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Assessing the perspective of health professionals on the impact of training on their safety, during the COVID-19 pandemic: The mediating role of Trust

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Master in Management of Services and Technology

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“I still believe in heroes”

– Nick Fury

Acknowledgements

The completion of this dissertation is undoubtedly one of the greatest and most challenging milestones I have ever achieved, and marks the end of my master's degree, a period on which I will look back fondly and proudly.

Firstly, I would like to thank all the health professionals who took the time, currently so valuable, to participate in my online questionnaire – without them, this study would not have been possible.

I also thank En^{fa}. Tatiana Fonseca and En^{fa}. Mariana Gaspar, for their help in developing and distributing the questionnaire. Without them, I would not have been able to develop such a precise instrument and reach the Portuguese health professionals.

This result was not achieved solely through the efforts of one person, and I was fortunate enough to have two amazing professors by my side. Professor Ana Lúcia Martins and Professor Madalena Ramos were always helpful, encouraging, considerate and understanding of my difficulties – it was a pleasure to work with both of you, and I am sure that your insights greatly enriched this work. Apart from their significant contribution, the motivation and belief they instilled in me spurred me on to do more and better. They were everything and more that I could have wished for at any given time.

I would also like to thank my friends, especially Carolina, Inês, Joana, Leonor and Maria, who helped me distribute the questionnaire and were a welcome and cheerful distraction from my research activities.

Last, but certainly not least, I would like to thank my family, especially my mother, my sister, my brother, my cousin Diana and my boyfriend, who have always encouraged me, especially when times seemed most dire.

This work is dedicated to my grandparents who never stopped sharing their wisdom, support and encouragement – I hope I have made you proud.

Abstract

In the face of the current pandemic, health professionals are one of the most important resources, if not the most important. Despite their importance to health care per se, their safety is of paramount importance. Nowadays, health professionals are at increased risk of infection due to the high rate of transmission of the virus. Therefore, all measures concerning their safety, as well as their analysis, become imperative.

The present thesis proposes to analyse the perspective of health professionals in Portugal, in terms of the training they have received, the level of trust embedded in the institution where they are employed, and how these aspects affect their perception of safety, during the pandemic period.

This study relied on an online questionnaire – with a total of 235 responses – and quantitative analysis methods to answer the defined research question. Data analysis combined descriptive and inferential analysis, internal consistency analysis and mediation analysis, using Hayes' PROCESS.

The results suggest that Health Professionals' Perception of Safety, Training Adequacy and Organisational Trust are evaluated at low, yet positive values, with the latter recording the highest evaluation.

Furthermore, the results demonstrate the existence of a direct effect of the perception of training on the perception of safety, as well as an indirect effect, the latter mediated by organisational trust.

In the context studied, the main problems and resulting opportunities for improvement, are to be found in the time and the content framework of training, and in the trust relationships between health professionals, their supervisors and the institution.

Keywords: COVID-19, Health Professional, Organisational Trust, Perception of Safety, Training.

JEL Classification:

I100 – Health General

Y40 – Dissertations

Resumo

Devido à situação pandémica, identificaram-se os profissionais de saúde como um dos recursos fundamentais, senão o mais importante, destacando a sua segurança como um tópico vital. Atualmente, os profissionais de saúde estão expostos a um maior risco de infeção devido à elevada taxa de transmissão do vírus, tornando todas as medidas de segurança, bem como a sua análise, imprescindíveis.

Esta investigação propõe uma análise à perceção dos profissionais de saúde em Portugal, durante a pandemia, sobre a formação recebida e à confiança que depositam na sua organização, bem como o impacto na sua perceção de segurança. Para tal, foi elaborado um questionário aos profissionais de saúde com instrumentos avaliadores da perceção da adequação da formação, da confiança organizacional e da sua segurança.

O questionário aplicado online recolheu 235 respostas. Os dados analisados com base em estatística descritiva e inferencial, consistência interna e de mediação com utilização do macro-PROCESS de Hayes.

Os resultados indicam que os profissionais de saúde percebem de forma positiva a adequação da formação recebida, confiam na sua organização e sentem-se seguros.

Os resultados suportam ainda a existência de um efeito direto da perceção relativamente à formação sobre o sentimento de segurança, e igualmente um efeito indireto, sendo este mediado pela confiança na organização.

O conteúdo e cronograma da formação, bem como a confiança dos profissionais de saúde nos seus supervisores e organização são os pontos onde se registam as avaliações mais baixas, evidenciando os problemas, e consequentemente, as oportunidades de melhoria.

Palavras-chave: Confiança Organizacional, COVID-19, Formação, Perceção de Segurança, Profissional de Saúde.

Sistema de Classificação JEL:

I100 – Health General

Y40 – Dissertations

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List of Abbreviations and Acronyms

The following table describes the significance of various abbreviations and acronyms used throughout the dissertation. The page on which one is defined, or is first used, is also given.

Abbreviation/Acronym	Meaning	Page
IOM	Institute of Medicine	1
HP	Health Professionals	1
WHO	World Health Organization	1
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus-2	1
PPE	Personal Protective Equipment	2
COVID-19	Coronavirus Disease 2019	2
ESAIC	European Society of Anaesthesiology and Intensive Care	3
RO	Research Objective	3
SCM	Supply Chain Management	7
OM	Operations Management	7
SOM	Service Operations Management	7
HOM	Health Operations Management	8
SARS	Severe Acute Respiratory Syndrome	11
WISH	Workplace Integrated Safety and Health	13
MOH	Ministry of Health	16
CV	Coefficient of Variation	33
OR	Operating Room	38

Introduction

1.1. Research Context

According to the Agency for Healthcare Research and Quality (2020), the Institute of Medicine (IOM) has defined quality of healthcare as “*the degree to which health services for individuals and population increase the likelihood for desired health outcomes and are consistent with current professional knowledge*”. It can be concluded that it is possible to conclude that health is the result of a process in which health professionals (HP) are a relevant transformation process.

According to the 2013 World Health Organization guidelines (WHO) “*health professionals maintain health in humans through the application of the principles and procedures of evidence-based and caring. Health professionals, study, diagnose, treat and prevent human illness, injury and other physical and mental impairments in accordance with the needs of the population they serve. They advise on, or apply, preventive and curative measures, and promote health with the ultimate goal of meeting the health needs and expectations of individuals and populations, and improving population health outcomes*” (World Health Organization, 2013: 57). To name a few, and according to Martins et al. (2003), physicians, nurses and general services personnel are considered HP.

The healthcare system is composed of several stakeholders, namely patients, health professionals, the organisation’s administration, other internal stakeholders, and a range of stakeholders external to the healthcare facilities. Specifically for HP, Kapoor (2011) states that their perception of quality is based on the parameters of providing care as per established practices, availability of resources, self-satisfaction with outcomes and acquisition of knowledge, skills and competencies. However, the author does not include the perspective of HP as stakeholders with needs that must be fulfilled, nor the training they receive, but only the perspective of the final customer (i.e., the patient receiving care).

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) presented an unprecedented challenge worldwide, resulting in extensive and complex changes and adaptations, especially in the health sector, that has been decisive in fighting the disease.

Being the most valuable resource of the process of care delivery at the forefront of the outbreak, HP are being placed at an increased risk of infection due to the high transmission rate of the virus (Xiang et al., 2020).

According to Sahu et al. (2020), the total percentage of HP who were SARS-CoV-2 positive was nearly 10% of the overall infected patients. This transmission was associated with overcrowding, lack of isolation and environmental issues (Zhang et al., 2020) and was fuelled by the insufficiency of protective supplies and lack of awareness of adequate protection (Xiang et al., 2020).

Therefore, the high risk of exposure at HP enhances the need for contact tracing, screening, and training of protective measures (Sahu et al., 2020), especially when it comes to donning and doffing personal protective equipment (PPE), as this poses a high risk of contamination. Thus, the proper donning and doffing of PPE is considered extremely important and impactful to HP' safety (Daghmouri et al., 2020).

In addition, Tabah et al. (2020) find that differences in knowledge and training regarding PPE procedures correlate with confidence, and are likely to impact the safety of HP, contributing to uncertainty and lack of trust in the workplace.

According to Ehrlich et al. (2020), the physical well-being of HP is being tested by the rising number of patients and the tremendously increasing workloads. Consequently, and as co-workers become infected, the worriedness and guilt of possibly contributing to family members and colleagues' infection, poses psychological hazards to HP.

Given the fear of uncertainty and negative emotions associated with the virus, Ehrlich et al. (2020) point to the need of keeping the entire team informed of the latest information, and to provide ongoing training on the efficient use of hospital resources, to maintain the order and curtail the negative impacts of this crisis.

Since transmission anxiety greatly affects the psychological stability of HP (Korkmaz et al., 2020; Vizheh et al., 2020), the availability of the appropriate PPE plays a major role as it provides physical protection against the virus. In fact, according to Algado-Sellés et al. (2020), and supported by Heinzerling et al. (2020), the risk of infection decreases when exposure is protected, regardless of the contact carried out. Hence, the use of appropriate PPE by all HP is key to their protection, and that of others, and its availability should be ensured.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, said that *"the COVID-19 pandemic has reminded all of us of the vital role health workers play to relieve suffering and save lives"* and that *"no country, hospital or clinical can keep its patients safe unless it keeps its health workers safe"* (WHO, 2020). Thus, there is no question that the safety of HP is crucial and must be ensured in the fight against a pandemic.

Notwithstanding the endeavours of the competent organisations, the perception of safety by HP is essential as it can help to understand how training in key aspects of combating this

pandemic, and the level of workplace trust, can influence their perception of safety within the work environment, and potentially provide guidance for preparing for other viral disasters.

1.2. Gap and Research Aim

As mentioned, the safety of HP is a very relevant factor when combating the pandemic we are living in because *“if the environment is not safe for health workers, it cannot be safe for patients”* as they *“cannot provide high-quality and safe care to patients in environments where there is a physical threat to their safety and they are fatigued and stressed”* (Shaw et al., 2020).

According to the European Society of Anaesthesiology and Intensive Care (ESAIC)’ newsletter, the training of the new working routine for the majority of HP (e.g., correct dressing, use and undressing of PPE) allows the implementation of *“basic precautions for the prevention and control of the infection based on the transmission dynamics”* (Vieira et al., 2020).

As it will be further detailed in the literature review chapter, several authors have studied and discussed the relationship between trust and safety, and how the first influences the latter (see, for instance, Avram et al. (2015); Conchie et al. (2006); Cox et al. (2006); Luria (2010)) and others have studied the influence of training in the HP’ perception of safety (see, for instance, Daghmouri et al. (2020); Furniss et al. (2011); Gao et al. (2019); Kretschmann et al. (2020); Robson et al. (2012); Tabah et al. (2020)). However, no studies regarding the influence of trust in the relationship between training and safety were found.

Therefore, and given the topicality and importance of this matter, the main purpose of this research is to analyse how, and if, the level of workplace trust impacts the HP’ perception of safety based on the quantity and quality of training received, during the COVID-19 pandemic.

1.3. Research Question

Given the context of this research, the following research question emerges:

RQ1: How does the perception of training adequacy influence the HP’ feeling of safety in the work environment?

1.4. Research Objectives

Considering the aim of this research, several research objectives (RO) must be addressed:

RO1: Assess the perception of the training received by HP during the pandemic.

RO2: Assess the HP’ perception of safety during the pandemic.

RO3: Assess the level of organisational trust of the HP, during the pandemic.

RO4: Evaluate if the levels of trust regarding supervisors and the institution are similar.

RO5: Evaluate if the professional category influences the HP' perception of safety.

RO6: Measure the influence of the perception of the training in HP' perception of safety.

RO7: Measure the influence of the perception of training on organisational trust.

RO8: Assess if the level of organisational trust has an impact on how the perception of the training influences HP' perception of safety and measure such impact.

RO9: Propose managerial recommendations on training and trust practices provided to HP to improve their perception of safety.

1.5. Method

This study is a quantitative research as it will measure the variables that influence the perception of the quality of service provided to HP, as the internal client of healthcare institutions, during the COVID-19 pandemic.

For this purpose, data will be gathered through a quantitative and descriptive collection – questionnaire. Focus-groups interviews will be conducted with HP to develop the questionnaire which will later be distributed online to HP in the Portuguese health sector.

Secondary data will be collected from news, articles, and government legislation regarding the COVID-19 pandemic.

The results obtained will be subjected to statistical analysis and will object to further discussion.

1.6. Scope

The study will focus on the different categories of HP of the Portuguese health sector, namely nurses, physicians, diagnostic and therapeutic technicians, general services personnel, senior health technicians and hospital administrators. The study will target HP from Portugal (mainland and the autonomous regions of Madeira and Azores) working in the different types of health institutions (i.e., public, private and public-private).

1.7. Global Structure

The second chapter provides the theoretical foundation for the research and support for the development of the hypotheses.

Initially, the concept of Operations Management is introduced to contextualise the differences between manufacturing services, converging in the definition of Health Operations Management, and concluding on how healthcare is a special type of service.

Following, the concept of Quality of Service is discussed from the perspective of different authors, demonstrating that the assessment and significance of both parties (i.e., health professionals and patients) are not considered in most of the instruments that were found.

The Scarcity of Healthcare Resources is then reviewed, breaking down the different types of scarcity, and focusing on the ramifications of the shortage of different resources in the response to a public health crisis.

Succeeding, the construct of Safety in Healthcare is presented, as well as its measurements and related construct (Training).

Lastly, the construct of Trust within Healthcare is introduced and analysed based on potential associations with the other constructs.

Throughout this chapter, the theoretical findings that support the thesis' hypotheses are discussed and the conceptual model is presented.

Chapter 3 develops the past section's study hypotheses and depicts the data collection instruments, pre-testing, data collection methods and participants. The methods for data treatment and analysis are also presented.

In the fourth chapter, the data and applicable analysis are presented, followed by a brief discussion of the gathered results.

The last chapter of this thesis presents the main conclusions, considering the achievement of the proposed objectives and the validation of the hypotheses developed. Furthermore, it discusses the thesis' contributions, potential limitations, and future research opportunities.

Literature Review

This chapter aims to provide a literature foundation to frame the research that will be conducted by identifying existing studies within the healthcare industry, the challenges faced and how other authors have addressed problems regarding HP. Additionally, it will support the research hypotheses and lead to the research model.

2.1. Operations Management in Healthcare

2.1.1. Supply Chain Management vs Operations Management

Supply chain management (SCM) is an integrated process that involves the transformation of raw materials to the final product and finally to customer delivery (Mathur et al., 2018). On the other hand, “*operations management (OM) refers to the planning and control of processes that transform inputs into outputs*” (Visser & Beech, 2005: 1).

In healthcare, these two concepts are inextricably linked together. As SCM enables the flow of products and services needed by the HP to provide care (Schneller and Smeltzer, 2006, referred by Landry & Beaulieu, 2010), OM conceptualises, plans, and implements the process that transforms those inputs into the provision of suitable service for the patient (Visser & Beech, 2005).

2.1.2. Service Operations Management – The special case of healthcare

According to Langabeer & Helton (2015), an organisation consists of “*a group of people who work together, through interconnected processes and behaviours, to achieve a common purpose*”. Thus, a healthcare organisation engages in the production and delivery of health services. Some examples of types of healthcare organisations given by the authors were primary care clinics, hospitals, physician offices and urgent care centres.

In the case of a hospital, the central function is to provide services. The concept of Service Operations Management (SOM) emerges, and Johnston et al. (2019) define it as the provision of services and values to customers, in order to ensure that they get the right experiences and desired outcomes. Moreover, these authors state that good SOM should lead to more appropriate services that are better for the ‘triple bottom line’, i.e., customers, staff, and organisation.

Given that hospitals comprise many different service operations and deal with a high volume of patients and a wide range of treatments available (Johnston et al., 2012), organizing the healthcare processes needed to provide effective health care and efficiently use the available resources can be challenging (Hulshof et al., 2012).

Accordingly, Health Operations Management (HOM) can be defined as “*the analysis, design, planning and control of all of the steps necessary to provide a service for a client*” (Visser & Beech, 2005: xviii).

On the other hand, Langabeer & Helton (2015) defined HOM as “*the management of the supporting business and clinical systems and processes that transform resources (or inputs) into healthcare services (outputs)*” where the inputs are defined as the resources and assets (i.e., labour and capital) and outputs refer to the result of the production and delivery of the healthcare services.

