challenges of human resources management, not only during the COVID-19 pandemic (Wong et al., 2021). Employee well-being refers to the idea that the quality of life is improving through the health, happiness, comfort, and tranquility that employees feel while working. A study on employee well-being showed that increasing employee well-being awareness has a positive effect on mental health, job satisfaction, organizational commitment, and work-life balance (Sirgy and Lee, 2016; Edgar et al., 2017; Yu et al., 2021).

The general requirements for the protection of food companies' human resources have been strictly defined in the FAO and WHO documents (e.g., COVID-19 and food safety. Guidance..., 2020). In addition, several guidance documents and resources have been developed on the local, national, and international levels, both in the private and public sectors; to support the food industry during this unprecedented time, and are being continuously updated

in the light of new knowledge (Nakat and Bou-Mitri, 2021). The same can be said about the seafood industry (How is COVID-19 outbreak..., 2020). The scientific literature also provides many reviews of knowledge and good practices in this field, allowing for the selection of appropriate protection measures (Ceylan et al., 2020; Nakat and Bou-Mitri, 2021; Ambarwati et al., 2022; Honarmand et al., 2022). According to experts, there is a hierarchy of actions taken into account to protect employees (Nakat and Bou-Mitri, 2021) (see Figure 1).



**Figure 1.** Protective measures against COVID-19 infection. Source: own elaboration based on Nakat and Bou-Mitri (2021).

As can be seen, the hierarchy is arranged by starting with the most effective measures and moving to the least effective. According to Figure 1, while it may not be currently possible to eliminate or substitute the COVID-19 hazard, the most effective protection measures are engineering and administrative controls and the use of personal protective equipment (Nakat and Bou-Mitri, 2021). Engineering controls involve isolating employees from work-related hazards, for example, installing a physical barrier (such as strip curtains or plexiglass), increasing ventilation and air exchange, adding more hand washing stations and hand sanitizers, and separating employees 1 to 2 m (depending on the reference). Administrative controls require action by the worker or the employer, and typically, administrative controls are changes in work policy or procedures to reduce or minimize exposure to a hazard (e.g. stay-at-home procedures, updating the cleaning schedule, minimizing contact among workers by staggering the shifts, and introducing training and education tools). The above controls may also apply to improving the well-being of employees. Food industry-related PPEs can include face masks, face shields, gloves, clean uniforms (worn on-site and laundered daily), hair nets, closed non-slip work shoes, etc. (OSHA, 2020; Trmčić et al., 2021; Yu et al., 2021; Nakat and Bou-Mitri, 2021).

### 3. Research methodology

#### 3.1. Respondents and research steps

The research was carried out in a small seafood company. The study covered all company staff (13 people) directly and indirectly involved in food handling. Respondents consisted of seven food handlers (FH), three members of the HACCP Team (HT), and three members of the Crisis Management Team (CT). To ensure objectivity, the Management Representative for Quality & Food Safety Assurance (RQFSA) was excluded from this research. As a result, 100% completed structured interview questionnaires were received. The questionnaires (two A4 sheets) were distributed after a short explanation of the purpose of the study by the authors of the article. Employees were informed that participation in the survey were optional and anonymous. The stages and concept of the research are presented in Table 1.

**Table 1.**

*Research steps and the concept of the research*

No	Stage	Methods used	Research questions/Interview questions
1	Contact with the company and preparation of its plans Characteristics	Secondary data analysis, Case study	-
2	Identification of preventive measures introduced by the company to protect employees against SARS-CoV-2 infection	Secondary data analysis, Case study	(R1) What measures have been taken to prevent the risk of infection among employees?
3	Conducting interviews and identification the most difficult and most easy responsibilities in terms of preventive measures and getting answers to questions about staff expectations and experiences	Structured interview method	(R2) What activities and responsibilities were the most difficult and easiest for employees to follow when implementing these measures? Q1: Which actions and responsibilities are the most difficult for you to meet in relation to the measures taken against SARS-CoV-2 infection (indicate the appropriate answer/answers)? Q2: Which actions and responsibilities are the easiest for you to meet in relation to the measures taken against SARS-CoV-2 infection (indicate the appropriate answer/answers)? Q3: Which activities and responsibilities, in your opinion, require further improvement and more attention (indicate appropriate answers/answers)? Q4: Has management encouraged you to report such improvements so far? Q5: Do you think that management will take into account your proposed improvements?
4	Drawing conclusions	Synthesis and logical reasoning	-

Source: own elaboration.

