



COVID-19, risks and measures: what do workers in a diagnostic laboratory say?¹

COVID-19, riscos e medidas: o que dizem os trabalhadores de um laboratório diagnóstico?

COVID-19, riesgos y medidas: ¿qué dicen los trabajadores de un laboratorio diagnóstico?

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RESUMO

Objetivo: Analisar as concepções de profissionais que atuam em um laboratório de referência para diagnóstico da COVID-19 sobre riscos ocupacionais de contaminação pelo SARS-CoV-2 e quais as medidas de prevenção adotadas. **Métodos:** Estudo descritivo com abordagem qualitativa foi realizado em 2020, com 13 trabalhadores de um Instituto de Medicina Tropical do Nordeste. A pesquisa teve aprovação do Comitê de Ética e utilizou-se como instrumento a entrevista semiestruturada. A pesquisa apóia-se na análise descritiva com o uso do *software* IRaMuTeQ. **Resultados:** Houve a identificação de seis classes: Riscos de contaminação; Medidas pessoais adotadas para evitar contaminação; Percepção sobre o risco biológico laboral; Satisfação laboral; Fatores intensificadores do risco de contaminação; e Equipamentos de proteção individual utilizados. Os profissionais compreendem os tipos de riscos aos quais estão expostos e os modos de contaminação. Houve consenso sobre a forma de prevenção da contaminação e minimização do risco laboral, baseado no uso correto de Equipamentos de Proteção Individual e Coletiva. Observou-se que a presença do risco potencial e a gravidade da contaminação podem atingir diretamente a saúde mental dos trabalhadores, uma vez que provoca os sentimentos de apreensão, medo e preocupação. **Conclusão:** As intensas jornadas e aumento do volume de trabalho, insuficiência de recursos humanos, pressão, cansaço e exaustão física e mental foram relatadas como fatores que podem aumentar o risco de contaminação. Assim, inferimos a necessidade da realização de estudos em outras instituições, para que assim possam surgir proposições de estratégias para a melhoria das condições de vida e trabalho dos profissionais da saúde.

Descritores: Infecções por coronavírus; Técnicas de Laboratório Clínico; Riscos Ocupacionais; Vigilância em Saúde do Trabalhador.

ABSTRACT

Objective: The objective of this study was to analyze the perceptions of professionals working in a reference laboratory for COVID-19 diagnosis regarding the occupational risks of SARS-CoV-2 contamination and the preventive measures adopted. **Methods:** A descriptive study with a qualitative approach was conducted in 2020, involving 13 workers from a Northeastern Institute of Tropical Medicine. A semi-structured interview was used as the research instrument, consisting of five guiding questions. The study received approval from the Ethics and Research Committee (Approval No. 4,132,811). The data were analyzed descriptively, using the IRaMuTeQ software (version 0.7 Alpha 2 and R 3.2.3), resulting in six classes. **Results:** The professionals demonstrated a comprehensive understanding of the types of risks they are exposed to and the modes of contamination. Consensus was reached regarding the prevention of contamination and the mitigation of occupational risks through the correct use of Personal

¹ This manuscript presents the results of a Master's dissertation from the Postgraduate Program in Collective Health (*Programa de Pós-Graduação em Saúde Coletiva - PPGSacol*), entitled: "Risks and protection measures for workers in a SARS-CoV-2 diagnostic laboratory", from the Federal University of Rio Grande do Norte, defended in 2021, with 74 pages.



Protective Equipment (PPE) and Collective Protective Equipment (CPE). It was observed that the potential risk and severity of contamination can directly impact the mental health of the workers, leading to feelings of apprehension, fear, and concern. **Conclusion:** Factors such as intense work schedules, increased workload, insufficient human resources, haste, fatigue, and physical and mental exhaustion were identified as contributing to an increased risk of contamination. Therefore, further studies in COVID-19 diagnostic settings across different institutions are necessary to propose promising strategies for enhancing the living and working conditions of healthcare professionals.

Descriptors: Coronavirus infections; Clinical Laboratory Techniques; Occupational Hazards; Worker's health.