Notwithstanding that each service operation uses and manages various input resources (e.g., health professional, medicine, equipment and so forth) (Johnston et al., 2012), the key input that influences the planning and control of resources is patient demand (Visser & Beech, 2005) and implies deciding in advance “*what to do, how to do activities, who should do which activities, when activities should be done and what capacity the activities need*” (Svensson & Hedman, 2018: 847).

Additionally, Johnston et al. (2012) state that the customers, in this case, patients, play a role in the service process and thus are considered the recipient but also the co-producer in a service process, where their experience is an intrinsic part of the operation’s process. The authors illustrate this co-production with the following example “*when we visit a doctor with an ailment, we are needed to describe the symptoms to them and discuss alternative treatments*”.

Thus, opposingly to Langabeer & Helton (2015) and Visser & Beech (2005), Johnston et al. (2012) view the service provided as the process, where the customer’s perspective (regarding the products, benefits, emotions, judgements, and intentions) and the organisation’s perspective (referring to meeting targets and objectives) are gathered. In other words, the latter authors understand HOM as the service provided through the management and co-production of the various inputs, where the output regards the takeaway of such service instead of the provided service itself.

Despite being confronted with challenges similar to those in manufacturing (e.g., the complexity of processes, efficient usage of resources and cost reduction), healthcare is a special kind of service, which emphasizes the difficulty to directly transfer knowledge (Visser &

Beech, 2005). According to the authors, although the flow of materials is considered a backup to the provision of service, operations in healthcare organisations concern mostly the flow of patients instead, and thus, there is a need to balance the power between the different groups of interest.

Hence, given that the level of uncertainty present in service organisations is far higher than in the case of manufacturing ones, there is a need to moulding well-established operations management concepts (Gittell et al., 2010).

2.2. Quality of Service in Healthcare

Services can be defined as “*an act of performance that creates benefits for customers by bringing about a desired change in/or on behalf of the recipient*” (Lovelock & Wright, 1999: 2, referred by Upadhyai et al., 2019).

Given the distinct characteristics of healthcare, such as intangibility, heterogeneity and simultaneity, the concept of quality in this context remains complex and difficult to define (Gupta et al., 2016).

Upadhyai et al. (2019) state that customers normally carry prior expectations from the services they are going to utilise, thus service quality can be defined as the discrepancy between customer’s perceptions and their expectations about that firm offering such services (Bolton & Drew, 1991; Parasuraman et al., 1988).

However, unlike other service industries, in healthcare, the service providers are also considered a stakeholder in the service delivery process, meaning that their expectations and perceptions about how a healthcare system operates are equally important (Brown & Swartz, 1989).

Accordingly, Kapoor (2011) detailed that quality of service is perceived differently by patients and HP: while patients perceive quality considering the accessibility and affordability of healthcare, promptness of delivery, early diagnosis and treatment, and how well they are treated, HP perception is based on the parameters of providing care as per established practices, availability of resources that impact their safety, self-satisfaction with outcomes and acquisition of competences.

2.2.1. Measuring Quality of Service

In 1988, Parasuraman et al. identified 10 dimensions of service quality which was later reduced to five, namely responsiveness, assurance, tangibility, empathy, and reliability. In order to measure it, the authors developed SERVQUAL, a 44 items instrument that specifies service

quality as the comparison between the service expected and the services perceived by customers.

However, this scale was criticised by Cronin & Taylor (1992) due to its context-specificity. Thus, the authors developed SERVPERF, a scale that scores only performance, where services quality is a form of consumer attitude, measured through expectations, performance, importance, and purchase intention, which has a higher predictive validity of the level of customers' satisfaction.

Several models to measure service quality in healthcare, most of them using SERVQUAL as the baseline, have been developed and can be consulted in Appendix A. However, no instruments regarding the perspective of HP in the quality of service provided were found.

Accordingly, Upadhyai et al. (2019) state that most methodologies and scales used to measure healthcare service quality do not incorporate the perspective of HP. Moreover, Brown & Swartz (1989) underline the importance of the examination of both parties (i.e., patients and HP), on the evaluation of service quality and satisfaction of the service encounter in order to understand the evaluation process.

Likewise, given that HP are considered the most valuable resource and present a high probability of shortage during a public health crisis (Powell, 2008), the quality of service provided to patients might be endangered by the scarcity and performance of such resource.

2.3. Scarcity of Healthcare Resources

2.3.1. The causality of Scarcity and the impact in healthcare

Scarcity refers to a gap between the existing resources and the limitless needs and wants of the customer, and it can be divided into three categories: demand-induced scarcity (when demand increases and supply stays the same); supply-induced scarcity (when the level of supply is very low compared to the level of demand) and structural scarcity (regarding the inequalities in accessing to the resources amongst population) (Pettinger, 2019).

In the healthcare system, the limited resources (i.e., money, time, and human resources) are often insufficient to meet all the needs and thus, are considered scarce (Bate et al., 2007). Hence, since the demand for HP has increased tremendously and the fact that their availability is not enough to bridge the surges and peaks at the hospitals during a pandemic, one can conclude that the shortage of such resources can be allocated to both demand-induced and supply-induced scarcity.

In 2008, Powell affirmed that, despite the shortages of medications and equipment, the most critical resource during a crisis is the HP and that, for various reasons, public health officials should assume that there will be a shortage of staff during a pandemic. To reduce voluntary absenteeism, the author concluded that, some incentives (e.g., access to PPE, vaccines, childcare arrangement, financial incentives, additional training, and protection from litigation) to work should be implemented as *“depending upon the healthcare professionals’ duty-to-care is not a viable option for ensuring an adequate healthcare workforce in the face of a public health disaster”* (Valdez & Nichols, 2013: 46).

2.3.2. PPE availability as the antidote to the shortage of health professionals

Straus et al. (2004) studied the impact of the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak in Toronto, on physician behaviours during the outbreak and concluded that the scarcity of PPE can be a predecessor to the scarcity of HP. Likewise, Martinnesse et al. (2009) highlight the importance of an adequate supply of PPE to increase the likelihood of HP providing care during an outbreak.

Given these findings, it can be concluded that safety in healthcare is highly influenced by the availability of resources, more specifically, the safer the HP feel, the more likely they are to report for duty during a health crisis.

2.4. Training of Health Professionals

2.4.1. The importance of Training

“The human cost of poor occupational safety and health management is huge” (Ahadzi et al., 2021: 2).

According to Nixon et al. (2015), work-related injuries and accidents are the major concern for HP, given the risky nature of the environment and the constant contact with physical, biological, and chemical hazards.

Hence, Vredenburg (2002), Gao et al. (2019) and Robson et al. (2012) identified the importance of safety training to acquire knowledge and skills that improve employee’s safe behaviour. Additionally, Aluko et al. (2016) state that occupational health and safety (OHS) training significantly improves the HP’s hazard knowledge, and Furniss et al. (2011) argues that well-trained HP are better at coping and dealing with unexpected risks.

Training “refers to instruction and practice for acquiring skills and knowledge of rules, concepts, or attitudes necessary to function effectively in specified task situations” (Cohen, Colligan, Sinclair, Newman & Schuler, 1998: 11).

This construct is an important indicator of safety (Beus, McCord & Zohar, 2016; Shea et al., 2016; Sinelnikov, Inouye & Kerper, 2015) as it is considered an important risk prevention and control strategy to guarantee safe and good workplace conditions (Cohen, 1998).

Moreover, Gao et al. (2019), Kretschmann et al. (2020) and Robson et al. (2012) consider that effective training affects safety behaviours, practices, and culture. Furniss et al. (2011) support it by stating that when HP are well-trained, they have a higher capability to deal with unexpected risks as they feel safer.

Hence, the first hypothesis of this study is formulated as follows:

H1: Training Adequacy has a direct positive impact on the HP’ Perception of Safety.

Additionally, safety training is the principal safety management practice which predicts safety knowledge, motivation compliance and participation (Vinodkumar and Bhasi, 2010). Thus, organisations must institute continuous safety training for HP as it leads to a higher safety performance (Hinze, Hallowell & Baud, 2013).

Adhazi et al. (2021) findings suggest that HP who have OHS training have a higher organisational safety culture perception than those who work at institutions with lack of safety training. In fact, according to a study performed by UNISON, 40% of HP considered that the training received to carry out their work was not sufficient (Sarre et al., 2018).

Considering that HP are exposed to higher risks of getting infected (Rosenbaum, 2020), the lack of adequate resources and proper training poses a great problem (Koo et al., 2020) and Xiang et al. (2020) found that HP serving as front line forces were not given proper orientation or training about the handling of COVID-19 patients.

2.5. Safety in Healthcare

2.5.1. Risk factors amidst health professionals during an outbreak

“Maintaining a good safety culture in the workplace is one of the most effective safety management strategies that can be employed to improve safety” (Ahadzi et al., 2021: 2). Additionally, the authors state that organisational safety concerns the individual and workgroup

safety’ “*attitude, behaviour, values, beliefs and perceptions*” and reflects the commitment to safety and how the organisation handles safety and health issues.

HP are at the forefront of COVID-19 outbreak response and, in some geographical areas, have comprised up to 11% of the total of COVID-19 confirmed cases (Tabah et al., 2020).

According to Mhango et al. (2020), the main risk factors that expose HP to hazards include lack of PPE, work overload, poor infection control and pre-existing medical conditions. Additionally, HP refer to the fear of getting infected and the possibility to further infect their families and colleagues as their main concern (Barello et al., 2020).

Several studies about the HP’ perception of safety and response to an influenza pandemic have been conducted and all have concluded that safety in the work environment, feeling of protection by the hospitals, well-being and safety of family members, provisioning of PPE and antiviral medications, are measures that have a positive correlation with higher motivation and lower hesitations to report for duty (Balicer et al., 2006; Imai et al., 2010; Martinese et al., 2009).

Ranney et al. (2020) identified that the shortages of PPE have led to malpractices, an attempt to address its inadequate supply (e.g., reduction and reuse of PPE and substitution for non-approved products). Additionally, the authors state that the fact that PPE was designed for single-used and brief durations, calls for an urgent design and manufacture of proper protection that can be safely worn and remain effective for HP.

With regards to PPE, Daghmouri et al. (2020) highlight the extreme importance of training regarding donning and doffing of PPE, as it represents a high risk of contamination, which may be higher at the beginning of an outbreak (Chersich et al., 2020).

On the other hand, Barello et al. (2020) and Ning et al. (2020), highlight mental health disorders as another factor of risk to HP as it can have long-term implications.

In order to assure motivation and reduce the risk of hesitation to report for duty, while enhancing the safety of HP, Barello et al. (2020) proposed a set of strategies: policy strategies that regard the strategic planning for future outbreaks; organizational strategies, that concern favourable working conditions and the provision of the necessary PPE to work safely; and person-directed strategies, which refers to psychological support and provision of accurate and timely information so that HP can protect themselves and their families.

2.5.2. Overcoming the risks and measuring Workplace Safety

Given that HP’ safety relies on the decisions of their employing organisations, Dennerlein et al. (2020) developed the Workplace Integrated Safety & Health (WISH) framework. This

framework identifies the multiple pathways within the workplace that impact workers safety, health, and well-being, and provides an approach for managers to organise their actions through six characteristics: leadership commitment, focus on working conditions, participation, comprehensive and collaboration strategies, adherence, data-driven challenge.

A second instrument to measure safety was the one developed by Felknor et al. (2000), an 11 items scale model that allowed the authors to identify administrative controls and training as the two most statistically significant predictors of safety climate.

Lastly, several authors have conducted research to define the predictors and factors influencing the safety climate within organisations. For Tabah et al. (2020), inconsistency in knowledge, training and technique are correlated with trust and are likely to impact the safety of HP and contribute to a sense of uncertainty and organisational distrust. Therefore, H2 is proposed:

H2: Training Adequacy has a positive impact on Organisational Trust.

2.6. Trust within Healthcare

2.6.1. What is Trust and why does it matter?

Trust is considered a complex concept that varies between settings and relationships. To Gilson et al. (2005), trusting another person or organisation places the trustor in a situation of risk as they are left vulnerable to others' actions, meaning that the trustor is required to believe that the other will behave in ways that will not cause any harm.

Accordingly, and in conformity with Laschinger et al. (2002), trust refers to employees' faith in organisational leaders and the belief that organisational actions will be beneficial for employees.

For Gausdal & Makarova (2017) "*trust is called the missing piece in the safety puzzle*" as it influences open and safe communication (Reason, 1998), the accuracy of work (Galford and Drapeau, 2002, referred by Gausdal and Makarova, 2017) and promotes safety leadership (Conchie et al., 2006).

According to Luria (2010), trust enhances the safety of employees and to Conchie et al. (2006) neglecting trust, does not only limits the effectiveness with which organisations engender trust in the workplace, but it may also create dynamics that lead to risk and unsafe behaviour.

Hence, Conchie et al. (2006) support the assumption that trust plays an important role in determining employees' perceptions and attitudes toward safety.

On the other hand, Avram et al. (2015) state that a factor influencing compliance towards safety procedures, intended to maintain a safe workplace environment, are the trust relationships between HP, supervisors, and the institution. Thus, a third hypothesis is formulated as follow:

H3: Organisational Trust has a direct positive impact on HP' Perception of Safety.

2.6.2. The dimensions of Trust and how they are impacted

Radzaz & Bahari (2013) defined the perception of a safety climate as *"a subjective perception of employees regarding organisational policies and practices meant to ensure a safe and out of danger occupational environment"*. Likewise, Hofmann et al. (2003) refer to safety climate as a construct based on various dimensions such as management's attitude towards safety issues, proactive behaviours for maintaining safety and a rewarding system for these behaviours.

Gilson et al. (2005) developed a 28 items scale model that examined the role of trust within two dimensions: workplace trust, which regards the respectful and fair treatment of the HP in the employing organisation, and patient-provider trust, which concerns the respectful and fair treatment of patients by HP.

The first dimension is further divided into three sub-categories: organisational trust, i.e., trust in the employing organisation, as *"a feeling of confidence and support in an employer; is the belief that an employer will be straightforward and will follow through on commitments"* (Gilbert & Tang, 1998: 322); trust in supervisors, regarding personal values and behaviours that build inter-personal trust as supervisors' actions may uphold or undermine trust in the employing organisation; and trust amongst colleagues based upon shared experiences and may be promoted through procedures that encourage and support work.

Tzafrir & Dolan (2004) developed a 16 items scale model to measure trust in employment relationships and concluded that trust is considered a three-dimensional construct involving harmony, reliability, and concern. Opposingly, for LoCurto & Berg (2016), the determinants of trust were honesty, confidentiality, dependability, communication, competency, fiduciary responsibility, fidelity, and agency.

Moreover, Shockley-Zalabak et al. (2000) referred that accuracy of the information, explanations for decisions and openness are aspects of communication that have a positive association to trust.

With Gilson et al. (2005) framework as a guide, Topp & Chipukuma (2016) performed a study on the role of workplace trust in Zambian primary health centres and found out that different matters influence the three sub-categories of workplace trust. Regarding trust in the employer, the most common reasons affecting that category were insufficient/delayed payment, unmet professional expectations, poor working conditions, and district/Ministry of Health (MOH) support. Secondly, trust in the supervisor was influenced mainly by weak transparency, lack of consistency, weak problem-solving capacity, and ad hoc information sharing. Lastly, the factors influencing trust in colleagues were related to weak accountability and unequal conditions of service.

Furthermore, Topp & Chipukuma (2016) stated that the weakening of individual work ethic, undermining of provider teamwork, concerns regarding personal health and safety and human resource shortages, were the most obvious effects of the influence of workplace trust on service quality and responsiveness.

Additionally, Mishra & Spreitzer (1998) argued that decreased levels of trust are associated with decreased communication and increased conflict, which can be explained by the downsizing of hospitals – as workload increases, employee trust and morale erodes which can later lead to job insecurities.

Thus, workplace trust is highly dependent on managers as they play a crucial role in the development of trust, given that they control the flow of information by either sharing it or not (Tyler and Degoey, 1996, referred by Laschinger et al., 2002).

Consequently, and according to Cangemi et al. (1989, referred by Laschinger et al., 2002), low trust in organisations may lead to high absenteeism, prolonged breaks, limited learning, low accountability, reactionary thinking, and low creativity.

