Effective hospital response to covid-19: evidence from social healthcare organizations in Brazil and Portugal

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ABSTRACT: This study analyzes the impact of effective knowledge management, organizational intelligence, and organizational performance on the effective hospital response and social health to covid-19. Data were collected through a research questionnaire sent to physicians and nurses who worked in hospitals in Brazil and Portugal. We sent the survey link using a professional social network and 101 valid responses were obtained. The PLS-SEM analysis technique was used to test hypotheses. The results showed that there is a positive relationship between the constructs of effective knowledge management and organizational performance, and effective response to covid-19. This study also indicates that effective knowledge management has a positive association with organizational intelligence and organizational performance, in addition to a positive relationship between organizational intelligence and organizational performance. As practical implications, our research reinforces the importance of effective knowledge management for pandemic management and validates the relationships between effective knowledge management, organizational intelligence, organizational performance, and hospital response effectiveness. From these results, hospitals and social health organizations will be able to improve their effectiveness in responding to new disease outbreaks. As originality, this work presents a model to manage the response of these health care and hospital institutions to pandemics.

KEYWORDS: Effective knowledge management, Organizational Intelligence, Organizational performance, Effective response, Partial least square (PLS), COVID-19.

ECONLIT DESCRIPTORS: M10, M15, I10.

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RESUMEN: Este estudio analiza el impacto de la gestión del conocimiento, la inteligencia organizativa y el desempeño organizacional en la eficacia ante la covid-19 en hospitales. Los datos se recogieron mediante un cuestionario de investigación, enviado a personal sanitario que trabajaban en hospitales de Brasil y Portugal. Enviamos el enlace de la encuesta utilizando una red social profesional y se obtuvieron 101 respuestas válidas. Se utilizó la técnica de análisis PLS-SEM para probar las hipótesis. Los resultados mostraron que existe una relación positiva entre los constructos de gestión eficaz del conocimiento y desempeño organizacional con la respuesta eficaz a la covid-19. Este estudio también indicó que la gestión eficaz del conocimiento tiene una asociación positiva con la inteligencia organizativa y el desempeño organizacional, además de la relación positiva entre la inteligencia organizativa y el desempeño organizacional. Como implicaciones prácticas, nuestra investigación refuerza la importancia de la gestión eficaz del conocimiento para la gestión de la pandemia y valida las relaciones entre la gestión eficaz del conocimiento, la inteligencia organizativa, el desempeño organizacional, así como la eficacia de la respuesta hospitalaria. A partir de estos resultados, los hospitales y organizaciones sociosanitarias podrán mejorar su eficacia en la respuesta a los nuevos brotes de enfermedades. Como originalidad, presentamos un modelo para gestionar la respuesta de estas instituciones sociosanitarias y hospitalarias a las pandemias.

PALABRAS CLAVE: Gestión eficaz del conocimiento, Inteligencia organizativa, Desempeño organizativo, Respuesta eficaz, Mínimos cuadrados parciales (PLS), COVID-19.

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Resumen amplio

Respuesta hospitalaria eficaz al covid-19: evidencia de las organizaciones socio-sanitarias de Brasil y Portugal

Contextualización y objetivos

A finales de 2019, se detectó un nuevo coronavirus en la ciudad de Wuhan, capital de la provincia de Hubei - China (Comfort et al., 2020; Zhang et al., 2021b). Poco después, el 30 de enero de 2020, la Organización Mundial de la Salud (OMS) declaró la existencia de una emergencia de salud pública de importancia internacional provocada por el nuevo coronavirus (OMS, 2020), posteriormente denominado covid-19 (Bryce et al., 2020). El covid-19 se propagó rápidamente por todo el mundo, infectando y matando a personas en más de 210 países y territorios en menos de cinco meses, convirtiéndose así en una pandemia global (Comfort et al., 2020).

El manejo de la pandemia desafía los complejos sistemas de salud de muchos países y la mitigación de sus efectos solo fue posible en los casos en que los gerentes pudieron tomar decisiones oportunas e implementar decisiones efectivas (Ammirato et al., 2020; Zhang et al., 2021b). En este contexto, la puntualidad de las respuestas ha sido un factor crítico de éxito (Huang y Shih-Wei, 2020). Por estas razones, las organizaciones necesitan diseñar sus procesos de gestión del conocimiento haciéndolos más eficientes y efectivos (Ammirato et al., 2020; Bdeir et al., 2013) para asegurar una mejor capacidad para crear, codificar, validar, almacenar, compartir, usar y evaluar conocimientos (Istudor et al., 2016; Soto-Acosta y Cegarra-Navarro, 2016).