RESUMEN

Objetivo: Analizar las concepciones de profesionales que actúan en un laboratorio de referencia para diagnóstico de Covid-19 sobre riesgos laborales de contaminación por SARS-CoV-2 y cuales medidas de prevención fueron adoptadas. **Métodos:** Estudio descriptivo con enfoque cualitativo fue realizado en 2020, con 13 trabajadores de un Instituto de Medicina Tropical del Nordeste. La investigación tuvo aprobación del Comité de Ética e Investigación y fue utilizado como instrumento la entrevista semiestructurada, con cinco preguntas norteadoras. Está basada en el análisis descriptivo de los datos y con uso del software IRaMuTeQ. **Resultados:** Seis tipos fueron identificados: Riesgos de Contaminación; Medidas Personales Adoptadas para Evitar Contaminación, Percepción Sobre el Riesgo Biológico Laboral; Satisfacción Laboral; Factores Intensificados del Riesgo de Contaminación; y Equipos de Protección Individual Utilizados. Los profesionales comprenden los tipos de riesgos a los cuales están expuestos y los modos de contaminación. Hubo consenso sobre la forma de prevención de la contaminación y minimización del riesgo laboral, basado en el uso correcto de Equipos de Protección Individual y Equipos de Protección Colectiva. Fue observado que la presencia de potencial riesgo y gravedad de contaminación puede atingir directamente la salud mental de los trabajadores, una vez que provoca sentimientos de aprehensión, miedo y preocupación. **Conclusión:** Las intensas jornadas e incremento del volumen de trabajo, insuficiencia de recursos humanos, prisa, cansancio y agotamiento físico y mental fueron informados como factores que pueden aumentar el riesgo de contaminación. Así, inferimos la necesidad de realización de otros estudios en locus de diagnóstico de Covid-19 en otras instituciones, para que puedan surgir proposiciones de estrategias promisoras para mejorar las condiciones de vida y trabajo de los profesionales de la salud.

Descritores: Infecciones por Coronavirus; Técnicas de Laboratorio Clínico; Riesgos Laborales; Vigilancia de la salud del Trabajador.

INTRODUCTION

At the end of 2019, a new strain of the coronavirus was discovered in China: SARS-CoV-2, which causes the COVID-19 disease, a transmissible, potentially serious and fatal respiratory disease that became a pandemic in March 2020, causing thousands of deaths in Brazil and around the world⁽¹⁾.

The disease caused by this virus has alerted services all over the world, generating insecurity and fear among the population and concern among professionals. Workers from the most diverse areas have become essential in the fight against SARS-CoV-2, requiring dedication, technical competence, and courage. In this scenario marked by ignorance, investigations, health, and economic crisis, the work of health professionals has been recognized and applauded worldwide, generating important and diverse scientific studies on the health of these workers. However, it is important to recognize the heterogeneity of the working class as something essential in combating the pandemic. In addition, there are also those who work in roles that are little known to society, such as laboratory professionals, the subject of this research.

It is worth noting that these professionals were in a scenario of accentuated vulnerability in the face of the problems associated with the underfunding of the Unified Health System (*Sistema Único de Saúde – SUS*), the government's freezing of spending in the sector, the deterioration of services, and the precariousness of the workforce. The "real SUS", with its chronic problems, was the challenging scenario for tackling and controlling the COVID-19 pandemic in Brazil⁽²⁾.

In this sense, workers' health is emphasized in the SUS, which considers the epidemiological perspective of the working conditions to which workers are subjected in their environment and work process, with a view to promoting and protecting workers' health⁽³⁾. Therefore, understanding how healthcare workers are exposed to the COVID-19 virus, which translates into a risk of infection, is essential for implementing infection prevention and control measures, as well as measures to protect workers' health.

In health services, preventing the infection from spreading to health professionals and patients depends primarily on the proper use of Personal Protective Equipment (*Equipamento de Proteção Individual – EPI's*), such as gloves,

masks, N95 respirators, goggles or face shields, aprons and closed/private shoes. There was, however, a critical shortage of these inputs worldwide due to their high demand⁽⁴⁾.

Early recognition and rapid diagnosis are essential to prevent transmission and provide timely supportive care. For the World Health Organization (*Organização Mundial da Saúde – OMS*)⁽⁵⁾, expanding the capacity to test all suspected cases was essential for pandemic control. In this way, it would be possible to identify the infected person and provide the necessary health care or isolate them.

