

## Research Article

### Occupational Risk Perceptions Network in the COVID-19 era

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#### Abstract

The objective of the work was to specify, through exploratory factor analysis, a model for the study of occupational risk perceptions. A documentary, cross-sectional and systematic investigation was carried out with a selection of sources indexed to international repositories, considering the period from 2019 to 2022. A network of profusion and connectivity was found that explains the differences and perceptual similarities around occupational risks. In relation to biosafety policies, the adjustment of the model is recommended in order to be able to anticipate decisions and behaviors determined by expectations against or in favor of occupational accidents and illnesses.

**Keywords:** COVID-19; Factor Analysis; Risk Perception; Structural Model

#### Introduction

Until March 2022, the pandemic has claimed the lives of five million, although international health systems such as the World Health Organization and the Pan American Health Organization recognize the underreporting of community transmission. Therefore, the number of deaths could increase to 20 million. In this scenario of risks of contagion, illness and death, the mitigation and containment policies for the pandemic consist of the strategies of distancing, confinement and social immunization [1]. In the case of organizations and institutions, biosafety policies translate into the prevention of risks such as the use of masks, ventilation, ozone measurement or the frequent use of alcohol gel.

However, risk prevention policies, strategies and programs are built from the recommendations for ventilation of closed spaces and the immunization of people, discarding the expectations of the

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workforce and workforce [2]. In this sense, a review of the state of the art suggests that the type of employment corresponds to occupational health [3]. In this way, jobs with high risks such as the cleaning service are limited to three years due to the deterioration of occupational health [4]. In this relationship between the type of employment and the level of occupational health, the migratory condition aggravates the situation [5]. Therefore, if employees in the cleaning and occupational hygiene sector are migrants, they are willing to take more risks compared to native workers [6]. In this way, migratory flows adopt risk behaviors in which they decide to assume more costs than benefits due to the lack of job opportunities for undocumented immigrants.

Regarding the gender perspective, migrant women are exposed to greater risks compared to men, since traveling to the workplace by public transport involves higher levels of stress, exhaustion and frustration [7]. In addition, the payment is lower than their male counterparts, as well as the exposure to workplace violence due to their gender condition, as is the case of the non-recognition of their work.

In this way, the objective of the present work was to specify a model for the study of risk perception, considering a review of the literature from 2019 to 2021, as well as the contrast of the null hypothesis regarding the significant differences between the structure of the perception of occupational risks with respect to the observations of the present work.

#### Risk perception theory

The theoretical and conceptual approaches that explain occupational risks are:

1. Risk perception theory.
2. Prospective decision theory.
3. Job expectations theory. These are theoretical perspectives that explain the impact of mitigation, and containment policies, biosafety programs and prevention strategies in the workplace.

Risk perceptions, understood as the expectation of costs and benefits around external demands and internal resources to organizations, suggest that accidents and illnesses can be anticipated [8]. In a risk scenario such as the pandemic, risk perception is triggered by expected gains and losses in the face of a labor decision or action. An increase in accidents and illnesses reflects an increase in the propensity for risk [9]. A reduction in costs and benefits implies an aversion to risks [10]. That is, the perception of risks indicates the degree of opportunities and profits, considering the trend of infections, illnesses or deaths related to a work activity [11]. The contribution of the perceptual approach to risks consists of an approach to the confidence of the workers regarding their leaders.

However, the mitigation and containment policies of the pandemic by implementing distancing, confinement and immunization strategies limit the workplace and reorient it towards biosafety guidelines [12]. In this situation, the theory of prospective decisions explains the relationships between leaders and talents in the face of contingent

events [13]. The theoretical approach raises differences between those who make decisions and those who abide by them [14]. In this hierarchy, leaders make decisions minimizing the expectations of their workers [15]. This is the case of prospective decisions that consist of accepting high costs to obtain greater benefits [16]. Such managerial decisions can be supported by the workers as long as they perceive a spread of profits.