Since organisational trust is an essential component in the process of implementing organisational safety (Avram et al., 2015) and a low trust relationship between the different stakeholders have shown to have a negative impact on safety culture (Cox et al., 2006), the impact of training on safety previously mentioned by Tabah et al. (2020) might be mediated by the level of workplace trust. Thus, H4 emerges and is formulated as follow:

H4: Training Adequacy has a positive influence on the HP' Perception of Safety, mediated by Organisational Trust.

2.7. Conceptual Model

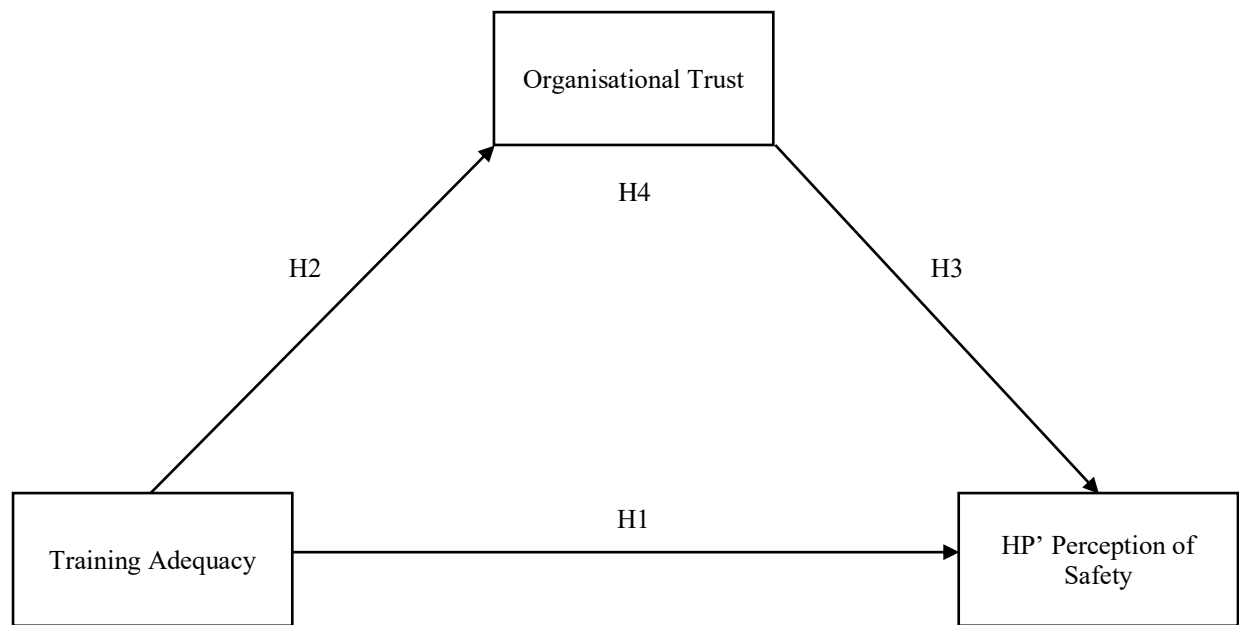


Figure 1: The conceptual model.

CHAPTER 3

Method

The present chapter intends to describe the tools and procedures used to collect and analyse the data, considering the aim, specific objectives and research question defined.

3.1. Data Collection Instruments

This study relies upon three main constructs (training, safety, and organisational trust). Given the fact that no instruments were found to measure the amount and quality of training perceived by HP, there was a need to develop some indicators to measure it. Thus, a focus group was conducted with the aim of gathering the necessary information to develop such indicators.

3.1.1. Focus-groups

As mentioned earlier, two focus-groups, each with four participants (i.e., HP), were conducted to develop an indicator to measure the HP' perception of training.

The decision to conduct two focus-groups instead of just one with the 8 HP, was based on the belief that fewer people and fewer topics in each session would increase the level of productivity and would help to better engage with every HP present. These two focus-groups were conducted via Zoom, on December 6 and 7, 2020, and had an average duration of 2 hours.

In these focus-groups, the HP were asked about aspects of their overall evaluation of training, coordination of the training they received within the employing healthcare institution, and the contact with COVID-19 reality. The interview guide used in the focus-groups can be found in its entirety in Appendix B.

Since HP received some form of training, the interview in the first focus-group focused on their feedback on the topics that were the subject of the training, their evaluation of that training, the topics that were omitted and on which they felt training was necessary, and the uniformisation of procedures after the training.

The second group, focused mainly on the potential impact of the lack of training on the performance and sense of safety of the HP, on the topics they thought should be covered in the training, and on what they thought would make a good training.

Although the focus-groups focused on different aspects of training, it was considered important to include both perspectives (i.e., indicators of the quality and type of training received by HP, and indicators of how the lack of training might affect the safety and performance of HP, who did not receive training). Therefore, all the information gathered from

the two focus-groups was compiled and analysed to develop a more comprehensive instrument to measure training.

3.1.2. Questionnaire

The questionnaire was divided into four sections: training, safety, trust, and demographics.

In the first section – training – participants were asked not only whether they had ever worked directly with COVID-19 positive patients before (dichotomous variable), but also whether the overall training received was adequate, as measured by an 11-point scale (where 0 means “I had no training” and 10 means “totally adequate”).

If HP responded that they had not received any training, the section on training would be skipped, and they would proceed to the next section regarding safety. Otherwise, the following question would be a multiple-response one that referred to who gave them the training.

Next, HP were asked to rate a series of 10 statements, created with the input from the focus-groups, using a 7-point scale (where 1 represented “strongly disagree” and 7 represented “strongly agree”) to determine how they felt about the adequacy of the training.

The construct that was assessed in the second section of the questionnaire was related to the safety of HP.

Table 1 provides an overview of the different authors found, who developed an instrument to measure the construct of safety.

After a thorough analysis of each instrument, the ones developed by Tabah et al. (2020) and Daghmouri et al. (2020) were discarded as they focused only on PPE, which was considered limiting in terms of the overall aim of this study.

Similarly, the instruments developed by Ning et al. (2020) and Gao et al. (2019) were abandoned as the focus was on the psychological effects of COVID-19 in HP and the effects of the type of leadership management on the safety of HP, respectively.

Finally, the choice relied upon the last two instruments, developed by Balicer et al. (2006) and Felknor et al. (2000). After careful consideration, the instrument developed by Felknor et al. (2000), although the oldest, proved to be the most appropriate for the aim of this research, as it addressed the safety climate as a whole and the factors and practises that influence it. In contrast, the instrument developed by Balicer et al. (2006) considered only the organizational perspective of the issue.

Table 1: Summary of instruments developed to measure Safety.

Author	Study theme	Number of items	Sample size	Scope of the research
Felknor et al. (2000)	Safety climate and its association with injuries and safety practices in public hospitals in Costa Rica.	11	878	Safety climate and factors associated to it; Work injuries; Safety practices.
Balicer et al. (2006)	Local public health workers' perception toward responding to an influenza pandemic.	N/A	308	Perception of existing knowledge about public health impact of a pandemic influenza; Confidence in personal safety; Family preparation; Health Department's perceived availability to provide timely information; Perception of the capacity to effectively communicate risk; Familiarity with one's role-specific response requirements. Perception of the importance of one's role in the agency's overall response; Perceived importance of preparedness training and education.
Gao et al. (2019)	The mediating role of safety management practices in process safety culture in the Chinese oil industry.	24	323	Leadership/management commitment; Organizing responsibilities/procedures; Communication & coordination; Safety training; Inspection & monitoring; Employee involvement.
Tabah et al. (2020)	PPE and intensive care unit healthcare worker safety in the COVID-19 era: an international survey.	27	2711	PPE usage and availability; Knowledge and training; Confidence with technique; Adverse effects.
Daghmouri et al. (2020)	PPE: A cross-sectional study in frontline healthcare workers during the COVID-19 outbreak in Tunisia.	33	723	Availability of PPE and satisfaction; Access to personal safety procedures; Side effects due to the use of PPE.
Ning et al. (2020)	The mental health of neurological doctors in Hunan Province, China, during the initial stages of the COVID-19 outbreak.	48	612	Anxiety and depression of participants; Occupational risk; Precautions in practice; Willingness to care for patients with COVID-19.

The third section of the questionnaire addressed the last construct present in this research: trust.

Table 2 summarises the instruments developed that were found to measure this construct.

The instruments that were initially omitted were those developed by Laschinger et al. (2002), Luria (2010) and Avram et al. (2015), as their scope was not considered optimal for the purpose of this study. While the first study focused on the effects of power and interpersonal trust on organisational commitment and job satisfaction, the second study shed light on the effects of trust in the leader on safety climate and injury rates, and the focus of the latter study was on how the perception of safety, which is associated with organisation trust, affect job satisfaction.

Therefore, the choice relied on the last four instruments listed in Table 2.

Considering that the instruments developed by Shockley-Zalabak et al. (2000), Tzafrir & Dolan (2004) and Robinson (1996) had some similarities in terms of their research scope, the initial assessment of these three instruments was compared with the one developed by Gilson et al. (2005). The reason for not choosing the latter was the nature of the statements it contained, as some of them did not fit the population of the present study due to their focus on developing countries.

The choice then fell on the instruments of Shockley-Zalabak et al. (2000), Tzafrir & Dolan (2004) and Robinson (1996). As both instruments have a similar research framework, the motive for choice depended on the content of the statements and the year of development.

Since the Tzafrir & Dolan (2004) and Robinson (1996) instruments were complementary and contained the most appropriate and understandable statements in terms of content, it was decided to adopt both with some adjustments. From the first, fifteen out of sixteen statements were used, as we felt that two statements were very similar in content. From the second instrument, five out of the seven statement were used in trust measurement section, as two of them were already included in the instrument developed by Tzafrir & Dolan (2004).

The last section of the questionnaire concerned the demographic characteristics of the participants, which are the independent variables.

Gender is divided into three categories (“female”; “male”; “prefer not to answer”). Age is presented as an open-ended question so that each respondent can indicate their exact age.

Table 2a): Summary of instruments developed to measure Trust.

Author	Study theme	Number of items	Sample size	Scope of the research
Robinson (1996)	Trust and Breach of the Psychological Contract	N/A	125	Psychology contract breach; Trust in the employer; Unmet expectations; Performance; Organisational citizenship; Intentions to remain; Turnover.
Shockley-Zalabak et al. (2000)	Organizational trust: what it means, why it matters.	75	367	Competence; Openness and Honesty; Concern for Employees; Reliability; Identification; Organizational trust; Perceived effectiveness; Job satisfaction.
Laschinger et al. (2000)	The impact of workplace empowerment, organizational trust on staff nurses' work satisfaction and organizational commitment.	77	412	Formal and informal power within the work environment; Organizational relationships; Interpersonal trust at work scale; Organizational commitment.
Tzafrir and Dolan (2004)	Trust me: a scale for measuring manager-employee trust.	16	405	Harmony; Reliability; Tenure; Concern.

Table 2b): Summary of instruments developed to measure Trust.

Author	Study theme	Number of items	Sample size	Scope of the research
Gilson et al. (2005)	Trust and health worker performance: exploring a conceptual framework using South African evidence.	28	111	Care outcomes; Facility treatment of community; Provider-community relations; Personal motivation; Training and learning; Working conditions; Workplace factors.
Luria (2010)	The social aspects of safety management: trust and safety climate.	43	105	Trust in the leader; Safety climate level and strength; Injury rate.
Avram et al. (2015)	Perceived safety climate and organizational trust: the mediator role of job satisfaction.	130	147	Perception of safety climate; Job satisfaction; Organizational trust.

Professional category was defined into six categories (“nurse”; “physician”; “diagnostic and therapeutic technician”; “general services personnel”; “senior health technician”; “hospital administrator”), following Martins et al. (2003).

Educational level was categorised into ten groups to assess the level of education respondents have completed thus far (“elementary school”; “middle school”; “junior high school”; “high school”; “post-secondary non-tertiary education”; “higher professional education”; “bachelor’s degree”; “post-graduate”; “master’s degree”; “PhD”).

To identify the geographical insertion of the healthcare institution in which they work, the respondents were asked to choose one of the following regional areas: “zona Norte”; “zona Centro”; “Lisboa e Vale do Tejo”; “Alentejo”; “Algarve”; “Madeira” and “Açores”.

To group the type of institutions included in the sample of this study, respondents were also asked about the nature of their employing institution (“public”; “public-private”; “private”).

Given the nationwide nature of this study, the institution and service in which respondents work were asked as two open-ended questions so that they could specify them. Considering potential privacy concerns, these two questions were solicited and not mandatory responses.

Since the subject of this research focuses on the period of the COVID-19 pandemic, respondents were asked if there was a specific area for the treatment of COVID-19 positive patients (i.e., “Covidário”) in the institution where they work, which they were asked to answer with a dichotomous variable (“yes” and “no”).

Finally, in the case of a positive answer to the previous question, (i.e., “yes”), the respondents were asked if they worked in the specific area of treatment of COVID-19 positive patients (“yes” or “no”).

The entire questionnaire, both the Portuguese and English versions, can be found in Appendix C.

3.1. Pre-test

Before the questionnaire is distributed for data collection, it is recommended that it be pretested to identify problem areas, assess whether respondents can fully understand it, reduce respondent burden, and incorporate recommended improvements in the final questionnaire. In addition, the pre-test also allows for an assessment of response latency, which is the time it takes to complete the full survey (Churchill, 1979; Ruel et al., 2016).

Since the instrument measuring the construct of the HP' perception about the training received was not found, the creation of some indicators to measure this construct reinforced the need to pre-test the questionnaire.

The pre-test was conducted through an online survey, on January 5 and 7, 2021, among 10 HP who worked in three different healthcare institutions (public hospitals, private hospital, and continuous and integrated care unit).

Based on the conducted pre-test, the necessary wording and layout adjustments, received by phone call, were made so that the questionnaire was appropriately adapted to the population and context of the study.

3.2. Data Collection

The questionnaire was distributed online through the Qualtrics platform to the HP of the Portuguese health system between January 21 and April 20, 2021. In order reach the relevant participants, the questionnaire was first distributed through personal contacts and the shared with colleagues.

In addition, a collaboration was made with a HP, through Instagram, to reach a higher number of participants. An additional attempt was made to promote the questionnaire to a higher percentage of the target population, but there was no contact sequence.

3.3. Participants

The sample collected for this study consists of 235 HP from different professional categories (physicians, nurses, general services personnel, and others), from different geographical areas and from institutions of different nature (public and private), working in the various types of institutions of Portugal (i.e., hospitals, clinics, health centres, among others).

3.4. Data Analysis

The descriptive analysis (frequencies, mean and standard deviation) of the variables under study was carried out, as well as the analysis of the internal consistency of the constructs (Cronbach's alphas), one-way ANOVA and paired-sample t tests. Afterwards, the research hypotheses presented during Chapter 2 were tested using the Macro PROCESS by Hayes. All the analysis were performed with the software IBM SPSS Statistics (version 27.0).

The proposed model (Chapter 2) resembles a simple mediator model (Hayes, 2013), with an antecedent variable (Training Adequacy) influencing the variable HP' Perception of Safety through a single intervening variable (Organisational Trust). In this model, Training Adequacy

causally influences the HP' Perception of Safety and Organisational Trust, and Organisational Trust causally influences the HP' Perception of Safety.

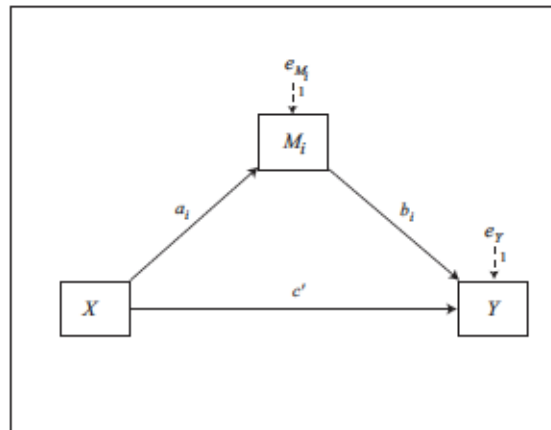


Figure 2: Statistical Diagram of the Simple Mediator Model.