### 3.2. General characteristics of the company

The organisation analysed is an important link in the global supply chain of frozen seafood products. Their core activity is providing high-quality logistics services; handling and storage of packed frozen food products, cross-docking, documentation flow, value-added logistics services, etc. The company operates in the north of Poland and is located in the middle of the FSC between the main producers of raw materials and food processors. It is not involved in the production or sale of finished products. The company has implemented the following universal management systems: ISO 9001, ISO 14001 and ISO 45001, and complies with the sector systems and practices like: HACCP (Hazard Analysis and Critical Control Point), GMP (Good Manufacturing Practice), GHP (Good Hygienic Practice), IFS Logistics, BRC Storage & Distribution, and MSC Chain of Custody. Additionally, the company has introduced the 4-pillar SMETA norm requirements (the Sedex Members Ethical Trade Audit). Although official bodies such as the Food Agricultural Organization (FAO), World Health Organization (WHO), Centers for Disease Control and Prevention, or European Food Safety Authority argue that 'so far there is no evidence that food is a source of COVID-19' (COVID-19 and food safety. Guidance..., 2020; <https://www.cdc.gov...>, 2019; <https://www.efsa.europa.eu...>, 2020), the company in its HACCP system also took into account the hazards connected to SARS-COV-2. This is related to the requirements set by different recipients in the food supply chain. The company employs 21 staff and has seven divisions responsible for operational, tactical, and strategical aspects. There are three groups of bodies directly engaged in ensuring compliance with different standards and regulations: Management Representative for Quality & Food Safety Assurance; Crisis Management Team responsible for preventive and corrective measures related to unexpected and incidental events; and Interdisciplinary HACCP team representatives from Quality Assurance, Technical, and Food Handling divisions. Food traceability process is supported by IT software, Warehouse Management System (WMS).

### 3.3. Methods

The research was qualitative and was carried out using case study analysis, supported with a structured interview method. Case studies generally cover the 'how' and 'why' questions and focus on real-life context (Rahim et al., 2015). Data for the case study were received from RQFSA. The structured interview questionnaire included one metrics part, three groups of multiple-choice questions, and two groups of open questions. The aim was to ensure that each interview was identical with the same fixed questions in a similar order (Rashidi et al., 2014). A structured interview is a conversation aimed both at gaining detailed knowledge about the interlocutor, an assessment of his attitudes and behaviours, as well as a conversation based on the rules of everyday communication and interpersonal interaction, in which the interlocutors strive to understand each other and share their own experiences (Schaefer and Presser, 2003). The interview questionnaire was verified and accepted by the RQFSA, Quality Assurance

division, and Crisis Management Team representatives. The first three questions were (see Table 1): Q1: Which actions and responsibilities are the most difficult for you to meet in relation to the measures taken against SARS-CoV-2 infection (indicate the appropriate answer/answers)? Q2: Which actions and responsibilities are easiest for you to meet in relation to the measures taken against SARS-CoV-2 infection (indicate appropriate answer/answers)? Q3: Which activities and responsibilities, in your opinion, require further improvement and more attention (indicate appropriate answers/answers)? The answer options were identical:

- a. Obligation to perform self-measurements of body temperature.
- b. Necessity to submit daily health declarations.
- c. Necessity to inform about the potential risk of infection in my immediate environment.
- d. Necessity to read and follow additional guidelines, procedures, and instructions implemented in the enterprise.
- e. Maintain a regime of physical distance between employees at work.
- f. Maintaining a regime of physical distance and limiting the possibility of use of common areas at the same time (locker room, toilets, dining rooms).
- g. Reorganization of work time (shift work).
- h. Necessity to wear additional equipment (disposable face masks/gloves, etc.).
- i. Necessity to comply with additional hygiene requirements.
- j. Others.

The next two questions were (see Table 1): Q4: Has management encouraged you to report such improvements so far? Q5: Do you think that management will take into account your proposed improvements? Here, respondents had a choice of one of the following three answers: a) Yes; b) No; c) Don't know.

## **4. Results and discussion**

### **4.1. Identifying protective measures in the industry (research question R1)**

As shown by the analysis of the documentation, protective measures were introduced at all stages and areas of the organization's operation, covering the following and main processes: 1) cargo delivery; 2) Cargo intake and unloading; 3) Palletizing, foiling, labelling; 4) Cargo transport & location of storage chambers; 5) Cargo storage; 6) Completion for dispatch; 7) Cargo dispatch. Additionally, the following supportive processes are taken into account: 8) Communication & Training; 9) Crisis Management; 10) Human Capital Management & Leadership.



Taking into account the hierarchy and the most effective preventive measures: engineering (E), administrative control (A), and personal protective equipment (P) presented in Figure 1, the authors of the article identified them and subordinated into three categories (see Table 2).