The laboratory diagnosis considered the golden standard for identifying SARS-CoV2 is real-time RT-PCR (qRT-PCR), a molecular test based on a single viral RNA sequences identification, with confirmation by nucleic acid sequencing when necessary. In the qualified laboratories for this test, the process takes place as follows: samples taken with a swab (an instrument for collecting liquid and solid substances such as saliva, blood, secretions and bacteria) from the nasopharynx and oropharynx of patients suspected of COVID-19 infection are received from health services and sorted and registered. Subsequently, the sample is prepared, the viral RNA is extracted, the viral RNA is amplified, and read⁽⁶⁾.

These are processes in which the handling of potentially infectious materials generates a significant risk of contamination for workers. The OMS, therefore, stresses that it is essential for health laboratories to use appropriate biosafety practices⁽⁷⁾.

Thus, understanding how healthcare workers are exposed to the COVID-19 virus, as well as the individual or institutional factors that increase the risk of infection, is essential for implementing infection prevention and control measures⁽⁷⁾.

Discussing the occupational dimension of this serious scenario is, therefore, imperative. Thus, this study aims to analyze the conceptions of professionals who work in a reference laboratory for COVID-19 diagnosis about the occupational risks of contamination by SARS-CoV-2, as well as the protection and prevention measures adopted.

METHODS

The study was descriptive with a qualitative approach⁽⁸⁾. The research was carried out between August and September 2020, at the RN Institute of Tropical Medicine (*Instituto de Medicina Tropical do Rio Grande do Norte – IMT/RN*), a supplementary unit of the Federal University of Rio Grande do Norte (*Universidade Federal do Rio Grande do Norte – UFRN*), Brazil, which operates in the teaching and research of endemic infectious and infectious diseases.

The study population was composed of professionals who worked in the IMT-RN laboratory, using the saturation sampling method, with a total of 13 professionals. As a research tool, we used a semi-structured interview script^(8,9) with the following guiding questions: “Are there risks of contamination by the new coronavirus in your workplace? If so, what are they? And how can this contamination happen?”; “Do you use personal protective equipment? Which ones?”; “Do you feel qualified to, correctly, put on and take off personal protective equipment? Why?”; “Does your workplace provide this equipment in quality and quantity? Have you been trained to use it?”; “What protective measures do you take outside the workplace?”; “What changes or improvements can be made in your workplace to minimize occupational risks to the new coronavirus?”. In addition, The study also used a sociodemographic questionnaire to collect data on the profile of the professionals.

After the consent of the participants, by signing the Informed Consent Form (*Termo de Consentimento Livre e Esclarecido – TCLE*), a voice recorder was used to record the interviewees' statements.

The participants' speeches were entirely transcribed, and subsequently the corpus was analyzed using the software Interface de R *pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRaMuTeQ) version 0.7 Alpha 2 and R version 3.2.3. This study used Descending Hierarchical Classification (*Classificação Hierárquica Descendente - CHD*) analyses⁽¹⁰⁾.

In CHD, the vocabulary in the corpus is identified and quantified in terms of frequency and position in the text. This analysis aims to find classes of text segments that, at the same time, have a similar vocabulary to each other, as well as a different vocabulary to segments in other classes^(11,12,13). With the production of the CHD, the words elucidated had a chi-square (χ^2) greater than or equal to 3.84 and $p < 0.05$. The data from the sociodemographic questionnaires was tabulated and analyzed using descriptive statistics. The data collected was interpreted using theoretical references from the specialized literature on health promotion, particularly occupational safety and collective health.

In order to avoid misunderstandings, we should also clarify that the inferences and interpretations made by the researchers are not achieved by the software^(14,15,16). It should be emphasized that, above all, an analytical eye is required from the qualitative researcher, which is something that no software can achieve.

Thus, after plotting the data in the CHD, there are classes known as categories. These classes, in turn, approximate similar text segments. After the graphical representation using the software, the interpretation was performed in the perspective of the qualitative researcher, which resulted in six classes: i) Risks of contamination; ii) Personal measures adopted to avoid contamination, iii) Perception of biological risk at work; iv) Work satisfaction; v) Factors intensifying the risk of contamination; and vi) Personal Protective Equipment (*Equipamento de Proteção Individual– EPI’s*) used.