(Source: Hayes, 2013, pp. 145)

As can be seen in Figure 2, the model represents one direct effect of X (Perception of Training Adequacy) on Y (Perception of Safety), and one indirect effect of X on the Y, through M (Organisational Trust). The total effect of X on Y can be calculated through the sum of all direct and indirect effects ($c = c' + a_i b_i$).

3.5. Main considerations

This chapter describes the main methodologies used in this study that enable the testing of the research model.

Table 3 describes the data analysis tools that were used to examine the research hypotheses and research objectives (RO) that were established.

Table 3: Link between the hypotheses tested and the research objectives.

Research Objectives	Analysis
RO1: Assess the perception of the training received by HP during the pandemic.	Descriptive Analysis
RO2: Assess the HP' perception of safety during the pandemic.	Descriptive Analysis
RO3: Assess the level of organisational trust of the HP during the pandemic.	Descriptive Analysis
RO4: Evaluate if the levels of trust regarding supervisors and the institution are similar.	Paired Samples T-Test
RO5: Evaluate if professional category influences the HP' perception of safety.	One-way ANOVA
RO6: Measure the influence of the perception of the training in HP' perception of safety.	Mediation analysis H1: Training Adequacy has a direct positive impact on the HP' Perception of Safety.
RO7: Measure the influence of the perception of training on organisational trust.	Mediation analysis H2: Training Adequacy has a positive impact on Organisational Trust.
RO8: Assess if the level of organisational trust has an impact on how the perception of the training influences HP' perception of safety and measure such impact.	Mediation analysis H3: Organisational Trust has a direct positive impact on HP' Perception of Safety. H4: Training Adequacy has a positive influence on the HP' Perception of Safety, mediated by Organisational Trust.

Analysis of Results

In this chapter, the aftereffects of the analysis will be presented, such as the assessment of each construct and the relation between them. The section will begin with a sample characterisation, followed by an evaluation of the three constructs – Training Adequacy, Organisational Trust and Perception of Safety. At last, the research hypotheses will be tested, through a simple and multiple linear regression using Hayes' Macro Process.

4.1. Sample Characterisation

The variables *Gender*, *Age*, *Professional Category*, *Education Level*, *Geographical Insertion of the Employing Institution*, *Nature of the Employing Institution*, *Employing Institution*, *Service Allocation*, *Existence of COVID-19 Specific Area of Treatment* and *Allocation to COVID-19 Specific Area of Treatment* were used to portray the profile of the respondents.

A sample of 235 HP was gathered, with a strong predominance of the female *Gender* (86.4%).

The *Age* ranged from 22 (minimum) and 66 years old (maximum), with a mean of 36.3 years ($SD = 11.4$). Most of the respondents (72.8%) were between 22 and 43 years old. In contrast, 18.3% were between 44 and 54 years old, and only 9.0% were 55 years or older.

As for *Professional Category*, “Nurse” was the most widely recognized category among the respondents, with 66.4% of the responses. Following was “Diagnostic and therapeutic technician” (17.4%), “Physician” (7.2%) and “General services personnel” (2.6%).

More than half of the respondents (50.2%) had a “Bachelor’s degree”, and 42.2% had either a “Post-graduate” (24.3%) or a “Master’s degree” (17.9%). On the other hand, 4.3% of respondents answered “High school”, and 1.7% had a “PhD”. The least frequent options, all with 0.4% of the responses, were “Middle school”, “Junior high school”, “Post-secondary non-tertiary education” and “Higher professional education”.

The full characterisation sample by *Age*, *Gender*, *Professional Category* and *Educational Level* can be found in Table D.1, in Appendix D.

Regarding the *Geographical Insertion of the Employing Institution*, most respondents worked in “Lisboa e Vale do Tejo” (84.2%), while “Zona Norte”, “Zona Centro” and “Madeira” were the least represented, with 3.6% each. Additionally, 3.2% of respondents worked in institutions inserted in “Algarve” and 1.8% in “Alentejo”. Regarding the *Nature of the Employing Institution*, most respondents worked in “Public” institutions (63.3%), with the

following most common type of institution being “Private” (24.0%). For a detailed characterisation of the *Geographical Insertion* and *Nature of the Employing Institution*, please refer to Table D.2, in Appendix D.

Because *Employing Institution* was an open-ended question, some respondents indicated the employing institution, others indicated only the group to which their employing institution belonged, and still others indicated both., the analysis of this variable was divided into groups (Table D.3, of Appendix D) and institutions (Table D.4, in Appendix D).

As shown in Table 4, almost 60% of the respondents worked at “Centro Hospitalar de Lisboa Ocidental, EPE”, “Centro Hospitalar Universitário de Lisboa Central, EPE”, “Hospital Garcia de Orta, EPE”, “Centro Hospitalar de Setúbal, EPE” and “Centro Hospitalar do Barreiro-Montijo, EPE”.

Table 4: Distribution of the most frequent answers of the Employing Institutions – Group.

Group	
Centro Hospitalar Universitário de Lisboa Central, EPE	17.7%
Centro Hospitalar de Lisboa Ocidental, EPE	12.7%
Hospital Garcia de Orta, EPE	11.4%
Centro Hospitalar Universitário de Lisboa Norte, EPE	6.3%
Centro Hospitalar de Setúbal, EPE	6.3%
Centro Hospitalar do Barreiro-Montijo, EPE	5.1%
Others ¹	40.5%

Regarding institution, which we can observe in Table 5, more than half of respondents (57.5%) worked in hospitals, more specifically in “Hospital de Santa Maria”, “Hospital de Santa Cruz”, “Hospital de São José”, “Hospital de Egas Moniz”, “Maternidade Dr. Alfredo da Costa”, “Hospital São Francisco Xavier”, “Hospital São Bernardo” and “Hospital dos Lusíadas de Lisboa” (Table D.7, Appendix D)

¹ To see the detailed discrimination of “Others” please refer to Table D.3 in Appendix D.

Table 5: Distribution of the most frequent answers of Employing Institutions – Institution.

Institution	
Hospital de Santa Maria	12.7%
Hospital de Santa Cruz	11.4%
Hospital de São José	7.9%
Hospital de Egas Moniz	6.3%
Maternidade Dr. Alfredo da Costa	4.8%
Hospital São Francisco Xavier	4.8%
Hospital São Bernardo	4.8%
Hospital dos Lusíadas de Lisboa	4.8%
Others ²	42.5%

For the variable *Service Allocation*, which was also asked as an open-ended question in the questionnaire, a vast number of options were collected and can be seen in Table D.5, of Appendix D.

As Table 6 shows, the most common services that 60.7% respondents were assigned were “Serviço de Urgência Geral”, “Serviço de Medicina”, “Serviço de Contingência – COVID-19”, “Serviço de Bloco Operatório”, “Serviço de Cardiologia”, “Serviço de Medicina Física e de Reabilitação”, “Serviço de Medicina Interna”, “Serviço de Pneumologia”, “Serviço de Obstetrícia/Ginecologia”, “Serviço de Cirurgia Geral” and “Unidade de Cuidados Intensivos”.

For the variables *Existence of COVID-19 Specific Area of Treatment* and *Allocation to COVID-19 Specific Area of Treatment*, 74.2% of respondents said that their institution had a COVID-19 specific treatment area, and of these, almost 60% worked in this area (Table D.6, in Appendix D).

4.2. Reliability of the Scales

Since this study requires the processing and analysis of the constructs, and not just the analysis of data obtained from individual items, the scales that measure such constructs need to be analysed and their internal consistency validated.

² To see the detailed discrimination of “Others” please refer to Table D.4 in Appendix D.

Table 6: Distribution of the most frequent answers of Service Allocation.

Service	
General Emergency Service	11.6%
Medicine Service	7.7%
COVID-19 Contingency Service	7.1%
Operating Room Service	6.5%
Cardiology Service	5.8%
Physical Medicine and Rehabilitation Service	5.2%
Internal Medicine Service	4.5%
Pulmonology Service	3.9%
Obstetrics and Gynaecology Service	3.2%
General Surgery Service	2.6%
Intensive Care Unit	2.6%
Others ³	39.3%

For this purpose, Cronbach's Alpha, a reliability measure used to assess the accuracy with which the variables can estimate a construct was calculated and analysed to assess the validity of the instruments. This coefficient was used because it is a recommended measure of the internal consistency of a set of items (Hair et al., 2014; Namdeo & Rout, 2016).

Table 7 shows the Cronbach's Alpha for each of the dimensions that make up the questionnaire. As can be seen, all items present an alpha above 0.8, which means that the instrument is good and reliable for the applicable domain and sample (Field, 2009).

Table 7: Cronbach's Alphas for the instrument dimensions.

Dimensions	Number of items	Cronbach's Alpha
Training Adequacy	10	0.933
Perception of Safety	11	0.903
Organisational Trust	20	0.889

³ To see the detailed discrimination of "Others" please refer to Table D.5 in Appendix D.

4.3. Descriptive Analysis of the Constructs

4.3.1. Training Adequacy

To assess the perception of the training received by respondents during the pandemic (RO1), the 11 items developed to measure it are analysed with their mean and standard deviation (SD). The distribution of responses on the seven-point rating scale used (1 = Strongly disagree, 7 = Strongly agree) can be found in Table E.1., in Appendix E.

Training Adequacy presented an average of 4.2, with item means ranging from 3.3 to 4.8. The calculation of the Coefficient of Variance (CV) suggests that the dispersion for this construct is low (33.4%), which means that the participants' responses are very homogeneous.

Within this construct, TA8 (*I had the necessary training to integrate new services/units, if necessary.*) is the item with the lowest mean of 3.3. (SD = 1.9). In contrast, TA6 (*In my service/unit/hospital there is uniformization of procedures related to the handling of biological material.*) has the highest mean of 4.8 (SD = 1.8). Since the mean scores of the items are just above, or below, the midpoint of the seven-point rating scale (4.0), it indicates that there is low agreement or even some disagreement on the adequacy of the training received, as TA8 shows.

4.3.2. Perception of Safety

Similarly, to assess the perception of safety of HP during the pandemic (RO2) the results for the mean and SD for the Perception of Safety dimension of the questionnaire are presented, and the distribution of the responses across the utilised seven-point rating scale (1 = Never, 7 = Always) can be observed in Table E.2., in Appendix E.

According to the data, Perception of Safety recorded a mean of 4.5, with items' means ranging from 3.1. and 5.4. This construct also has a low level of dispersion as CV has a high degree of homogeneity in the participants' responses, at 26%.

Of the 11 items of this construct, PS8 (Senior management is involved in safety.) was the item with the lowest mean of 4.2 (SD = 1.6).

Inversely, PS10 (Unsafe work practices are corrected by co-workers) was the item with the highest mean of 5.4 (SD = 1.4), which could mean that there is a moderate to high level of cooperation and trust between HP, regarding safety within the institution.

Table 8 compares the Perception of Safety of HP according to their professional category. Senior health technicians are the HP have the highest Perception of Safety (5.2), while Nurses have the lowest perception of safety (4.3). Since Nurses are the largest occupational group that

has direct and intensive contact with patients (Vizheh et al., 2020), this evaluation might be concerning.

Table 8: HP' Perception of Safety – Comparison between Professional Categories.

Professional Category	Average											Total Average
	PS1	PS2	PS3	PS4	PS5	PS6	PS7	PS8	PS9	PS10	PS11	
Nurse	4.2	4.0	4.1	4.2	4.3	5.1	3.2	3.9	4.7	5.3	4.3	4.3
Physician	5.2	5.0	5.0	5.2	4.4	5.3	3.6	4.5	4.4	4.8	5.5	4.8
Diagnostic and Therapeutic Technician	5.3	5.1	5.1	5.0	4.8	5.8	2.8	4.9	5.1	5.5	5.0	4.9
General Services Personnel	5.1	4.6	5.2	5.1	5.4	5.7	3.0	4.7	5.1	5.9	4.9	5.0
Senior Health Technician	5.7	5.2	5.5	5.0	5.3	5.5	3.2	5.7	5.5	5.7	5.3	5.2

However, as the gathered sample is biased (i.e., most respondents are Nurses), the analysis on the differences of Perception of Safety based on Professional Category, intends to only be an exploratory analysis with the aim of pointing out some trends that may, or may not, be confirmed in future research.

To compare perceptions between professional categories, a one-way ANOVA was conducted⁴. This analysis suggests that the level of safety differs with professional category [$F(3,225) = 4.911; p = 0.003; R^2 = 0,061$]. However, we are facing very small differences ($R^2 = 0,061$). All the tables regarding this analysis can be found in Appendix G.

The Scheffé's test for multiple comparisons showed that the only statistically significant difference was between Nurses and Diagnostic and Therapeutic Technicians ($p = 0.019$) (Appendix G.3), with the latter feeling safer (4.9 against 4.3) (Appendix G.2).

It would have been interesting to also analyse the impact of Geographical Insertion on the Perception of Safety of HP, but due to the asymmetry of responses between groups, and the fact that splitting them into only two groups (i.e., “Lisboa e Vale do Tejo” and “Others”) would mean grouping many different geographical areas together, this analysis was not performed.

⁴ The professional category “Senior Health Technician” was left out of this analysis due to the few responses gathered. All the underlying assumptions for the ANOVA test were validated and the correspondent output can be observed in Appendix G.

4.3.3. Organisational Trust

To assess the level of organisational trust of HP (RO3), the mean and SD were calculated, which are detailed below, and the distribution of responses on the seven-point rating scale (1 = Strongly disagree, 7 = Strongly agree) can be seen in Table E.3, in Appendix E.

A mean score of 4.0 was obtained for this construct (SD = 1.0). Similar to the other constructs, the CV amounts to 24.3%, reflecting the low dispersion of the Organisational Trust dimension, and consequently the homogeneity of responses. From the comparison and analysis of the three CV, it can be concluded that the responses of HP to the questionnaire are very homogeneous, especially in relation to Organisational Trust, as it has presented the lowest CV.

In this construct, there were both positively and negatively formulated items, so the analysis will be divided accordingly.

OT10 (*Supervisors' actions and behaviours are not consistent.*), OT12 (*It is best not to share information with my supervisors*), OT18 (*My employing institution is not always honest and truthful.*) and OT20 (*I don't think my employing institution treats me fairly.*) were negatively formulated, meaning their mean values, equal to or below to the central point of the seven-point rating scale (4.0), signify a positive sense of trust. In other words, this means that HP consider they can have open communication with their employing institution, as they are honest, consistent, and fair with them.

Excluding the negatively formulated items, as they convey a positive feeling of trust, the items with the lowest mean of 3.6 were OT9 (*If I make a mistake, my supervisors are willing to "forgive and forget".*) (SD = 1.6) and OT14 (*Supervisors would make personal sacrifices for our group*) (SD = 1.9). Opposingly, OT3 (*Supervisors would not knowingly do anything to hurt the institution*) was the item with the highest mean of 5.40 (SD = 1.5).

Of the 20 items measuring Organisational Trust, more than half of them (13) had means equal to, or below, the central point of the seven-point rating scale (4.0), while the rest were slightly above. This indicates that trust in the organisation is low, i.e., HP only trust their supervisors and the employing institution to a certain extent. However, OT3 (*Supervisors would not knowingly do anything to hurt the institution*), is the only item with a mean above 5.

The conclusion that can be drawn from this is that, despite the lack of trust in supervisors and employing institution, HP do not believe that anything would be done to intentionally jeopardise the institution.

When comparing the level of trust in relation to the supervisors and the institution, it was found trust in the institution (4.3) was higher than trust in the supervisors (4.1) (Table 9):

Table 9: Comparison of the HP' level of trust between institution and supervisors.

Construct	alfa	Mean	Stand. Deviation
Trust in supervisors	0.954	4.1	1.34
Trust in institution	0.877	4.3	1.37

Since the samples were paired samples (i.e., the same respondents answered the questions regarding trust in the institution and trust in supervisors), a paired samples t-test was conducted to analyse whether the difference was significant⁵.

The results revealed a strong and positive correlation between trust in supervisors and trust in institution ($r = 0.747$), i.e., the higher the level of trust in the institution, the higher the level of trust in supervisors, and vice versa (Appendix F.2).

Furthermore, the difference between trust in supervisors and trust in the institution was significant [$t(234) = -2.835$, $p = 0.005$]. However, Cohen's d coefficient highlights the weakness of this difference ($Cd = -0.185$) (Appendix F.2).