Considerando que el conocimiento es un factor crítico para la gestión eficiente de crisis (Huang y Shih-Wei, 2020) y considerando la complejidad de la crisis en las organizaciones de salud (Lee et al., 2014), este estudio tiene como objetivo examinar el impacto de una gestión eficaz del conocimiento, inteligencia organizacional y desempeño organizacional sobre la respuesta efectiva de las instituciones socio-sanitarias al covid-19.

Diseño y metodología

Con el fin de cumplir con nuestro objetivo, recopilamos y analizamos las respuestas de médicos y enfermeras que trabajaron en organizaciones de atención social de la salud (por ejemplo, en entidades sociales como "Santa Casa de Misericordia") en Brasil y Portugal durante la pandemia sobre la respuesta efectiva de estas organizaciones al covid-19.

Para el análisis de los datos se utilizó la técnica PLS-SEM (Partial Least Square - Structural Equation Modeling); con el empleo de un cuestionario estandarizado combinado con una es-

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cala Likert de cinco puntos, que van desde "totalmente en desacuerdo" hasta "totalmente de acuerdo"; el cual se desarrolló a partir de la propuesta de los autores Albrecht (2003), Darroch (2005), De Angelis (2013), Ghosh y Scott (2006), Peters et al. (2016), Preece (2015), Zangoueinezhad y Moshabaki (2009), Wamba et al. (2017) y Wu y Hu (2012).

Mediante la metodología Delphi, el cuestionario fue validado por un panel de expertos de Brasil y Portugal con el fin de llegar a un consenso sobre las definiciones conceptuales y la validez del contenido de los ítems (Hasson et al., 2000; Lima et al., 2016; Malekzadeh et al., 2016). El cuestionario se entregó a 6 profesores (Ph.D.) y consultores de salud especializados y a 10 profesionales de la salud (médicos y enfermeras) para interacciones de recolección de opiniones (Dalkey y Helmer, 1963; Lima et al., 2016). Luego de tres interacciones, se llegó a la versión final, compuesta por 8 preguntas sobre gestión del conocimiento, 6 preguntas sobre inteligencia organizacional, 6 sobre desempeño organizacional y 3 preguntas sobre respuesta efectiva al covid-19.

La muestra está formada por enfermeros y médicos que fueron contactados a través de la red social profesional Linkedin. Se seleccionaron profesionales de la salud que cumplieran con los siguientes criterios: estar trabajando en organizaciones sociosanitarias y tener un perfil completo en Linkedin (información sobre descripción profesional, foto, cargo y empresa actual en la que trabajaba).

Para calcular el tamaño de la muestra se utilizó el software GPower 3.1. Para obtener un tamaño del efecto de 0,15 y una potencia de 0,80, se necesitaron 77 muestras considerando el total de 3 predictores (Faul et al., 2009). Para ello, se contactaron 1.150 profesionales de la salud y 101 aceptaron la invitación a participar y respondieron la encuesta.

Resultados, conclusiones y limitaciones

Los resultados se dividieron entre el análisis de la evaluación de las medidas que componen el modelo conceptual, la evaluación del modelo de medida y la evaluación del modelo estructural.

En la primera etapa de los análisis se realizó un Análisis Factorial Confirmatorio (CFA) (Latan, 2018; Roemer, 2016). El CFA permite evaluar la contribución de cada ítem de la escala en la formación del constructo, así como si la escala mide adecuadamente el concepto (Bandalos, 2018; Hair et al., 2018). Los indicadores KM6, KM7 y OP5 fueron excluidos porque tienen cargas factoriales inferiores a 0,7 y después de la confirmación de su eliminación no tuvieron un impacto negativo en la raíz cuadrada del AVE y CR y no afectaron significativamente el contenido del modelo. Si bien el indicador OP6 tiene una carga factorial menor a 0,7 (0,689), se mantuvo en el modelo por la importancia de su contenido (Bido y Silva, 2019; DeVellis, 2016; Netemeyer et al., 2003).