**Table 2.**

*Protective measures identified in the company*

No.	Processes	Protective measures description	E	A	P
1	Cargo delivery control	Manual temperature control scheme		v	v
		Following GHP rules and procedures		v	
		Handling of cargo only with disposal protective equipment (masks, gloves).		v	v
		Increased number of disinfection points and activities focused on handling equipment and areas.	v		v
		Declaration of precaution measures taken by the cargo owner and/or supplier		v	
2	Cargo intake and unloading	Visual assessment		v	
		Following GMP & GHP rules		v	
		Procedures of waste disposal		v	
		Proper hygiene and disinfection points and activities	v	v	v
		Cleaning and disinfection of tables, door handles, handrails		v	
		Airflow and UV-C lamps in social areas and open-space offices	v		
		Ozoning offices and social spaces after working hours	v		
3	Palletizing, foiling, labelling	Proper labelling of the unloaded cargo batches		v	
		Procedures for handling complaints		v	
		Instructions of cargo intake		v	
		Following GMP rules		v	
		Procedures of waste disposal		v	
		Procedures of cleaning & disinfection		v	
4	Cargo transport & location at storage chambers	Temperature monitoring		v	v
		Instructions for cargo storage, control measures, cleaning & disinfection		v	
		Following GMP rules		v	
5	Cargo storage	Hygienic lock for office visitors	v	v	
		External visits are minimised to an absolutely needed level		v	
		Document flow without direct contact through hygienic locks with remote audio contact		v	
		Each visitor declares any potential risk related to direct & indirect contact with SARS-CoV-2, current health condition, and allows the measurement of their body temperature		v	
		The visitor wears masks/face covers		v	v
		Not allowed to walk around the office		v	
		Contact with team members is very limited, only when needed.		v	
		All operations and cooperation with external personnel are conducted in a highly hygienic manner (min. 2m. social distance, facemask/shields, gloves) and with the demand of min. document/paper flow		v	v
6	Completion for dispatch	Proper labelling of the unloaded cargo batches		v	
		Instructions of cargo handling		v	

Cont. table 2

7	Cargo dispatch	Inspection of the means of transport prior to loading		v	
		Arrangements with the cargo carrier	v	v	
		Instructions of cargo handling		v	
		Document flow without direct contact through hygienic locks with remote audio contact		v	
		Hygienic lock implemented in the facility for operational visitors/drivers	v	v	
		External visits are minimised		v	
		Each visitor declares any potential risk related to direct & indirect contact with SARS-CoV-2, current health condition, and allows the measurement of their body temperature		v	
		The visitor wears masks/face covers. Not allowed to walk around the office		v	v
		Contact with team members is limited, only when needed		v	
8	Communication & Training	Rules regarding the continual use of Personal Protective Equipment (PPE)		v	
		Additional warnings, pictogram signs, leaflets, and communication materials distributed among personnel and throughout the organisation		v	
		Additional hygienic & epidemiological trainings		v	
		Additional occupational health instructions and risk assessment		v	
9	Crisis Management	Procedure for crisis management in case of identified risk of SARS-CoV-2 at the facility		v	
		First aid respiratory equipment			v
		Information and attention materials (printouts, information signs, etc.) placed around the facility		v	
		External & internal training dedicated to SARS-CoV-2 protection and prevention		v	
		Access to a private healthcare system provided and maintained		v	
		Private life insurance with COVID-19 risk coverage ensured.		v	
		An additional pension saving program is implemented for interested personnel		v	
		Sports equipment is ensured at the facility to encourage a healthy lifestyle model		v	
		Twice a week fresh fruits are delivered to the organization to support healthy food habits		v	
10	Human Capital Management & Leadership	Each employee declares any potential risk related to direct & indirect contact with SARS-CoV-2		v	
		Temperature self-test and a logbook of measurements, health condition, and SARS-CoV-2 exposure declaration of each employee		v	
		Employees are encouraged to report, without consequence, every suspicion regarding their health condition		v	
		Home office work option (where applicable)		v	
		Private healthcare provider		v	
		SARS-CoV-2 RT PCR tests in case of a high risk of virus infection and/or before returning to direct work at the facility		v	v
		Rotation working system implemented; operational employees working on shifts with zero contact between shifts (separate social facilities, etc.)		v	
		Physical distance requirements		v	
		Limits of persons per rooms		v	
		Each employee equipped with additional (more than GMP/GHP): PPE – face shields, disposal masks, gloves, and Personal Disinfection Dispensers			v
		Handling of supply materials in a highly hygienic manner and disposal of unnecessary outer packaging before entering the office		v	
		Min. 24h quarantine (in room temp.) before usage (proper disinfection conducted)	v	v	

Source: own studies.