Table 10 summarises the mean, SD, and CV of the three constructs previously described.

Table 10: Mean, SD and CV for Training Adequacy, HP' Perception of Safety and Organisational Trust.

Construct	Mean	SD	CV
Training Adequacy	4.2	1.41	33.4%
HP' Perception of Safety	4.5	1.17	26.0%
Organisational Trust	4.0	0.97	24.3%

4.4. Research Hypotheses Analysis

The purpose of this subsection is to test the research hypotheses stated in Chapter 2. Prior to this, all the assumptions underlying the hypothesis tests were validated⁶.

Table 11 and Figure 3 show the results for the mediation model, and the output of the Macro Process by Hayes (2013) can be observed in Appendix H.

As Figure 3 illustrates, the effect of Training Adequacy on Organisational Trust is positive and significant ($B = 0.577$, $SE = 0.0502$, $p < 0.001$), as is the effect of Organisational Trust on HP' Perception of Safety ($B = 0.522$, $SE = 0.0472$, $p < 0.001$), confirming H2 and H3.

⁵ All the underlying assumptions for this hypothesis testing were validated. The validation of the hypothesis testing assumptions can be observed in Appendix F.

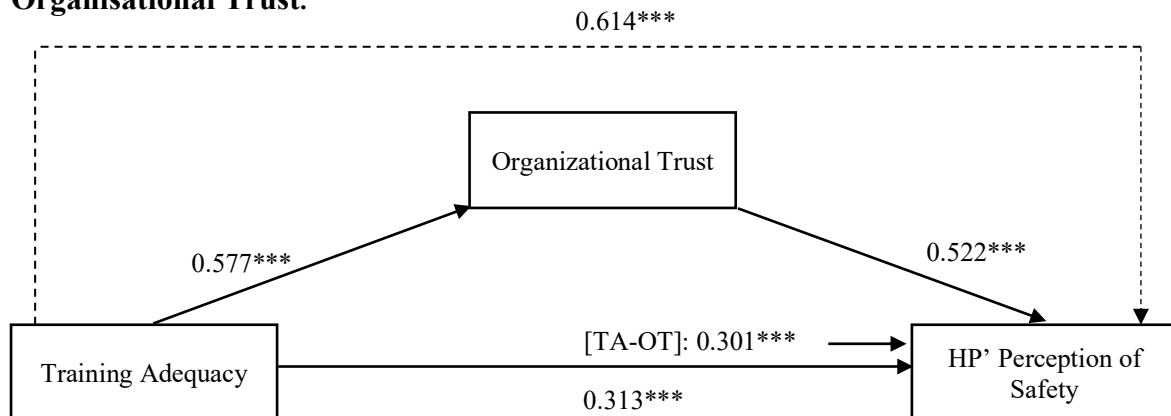
⁶ The validation of the linear regression assumptions can be observed in Appendix I.

This means that the higher the perception of Training Adequacy, the greater the Organisational Trust; at the same time, the higher the level Organisational Trust, the greater the HP' Perception of Safety is.

Table 11: Regression Coefficients, Standard Errors and Model Summary Information – Mediation Model.

Antecedent		Consequent						
		M (OT)			Y(PS)			
		Coeff.	SE	<i>p</i>	Coeff.	SE	<i>p</i>	
X (TA)	a_1	0.577	0.050	< .001	c'	0.313	0.043	< .001
M (OT)		–	–	–	b_1	0.522	0.047	< .001
Constant	i_M	1.779	0.227	< .001	i_Y	1.049	0.158	< .001
		$R^2 = 0.433$			$R^2 = 0.741$			
		$F(1,183) = 131.697, \quad p < .001$			$F(1,182) = 325.226, \quad p < .001$			

Figure 3: Effect of Training Adequacy on HP' Perception of Safety, mediated by Organisational Trust.



Legend: The current data represents the non-standardized coefficients B. The dashed line represents total effect. [TA-OT] – regression coefficient for the indirect effect of Training Adequacy on HP' Perception of Safety, via Organisational Trust. *** $p < .001$.

As for the effect of Training Adequacy on HP' Perception of Safety, results show that both the direct effect ($B = 0.313$, $SE = 0.0433$, $p < 0.001$) and the indirect effect⁷

⁷ The indirect effect was tested using bootstrap standard errors and confidence intervals. If zero does not fall between the lower and upper bound of the confidence interval, the effect is significant.

($B = 0.301$, $BootSE = 0.037$, $BootCI =]0.2320, 0.377[$) are significant and positive. Consequently, H1 and H4 are also confirmed.

Thus, it can be said that the higher the Training Adequacy the greater the HP' Perception of Safety. Moreover, a higher Training Adequacy will lead to a higher Organisational Trust which, in turn, will also lead to a higher HP' Perception of Safety.

As shown Appendix H, Training Adequacy explains about 56% of the variation in the HP' Perception of Safety ($R^2 = 0.564$), and by including the effect of Organisational Trust, this effect size substantially increases ($R^2 = 0.741$), which means that Organisational Trust explains 17.7% (difference between R^2 of the Model including the mediator and the model with the independent variable only).

4.5. Main Considerations

The present chapter aimed to describe the sample and the consistency of the constructs, as well as to test the hypotheses. To this end, a sample of 235 valid responses was collected and statistically analysed, leading to several conclusions, which are summarised below.

The sample consisted largely of women, with the majority being between the ages of 22 and 43. The majority of respondents were nurses, and the most frequent level of education was "Bachelor's degree", closely followed by "Post-graduate". The sample includes respondents who work mainly in public institutions of "Lisboa e Vale do Tejo", mainly in hospital centres, with "Hospital Santa Maria" and "Hospital de Santa Cruz" being the most common institutions.

Most of the respondents worked in general emergency, medicine, Operating Room (OR), cardiology, physical medicine and rehabilitation, internal medicine, pneumonology, obstetrics and gynaecology, general surgery, and intensive care.

Cronbach's alpha was used to assess the reliability of the scales for the constructs used in this study, Cronbach's Alpha was used, and all constructs attained values above 0.9, demonstrating strong reliability.

The overall evaluation of the three constructs (i.e., Training Adequacy, Perception of Safety and Organisational Trust) was positive, with Perception of Trust recording the highest mean, and Organisational Trust recording the lowest.

The original research hypotheses were all validated (Table 12).

Table 12: Summary of the results of the hypotheses' testing.

Hypotheses	Result
H1 Training Adequacy has a direct positive impact on the HP' Perception of Safety.	Validated
H2 Training Adequacy has a positive impact on Organisational Trust.	Validated
H3 Organisational Trust has a direct positive impact on HP' Perception of Safety.	Validated
H4 Training Adequacy has a positive influence on HP' Perception of Safety, mediated by Organisational Trust.	Validated

Overall, HP evaluated the training they have received during this pandemic period as positive. However, the evaluation was considered low in the chosen rating scale (4.2 out of 7).

Furthermore, and despite the low positive evaluation, most respondents considered that they did not have the necessary training to integrate new services or units. This apprehension could possibly be attributed to the content of the training provided.

On the other hand, and despite the shortcomings, HP highlight the uniformisation of procedures within their service/unit/hospital.

The second construct, perception of safety, was also positively evaluated by HP.

According to the data collected, the descriptive analysis shows that geographical insertion has an influence, albeit weak, on the perception of safety of HP. However, the results obtained could be influenced by the number of responses of each geographical area.

When regarding professional category, it was discovered that Nurses, who were the main group of HP participating in this study, perceived safety at the lowest. Conversely, Senior Health Technicians were those who had the highest level of perception of safety. However, because few responses were received from the latter group, it was not included in the analysis used to compare the different professional categories, resulting in the largest difference between Nurses and Diagnostic Therapeutic Technicians.

Because Nurses generally have more direct contact with infected patients than Diagnostic Therapeutic Technicians, they are likely to have a higher perception of the risk to which they are exposed to. This higher perception of risk may translate into a higher level of concern and thus, a more accurate assessment of their sense of safety when dealing with infected patients.

As there is less contact between infected patients and Diagnostic Therapeutic Technicians, and consequently less risk of infection, they may perceive the training provided as sufficient for their daily work.

However, this difference could also be due to the fact that one professional category gave the most answers and the others gave very few.

In terms of organisational trust, HP felt that they had an open communication relationship with their institution, suggesting a positive sense of trust. However, when comparing the evaluations of each item, it was observed that the majority was evaluated equal to, or below, the central point of the rating scale, which, contrarily indicates a low level of organisational trust on these items.

Therefore, although the overall positive evaluation of this construct, it received the lowest rating compared to the other two.

The conclusion that can be drawn is that HP trust their institution and supervisors only to a certain extent.

In fact, when analysing the level of trust in the institution and in the supervisors, it was found that the institution has a greater influence and allows a higher level of trust in HP than supervisors. This could be due to the greater involvement of supervisors in the daily activities of HP.

In other words, since HP report and are evaluated by their supervisors, and since there is a closer and more direct relationship between these two stakeholders, HP might be more critical in their evaluation.

Conclusions

This chapter presents the main conclusions for the thesis, with the intention to answer the research question presented in the Introduction (Chapter 1), supported by the findings from the hypotheses' testing in Chapter 4.

Additionally, limitations for the results will be disclosed, and suggestions for future research will be provided.

5.1. Main Considerations

The first three RO were analysed through a descriptive analysis of the evaluation of the items used to measure the three constructs. The first finding from this analysis was that HP general rated the training received positively. However, as some items recorded means below the central point of the seven-point rating scale, there is some room for improvement in terms of the content of the training. Considering that we were able to assess the HP' perception of the training received during this pandemic period, RO1 is achieved.

Second, based on this analysis, we were able to determine that the overall assessment of the HP' perception of safety was also positive. In addition, it was discovered that the geographical insertion of their institution and their professional category influenced this perception of safety. Accordingly, it was found that Nurses had the lowest perception of safety, and that HP working in Madeira had the highest perception of safety. Since we were able to assess the HP' perception of safety during the pandemic, RO2 could be obtained.

Lastly, this analysis revealed that among the three constructs, organisational trust was the lowest, but positively evaluated. Additionally, it was found that HP trust their supervisors and their employing institution only to a certain extent. Since we were able to assess the level of organisational trust of HP during the pandemic, RO3 was also attained.

RO4 was achieved through a hypothesis analysis with a paired sample t-test. It was concluded that HP did not trust their supervisors and institution equally. Rather, they trust the institution more than their supervisors (Appendix F.2) Moreover, a positive correlation was found between the two, which means that the level of trust in supervisors positively influences the level of trust in the institution and vice versa.

To analyse the next RO, a one-way ANOVA was conducted, which showed that professional category indeed influences the HP' perception of safety. Accordingly, using the

Scheffé test, a significant statistical difference was found between Nurses and Diagnostic and Therapeutic Technicians, leading to the achievement of RO5.

The mediation model allowed us to analyse the last three RO and to answer the research question. Firstly, the appropriateness of training was found to have a positive impact on the HP' perception of trust (i.e., the higher the perception of training, the safer HP feel). Accordingly, it can be said that the training adequacy explains about 56% of HP' perception of safety, reaching RO6.

Afterwards, linear regression was used to measure the influence of the perception of training on organisational trust, and it was discovered that the latter is positively influenced by the former (RO7). More specifically, the perception of training explained 43.3% of organisation trust ($R^2 = 0.4330$) (Appendix H).

Finally, this analysis led us to RO8, as it allowed us to understand that organisational trust has an indirect and positive impact on how the perception of training influences the HP' perception of safety. Accordingly, the combination of both organisational trust and training adequacy explains about 74% of the HP' perception of safety, which means that organisational trust alone explains 17.7% by itself. Therefore, RO8 is also attained.

5.2. Answer to the Research Question

How does the perception of training adequacy influence the HP' feeling of safety in the work environment?

HP's evaluation of Training Adequacy, in the context of the Portuguese Health System context, was positive. However, despite existing uniformisation of procedures in place, respondents felt that the training had not been delivered in a timely manner and had not helped to enable them to integrate new services/unit, in case of need.

In general, this analysis suggests that HP perceived the training received as positive, but not entirely sufficient.

Similarly, the HP' evaluation of Organisational Trust within the Health Institutions of the Portuguese Health System also proved to be positive. Nevertheless, a slight difference found in terms of trust between HP and their supervisors and institution was discovered, indicating that HP trust their institution more. It was also determined that the more HP trusted their institution, the more they trusted their supervisors, and vice versa.

However, given the greater uncertainty that a public health crisis brings, it is extremely important to foster trust between HP and their supervisors, as well as within the institution, in order to improve the most relevant aspect of this struggle: safety.

Finally, the HP' Perception of Safety was the construct with the highest positive evaluation. Analysis of this construct suggests that HP feel that much is being done, by the employing institutions and supervisors, to minimise the hazards to which they are constantly exposed. However, there is room for improvement as the mean of the constructs is only slightly above the central point of the seven-point rating scale.

In addition, HP from different professional categories, present different perceptions of safety.

The research hypotheses were tested using Macro Process by Hayes (2013) to understand the impact of Training Adequacy and Organisational Trust on the HP' Perception of Safety.

In testing all the hypotheses, the direct and indirect effects between training and safety were confirmed, as well as between trust and safety.

The results gathered show that 43.3% of the variability in Organisational Trust can be explained by Training Adequacy. This conforms with the findings of the earlier study by Tabah et al. (2020).

Furthermore, the observed influence of Training Adequacy and Organisational Trust on the HP' Perception of Safety is in line with the results from the previous studies by Furniss et al. (2011), Gao et al. (2019), Kretschmann et al. (2020) and Robson et al. (2012).

Finally, it was also confirmed that Organisational Trust mediates the relationship between Training Adequacy and the HP' Perception of Safety.

Therefore, considering the analysis conducted, it can be concluded that Training Adequacy directly and indirectly influences the HP' Perception of Safety, via Organisational Trust. This means that when HP perceive the training provided as adequate, they feel safer. On the other hand, the more HP' training is perceived to be adequate, and the more secure they feel in their work environment, the greater their trust in the organisation.

5.3. Managerial Recommendations

Based on the findings of this research, several managerial recommendations can be derived.

Regarding the training provided, health institutions could consider adjusting and investing in training schedules to facilitate reassignment of HP as needed and keep them abreast of the ever-changing legislation for this pandemic.

Considering the lowest evaluated items, to promote trust within the healthcare setting, feedback sessions could be routinely held for all stakeholders to voice their opinions and concerns to improve communication, accountability, fair treatment, and performance.

In addition, given the impact of training on organisational trust, training could be strengthened to increase trust in the organisation. For example, the development and implementation of contingency plans detailing the type of training required during a pandemic might be necessary to meet the needs of a future public health crisis.

With regards to safety, given that this is perceived differently depending on professional category, more specific and standardised guidelines for safety procedures could be developed, taking into account the different contact of each HP with infected patients. In other words, safety procedures should be standardised across the healthcare system but tailored to each HP.

5.4. Contributions

The present thesis adds value to the current body of knowledge in this area by providing a tool for measuring perception of training, and providing information on its impact on healthcare, particularly during a pandemic. It also adds value by highlighting the relationship between perceptions of training, trust and safety in healthcare, and the mediating role of trust.

The practical contribution of this thesis is the management recommendations for healthcare institutions based on the responses and results collected.

However, there are some limitations to this study, which will be discussed in more detail in the next section.

5.5. Limitations

One major limitation of this study relates to the data collected. Given the circumstances created by the current pandemic, all data was collected via online questionnaire, and given the increasing workload of HP, it was difficult to reach a higher volume of the target population. Nevertheless, 235 responses were collected.

Given the non-probabilistic biased sample, consisting mainly of Nurses and HP working in Lisboa e Vale do Tejo, the results should be considered exploratory and relate mainly to this specific group of HP.

Accordingly, the results obtained are only relevant to the specific sample in the study, but not necessarily to the entirety of the Portuguese Health System workers, as it is not considered representative of the total population. Here, the inferential analysis aimed mainly to better quantify the differences and effect sizes.

5.6. Future Research

Considering the presented limitations, it would be interesting that future research on this topic could focus on whether there are differences between geographic areas, professional categories and employing institution.