However, if the employees notice higher costs than benefits, they will develop distrust towards their leader [17]. In this situation, risk perceptions may be minimal and prospective management decisions supported, but with levels of mistrust among employees [18]. The job expectations approach suggests that this distrust can be generated by the absence of objectives and goals [19] or, mistrust can emerge from investment in technology that is associated with layoffs or job rotations.

Risk perceptions explain that accidents and illnesses can be prevented if they are considered close to workers [20]. In a different sense, prospective decisions choose processes with high costs expecting greater benefits [2]. In the midst of both proposals, job expectations are translated into confidence when workers notice preventive risk management based on the dissemination of benefits in the face of prospective decisions.

### Risk perception studies

Anti-COVID-19 policies focused on lack of confidence and social distancing as strategies to contain and mitigate the pandemic [21]. As vaccines positioned themselves as an immunization alternative, the epidemiological traffic light, established by the number of infections, sick people, and deaths from COVID-19, ended up defining the COVID-19 strategy. In this scenario, perceptions were associated with attitudes towards COVID-19, stigma towards health professionals, quality of service in hospitals, work stress or social support for adherence to treatment.

The relationships between risk perception and occupational health variables configure training scenarios [22]. That is, the variables interact and are related concomitantly [23]. In this sense, occupational health models stand out in which risk behaviors are predicted based on perceptions, attitudes, motives or prevention skills [24]. In contrast, subjective well-being models do not predict any behavior, but interact with occupational and occupational health variables [25]. For their part, risk communication models assess the impact of disease prevention such as distancing or confinement on community transmission of COVID-19.

The relationship between attitudes towards the pandemic and the perception of risk explain and predict the stigma towards health professionals [26]. The structure that anticipates the differences between users and health professionals suggests that the health crisis can be assumed as a risk. The amplification of this risk is transferred to health professionals. In the process of attributing responsibilities of users towards health professionals, attitudes regulate emotions. If users assume that the pandemic is a laboratory experiment, then they will attribute responsibility for contagion, illness and death to health professionals.

Emotions are determinant variables of attitudes and these regulate fears, anger or anxiety towards health professionals [27]. In this line of incidence, the rulers are also evaluated from the attitudes towards their policies of confinement, distancing and immunization. An

increase in the expectations of risk of job loss or contagion affect attitudes towards the rulers. Risk management and communication is the result of expectations, emotions and attitudes towards the death toll. Therefore, the recognition for governments with a lower death rate is because their crisis management and risk communication is acceptable.

### Modeling of risk perception

Anti-COVID-19 policies and confinement and social distancing strategies conditioned the observation of risk perception from the incommensurability, unpredictability, and uncontrollability of infections, illness, and deaths [28]. In this sense, the proposed models have advanced towards the prediction of risk behavior. Based on emotions, expectations and attitudes, possible infections, illnesses and deaths related to the pandemic are anticipated. In the situation of health and economic crisis, risk perceptions are determinants of exposure to the SARS CoV-2 coronavirus and the development of COVID-19.

The lines of study that go from emotions, attitudes, expectations and risk behaviors have shown the emergence of stigma towards health professionals and the rejection of rulers who report high rates of contagion, disease and death, even when immunization is has been implemented [29]. In this sense, the perception of risks has not been examined from its indicators that reflect emotions of the users of the public health system.

A model that reflects the indicators is distinguished from a model of determinants based on the specificity of a study [30]. If the objective is to know the dimensions of risk from the expectations of the users of the public health system, then a reflective model is ideal. If you want to establish the determinants of an immunization campaign, then some model of those already consulted in the literature is more convenient.