The analysis of the documentation made it possible to identify many different preventive measures, implemented both in terms of the protection of employees and external stakeholders. Furthermore, the analysis revealed various safeguards related to SARS-CoV-2 as recommended by recognized agencies (COVID-19 and food safety. Guidance..., 2020; COVID-19 and food safety. Questions..., 2020; Guidance for the Food Industry..., 2020). Individual measures based on GHP and GMP rules to prevent the risk of SARS-CoV-2 contamination and infection) are washing hands, wearing protective clothes, masks, gloves. Other more serious measures are collecting declarations of precautionary measures by cargo owners and/or suppliers with each delivery (e.g. process 1); increasing of disinfection activities (e.g. processes 1 and 2); ozoning premises (e.g. process 2), following the rules of quarantine (e.g. process 3), of distance (both in the workplace and in social spaces – e.g. process 5) or confirming good health (e.g. process 1); additional rules related to the hygienic handling of documents (e.g. process 5). Rules for new visitors (e.g., process 7) auditors, veterinary inspectors, customs supervision services, customer representatives, and technical service companies are also crucial. For example, visitors must declare any direct and indirect contact with SARS-CoV-2, their current health condition, and measure body temperatures. Visitors must wear masks/face covers and gloves. Walking around the premises and contact with employees is limited. The importance of these measures is clear (e.g., Safefood, 2020; COVID-19 and food safety. Guidance..., 2020).

SARS-CoV-2 infection disrupts supportive processes, affecting both the safety of employees and continuity of operations (Staniforth, 2020; COVID-19 and food safety. Guidance..., 2020). Protection of physical and mental health is related to the implementation of processes 8, 9, and 10. Key additional measures implemented to promote physical health are training on hygiene & epidemiological rules; crisis management instructions; warning signs, pictograms, and other educational materials. Workers have access to first-aid respiratory equipment and private health care. Measures to protect mental health and well-being include private insurance covering COVID-19, additional pension savings programs, and on-site sports equipment. Measures also implemented are obligations to submit health declarations, self-monitoring of body temperatures, reporting of any suspicious situations, maintenance of physical distance in the workplace, and more restrictive rules of hygiene. Important to employees is the possibility of SARS-CoV-2 testing, additional protective equipment (face shields, disposal masks, gloves), and rotating working systems to ensure zero contact between shifts.

In summary, our research shows that some of the identified measures fall into two or three categories. This is due to the fact that their implementation involves activities of a different nature, e.g. at the engineering and/or administrative and/or operational level. It also turned out that administrative measures predominate in the organization as protective measures. In addition, attention should be paid to numerous measures to protect workers against possible transmission of the virus from the surface of the packaging. According to Han et al. (2020), evidence of virus transmission was disclosed in China early July 2020 by detection of SARS-CoV-2 in packaging materials and storage environments, with two re-emergent outbreaks linked to contaminated food sources.

#### 4.2. The results of structured interviews (research question R2)

The results of the research carried out at this stage are presented in Table 3.

**Table 3.**

*Summary of responses from the structured interviews*

Question	Total number of indication FH1-FH7	% of indication FH1-FH7	Total number of indication HT1-HT3	% of indication HT1-HT3	Total number of indication CT1-CT3	% of indication CT1-CT3	Total number of all indications	% of all indications
Q1								
a	2	28.57	0	0.00	1	33.33	3	23.08
b	3	42.86	0	0.00	1	33.33	4	30.77
c	2	28.57	1	33.33	0	0.00	3	23.08
d	6	85.71	0	0.00	1	33.33	7	53.85
e	7	100.00	2	66.67	1	33.33	10	76.92
f	6	85.71	2	66.67	1	33.33	9	69.23
g	3	42.86	2	66.67	1	33.33	6	46.15
h	6	85.71	0	0.00	2	66.67	8	61.54
i	0	0.00	0	0.00	0	0.00	0	0.00
j	No others reported							
Q2								
a	4	57.14	3	100.00	1	33.33	8	61.54
b	2	28.57	3	100.00	1	33.33	6	46.15
c	2	28.57	1	33.33	1	33.33	4	30.77
d	0	0.00	1	33.33	1	33.33	2	15.38
e	0	0.00	0	0.00	1	33.33	1	7.69
f	1	14.29	0	0.00	1	33.33	2	15.38
g	1	14.29	1	33.33	1	33.33	3	23.08
h	0	0.00	2	66.67	0	0.00	2	15.38
i	3	42.86	2	66.67	1	33.33%	6	46.15
j	No others reported							
Q3								
a	0	0.00	0	0.00	0	0.00	0	0.00
b	0	0.00	0	0.00	0	0.00	0	0.00
c	1	14.29	0	0.00	0	0.00	1	7.69
d	0	0.00	1	33.33	0	0.00	1	7.69
e	0	0.00	1	33.33	1	33.33	2	15.38
f	0	0.00	1	33.33	0	0.00	1	7.69
g	1	14.29	0	0.00	0	0.00	1	7.69
h	0	0.00	0	0.00	0	0.00	0	0.00
i	0	0.00	0	0.00	0	0.00	0	0.00
j	Some postulates formulated							
Q4								
a	2	28.57	3	100	2	66.67	7	53.85
b	1	14.29	0	0	0	0.00	1	7.69
c	3	42.86	0	0	1	33.33	4	30.77
Q5								
a	1	14.29	3	100	2	66.67	6	46.15
b	0	0.00	0	0	0	0.00	0	0.00
c	5	71.43	0	0	1	33.33	6	46.15