In addition, other data collection instruments (e.g., observation and interviews) may be of interest and helpful in understanding whether such differences indicate the need for adjustments in training or in promoting trust and safety.

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Appendix A: Instruments developed to measure Quality of Service.

Table A.1: Summary of Instruments developed to measure Quality of Service.

Author	Instrument	Perspective	Measurement
Camilleri & O'Callaghan (1998)	HEALTHQUAL	Patient	Measurement of service quality in private and public hospitals.
Pakdil & Harwood (2005)		Patient; Attendants.	Measurement of service quality in a hospital-based preoperative assessment clinic.
Ramsaram-Fowdar (2008)	PRIVHEALTHQUAL	Patient.	Measurement of service quality in public hospitals.
Aagja & Garg (2010)	PubHosQual	Patient; Attendants.	Measurement of service quality in public hospitals.
Prakash & Mohanty (2012)		Patient; Attendants.	Measurement of service quality in private-specialty hospitals in India.
Itumalla et al. (2014)	HospitalQual	Patient.	Monitors, controls and improves the service quality in public hospitals.
Satsanguan et al. (2015)		Patient; Attendants.	Measure of service quality in nursing homes in Bangkok.
Peek et al. (2018)	EQ-5D-5L	Patient.	Measures health-related quality of life (HRQOL) through the dimensions of mobility, self-care, usual activities, pain and discomfort, anxiety and depression.
	ICECAP-A		Measures capability wellbeing through the dimensions of stability, enjoyment, achievement, attachment and autonomy.

Appendix B: Interview guide.

Overall training evaluation

1. *Training of contact with COVID-19 positive patients.*
2. *Subjects of training.*
3. *Evaluation of training received.*
4. *Moment of training.*
5. *Sufficiency of the training received.*
6. *Satisfaction regarding the training received.*
7. *Trainers.*

Coordination of the training received within the employing healthcare organisation

1. *Implementation and coordination of training in the employing organisation.*
2. *Homogeneity of procedures with COVID-19 patients within the organisation.*

Contact with the COVID-19 reality

1. *Working with COVID-19 patients*

Feedback of the training received

Appendix C: Questionnaire.

Portuguese version

Análise da perspectiva dos profissionais de saúde do impacto da Formação na sua Segurança, durante a pandemia COVID-19: O papel mediador de Confiança.

Caro/a participante,

Este questionário foi desenvolvido no âmbito de uma tese de Mestrado na Iscte Business school e destina-se a recolher informação exclusivamente para esse fim.

As respostas ao questionário serão anónimas e os dados solicitados não permitem a identificação do respondente. As respostas serão analisadas no conjunto de todos os participantes, e nunca de forma individual.

O objetivo é estudar a percepção de segurança dos profissionais de saúde durante as fases de resposta ao COVID-19. As questões que compõem o questionário não têm respostas corretas ou incorretas, nem são sujeitas a avaliação.

Se é profissional de saúde, pedimos-lhe que disponha de cerca de 6 minutos do seu tempo para responder a este questionário, relativo à sua experiência na instituição de prestação de cuidados de saúde onde exerce funções.

A sua colaboração é de extrema importância para nós.

Obrigada.

Esta secção destina-se à recolha de informação relativa a procedimentos e diretrizes de combate à pandemia COVID-19.

Já trabalhou diretamente com pessoas infetadas pelo COVID-19?

- ☐ Sim
- ☐ Não

Indique, em termos globais, qual o nível de adequação da formação que teve ao longo deste período.

Não tive formação										Totalmente adequada
0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Indique quem lhe deu a formação (escolha todas as opções que se apliquem).

- ☐ Enfermeira-chefe
- ☐ Segundo elemento
- ☐ Médico/a
- ☐ Área de controlo de infeção da instituição
- ☐ Entidade externa
- ☐ Outro colega
- ☐ Outro. Quem?

Como avalia a formação que teve durante a pandemia sobre:

Escala (1 – Inapropriada; 7 – Totalmente apropriada)	1	2	3	4	5	6	7
Colocar e retirar EPIs							
Manipulação de material biológico							
Contacto com doentes COVID-19							
Circulação em novos percursos definidos devido ao COVID-19							

Por favor indique o seu nível de concordância com as seguintes afirmações relativas a toda a formação recebida durante a pandemia.

Escala (1 – Discordo totalmente; 7 – Concordo totalmente)	1	2	3	4	5	6	7
O conteúdo da formação ministrada foi suficiente, permitindo a resposta à necessidade urgente dos serviços/unidades/hospitais.							
Na vivência do dia a dia, a formação ministrada permitiu o contacto em segurança com doentes infetados pelo COVID-19.							
A formação foi ministrada em tempo útil.							
Durante o decurso da pandemia, a prestação de cuidados foi facilitada pelos momentos de formação que permitiram a adequação às atualizações das diretrizes da DGS.							
Existe, no meu serviço/unidade/hospital uniformização de procedimentos relacionados com a colocação e descarte de EPIs.							
Existe, no meu serviço/unidade/hospital uniformização de procedimentos relacionados com a manipulação de material biológico.							
Existe, no meu serviço/unidade/hospital uniformização de procedimentos relacionados com o contacto com doentes COVID-19 em diferentes enfermarias/espacos/zonas.							
Tive a formação necessária para integrar novos serviços/unidades para o caso dessa alteração vir a ser necessária.							
A formação que tive diminui o meu risco de infeção.							
O meu desempenho foi beneficiado pela formação que tive.							

Esta secção destina-se à recolha de informação relativa à segurança dos profissionais de saúde no combate à pandemia COVID-19.

Por favor indique a ocorrência das seguintes afirmações.

Escala (1 – Nunca; 7 – Sempre)	1	2	3	4	5	6	7
A equipa de gestão da instituição considera importante a saúde e segurança dos profissionais de saúde.							
Foram tomadas todas as medidas necessárias para minimizar o risco de tarefas perigosas.							
Os profissionais de saúde, as chefias e a equipa de gestão da instituição trabalham juntos para a promoção de segurança.							
A segurança dos profissionais de saúde é considerada na tomada de decisões.							
As chefias corrigem práticas inseguras.							
A minha área de trabalho é mantida limpa.							
A minha área de trabalho é desorganizada.							
A equipa de gestão da instituição está envolvida na promoção de segurança.							
As chefias preocupam-se com a segurança dos profissionais de saúde.							
Os profissionais de saúde corrigem práticas inseguras dos seus colegas.							
Sinto-me à vontade para denunciar violações de segurança.							

Esta secção destina-se à recolha de informação relativa ao nível de confiança entre os profissionais de saúde, as suas chefias e a instituição, durante a pandemia COVID-19.

Por favor indique o seu nível de concordância com as seguintes afirmações.

Escala (1 – Discordo totalmente, 7 – Concordo totalmente)	1	2	3	4	5	6	7
As necessidades dos profissionais de saúde são extremamente importantes para as chefias.							
Posso contar com as chefias para me ajudarem, caso tenha dificuldades no meu trabalho.							
As chefias não fariam nada intencionalmente que prejudicasse a instituição.							
As chefias são abertas e francas comigo.							
As chefias cumprirão as promessas que fizerem.							
As chefias preocupam-se com o que é importante para os profissionais de saúde.							
As chefias têm bastante conhecimento sobre o trabalho que precisa de ser feito.							
As chefias são conhecidas por serem bem-sucedidas em tudo o que procuram alcançar.							
Se eu cometer erros, as chefias estão dispostas a “perdoar e esquecer”.							
As atitudes e comportamentos das chefias não são congruentes.							
Os atos das chefias são consistentes com as suas afirmações.							
É melhor não partilhar informações com as chefias.							
Existe uma grande proximidade nas relações entre as chefias e os profissionais de saúde na instituição.							
As chefias fariam sacrifícios pessoais pela equipa.							
As chefias expressam os seus verdadeiros sentimentos sobre assuntos importantes.							

Acredito que a minha instituição tem um elevado nível de integridade.							
Posso confiar que a minha instituição me tratará de forma coerente e adequada ao meu desempenho.							
A minha instituição nem sempre é honesta e verdadeira comigo.							
De um modo geral, acredito que as intenções da minha instituição são boas.							
Não acho que a minha instituição me trate de forma justa.							

Género

- ☐ Feminino
☐ Masculino
☐ Prefiro não responder

Idade

Categoria profissional

- ☐ Enfermeiro/a
☐ Médico/a
☐ Técnico/a de diagnóstico e terapêutica
☐ Assistente operacional
☐ Técnico/a superior de saúde
☐ Administrador/a hospitalar

Qual o nível de ensino mais elevado que completou?

- ☐ Ensino Básico – 1º ciclo (1º, 2º, 3º e 4º anos de escolaridade)
- ☐ Ensino Básico – 2º ciclo (5º e 6º anos de escolaridade)
- ☐ Ensino Básico – 3º ciclo (7º, 8º e 9º anos de escolaridade)
- ☐ Ensino Secundário (10º, 11º e 12º anos de escolaridade)
- ☐ Ensino Pós-secundário (cursos de especialização tecnológica não superior)
- ☐ Ensino Superior – Licenciatura
- ☐ Ensino Superior – Pós-graduação
- ☐ Ensino Superior – Mestrado
- ☐ Ensino Superior – Doutoramento

Em que área regional de saúde está inserida a sua instituição empregadora?

- ☐ Zona Norte
- ☐ Zona Centro
- ☐ Lisboa e Vale do Tejo
- ☐ Alentejo
- ☐ Algarve
- ☐ Açores
- ☐ Madeira

A instituição onde exerce funções a tempo inteiro (ou onde trabalha mais horas por semana) é:

- ☐ Pública
- ☐ Privada
- ☐ Público-privada

Indique, por extenso, a instituição onde exerce funções a tempo inteiro (ou onde trabalha mais horas por semana).

Em que serviço está integrado/a na instituição onde exerce funções a tempo inteiro (ou onde trabalha mais horas por semana)?

Na instituição onde exerce funções a tempo inteiro (ou onde trabalha mais horas por semana) existe área específica de COVID-19?

☐ Sim

☐ Não

Trabalha na área COVID-19 da sua instituição?

☐ Sim

☐ Não

English version

Assessing the perspective of health professionals on the impact of Training on their Safety, during the COVID-19 pandemic: The mediating role of Trust.

Dear participant,

This questionnaire was developed as a part of a master's thesis at Iscte Business School and is intended to collect information exclusively for this purpose.

The responses to the questionnaire will be anonymous and the requested data does not allow the identification of the respondent. The responses will be analysed as a whole, and never individually.

The objective of this study is to analyse the health professionals' perception of safety during the response phases to COVID-19. The questions that make up the questionnaire do not have correct or incorrect answers, nor are they subject to any type of evaluation.

If you are a health professional, we ask you to dispense 6 minutes of your time to complete this questionnaire, relating to your experience at the health care institution where you work.

Your collaboration is extremely important to us.

Thank you.

This section is intended to collect information on procedures and guidelines for combating the pandemic COVID-19.

Have you worked directly with COVID-19 infected patients?

- ☐ Yes
☐ No

Please indicate, in global terms, the level of adequacy of training that you have received during this period.

I did not have training									Totally adequate	
0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please indicate who gave you such training (choose all the applicable options).

- ☐ Head nurse
- ☐ Second element
- ☐ Physician
- ☐ Institution's infection control area
- ☐ External entity
- ☐ Another colleague
- ☐ Other. Who?

How do you evaluate the training that you have had regarding the following matters:

Scale (1 – Inappropriate; 7 – Totally appropriate)	1	2	3	4	5	6	7
Donning and doffing of PPE							
Handling of biological material							
Contact with COVID-19 patients							
Circulation on new defined routes, due to COVID-19							

Please indicate your level of agreement with the following statements regarding all the training received during the pandemic.

Scale (1 – Totally disagree; 7 – Totally agree)	1	2	3	4	5	6	7
1. The content of the training provided was sufficient, allowing the response to the urgent needs of the services/units/hospitals.							
2. In the day-to-day experience, the training provided allowed for safe contact with patients infected with COVID-19.							
3. The training was provided in a timely manner.							
4. During the pandemic, the provision of care was facilitated by the training moments that allowed the adaptation to the updates of the DGS guidelines.							
5. In my service/unit/hospital there is uniformisation of procedures related to donning and doffing of PPE.							
6. In my service/unit/hospital there is uniformization of procedures related to the handling of biological material.							
7. In my service/unit/hospital there is uniformization of procedures related to the contact with COVID-19 infected patients in different wards/spaces/areas.							
8. I had the necessary training to integrate new services/units, if necessary.							
9. The training provided diminished my risk of infection.							
10. The training provided benefited my performance.							

This section is intended to collect information regarding the safety of health professionals in combating the COVID-19 pandemic.

Please indicate the occurrence of the following statements.

Scale (1 – Never; 7 – Always)	1	2	3	4	5	6	7
1. Management considers worker health and safety important.							
2. All reasonable means to minimise hazardous tasks were taken.							
3. Workers, supervisors and management work together for safety.							
4. Worker safety is considered when decisions are made.							
5. Supervisors correct unsafe practices.							
6. My work area is kept clean.							
7. My work area is cluttered.							
8. Senior management is involved in safety.							
9. Supervisors are concerned for worker safety.							
10. Unsafe work practices are corrected by co-workers.							
11. I feel free to report safety violations.							

This section is intended to collect information regarding the level of trust between health professions, supervisors and the organisation, during the COVID-19 pandemic.

Please indicate you level of agreement with the following statements.

Scale (1 – Totally disagree; 7 – Totally agree)	1	2	3	4	5	6	7
1. Employees' needs, and desires are very important to supervisors.							
2. I can count on my supervisors to help me if I have difficulties with my job.							
3. Supervisors would not knowingly do anything to hurt the institution.							
4. My managers are open and up front with me.							
5. Supervisors will keep the promises they make.							
6. Supervisors really look out for what is important to the employees.							
7. Supervisors have a lot of knowledge about the work that needs to be done.							
8. Supervisors are known to be successful in the things they attempt to accomplish.							
9. If I make a mistake, my supervisors are willing to "forgive and forget".							
10. Supervisors' actions and behaviours are not consistent.							
11. Supervisors' actions and behaviours are consistent with their words.							
12. It is best not to share information with my supervisors.							
13. There is a lot of warmth in the relationships between the supervisors and workers in this institution.							
14. Supervisors would make personal sacrifices for our group.							
15. Supervisors express their true feelings about important issues.							

Scale (1 – Totally disagree; 7 – Totally agree)	1	2	3	4	5	6	7
16. I believe my employing institution has high integrity.							
17. I can expect my employing institution to treat me in a consistent and predictable fashion.							
18. My employing institution is not always honest and truthful.							
19. In general, I believe my employing institution's intentions are good.							
20. I don't think my employing institution treats me fairly.							

Gender

- ☐ Female
- ☐ Male
- ☐ Prefer not to answer

Age

Professional typology

- ☐ Nurse
- ☐ Physician
- ☐ Diagnostic and therapeutic technician
- ☐ General services personnel
- ☐ Senior health technician
- ☐ Hospital administrator

What is the level of education you have completed thus far?

- ☐ Elementary school
- ☐ Middle school
- ☐ Junior high school
- ☐ High school
- ☐ Post-secondary non-tertiary education
- ☐ Higher professional education
- ☐ Bachelor's degree
- ☐ Post-Graduate
- ☐ Master's degree
- ☐ PhD

In which health regional area is your employing institution inserted?

- ☐ Zona Norte
- ☐ Zona Centro
- ☐ Lisboa e Vale do Tejo
- ☐ Alentejo
- ☐ Algarve
- ☐ Açores
- ☐ Madeira

The institution where you work full time (or where you work the most hours per week) is:

- ☐ Public
- ☐ Private
- ☐ Public-private

Please indicate the institution where you work full time (or where you work the most hours per week).

In which service of the institution where you work full time (or where you work the most hours per week) are you inserted?

**Is there a specific COVID-19 treatment in the institution where you work full time
(or where you work the most hours per week)?**

☐ Yes

☐ No

Do you work in the specific COVID-19 treatment area of your institution?

☐ Yes

☐ No

Appendix D: Sample Characterisation.

Table D.1: Mean and frequencies for the variables Age, Gender, Professional Category and Education Level.