This study was approved by the Research Ethics Committee (*Comitê de Ética e Pesquisa – CEP*) of the Trairí Faculty of Health Sciences (*Faculdade de Ciências da Saúde do Trairí – FACISA*), UFRN, under protocol number 4.132.811, in compliance with resolution 466/12. After reading and signing the TCLE and the consent form for voice recording, we carried out the interviews and recordings individually. We have preserved the identity of the professionals taking part in the research; therefore, in our results we present the nomenclature: P followed by an Arabic numeral.

RESULTS AND DISCUSSION

The sociodemographic data of the participants presented that 6 were male and 7 female, 6 married and 7 single. Their ages ranged from 26 to 40, with the 31 to 35 age group predominating (46% of participants). The participants’ educational backgrounds varied between nursing (1 participant), biology (2 participants), pharmacy (5 participants) and biomedicine (5 participants).

It was also observed that all the professionals have completed or are currently completing postgraduate studies, with a master’s degree being the most common (46%). Therefore, the professionals who work at the IMT – whether they are volunteer staff from other sectors of the UFRN or are based at the IMT itself – are well qualified.

The young age of the participants in this study is something peculiar, considering workers with greater resilience to adapt to the challenges of working in times of pandemic, as well as not being considered risk groups for COVID-19. A high level of education means greater training and potential to assimilate the complexity of dealing in the workplace with something little known and little studied until the realization of the research.

The analysis of the text corpus was carried out using the IRaMuTeQ software. Using CHD, we found 312 text segments, of which 270 are analyzable, with an utilization rate of 86.54%, consisting of 1639 words, which occurred 10,809 times. With the dendrogram (Figure 1), it’s possible to see which words had the highest percentage, in terms of average frequency between them and different frequency between them. It also makes it possible, using the chi-square (χ^2), to check which words have a value greater than 3.84 and $p < 0.0001$.

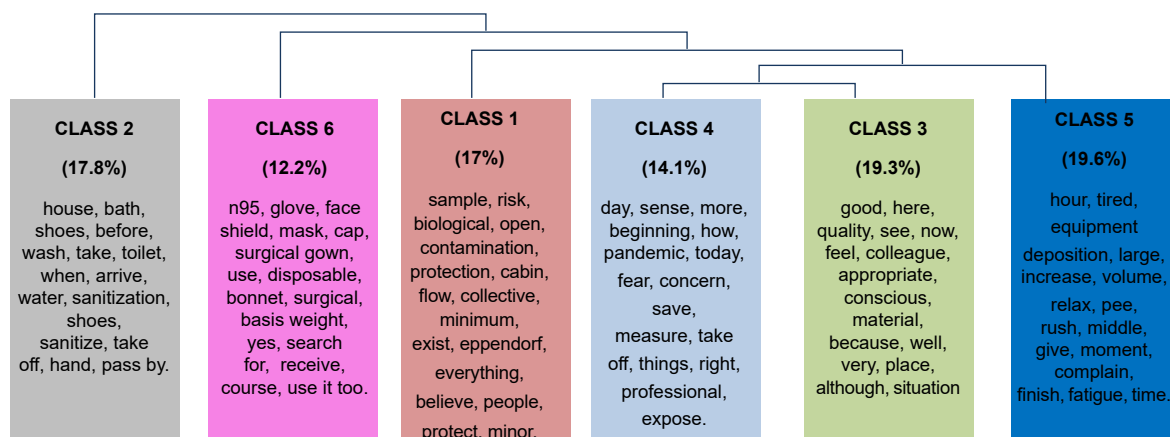
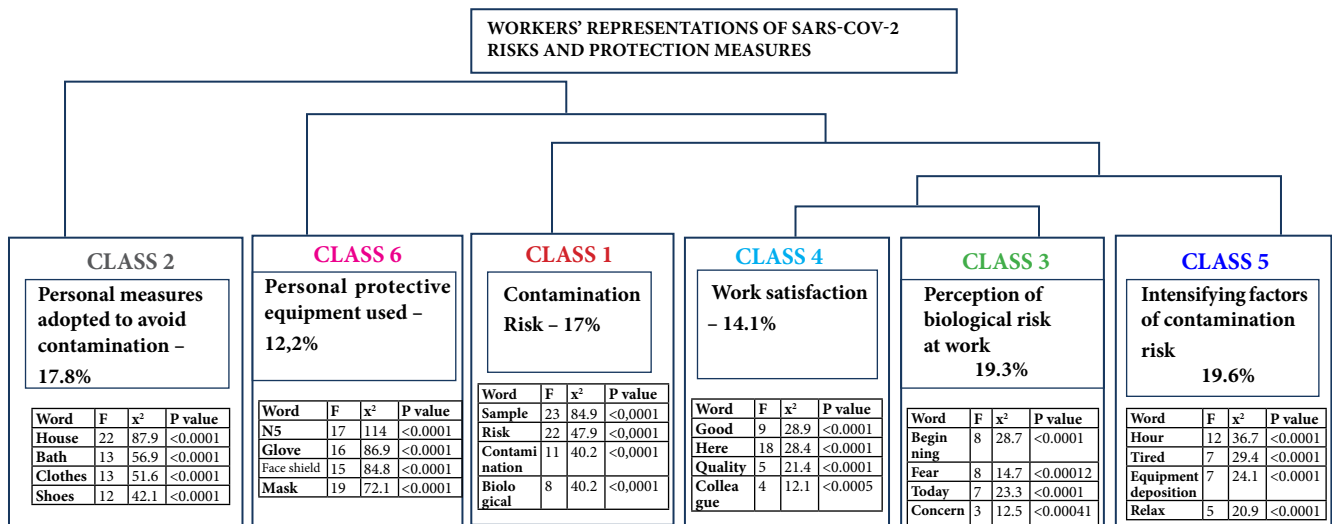