Source: own studies.

The answers related to Q1 showed that for all groups of respondents, although mainly noted by FH and HT, the most difficult is to maintain a regime of physical distance between employees. This is an important requirement, as emphasized in several guidelines (COVID-19 and food safety. Guidance..., 2020; Guidance for the Food Industry..., 2020; Recommendations for food producers..., 2020). For FH, also difficult is following additional guidelines, procedures/instructions, as well as the necessity to wear additional protective equipment. The latter obligation was also important for all the employees surveyed. Q2 showed that the easiest measures were self-examination of body temperature, particularly for HT, submission of daily health declarations, and additional hygiene-related activities. This may demonstrate the effectiveness of training and educational campaigns crucial to implementing FSMS and enforcing hygiene rules (Rahman et al., 2020). Q3 shows that the vast majority of respondents agree that they currently do not see the need to improve existing protective measures. However, from the CT point of view, more attention could be paid to following new guidelines and implementing procedures. The responses of the HT group agree and additionally emphasize 'paying more attention to maintaining a regime of physical distance in social areas'. According to two people from the FH group, 'better reorganization of working hours and information on the potential risk of infection could be considered', as recommended (COVID-19 and food safety, Guidance..., 2020). It should be noted that the surveyed group of people also includes employees who, for example, do not perceive any difficulties, nor do they consider any of them to be particularly easy. The same can be said about the willingness to express an opinion on improvements (e.g., see CT1, CT2, FH3, FH4, FH5). The survey also provided the opportunity to provide answers other than those included in the questionnaire. Only two people (from the HT and CT groups) used this possibility. In Q3, both of these people indicated that, to improve on existing protective measures, monitoring of international and legal requirements, guidelines, and recommendations could be necessary ('procedures should definitely be updated, if necessary'; 'following the law is imperative in our industry'). In our opinion, the Q4 and Q5 relating to management are essential. More than half of the respondents admitted that management encourages them to give their opinions on improving existing protective measures. However, up to one-third of employees indicated that they 'did not know that this form of encouragement from their superiors exists'. This problem mainly affects FH. Employees responded quite similarly when asked about feedback and management responses to any proposed potential changes. Again, the most doubts were expressed in the FH group, their responses mean they certainly require more support from management, as well as more direct involvement in fulfilling the requirements of standards, e.g. ISO 9001, BRC or IFS (e.g. 'Some day-to-day support would be useful to me'; 'I would like to take advantage of such help', 'I don't know if my opinion will count'). According to scholars, this type of management support and listening to their staff strengthens productivity, employees' trust, morale, and motivation (Do, 2018; Glikson and Woolley, 2020; Kluger and Itzchakov, 2022).

## 5. Conclusions

This case study, supported by structured interviews, obtained answers to research questions on measures to protect workers from SARS-CoV-2 infection on the workplace. It appeared that the protective measures implemented were primarily associated with the need to follow the fundamental requirements of GHP and GMP, but they also comply with the official sector recommendations regarding SARS-CoV-2.

Based on the study results, one can conclude that:

- Administrative protective measures, such as hygiene procedures or protocols, are those that dominate in the organization.
- Administrative measures are effectively supported using different PPEs.
- Some PPEs are difficult to implement for specific groups of employees, particularly food handlers.
- Wearing additional protective equipment makes work more difficult.
- Keeping distance in everyday work, due to its specificity and the need to maintain the fluency and effectiveness of activities, is a difficult issue, as is following new hygienic guidelines or procedures.
- Self-measurement of body temperature or signing health declarations are not a problem for employees, although it requires extra time and attention.
- All adopted measures require continuous improvement, as well as the guidelines and regulations themselves.
- Ongoing supervision of compliance and monitoring of new procedures and restrictions is necessary.
- Management must be more committed to listening to the needs and proposals of employees, and feedback in this regard will foster trust and increase productivity and staff safety.