En la segunda etapa, para la evaluación de modelos de medida reflexiva, se realizó una prueba de consistencia interna y validez convergente y discriminante (Hair et al., 2017). Todas las pruebas fueron evaluadas mediante el software Smart PLS 3 (Ringle et al., 2015) y todos los resultados encontrados para los análisis de consistencia interna, validez discriminante y validez convergente están de acuerdo con los límites establecidos por la literatura (Fornell y Larcker, 1981; Franke y Sarstedt, 2019; Hair et al., 2017).

Finalmente, se realizó la evaluación del modelo estructural. Se realizó el análisis de ajuste global del modelo, condición necesaria para realizar el análisis confirmatorio con PLS-SEM. El valor obtenido para la raíz cuadrada media residual estandarizada (SRMR) fue 0,071, el cual está de acuerdo con las condiciones esperadas (SMRM ≤ 0,08), confirmando el ajuste global del modelo (Hair et al., 2017; Henseler, 2018; Hu Y Bentler, 1999).

Como resultado, encontramos que la gestión eficaz del conocimiento y la inteligencia organizacional tienen una asociación positiva con el desempeño organizacional. Los resultados también indicaron que la gestión eficaz del conocimiento y el desempeño organizacional tienen una asociación positiva con una respuesta eficaz al covid-19. Por otro lado, no se apoyó la hipótesis de que la inteligencia organizacional tiene un efecto positivo en la respuesta efectiva al covid-19, contradiciendo lo esperado en cuanto a la capacidad de la inteligencia organizacional para asegurar una mejor vigilancia, reacción y adaptación a los cambios del mercado (Istudor et al., 2016; Malekzadeh et al., 2016, Briones-Peñalver et al., 2012). Finalmente, el estudio confirmó que existe una relación positiva y significativa entre la gestión del conocimiento y la inteligencia organizacional, la cual era de esperar siguiendo la revisión académica más reciente.

Este estudio tiene algunas limitaciones que conviene observar como sugerencias para futuros estudios. El grupo de encuestados está compuesto en su mayoría por profesionales de la salud que trabajan en las actividades operativas de los hospitales y en contacto directo con los pacientes. Este hecho reduce la visión de los profesionales que se desempeñan en puestos directivos, lo cual también es una limitación importante y constituye una futura línea de investigación para futuros estudios.

Valor original e implicaciones prácticas

Este estudio proporciona evidencia empírica de la importancia de una gestión eficaz del conocimiento para hacer frente a las crisis. En particular, valida la relación entre la gestión eficaz del conocimiento, la inteligencia organizacional y el desempeño organizacional, y la importancia de ambos para que las organizaciones respondan de manera efectiva a la aparición de nuevos brotes y otros cambios en el entorno.

Entre las implicaciones teóricas se encuentra la importancia de una gestión eficaz del conocimiento para la respuesta eficaz de las organizaciones socio-sanitarias a las crisis y el desempeño hospitalario. Además, el estudio identifica una relación directa y positiva entre la gestión eficaz del conocimiento y el desempeño organizacional de estas organizaciones. Esto es significativo al avanzar en el campo del conocimiento sobre la preparación y toma de decisiones para responder a momentos de crisis en el área de la salud.

Las implicaciones prácticas relevantes son que las organizaciones de salud deben buscar mejorar su gestión del conocimiento, a fin de prepararse para nuevos momentos turbulentos como el ocurrido durante la pandemia covid-19. Los resultados pueden orientar la toma de decisiones de los gobiernos de todo el mundo a la hora de definir políticas de salud pública, fomentando así el intercambio de conocimientos y aumentando la transferencia de conocimientos entre organizaciones sanitarias, como la "Santa Casa de Misericórdia".

En cuanto a las organizaciones socio-sanitarias, los resultados de este estudio sugieren la necesidad de que los directivos concentren sus esfuerzos en el desarrollo de actividades y programas internos orientados a la gestión eficaz del conocimiento. Esto contribuiría a mejorar la calidad de los servicios prestados por sus empleados, así como el desempeño organizacional y la respuesta efectiva de las organizaciones a las crisis. Por ello, conviene fomentar las buenas prácticas de gestión del conocimiento, tanto en periodos regulares como en épocas de mayor turbulencia, además de ser incluidas en el desarrollo de sistemas de evaluación del desempeño de los profesionales de la salud.