Figure 1 - Dendrogram of the corpus. Tropical Medicine Institute of UFRN, Natal, Rio Grande do Norte, 2023.

In order to make it easier to understand the results presented, the classes have been named to identify the approach taken by each of them (Figure 2). The order, naming and description of the classes followed the logic of the questions and answers in the semi-structured interview conducted with the participants and the discussion of the results will be presented below.



F: absolute frequency

Figure 2 - Presentation of the classes and their respective most significant words, extracted from the corpus. Tropical Medicine Institute of UFRN, Natal, Rio Grande do Norte

RISK OF CONTAMINATION

Class 1, called “Risk of contamination” was made up of 46 text segments, representing 17.04%. In this context, the most significant words were: **sample, risk, biological, contamination**, with **sample** being the word with the highest X², at 84.9.

It can be observed that the recurrent mention of the word **sample**, associated with risk, biological and contamination indicates that the professionals perceive the existence of biological risk in the work environment in an expressive way. It is understood that laboratory samples that potentially contain SARS-CoV-2 are handled and processed directly by them, thus representing a high chance of contamination.

Health professionals are exposed to occupational risks on a daily basis and many don't even recognize them, which ends up leading them to underestimate the care they need, increasing their vulnerability⁽¹⁷⁾. Therefore, the control of biological risks is only possible when they are recognized as potential factors of damage to health professionals. Recognizing the risk means identifying the possible causes of harm to workers' health and acting to prevent, eliminate and control them⁽¹⁸⁾.

The perception of risk in the reports varied in its intensity or severity. Some participants perceive the risk as minimal, due to the correct use of EPI, the proper functioning and availability of Collective Protection Equipment (*Equipamentos de Proteção Coletiva – EPC*) and professional training. Others perceive the risk as moderate or even high:

“[...] we work inside a biological safety cabin that exhausts the air circulating inside the cabin to the outside. So there's no contamination, the risk of contamination by inhalation is minimal and, what's in addition, we're super mega protected by all the EPI”. (P2)

“I see. Being very technical, aerosol formation, when we open the tubes to add the samples, the extraction plates; contamination by contact with the samples, staying in the glove and you go through the EPI and when dressing up, mainly”. (P11)

In a systematic review⁽¹⁹⁾ of the risk factors related to SARS-CoV-2 infection in healthcare workers, it was found that the scarcity, inadequate use, or non-use of EPI's are among the most commonly cited risk factors for contamination of healthcare workers.

The mentioned authors draw attention to the importance of training in the proper handling of this equipment, as well as paying attention to the routine and habits that encourage contamination, making professionals aware that transmission can happen even during meals and group meetings⁽¹⁹⁾.

Since the first moments of the pandemic caused by the new coronavirus, precautionary measures for contact, droplets, and aerosols have been disseminated and encouraged by world health organizations, which have determined

that the use of EPI by health professionals during work directly linked to SARS-CoV-2 is essential^(1,20). Initial studies into coronavirus outbreaks have shown the efficiency and incentive to use, for example, the N95 mask⁽²¹⁾.