As authors, we are aware of the limitations of the study. These results refer to one unique case and should not be generalized. However, it is clear that protective measures and their implementation seem to make employees more aware of potential hazards. In turn, measures such as additional insurance, management care for the quality of nutrition or easy access to first-aid respiratory equipment, strengthen the sense of security and overall well-being of employees.

## References

1. Aday, S., Aday, M.S. (2020). Impact of COVID-19 on the food supply chain. *Food Quality and Safety, Vol. 4, No. 4*, pp. 167-180.
2. Ambarwati, R., Yuliasri, D., Sulistiyowati, W. (2022). Human resource risk control through COVID-19 risk assessment in Indonesian manufacturing. *Journal of Loss Prevention in the Process Industries, Vol. 74*, 104665.
3. Bouey, J. (2020). *Assessment of COVID-19's Impact on Small and Medium-Sized Enterprises: Implications from China*. Santa Monica, CA: RAND Corporation PP.
4. Bukeviciute, L., Dierx, A., Ilzkovitz, F. (2009). The functioning of the food supply chain and its effect on food prices in the European Union *European Economy Occasional Papers, No. 47*. Retrieved from [https://ec.europa.eu/economy\\_finance/publications/pages/publication15234\\_en.pdf](https://ec.europa.eu/economy_finance/publications/pages/publication15234_en.pdf), 19.02.2022.
5. Butt, A.S. (2022). Mitigating the Spread of COVID-19: What are firms doing and what they need to do? *SAGE Open, Vol. 12, Iss. 1*, pp. 1-10. Retrieved from <https://journals.sagepub.com/doi/full/10.1177/21582440211071098>, 22.02.2022.
6. Ceylan, Z., Meral, R., Cetinkaya, T. (2020). Relevance of SARS-CoV-2 in food safety and food hygiene: potential preventive measures, suggestions and nanotechnological approaches. *VirusDisease, Vol. 31*, pp. 154-160.
7. Christopher, M., Peck, H. (2004). Building the resilient supply chain. *International Journal of Logistics Management, Vol. 15, No. 2*, pp.1-13.
8. *Coronavirus: no evidence that food is a source or transmission route*. Available online <https://www.efsa.europa.eu/en/news/coronavirus-no-evidence-food-source-or-transmission-route>, 22.02.2022.
9. Côté, D., Durant, S., MacEachen, E., Majowicz, S., Meyer, S., Huynh, A-T., Laberge, M., Dubé, J. (2021). A rapid scoping review of COVID-19 and vulnerable workers: Intersecting occupational and public health issues. *American Journal of Industrial Medicine, Vol. 64, Iss. 7*, pp. 551-556.
10. *COVID-19 advice – safe food*. Available online <https://www.safefood.qld.gov.au/covid-19-advice/>, 23.02.2022.
11. *COVID-19 and food safety. Guidance for food businesses. Interim guidance FAO.WHO*. Available online [https://apps.who.int/iris/bitstream/handle/10665/331705/WHO-2019-nCoV-Food\\_Safety-2020.1-eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/331705/WHO-2019-nCoV-Food_Safety-2020.1-eng.pdf), 20.02.2022.
12. *COVID-19 and food safety. Questions and Answers, European Commission Directorate-General for Health and Food Safety*. Available online [https://ec.europa.eu/food/system/files/2020-04/biosafety\\_crisis\\_covid19\\_qandas\\_en.pdf](https://ec.europa.eu/food/system/files/2020-04/biosafety_crisis_covid19_qandas_en.pdf), 20.02.2022.
13. Do, T.T. (2018). How spirituality, climate and compensation affect job performance. *Social Responsibility Journal, Vol. 14, No. 2*, pp. 396-409.