However, neither reflective nor formative models explain the prevalence of the type of studies conducted regarding risk perception in the literature published from 2019 to 2022. Neural networks are an attempt to explain the trend of research that reports consistent findings with determinants and indicators of risk perception. The neural network model of risk perception assumes that the pandemic is a phenomenon of risk learning opportunities. As the pandemic intensifies, the perception of risks is oriented towards the prevention of infections, illnesses and deaths. The neural learning process can be appreciated in the review of the literature considering a sufficient period of consistent results.

In this way, the risk perception model includes the indicators that reflect the impact of risk communication on expectations related to the measurement, prediction and control of COVID-19 [31]. According to the neural network model, observable learning is expected in the literature regarding indicators that may increase at the start of the pandemic, although they decrease as it progresses.

### Method

A documentary study was carried out with a selection of sources indexed to international repositories, considering the edition period from 2019 to 2022 (Table 1).

In order to be able to evaluate the relationship between the theories that explain occupational risks with respect to the findings reported in the literature, the Delphi Inventory was used [32]. In three phases,

Repository	Accidents				Diseases			
	2019	2020	2021	2022	2019	2020	2021	2022
Academy	1	3	2	3	2	4	2	1
Copernicus	2	2	1	2	1	3	1	2
Dialnet	3	1	3	1	1	2	3	2
Dimensions	4	3	2	2	1	1	4	3
Ebsco	2	2	1	3	3	2	3	1
Frontiers	3	3	1	1	4	1	5	1
Google	4	2	1	2	2	2	4	1
Latindex	1	1	2	3	2	1	3	1
Mendeley	2	3	1	1	4	3	1	1
Microsoft	5	2	3	1	1	1	2	1
Redalyc	1	2	3	1	1	1	1	2
Scielo	4	4	2	1	1	3	1	3
Scopus	3	2	4	1	3	2	1	4
Zenodo	2	1	3	2	2	1	1	1
Zotero	1	3	1	3	1	1	1	1

**Table 1:** Descriptive of the sample.

Source: Prepared with study data

expert judges on the subject evaluated the results consulted in the public literature from 2019 to 2022 regarding occupational risks. The selection criteria of the expert judges were the h index of production in Google Scholar and the area of knowledge in labor sciences (see Table 2).

Sex	Age	Entry	Area	h-index
Male	56	18'954.00	Occupational health	32
Feminine	61	16'964.00	Entrepreneurship	31
Feminine	77	15'843.00	Human Resources	17
Male	83	16'905.00	Human capital	26
Feminine	42	16'534.00	Intellectual capital	19
Male	53	19'674.00	talent management	20
Feminine	62	17'534.00	Process quality	16

**Table 2:** Descriptions of the expert judges.

Source: Prepared with study data

In the first phase, the expert judges rated the relationship established in the consulted literature, considering: 0 = “not at all in agreement” to 5 = “quite in agreement”. In the second phase, the averages of the first round were compared with the individual ratings of the judges in that first phase [33]. In the third phase, the ratings based on the second round were reconsidered. Or, the expert judges reiterated their initial assessments, even when confronted with the average (see Table 3).

The data was captured in Excel and processed in JASP version 15 considering the normal distribution, contingency, correlation, fit and residual analyzes in order to test the null hypothesis regarding the differences between the reported findings and the ratings of the expert

	M	SD	$\chi^2$	df	p
R1					
Judge 1	4.32	1.34	14.21	13	.05
Judge 2	4.56	1.54	13.25	14	.07
Judge 3	4.32	1.21	12.13	12	.03
Judge 4	4.36	1.43	10.45	15	.08
Judge 5	4.12	1.09	15.46	14	.06
Judge 6	4.32	1.46	14.32	14	.07
Judge 7	4.30	1.07	15.71	10	.08
R2					
Judge 1	4.36	1.21	13.26	12	.04
Judge 2	4.89	1.34	14.36	11	.03
Judge 3	4.35	1.21	16.57	14	.02
Judge 4	4.32	1.45	13.21	15	.06
Judge 5	4.12	1.32	19.67	13	.05
Judge 6	4.34	1.32	19.21	13	.08
Judge 7	4.36	1.56	14.35	12	.06
R3					
Judge 1	4.36	1.08	13.21	14	.07
Judge 2	4.45	1.31	14.35	12	.09
Judge 3	4.03	1.24	10.45	13	.06
Judge 4	4.41	1.12	13.24	12	.04
Judge 5	4.37	1.35	14.89	11	.03
Judge 6	4.35	1.54	18.21	13	.06
Judge 7	4.67	1.36	14.35	14	.09