INDEPENDT VARIABLES		Absolute frequency	Mean (SD)
Age		235	36.3 (11.4)
		Absolute frequency	Relative frequency
Gender	Female	203	86.4%
	Male	30	12.8%
	Prefer not to answer	2	0.9%
	Total	235	100.0%
Professional Category	Nurse	156	66.4%
	Physician	17	7.2%
	Diagnostic and therapeutic technician	41	17.4%
	General services personnel	15	6.4%
	Senior health technician	6	2.6%
	Hospital administrator	0	0.0%
	Total	235	100.0%
Education Level	Elementary school	0	0.0%
	Middle school	1	0.4%
	Junior high school	1	0.4%
	High school	10	4.3%
	Post-secondary non-tertiary education	1	0.4%
	Higher professional education	1	0.4%
	Bachelor's degree	118	50.2%
	Post-graduate	57	24.3%
	Master's degree	42	17.9%
	PhD	4	1.7%
	Total	235	100.0%

Table D.2: Mean and frequencies for the variables Geographical Insertion and Nature of the Employing Institutions.

INDEPENDT VARIABLES		Absolute frequency	Mean (SD)
Geographical Insertion of the Employing Institution	Zona Norte	8	3.6%
	Zona Centro	8	3.6%
	Lisboa e Vale do Tejo	186	84.2%
	Alentejo	4	1.8%
	Algarve	7	3.2%
	Açores	0	0.0%
	Madeira	8	3.6%
	Total	221	100.0%
Nature of the Employing Institution	Public	140	63.3%
	Public-private	28	12.7%
	Private	53	24.0%
	Total	221	100.0%

Table D.3: Mean and frequencies for the variable Identification of the Employing Institution – Group.

INDEPENDT VARIABLES		Absolute frequency	Mean (SD)
Identification of the Employing Institution - Group	ACES Lisboa Ocidental	1	0.6%
	ACES Oeste Sul	1	0.6%
	Associação Portuguesa para as perturbações do Desenvolvimento e Autismo de Setúbal	1	0.6%
	Centro Hospitalar	1	0.6%
	Centro Hospitalar de Lisboa Ocidental, EPE	20	12.7%
	Centro Hospitalar de Setúbal, EPE	10	6.3%
	Centro Hospitalar do Baixo-Vouga, EPE	3	1.9%
	Centro Hospitalar do Barreiro-Montijo, EPE	8	5.1%
	Centro Hospitalar do Médio Tejo, EPE	1	0.6%
	Centro Hospitalar Universitário de Lisboa Central, EPE	28	17.7%
	Centro Hospitalar Universitário de Lisboa Norte, EPE	10	6.3%
	Centro Hospitalar Universitário de São João, EPE	1	0.6%
	Centro Hospitalar Universitário do Algarve, EPE	2	1.3%
	Clínica Privada	2	1.3%
	CUF	4	2.5%
	DaVita	1	0.6%
	DIALVERCA – Sociedade Médica AS	1	0.6%
	Escola Superior de Saúde Egas Moniz	1	0.6%
	Hospital	3	1.9%
	Hospital Beatriz Ângelo, EPE	4	2.5%
	Hospital da Luz	3	1.9%
	Hospital das Forças Armadas	1	0.6%
	Hospital Distrital de Santarém, EPE	1	0.6%
	Hospital Garcia de Orta, EPE	18	11.4%
	Hospital Professor Doutor Fernando Fonseca, EPE	3	1.9%
	Hospital Público	1	0.6%
	HPA Saúde	1	0.6%

INDEPENDENT VARIABLES (<i>Prolongation</i>)		Absolute frequency	Mean (SD)
Identification of the Employing Institution - Group	Instituto da Imaculada para Pessoas com Necessidades Especiais, IPSS	1	0.6%
	Instituto das Irmãs Hospitaleiras do Sagrado Coração de Jesus, IPSS	3	1.9%
	Instituto Português de Oncologia de Lisboa Francisco Gentil, EPE	3	1.9%
	Linde	1	0.6%
	Lusiadas Saúde	3	1.9%
	ProCon Som – Serviços Especializados em Terapia da Fala	1	0.6%
	SAMS	1	0.6%
	Santa Casa da Misericórdia da Amadora	1	0.6%
	Santa Casa da Misericórdia de Almeida	1	0.6%
	Santa Casa da Misericórdia de Lisboa	1	0.6%
	Santa Casa da Misericórdia de Ponte de Lima	1	0.6%
	SESARAM, EPERAM	5	3.2%
	UCCI Almada Saúde	1	0.6%
	Unidade Local do Litoral Alentejano, EPE	1	0.6%
	Outros não definidos	9	5.6%
Total		158	100.0%

Table D.4: Mean and frequencies for the variable Identification of the Employing Institution – Institution.

INDEPENDT VARIABLES		Absolute frequency	Mean (SD)
Identification of the Employing Institution - Institution	Casa de Saúde da Idanha	2	3.2%
	Centro de Hemodiálise	1	1.6%
	Centro de Medicina de Reabilitação de Alcoitão	1	1.6%
	Centro de Saúde de Sintra	1	1.6%
	Centro de Saúde de Torres Vedras	1	1.6%
	Centro de Saúde do Campanário	1	1.6%
	Clínica Psiquiátrica de São José	1	1.6%
	DaVita Sacavém	1	1.6%
	Hospital Central do Funchal	1	1.6%
	Hospital CUF Descobertas	2	3.2%
	Hospital CUF Tejo	1	1.6%
	Hospital Curry Cabral	2	3.2%
	Hospital da Luz de Lisboa	2	3.2%
	Hospital das Torres de Lisboa	1	1.6%
	Hospital de Egas Moniz	4	6.3%
	Hospital de Santa Cruz	7	11.1%
	Hospital de Santa Maria	8	12.7%
	Hospital de Santo António dos Capuchos	1	1.6%
	Hospital de São José	5	7.9%
	Hospital do Litoral Alentejano	1	1.6%
	Hospital do SAMS	1	1.6%
	Hospital Dona Estefânia	2	3.2%
	Hospital dos Lusíadas de Lisboa	3	4.8%
	Hospital Particular da Madeira	1	1.6%
	Hospital São Bernardo	3	4.8%
	Hospital São Francisco Xavier	3	4.8%
	Maternidade Dr. Alfredo da Costa	3	5.8%

INDEPENDENT VARIABLES (<i>Prolongation</i>)		Absolute frequency	Mean (SD)
Identification of the Employing Institution - Group	União Mutualista Nossa Senhora da Conceição	1	1.6%
	Unidade de Cuidados Continuados de Almeida	1	1.6%
	Unidade de Cuidados Continuados Sagrada Família	1	1.6%
	Total	63	100.0%

Table D.5: Mean and frequencies for the variable Service Allocation.

INDEPENDT VARIABLES		Absolute frequency	Mean (SD)
Service Allocation	Área de Saúde da Mulher	1	0.6%
	Centro de Atividades Ocupacionais, Educativas e Lar Residencial	1	0.6%
	Centro Linde Saúde	1	0.6%
	Laboratório	1	0.6%
	Serviço de Ambulatório	1	0.6%
	Serviço de Apoio ao Utente e ao Enfermeiro	1	0.6%
	Serviço de Bloco de Partos	1	0.6%
	Serviço de Bloco Operatório	10	6.5%
	Serviço de Cardiologia	9	5.8%
	Serviço de Cirurgia Cardíaca	1	0.6%
	Serviço de Cirurgia Geral	4	2.6%
	Serviço de Cirurgia Vascular	1	0.6%
	Serviço de Consultas Externas	1	0.6%
	Serviço de Contingência – COVID-19	11	7.1%
	Serviço de Cuidados Primários	1	0.6%
	Serviço de Enfermaria	2	1.3%
	Serviço de Enfermaria de Isolamento	1	0.6%
	Serviço de Fisioterapia	2	1.3%
	Serviço de Ginecologia/Obstetrícia	5	3.2%
	Serviço de Hematologia	1	0.6%
	Serviço de Hemato-Oncologia	1	0.6%
	Serviço de Hemodiálise	1	0.6%
	Serviço de Imunoalergologia	1	0.6%
	Serviço de Infecçiology	3	1.9%
	Serviço de Medicina	12	7.7%
	Serviço de Medicina Física e de Reabilitação	8	5.2%

INDEPENDENT VARIABLES (<i>Prolongation</i>)		Absolute frequency	Mean (SD)
Service Allocation	Serviço de Medicina Intensiva	3	1.9%
	Serviço de Medicina Interna	7	4.5%
	Serviço de Nefrologia	1	0.6%
	Serviço de Neonatologia	1	0.6%
	Serviço de Neurocirurgia	3	1.9%
	Serviço de Neurologia	2	1.3%
	Serviço de Oftalmologia	1	0.6%
	Serviço de Oncologia	2	1.3%
	Serviço de Ortopedia	2	1.3%
	Serviço de Pedopsiquiatria	1	0.6%
	Serviço de Pneumologia	6	3.9%
	Serviço de Psicologia	1	0.6%
	Serviço de Radioterapia	1	0.6%
	Serviço de Terapia da Fala Pediátrica	1	0.6%
	Serviço de Urgência Geral de Adultos	1	0.6%
	Serviço de Urgência Geral	18	11.6%
	Serviço de Urgência Pediátrica	1	0.6%
	Serviço de Medicina Interna – Unidade COVID-19	1	0.6%
	Unidade AVC	1	0.6%
	Unidade Cérebro-Vascular	1	0.6%
	Unidade de Cirurgia de Ambulatório	1	0.6%
	Unidade de Cuidados Continuados	1	0.6%
	Unidade de Cuidados Continuados Integrados	1	0.6%
	Unidade de Cuidados Intensivos	4	2.6%
	Unidade de Cuidados Intensivos – COVID-19	1	0.6%
	Unidade de Cuidados Intensivos Polivalentes	2	1.3%
	Unidade de Cuidados Intensivos Polivalentes – COVID-19	1	0.6%
	Unidade de Cuidados Intermédios	1	0.6%

INDEPENDENT VARIABLES (<i>Prolongation</i>)		Absolute frequency	Mean (SD)
Service Allocation	Unidade de Cuidados Intermédios de Pneumologia	1	0.6%
	Unidade de Curto Internamento	1	0.6%
	Unidade de Longa Duração e Manutenção	1	0.6%
	Unidade de Saúde Familiar	1	0.6%
	Unidade de Saúde Pública	1	0.6%
	Unidade de Urgência Médica	1	0.6%
	Total	155	100.0%

Table D.6: Mean and frequencies for the variables Existence and Allocation to COVID-19 Specific Area of Treatment.

INDEPENDT VARIABLES		Absolute frequency	Mean (SD)
Existence of COVID-19 Specific Area of Treatment	Yes	164	74.2%
	No	57	25.8%
	Total	221	100.0%
Allocation to COVID-19 Specific Area of Treatment	Yes	98	59.8%
	No	66	40.2%
	Total	221	100.0%

Appendix E: Descriptive Analysis.

Table E.1: Training Adequacy.

		Scale (Relative frequencies)								
		Mean	SD	1	2	3	4	5	6	7
Training Adequacy		4.2	1.4							
TA1:	The content of training provided was sufficient, allowing the response to the urgent needs of the services/units/hospitals.	4.0	1.7	9,6%	10.1%	20.7%	18.1%	23.9%	11.7%	5.9%
TA2:	In the day-to-day experience, the training provided allowed for safe contact with patients infected with COVID-19.	4.5	1.7	4.8%	7.9%	19.7%	17.6%	18.1%	18.6%	13.3%
TA3:	The training was provided in a timely manner.	4.0	1.8	11.7%	9.6%	22.3%	17.6%	15.4%	11.7%	11.7%
TA4:	During the pandemic, the provision of care was facilitated by the training moments that allowed the adaptation to the updates of the DGS guidelines.	3.9	1.7	9.6%	11.7%	25.0%	18.6%	15.4%	11.7%	8.0%
TA5:	In my service/unit/hospital there is uniformisation of procedures related to donning and doffing of PPE.	4.8	2.0	9.6%	6.9%	11.7%	11.2%	16.5%	18.6%	25.5%
TA6:	In my service/unit/hospital there is uniformisation of procedures related to the handling of biological material.	4.8	1.8	5.3%	9.0%	9.0%	19.2%	16.5%	17.6%	23.4%
TA7:	In my service/unit/hospital there is uniformisation of procedures related to the contact with COVID-19 infected patients in different wards/spaces/areas.	4.6	1.8	3.7%	11.2%	12.8%	22.3%	15.4%	13.8%	20.7%
TA8:	I had the necessary training to integrate new services/unit, if necessary.	3.3	1.9	20.2%	21.3%	16.0%	18.1%	8.5%	8.5%	7.5%
TA9	The training provided diminished my risk of infection.	4.6	1.8	4.3%	11.7%	18.8%	15.4%	21.8%	14.9%	18.1%
TA10:	The training provided benefited my performance.	4.4	1.8	9.0%	9.0%	11.7%	21.3%	16.5%	17.0%	15.4%

Table E.2: Perception of Safety.

		Scale (Relative frequencies)								
		Mean	SD	1	2	3	4	5	6	7
Perception of Safety		4.5	1.2							
PS1:	Management considers worker health and safety important.	4.6	1.7	2.5%	11.4%	15.3%	19.1%	19.9%	14.0%	17.8%
PS2:	All reasonable means to minimise hazardous tasks were taken.	4.4	1.7	2.1%	13.1%	17.8%	19.9%	21.2%	11.4%	14.4%
PS3:	Workers, supervisors and management work together for safety.	4.4	1.7	2.5%	12.3%	17.4%	17.8%	19.9%	16.5%	13.6%
PS4:	Worker safety is considered when decisions are made.	4.5	1.7	2.5%	11.4%	16.5%	18.6%	20.3%	17.4%	13.1%
PS5:	Supervisors correct unsafe practices.	4.5	1.7	4.7%	11.9%	11.9%	19.1%	22.5%	17.0%	13.1%
PS6:	My work area is kept clean.	5.3	1.5	0.9%	5.1%	7.2%	13.1%	25.0%	24.6%	24.2%
PS7:	My work area is cluttered.	3.1	1.6	16.1%	28.0%	18.2%	13.1%	14.8%	7.2%	2.5%
PS8:	Senior management is involved in safety.	4.2	1.6	3.8%	12.3%	17.0%	23.7%	19.9%	12.7%	10.6%
PS9:	Supervisors are concerned for worker safety.	4.8	1.7	2.5%	9.3%	14.0%	13.6%	20.3%	21.2%	19.1%
PS10:	Unsafe work practices are corrected by co-workers.	5.4	1.4	1.7%	3.0%	4.7%	12.7%	26.6%	28.8%	22.5%
PS11:	I feel free to report safety violations.	4.5	1.9	6.8%	9.8%	15.3%	15.3%	16.5%	17.0%	19.6%

Table E.3: Organisational Trust.