14. Edgar, F., Geare, A., Saunders, D., Beacker, M., Faanunu, I. (2017). A transformative service research agenda: A study of workers' well-being. *The Service Industries Journal*, Vol. 37, Iss.1, pp. 84-104.
15. Falco, A., Girardi D., Dal Corso, L., Yildırım, M., Converso, D. (2021). The perceived risk of being infected at work: An application of the job demands–resources model to workplace safety during the COVID-19 outbreak. *PLOS ONE*, Vol. 16, Iss. 9, e0257197. Retrieved from <https://doi.org/10.1371/journal.pone.0257197>, 22.02.2022.
16. *Food and Coronavirus Disease 2019 (COVID-19)*. Available online <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/food-and-COVID-19.html>, 23.02.2022.
17. Galanakis, C.M., (2020). The Food Systems in the Era of the Coronavirus (COVID-19) Pandemic Crisis. *Foods*, Vol. 9, No. 4, pp. 1-10.
18. Glikson E., Woolley, A. (2020). Human Trust in Artificial Intelligence: Review of Empirical Research, *Academy of Management Annals*, Vol. 14, No. 2, pp. 627-660.
19. *Guidance for the Food Industry: Coronavirus Outbreak III. Suggested Business Practices*, The Food Industry Association. Available online [https://www.fmi.org/docs/default-source/coronavirus/food-industry-suggested-business-practices---3.pdf?sfvrsn=455fcdaf\\_2](https://www.fmi.org/docs/default-source/coronavirus/food-industry-suggested-business-practices---3.pdf?sfvrsn=455fcdaf_2), 21.02.2022.
20. Han, J., Zhang, X., He, S., Jia, P. (2020). Can the coronavirus disease be transmitted from food? A review of evidence, risks, policies and knowledge gaps. *Environmental Chemistry Letters*, Vol. 19, pp. 1-12.
21. Honarmand, K., Yarnell, C.J., Young-Ritchie, C., Maunder, R., Priestap, F., Abdalla, M., Ball, I.M., Basmaji, J., Bell, Ch.M., Jeffs, L., Shah, S., Chen, J., LeBlanc, D., Kayitesi, J., Eta-Ndu, C., Mehta, S. (2022). Personal, professional, and psychological impact of the COVID-19 pandemic on hospital workers: A cross-sectional survey. *PLoS One*, Vol. 17, Iss. 2, e0263438. Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0263438>, 23.02.2022.
22. *How is COVID-19 outbreak impacting the fisheries and aquaculture food systems and what can FAO do*. FAO Fisheries and Aquaculture Department. Available online [https://www.fao.org/fileadmin/user\\_upload/faoweb/FI/COVID19/COVID19\\_Information\\_Paper.pdf](https://www.fao.org/fileadmin/user_upload/faoweb/FI/COVID19/COVID19_Information_Paper.pdf), 20.02.2022.
23. *Interim Guidance for Job Tasks Associated with Increased Risk of Exposure to SARS-CoV-2*. Occupational Safety and Health Administration, Department of Labor's. Available online [https://www.osha.gov/coronavirus/control-prevention#interim\\_increased\\_risk](https://www.osha.gov/coronavirus/control-prevention#interim_increased_risk), 23.02.2022.
24. Józefowicz, K., Smolińska, K., Wiza, P. (2020). Działania na rzecz pracowników w czasie pandemii – przykłady wybranych przedsiębiorstw. *Intercathedra*, Vol. 2, Iss. 43, pp. 73-80.
25. Kluger, A.N., Itzhakov, G. (2022). The power of listening at work, *Annual Review of Organizational Psychology and Organizational Behavior*, Vol. 9, pp. 121-146.



26. Liu, C.-L., Lee, M.-Y. (2018). Integration, supply chain resilience, and service performance in third-party logistics providers. *The International Journal of Logistics Management*, Vol. 29, No. 1, pp. 5-21.
27. Maffoni, S.I., Kalmpourtzidou, A., Cena, H. (2021). The potential role of nutrition in mitigating the psychological impact of COVID-19 in healthcare workers. *NFS Journal*, Vol. 22, pp. 06-08.
28. Nakat, Z., Bou-Mitri, Ch. (2021). COVID-19 and the food industry: Readiness assessment. *Food Control*, Vol. 121, 107661.
29. Olaimat, A.N., Shahbaz, H.M., Fatima, N., Munir, S., Holley, R.A. (2020). Food safety during and after the era of COVID-19 pandemic. *Frontiers in Microbiology*, Vol. 11, p. 1854.
30. Paais, M., Pattiruhu, J.R. (2020). Effect of Motivation, Leadership, and Organizational Culture on Satisfaction and Employee Performance. *The Journal of Asian Finance, Economics and Business*, Vol. 7, Iss. 8, pp. 577-588.
31. Peterson, O., Thankom, A. (2020). Spillover of COVID-19: impact on the Global Economy *MPRA Paper*, No. 99850. Retrieved from [https://mpra.ub.uni-muenchen.de/99850/1/MPRA\\_paper\\_99850.pdf](https://mpra.ub.uni-muenchen.de/99850/1/MPRA_paper_99850.pdf), 23.02.2022.
32. Poudel, P.B., Poudel, M.R., Gautam, A., Phuyal, S., Tiwari, C.K., Bashyal, N., Bashyal, S. (2020). COVID-19 and its Global Impact on Food and Agriculture. *Journal of Biology and Today's World*, Vol. 9, No. 5, pp. 221-224.
33. *Quality & standards and their role in responding to COVID-19* (2020), UNIDO. Available online <https://www.unido.org/sites/default/files/files/2020-04/Quality%20and%20Standards%20and%20their%20Role%20in%20Responding%20to%20COVID-19.pdf>, 23.02.2022.
34. *Questions and answers on COVID-19: Basic facts*. Available online <https://www.ecdc.europa.eu/en/covid-19/facts/questions-answers-basic-facts>, 23.02.2022.
35. Rahim, M.A., Norhayate, W. Daud, W., Abdul, M. (2015). The Case Study Method in Business. *Scholars Journal of Arts, Humanities and Social Sciences*, Vol. 3, No. 1B, pp. 105-109.
36. Rahman, C.K.F., Sharun, K., Jose, B., Dhama, K. (2020). COVID-19 and food safety: implications and opportunities to improve the food supply chain. *Journal of Experimental Biology and Agricultural Sciences*, Vol. 8 (Spl-1- SARS-CoV-2), pp. S34-S41.
37. Rashidi, M.N., Begum R.A., Mokhtar M., Pereira J.J. (2014). The Conduct of Structured Interviews as Research Implementation Method. *Journal of Advanced Research Design*, Vol. 1, No.1, pp. 28-34.
38. Rizou, M, Galanakis, I.M., Aldawoud, T.M.S., Galanakis, C.M. (2020). Safety of foods, food supply chain and environment within the COVID-19 pandemic. *Trends in Food Science & Technology*, Vol. 102, pp. 293-299.