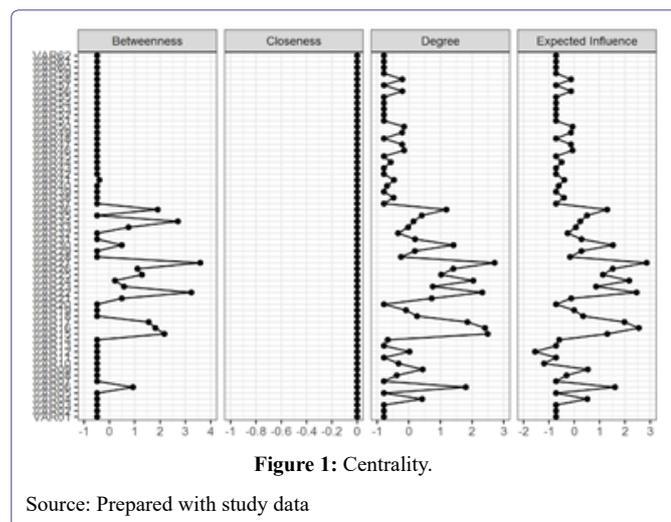
**Table 3:** Descriptive of the evaluated findings.

Source: Prepared with the study data, R = Evaluation round of the expert judges, R1 = Qualifying phase, R2 = Comparative phase, R3 = Reconsideration phase, M = Mean or average of the qualifications of the judges, SD = Standard Deviation of the evaluations of expert judges.

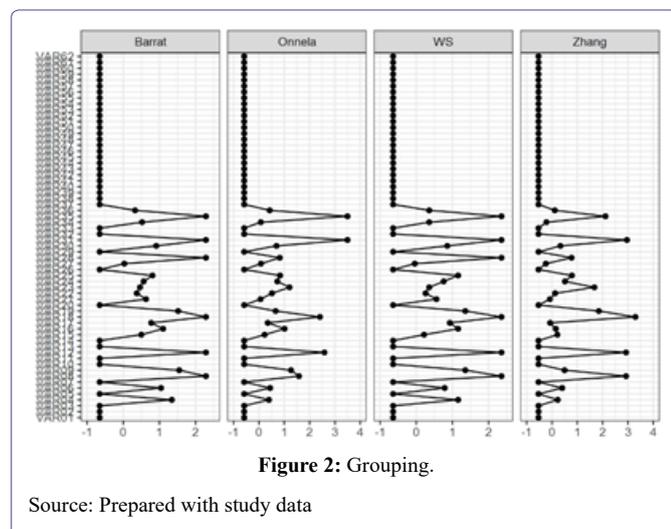
judges [34]. The values were interpreted considering their proximity to the unit with the exception of the residual coefficients [35-37].

## Results

Figure 1 shows the networks of profusion and connectivity among the expert judges with respect to the findings evaluated in three rounds. The relationship structure suggests that the summaries evaluated are circumscribed to an evaluative neutrality on the part of the expert judges. In other words, the participants agree that most of the literature consulted presents a weak relationship between occupational risks and workers' perceptions.