“The common personal risk of transmission from one person to another, which happens in other places, but here I see an additional risk, which is direct contact with potentially infected biological material.” (P1)

The possible forms of contamination were also mentioned by the workers in the answers in this class. There was mention of contamination through the formation of aerosols, interpersonal contact, and contact with utensils.

The comments on this issue were predominantly technical and confirm what the literature says about the forms of contamination⁽²⁰⁾. Furthermore, the workers did not emphasize the possible ways of contamination.

PERSONAL MEASURES TAKEN TO AVOID CONTAMINATION

Class 2, called “Personal measures taken to avoid contamination”, was made up of 48 text segments, representing 17.78%. In this context, the most significant words were **house**, **bath**, **clothes** and **shoes**.

From the answers given by this class, it was possible to perceive the notion of biosafety as the protagonist of everyday life. This notion extends even beyond the walls of the workplace, such as personal hygiene and disinfection of surfaces and personal objects.

“[...] when I get home there’s a whole process of sanitizing everything I’ve walked down the street with. I don’t bring anything into the house without first sanitizing it and taking a shower”. (P9)

“I wash my hands and take my mask off, then I go to sanitize the car. I apply alcohol to everything inside the car that I’ve picked up: the door handle, the steering wheel, and everything I’m sanitizing.” (P4)

The interviews show that a lot of attention is paid to transmission through utensils (contaminated inanimate surfaces). However, despite studies^(22,23) showing that the virus can remain detectable on some objects for hours or days, the WHO⁽²⁴⁾ concludes that contamination in this way is only possible, but not confirmed. It is therefore understandable that there are still no specific reports of direct transmission of SARS-CoV-2 by utensils.

From this perspective, the main recommendations for extra-work environments are based on the constant practice of sanitizing hands, physical distancing, and respiratory etiquette; avoiding places with crowds of people⁽²⁴⁾.

Some reports on care reveal the understanding of the professionals studied about these recommendations:

“[...] I wash my hands, I use hand sanitizer, I avoid going out, I stay at home most of the time, I leave my shoes at the door, when I go out I always take a shower, when I come here”. (P8)

Professionals recognize the importance of consciously adopting precautionary measures in the face of COVID-19, demanding an immediate and emphatic change in individual and collective behavior.

PERCEPTION OF BIOLOGICAL RISK AT WORK

Class 3, called “Perception of biological risk at work”, was made up of 38 text segments, representing 14.07%. In this context, the most significant words were: **beginning**, **today**, **fear** and **worry**.

The words **beginning** and **today** refer to how this perception of biological risk occurs, comparing the period in which they began working on SARS-CoV-2 testing to the period in which the interviews were carried out, on average five months later. It is noticeable that **fear** and **worry**, also significant words in the class, have become part of the professionals’ daily lives, although the majority report that these feelings had already increased over time.

“[...] at first I was afraid because of my family, of contaminating myself and someone in my family, but since things are now, let’s say, calmer, and since I’ve already gotten to know the way of working and I felt safe nowadays I’m not afraid anymore.” (P13)

From this perspective, despite the fact that this is an infectious disease, the damage to the mental health of workers who combat the virus that causes COVID-19 should not be overlooked, as there are several factors that can lead to mental illness and, consequently, compromise this workforce that is so essential in controlling the pandemic. Anxiety symptoms, depression, loss of sleep quality, increased drug use, psychosomatic symptoms, and fear of infection have been frequently described and can remain even after the control of the pandemic^(25,26).

There is a lack of studies dealing with the mental health of workers who work in laboratories that process SARS-CoV-2 samples, however the findings of this study show that professionals have lost their fear and concern about contamination, and there is little evidence of mental exhaustion. Dealing with the virus in a controlled environment, equipped with the necessary EPI's and EPC's, makes the workplace safer and more comfortable when compared to services such as Intensive Care Units (*Unidade de Terapia Intensiva – UTI*) and wards, where there are inherent instabilities in dealing with human lives:

“Despite being overloaded, I feel satisfied and safe, mainly because we’re four months into the pandemic and I’ve been exposed since the beginning and I haven’t been contaminated.” (P10)

Safety and loss of fear also show a relevant association with the knowledge understood as adequate about the biosafety measures to be taken in the work environment, with the availability of effective individual and collective protection equipment, and with the fact that there has been no contamination in the team.