39. Schaefer, N.C., Presser, S. (2003). The Science of Asking Questions. *Annual Review of Sociology*, Vol. 29, pp. 65-88.
40. Seoki, L., and Sunny, H. (2021). Food service industry in the era of COVID-19: trends and research implications. *Nutrition Research and Practice*, Vol. 15, pp. 23-31.
41. Shahbaz M., Bilal M., Akhlaq M., Moiz A., Zubair S., Iqbal H.M.N. (2020). Strategic measures for food processing and manufacturing facilities to combat coronavirus pandemic (COVID-19). *Journal of Pure and Applied Microbiology*, Vol. 14, No. 2, pp. 1087-1094.
42. Sirgy, M. J., Lee, D-J. (2016). Work-life balance: A quality-of-life model. *Applied Research in Quality of Life*, Vol. 11, Iss. 4, pp. 1059-1082.
43. Staniforth, J. (2020). *COVID-19 update: Worker health, absenteeism present largest risks to U.S. food supply chain*. Available online <https://www.foodqualityandsafety.com/article/covid-19-update-worker-health-andabsenteeism-present-largest-risk-to-u-s-food-supply-chain>, 23.02.2022.
44. Studenski, R. (2000). Kultura bezpieczeństwa pracy w przedsiębiorstwie. *Bezpieczeństwo Pracy*, Vol. 9, pp. 01-04.
45. *The QEHS Guide to Operational Excellence*. ETQ Inc. Available online [https://www.environmentalleader.com/wp-content/uploads/2017/02/qehs\\_guide-1-4.pdf](https://www.environmentalleader.com/wp-content/uploads/2017/02/qehs_guide-1-4.pdf), 19.02.2022.
46. Trmčić, A., Demmings, E., Kniel, K., Wiedmann, M., Alcaine, S. (2021). Food Safety and Employee Health Implications of COVID-19 A Review. *Journal of Food Protection*, Vol. 84, No. 11, pp. 1973-1989.
47. Usman, M., Cheng, J., Ghani, U., Gul, H., Shah, W.U. (2021). Social support and perceived uncertainties during COVID-19: Consequences for employees' wellbeing. *Current psychology (New Brunswick, N.J.)*, Sep 23, pp. 1-12. Retrieved from <https://link.springer.com/article/10.1007/s12144-021-02293-3>.
48. Yu, Y., Park, Y., Hyun, S.S. (2021). Impacts of the COVID-19 pandemic on employees' work stress, well-being, mental health, organizational citizenship behavior, and employee-customer identification. *Journal of Hospitality Marketing & Management*, Vol. 30, Iss. 5, pp. 529-548.
49. *Zalecenia dla producentów żywności w związku z koronawirusem [Recommendations for food producers related to the risk of coronavirus, General Veterinary Inspectorate of Republic of Poland]* (2020). Available online <https://www.wetgiw.gov.pl/inspekcja-weterynaryjna/zalecenia-dla-producentow-zywnosci-w-zwiazku-z-koronawirusem>, 23.02.2022.
50. Zhang, K.C., Fang, Y., Cao, H., Chen, H., Hu, T., Chen, Y., Zhou, X., Wang, Z. (2021). Behavioral Intention to Receive a COVID-19 Vaccination Among Chinese Factory Workers: Cross-sectional Online Survey. *Journal of Medical Internet Research*, Vol. 23, No. 3, e24673. Retrieved from <https://www.jmir.org/2021/3/e24673/>, 23.02.2022.