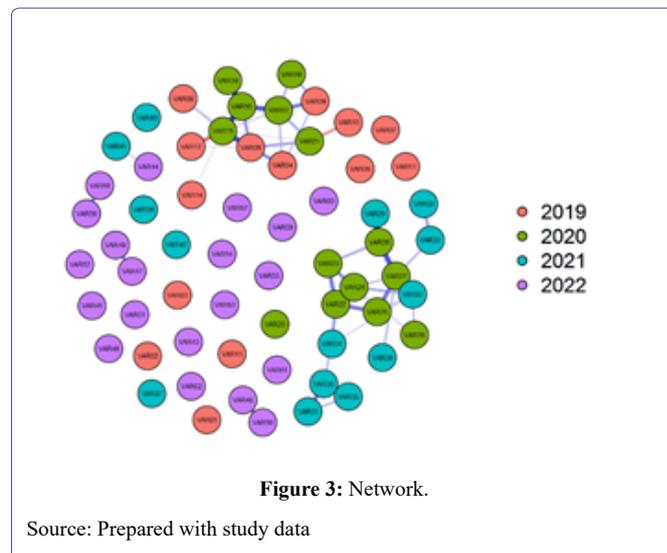


Regarding illnesses and accidents, the evaluations of the judges warn that weak connections between the reviewed literature and the theories that explain occupational risks. Therefore, the results show a research network that reports the relationship between occupational risks and employee perception, but the judges who evaluated these relationships warn that such contributions would not be related to the exposed theoretical framework. Four of the summaries evaluated by the judges were considered extremely important for the specification of a perceptual model around occupational risks (Figure 2).



The expert judges in labor risks assume that only four of the summaries evaluated account for the phenomenon. Expert judges assume

that the relationship between accidents and illnesses is significant with respect to biosecurity derived from the pandemic (Figure 3).



The judges consider that this network of relationships could be modeled as a robust structure in the prediction of risk scenarios in the face of Covid-19. The judges suggest that these four findings reported in the literature reflect the situations of risk prevention, both accidents and diseases. The profusion and connectivity of the judges' evaluations warns of the prevalence of non-significant relationships, although the rest of the findings tend to be integrated.

## Discussion

The contribution of this work to the state of the matter lies in the specification of a model for the study of the perception of occupational risks in the Covid-19 era. The results show that the findings reported in the literature were evaluated as not very significant by expert judges. In relation to the consulted literature where illnesses and accidents stand out as central axes of risk perception, the present work corroborates such question. Regarding the theoretical and empirical frameworks that highlight the differences between occupational hazards and risk perceptions, this paper corroborates these findings. Regarding the explanation that the perception of risks revolves around specific and contingent situations, the present work corroborates this assumption. Regarding the approach of prospective decisions in the face of risk events to maximize profits, this paper discusses this hypothesis. It is true that decisions in situations of risk are increasingly haphazard, but the judges surveyed assume that the illnesses and accidents reported as objects of perception are not very significant. That is, the judges consider that the prospective decisions are generated from risks that have not been reflected as accidents or illnesses.

Lines of investigation concerning occupational risks after the lack of confidence will allow the judges' evaluations to be corroborated. The reactivation of the economy and the return to the workplace will make it possible to warn of risks to occupational health. Accidents and illnesses as occupational risks were qualified as an area of opportunity by the judges. Therefore, occupational risks can be seen as reflections of occupational biosecurity. Risk management from the prevention of accidents and diseases will contribute to the theories that explain them. Studies alluding to occupational hazards may contribute to theories from explanation and perceptions.

## Conclusion

The objective was to specify a model for the study of occupational risk perceptions in the Covid-19 era. A structure of relationships was found between the findings reported in the literature regarding the evaluations of expert judges. The criteria of the judges were established from a position of “not at all in agreement” to “quite in agreement” for the qualification of the findings. The comparison of the average of the qualifications with the initial appraisals allowed moving towards a reconsideration. The judges’ evaluations were different in each round. The judges’ criteria opened the discussion around the profusion and connectivity of the findings reported in the literature during the pandemic so far. From this study it was possible to notice biosafety policies focused on diseases and accidents as axes of the research agenda.

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