		Scale (Relative frequencies)								
		Mean	SD	1	2	3	4	5	6	7
Organisational Trust		4.0	1.0							
OS1:	Employees' needs and desires are very important to supervisors.	4.0	1.8	8.9%	13.6%	20.4%	16.6%	17.9%	14.5%	8.1%
OS2:	I can count on my supervisors to help me if I have difficulties with my job.	4.4	1.8	5.1%	13.6%	16.6%	11.9%	21.7%	15.3%	15.7%
OS3:	Supervisors would not knowingly do anything to hurt the institution.	5.4	1.5	1.7%	3.4%	8.9%	10.6%	20.9%	23.4%	31.1%
OS4:	My supervisors are open and up front with me.	4.2	1.8	9.4%	8.9%	18.7%	17.5%	20.9%	11.9%	12.8%
OS5:	Supervisors will keep the promises they make.	3.8	1.6	10.6%	10.6%	24.7%	22.1%	16.2%	9.8%	6.0%
OS6:	Supervisors really look out for what is important to the employees.	4.1	1.7	7.2%	15.3%	17.5%	18.3%	18.3%	14.0%	9.4%
OS7:	Supervisors have a lot of knowledge about the work that needs to be done.	4.1	1.8	11.1%	13.2%	13.2%	14.5%	23.8%	14.9%	9.4%
OS8:	Supervisors are known to be successful in the things they attempt to accomplish.	3.9	1.7	12.8%	8.5%	17.9%	24.3%	17.9%	13.2%	5.5%
OS9:	If I make a mistake, my supervisors are willing to “forgive and forget”.	3.6	1.6	13.6%	11.9%	15.7%	27.7%	20.4%	8.5%	2.1%
OS10:	Supervisors’ actions and behaviors are not consistent.	4.0	1.7	2.1%	3.7%	5.9%	16.0%	33.5%	36.2%	28.2%

		Mean	SD	1	2	3	4	5	6	7
Organisational Trust		4.0	1.0							
OS11:	Supervisors' actions are consistent with their words.	4.0	1.6	7.2%	11.5%	18.3%	24.7%	19.6%	12.3%	6.4%
OS12:	It is best no to share information with my supervisors.	3.0	1.7	24.3%	20.9%	17.0%	17.5%	9.4%	7.2%	3.8%
OS13:	There is a lot of warmth in the relationships between the supervisors and workers in this institution.	3.9	1.7	11.1%	11.9%	19.2%	21.7%	14.9%	14.0%	7.2%
OS14:	Supervisors would make personal sacrifices for our group.	3.6	1.9	18.7%	15.7%	17.5%	14.0%	13.6%	12.8%	7.7%
OS15:	Supervisors express their true feelings about important issues.	3.7	1.8	15.7%	12.3%	17.5%	21.3%	12.8%	15.7%	4.6%
OS16:	I believe my employing institution has high integrity.	4.3	1.7	7.2%	7.2%	14.5%	26.0%	20.0%	14.5%	10.6%
OS17:	I can expect my employing institution to treat me in a consistent and predictable fashion.	3.9	1.7	9.4%	15.3%	14.9%	20.9%	21.3%	12.3%	6.0%
OS18:	My employing institution is not always honest and truthful.	3.9	1.8	8.9%	17.0%	16.2%	19.6%	17.5%	12.3%	8.5%
OS19:	In general, I believe my employing institution's intentions are good.	4.7	1.5	3.0%	3.4%	15.3%	22.6%	25.5%	18.7%	11.5%
OS20:	I don' think my employing institution treats me fairly.	3.6	1.8	11.5%	22.6%	17.5%	18.7%	13.2%	8.1%	8.5%

Appendix F: Comparison of the levels of Trust regarding Supervisors and Institution

Appendix F.1: Normality Tests

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Trust_Supervisors (TS)	.042	235	.200*	.986	235	.020
Trust_Institution (TI)	.058	235	.050	.985	235	.015

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Normality can be assumed as $K - S_{TS}(235) = 0.042, p = 0.200$ and $K - S_{TI}(235) = 0.058, p = 0.050$.

Appendix F.2: Paired Sample T-Test

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Trust_Supervisors	4.0982	235	1.34487	.08773
	Trust Institution	4.2766	235	1.36960	.08934

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Trust_Supervisors & Trust_Institution	235	.747	.000

Paired Samples Test									
Paired Differences									
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Mean	Lower	Upper			
Pair 1	Trust_Supervisors - Trust_Institution	-.17844	.96491	.06294	-.30245	-.05443	-2.835	234	.005

			Standardize		95% Confidence Interval	
			d ^a	Point Estimate	Lower	Upper
Pair 1	Trust_Supervisors -	Cohen's d	.96491	-.185	-.314	-.056
	Trust_Institution	Hedges' correction	.96646	-.185	-.313	-.056

Cohen's d uses the sample standard deviation of the mean difference.

Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Appendix G: Comparison of the HP' Perception of Safety between Professional Categories.

Appendix G.1: Normality tests

		Tests of Normality					
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
Professional Category		Statistic	df	Sig.	Statistic	df	Sig.
Safety	Nurse	.060	156	.200*	.983	156	.046
	Physician	.142	17	.200*	.925	17	.182
	Diagnostic and Therapeutic Technician	.124	41	.117	.939	41	.029
	General Services	.171	15	.200*	.957	15	.637
	Personnel						

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Normality can be assumed as $K - S(156) = 0.060, p = 0.200$; $K - S(17) = 0.142, p = 0.200$; and $K - S(15) = 0.171, p = 0.200$.

Appendix G.2: One-Way ANOVA.

				95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum Maximum
Nurse	156	4.2984	1.11033	.08890	4.1228	4.4740	2.00 6.55
Physician	17	4.8021	1.26591	.30703	4.1513	5.4530	2.82 6.64
Diagnostic and Therapeutic Technician	41	4.9379	1.17347	.18327	4.5675	5.3083	2.82 6.64
General Services Personnel	15	4.9818	1.25178	.32321	4.2886	5.6750	2.73 7.00
Total	229	4.4950	1.17163	.07742	4.3425	4.6476	2.00 7.00

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Safety	Based on Mean	.507	3	225	.678
	Based on Median	.425	3	225	.735
	Based on Median and with adjusted df	.425	3	222.753	.735
	Based on trimmed mean	.513	3	225	.674

The assumption of homogeneity of variances is verified [$F(3,225) = 0.507, p = 0.678$].

ANOVA

Safety					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.233	3	6.411	4.911	.003
Within Groups	293.747	225	1.306		
Total	312.980	228			

Appendix G.3: Multiple Comparisons

Multiple Comparisons						
Dependent Variable: Safety						
Scheffé						
(I) Professional Category	(J) Professional Category	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Nurse	Physician	-.50377	.29183	.397	-1.3258	.3182
	Diagnostic and Therapeutic Technician	-.63955*	.20053	.019	-1.2044	-.0747
	General Services Personnel	-.68345	.30888	.183	-1.5535	.1866
Physician	Nurse	.50377	.29183	.397	-.3182	1.3258
	Diagnostic and Therapeutic Technician	-.13578	.32960	.982	-1.0642	.7926
	General Services Personnel	-.17968	.40476	.978	-1.3198	.9604
Diagnostic and Therapeutic Technician	Nurse	.63955*	.20053	.019	.0747	1.2044
	Physician	.13578	.32960	.982	-.7926	1.0642
	General Services Personnel	-.04390	.34479	.999	-1.0151	.9273
General Services Personnel	Nurse	.68345	.30888	.183	-.1866	1.5535
	Physician	.17968	.40476	.978	-.9604	1.3198
	Diagnostic and Therapeutic Technician	.04390	.34479	.999	-.9273	1.0151

*. The mean difference is significant at the 0.05 level.

Appendix H – Output of the Macro Process

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
Y : Safety
X : Training
M : Trust

Sample
Size: 185

OUTCOME VARIABLE:
Trust

Model Summary

	R	R-sq	MSE	F(HC3)	df1	df2	p
	.6580	.4330	.8749	131.6972	1.0000	183.0000	.0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	1.7793	.2273	7.8282	.0000	1.3309	2.2278
Training	.5765	.0502	11.4759	.0000	.4774	.6756

OUTCOME VARIABLE:
Safety

Model Summary

	R	R-sq	MSE	F(HC3)	df1	df2	p
	.8607	.7408	.3507	325.2264	2.0000	182.0000	.0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	1.0486	.1581	6.6342	.0000	.7368	1.3605
Training	.3133	.0433	7.2383	.0000	.2279	.3987
Trust	.5220	.0472	11.0645	.0000	.4289	.6150

Standardized coefficients

	coeff
Training	.3829
Trust	.5590

***** TOTAL EFFECT MODEL *****

OUTCOME VARIABLE:

Safety

Model Summary

	R	R-sq	MSE	F(HC3)	df1	df2	p
	.7507	.5636	.5871	285.7813	1.0000	183.0000	.0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	1.9774	.1767	11.1879	.0000	1.6287	2.3261
Training	.6142	.0363	16.9051	.0000	.5425	.6859

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y

Effect	se(HC3)	t	p	LLCI	ULCI	c_ps	c_cs
.6142	.0363	16.9051	.0000	.5425	.6859	.5309	.7507

Direct effect of X on Y

Effect	se(HC3)	t	p	LLCI	ULCI	c'_ps	c'_cs
.3133	.0433	7.2383	.0000	.2279	.3987	.2708	.3829

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Trust	.3009	.0368	.2320	.3770

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

----- END MATRIX -----

Appendix I: Validation of Linear Regression Assumptions.

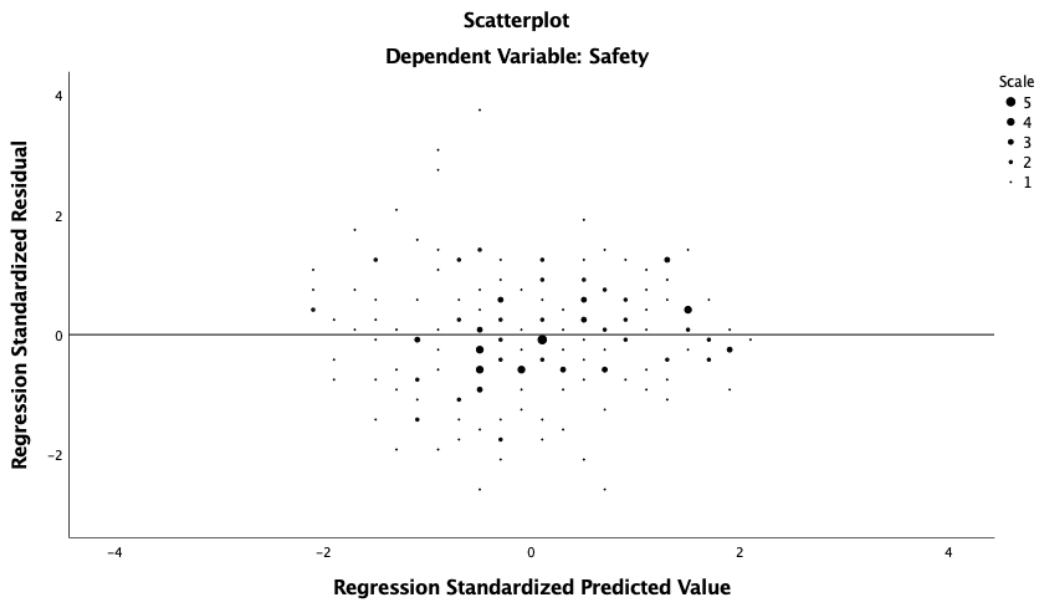


Figure I.1: Scatterplot - Linearity, Normality and Homoscedasticity Analysis

According to Tabachnick & Fidell (2019), we can assume linearity, as the residuals' distribution presents a rectangular form; normality, as the residuals are symmetrically distributed relatively to the centre; and homoscedasticity, as the residuals are randomly distributed around zero.

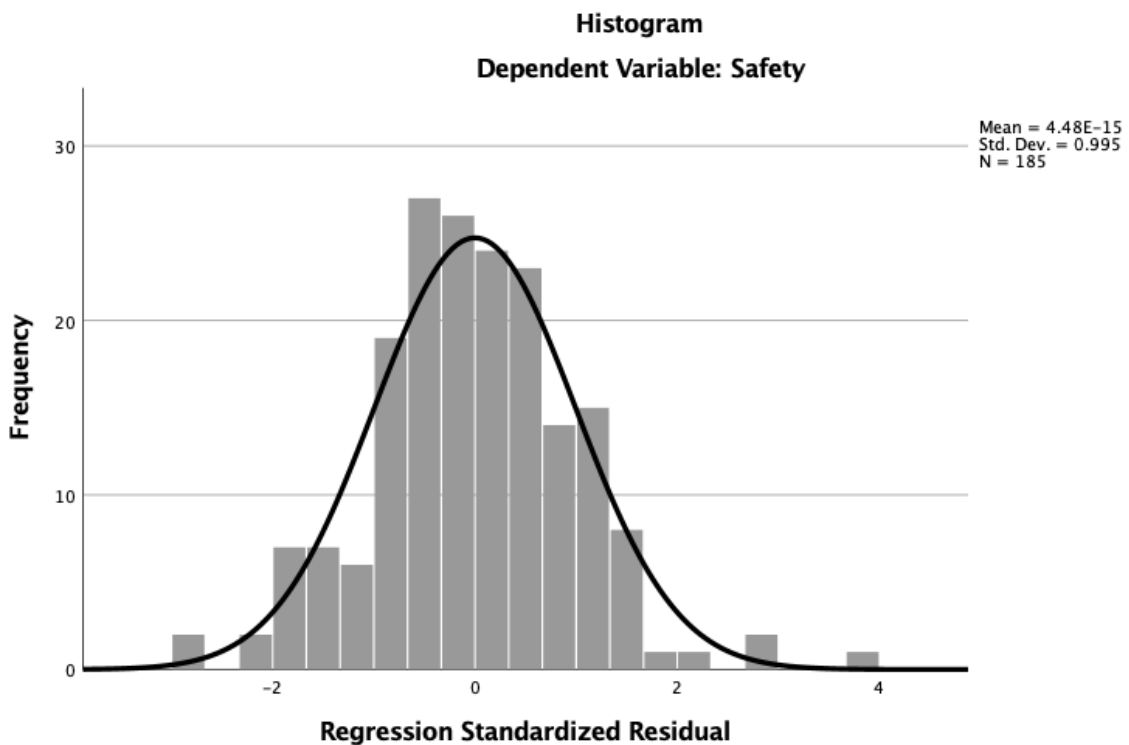


Figure I.2: Histogram

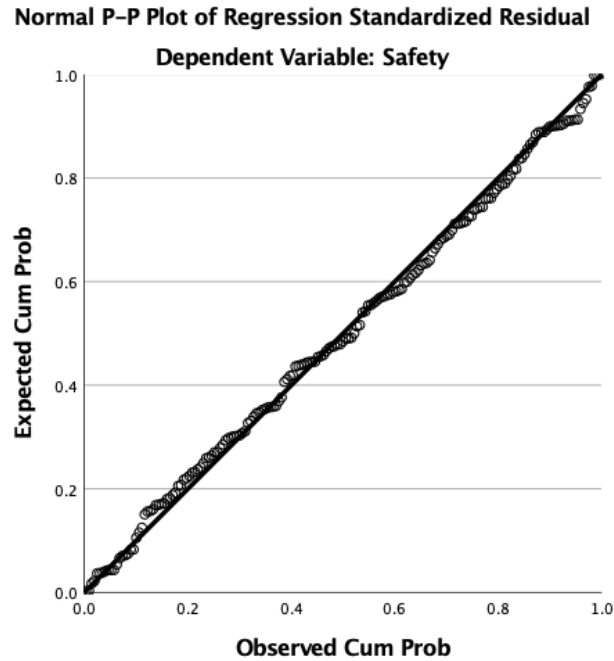


Figure I.3: Normal P-P Plot of Regression Standardised Residual – Safety

Table I.1: Tests of Normality – Kolmogorov-Smirnov.

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Standardized Residual	.043	185	.200

The normality is also confirmed by the adherence test of Kolmogorov-Smirnov [K-S (185) = 0.043, $p=0,200$].

Table I.2: Multicollinearity Analysis – Safety.

		Coefficients ^a			Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	Tolerance	VIF
1	(Constant)	1.977	.178			
	Training	.614	.040	.751	1.000	1.000
2	(Constant)	1.049	.161			
	Training	.313	.041	.383	.567	1.764
	Trust	.522	.047	.559	.567	1.764

a. Dependent variable: Safety

There is no multicollinearity as the tolerance values are all above 0.2, and as the VIF values are all below 5.

Table I.3: Casewise Diagnostics.

Casewise Diagnostics^a				
Case Number	Std. Residual	Safety	Predicted Value	Residual
9	3.723	6.18	3.977	2.205
19	2.009	4.55	3.356	1.189
32	-2.708	2.55	4.149	-1.604
118	-2.735	3.64	5.256	-1.620
167	2.870	5.36	3.664	1.700
177	2.992	5.55	3.774	1.772
208	-2.005	3.82	5.006	-1.187
210	-2.109	3.00	4.249	-1.249

Table I.4: Measures of Detection of Influential Cases.

Descriptive Statistics			
	N	Minimum	Maximum
Standardized Residual	185	-2.735	3.723
Cook's Distance	185	.000	.105
Standardized DFBETA Intercept	185	-.204	.247
Standardized DFBETA Training	185	-.528	.256
Standardized DFBETA Trust	185	-.327	.324
Valid N (listwise)	185		

Despite existing some outliers (Casewise Diagnostics), they are not considered influent cases as it can be observed by the values of Cook's Distance (under 1), Leverage (under 0.2) and Std. Df (Betas) (under 1).