WORK SATISFACTION

Class 4, called “Work satisfaction”, was made up of 52 text segments, representing 19.26%. In this context, the most significant words were **good, here, quality, colleague, and adequate**.

The significant words in this class, especially the first one, reveal something positive in terms of the health of workers during the pandemic: a reality of satisfaction and well-being in the workplace.

The reasons for work satisfaction are based on the safety provided by the environment through the adequate EPI provision, the professional training and continuing education offered, and the fact that there was no contamination between colleagues since the beginning of its work..

“[...] I feel much more worried outside than basically here on the inside, because here I’ve been working dressed in the right EPO’s.” (P6)

Something that was also noticeable in the speeches was the joy of being able to collaborate directly, through their work, in controlling the pandemic. Beyond the present day, work has always been a significant part of people's daily lives and essential to the construction of their identity.

Knowing that work can be beneficial or destructive in the health field, thus becoming a relevant factor in the health-disease process⁽²⁷⁾, the healthy environment described in the reports indicates a reinforcement of the workers' health, perceived as physical, mental, and social well-being.

“[...] and I can use my expertise to help, so I feel very happy to be here”. (P3)

It can be seen that the workplace has changed a lot in terms of relations with workers, from practices that only sought to increase productivity to a more human and holistic vision.

In this sense, understanding and analyzing Quality of Life at Work (*Qualidade de Vida no Trabalho – QVT*) and its impact on organizations has become imperative. Thus, QVT is seen as the set of actions of a company that involves the implementation of management and technological improvements and innovations in the workplace⁽²⁸⁾.

In this respect, the institution to which the workers in this study belong has an effective QVT program. It presents this concept as an important tool for encouraging the adoption of actions and practices that promote workers' well-being in a sustainable and lasting way⁽²⁹⁾. Thus, the results of this study show the importance of this tool for well-being at work.

The harmonious organizational atmosphere can also be seen in the commitment of the institution's professionals. In other words, they voluntarily chose to offer their expertise and work because of the critical moment they were experiencing.

Understanding the vast importance of public service to society, it is clear that the subject of QVT in public organizations is highly representative. This is because civil servants are the link between public bodies and citizens, playing an important role in the quality of the public service and the satisfaction of those who receive the service⁽³⁰⁾.

It's important to emphasize that the health-work relationship is significantly increasing productivity, work motivation, life expectations, and a reduction in morbidity and mortality rates. As such, promoting health and safety at work plays an important role in improving workers' quality of life⁽³¹⁾.

This concept is related to the expanded concept of health used by the Unified Health System (*Sistema Único de Saúde – SUS*), which includes workers' health. In the field of Collective Health, it refers to the expression “social

determination of the health-disease process” to indicate the complexity of the causes, effects, consequences, and necessary responses in addressing this concept⁽³²⁾.

For this reason, thinking about promoting workers’ health requires discussing the meaning of work, which can be a factor of illness, but can also be an element that promotes health. Work can be healthy when there are possibilities for workers to contribute in some way to the institution and/or society, as well as providing pleasure when performing tasks and being able to solve problems autonomously⁽³¹⁾. In this study, it is understood that civil servants have become protagonists in promoting the quality of service, motivation, and commitment necessary for successful development.

The reality of workers on the pandemic front line contradicts the research consensus, bringing evidence of alarming situations with a high number of infected professionals who have died due to the overload of the health system. In addition, there were absences from work, illnesses, death, and intense psychological suffering^(19,25) due to the risk of contamination. Therefore, it is imperative that workers are welcomed and recognized, guaranteeing decent wages, fair working hours, safety, and well-being at work, which are essential for promoting and protecting their health.

INTENSIFYING FACTORS OF CONTAMINATION RISK

Class 5, called “Intensifying factors of contamination risk”, was made up of 53 text segments, representing 19.63%. In this context, the most significant words were **hour, tired, unpack, relax** and **rush**.

Thus, the significant words in this class confirm the fragility of the greater biological risk suffered by the participants. The increased volume of work, generating an increase in working time beyond ideal conditions, was one of the points mentioned by the interviewees.

“[...] but it’s happened that we’ve left later, 7:30, sometimes we’re already so tired and hungry that it can speed up the process of unpacking and removing the equipment not so effectively”. (P12)

During the working day, laboratory employees are continually exposed to risky situations that can cause damage to their health, such as physical, chemical, ergonomic, accidental, or biological hazards. With the COVID-19 pandemic, biosafety in the workplace has become more important, given the potential seriousness of the disease, which can take the form of an accident at work⁽³⁰⁾

It is important to emphasize, however, that occupational accidents, in general, are potentially preventable. Their occurrence may be related to a number of factors such as the lack of risk management on the part of companies and workers, failure to provide or use EPI, the need for permanent education to inform employers and employees about ways of preventing accidents at work, the implementation of management tools for monitoring, controlling and preventing accidents⁽³³⁾

In this sense, the work circumstances described in the reports corroborate the research⁽⁷⁾. In one study, it was confirmed that increased working hours due to increased demand, for example, can lead professionals to a state of mental exhaustion, fatigue, and a propensity to failures and adverse health events⁽⁷⁾. The interviewees were aware of these circumstances and recognized them as risk factors. However, the lack of technical training was not shown to be a reality for the professionals in this study:

“[...] we went through a series of trainings even before the virus arrived in Brazil and then when it arrived in Brazil and in Rio Grande do Norte we had an intensification of these trainings and this gives me the confidence to train other people about this.” (P10)

To ensure working conditions that reduce the transmission of the virus, organizational measures need to be discussed within the scope of each work activity. In addition, the praxis of workers’ health must be valued in the list of public health measures and actions aimed at controlling the pandemic⁽³⁴⁾

PERSONAL PROTECTION EQUIPMENT USED

Class 6, called “Personal protective equipment used”, was made up of 33 text segments, representing 12.22%. In this context, the most significant words were **N95, glove, face shield**, and **mask**.

The professionals in this study objectively reported on the EPI’s used in the workplace, which corroborates the recommendations of the health authorities, including the use of a respiratory protection mask (N95/PFF2 mask), which is considered the most efficient biological protection against aerosols⁽³⁵⁾.

The use of EPI to protect the health of healthcare workers is recommended⁽⁵⁾ and imperative, as they act as

physical barriers or filtration of inhaled air, which can prevent accidental infection. Thus, knowledge about the appropriate EPI's needed in situations involving work linked to COVID-19 has become essential.

FINAL CONSIDERATIONS

The approach to work-health relations needs to be discussed in the most diverse spheres of society. In the health sector, especially during the pandemic, the heterogeneity of the fields of work requires an even closer look. This working class, therefore, becomes the most vulnerable to COVID-19 illness, requiring greater monitoring and visibility of its social role.

This study achieved its objective. Based on the speeches and the routine experienced in the laboratory that processes SARS-CoV-2 samples at the IMT, it was possible to infer that professionals recognize the risk of contamination in the workplace, as well as understand the ways this contamination can occur.

The workers described the EPI's they used, their mastery of the techniques, and their access to training. There was no mention of unsatisfactory quantity or quality of EPI's. It is understood, therefore, that the equipment was adequate for the activities performed by the workers.

It was observed that the presence of risk and the potential and severity of contamination can directly affect workers' mental health, causing feelings of apprehension, fear, and worry. The intense working hours and increased volume of work required, insufficient human resources, rush, fatigue, and physical and mental exhaustion were mentioned as factors that could increase the risk of contamination.

The personal measures taken were described, based on personal hygiene actions, social distancing, the use of masks, and cleaning and disinfecting possible utensils carried from work to home.

Work satisfaction was emphasized by the workers, who said they were happy to work in an environment considered safe, as well as pleased to contribute their work and expertise at such a complex and challenging time for humanity.

The limitations of the study were the atypical number of professionals, mostly made up of staff from other sectors, who, despite belonging to the UFRN institution, were not assigned to the IMT laboratory sector; suggesting a staff rotation that was not consistent with the long-term reality.

In this way, and finally, we infer the need to carry out studies in COVID-19 diagnostic laboratories that take place in other institutions, in order to come up with promising strategies for improving the living and working conditions of these professionals.

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CONTRIBUTIONS

Marina Gabriela Medeiros de Moura and **Cecília Nogueira Valença** contributed to the preparation and design of the research; the collection, analysis, and interpretation of the data; and the writing and revision of the manuscript. **Diogyns Cesar Felix de Lima** contributed to the writing and revision of the manuscript.

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