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1. Introduction

The theme of knowledge and organizational intelligence has come a long way in the field of management sciences. However, although these themes appear to be already consolidated in the scientific domain, new events, especially unforeseen ones, such as the Covid-19 Pandemic, often give rise to the need for adjustments at the conceptual level, due to necessary adjustments to current challenges.

We highlight the recent Coronavirus-associated pandemic which, having started in 2019, has challenged many traditional management practices, instruments, methodologies and assumptions. A good example of this is the pressure on the temporal variable in organizational decisions and dynamics associated with the coronavirus.

At the end of 2019, a novel coronavirus was detected in the city of Wuhan, capital of Hubei province - China (Comfort et al., 2020; B. Zhang et al., 2021). Shortly after, on January 30, 2020, the World Health Organization (WHO) declared the existence of a public health emergency of international importance caused by the novel coronavirus (WHO, 2020), later called covid-19 (Bryce et al., 2020).

As seen, covid-19 spread rapidly around the world, infecting and killing people in more than 210 countries and territories in less than five months, thus becoming a global pandemic (Comfort et al., 2020). People found themselves confined to their homes, and commerce, in general, was paralyzed without economic activity. Many organizations, particularly in the health sector or associated, found themselves unable to respond to the various needs or economic requests that ensued. In the health sector, all institutions were called to participate in the fight against the pandemic: public, social and private.

As a consequence of the delay in recognizing the severity of covid-19, there has been an exponential increase in infections and deaths (Bryce et al., 2020). This unrestrained growth has made covid-19 a cross-border and global problem, challenging the ability of national governments and health managers to manage the crisis (Comfort et al., 2020).

Pandemic management challenged the complex health systems of many countries and the mitigation of its effects was only possible in cases where managers were able to take timely decisions and implement effective decisions (Ammirato et al., 2020; F. Zhang et al., 2021). In this context, the timeliness of responses has been a critical success factor (Huang and Shih-Wei, 2020).

Therefore, organizations need to architect their knowledge management processes making them more efficient and effective (Ammirato et al., 2020; Bdeir et al., 2013) to ensure a better capability to create, code, validate, store, share, use and evaluate knowledge (Istudor et al., 2016; Soto-Acosta and Cegarra-Navarro, 2016).

Additionally, organizations need to develop high levels of organizational intelligence to be able to develop efficient behavior and to guarantee an adequate reaction to the dynamics and uncertainties present in the environment. Organizational intelligence influences the capacity to create and use knowledge as a strategic asset to ensure the best market reaction and adaptation (Istudor et al., 2016; Malekzadeh et al., 2016).

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Considering that knowledge is a critical factor for efficient crisis management (Huang and Shih-Wei, 2020) and considering the complexity of the crisis in health organizations (Lee et al., 2014), this study aims to examine the impact of effective knowledge management, organizational intelligence, and organizational performance on the effective response of social healthcare institutions to covid-19. To this end, we collected data through a survey sent to physicians and nurses who worked in hospitals in Brazil and Portugal. The survey link was sent through a professional social network to 1,150 healthcare professionals and 101 valid responses were obtained. The PLS-SEM analysis technique was used to analyze the data.

2. Literature Review

2.1. The importance of knowledge management and organizational intelligence for organizational performance

Information and knowledge are central resources in organizational economic dynamics and in the relationship with different stakeholders. Therefore, they constitute an economic and organizational asset (Nisar et al., 2019) that must be properly managed as the capacity for innovation depends on them (Du Plessis, 2007; Jad et al., 2017; Hosseini et al., 2019) and is often generated through an information-sharing environment between the various organizational collaborators (Istudor et al., 2016). Knowledge, in addition to allowing expertise acquisition, enables the development of organizational learning practices (Nisar et al., 2019).

Knowledge constitutes an intermediate stage between information and organizational intelligence in a roadmap that is essential for the development of economic organizations and responses to environmental changes, market demands, new customers' requirements, expertise and emerging capabilities (Chang and Chuang, 2011; Gold et al., 2001; Keshavarz et al., 2018; Nisar et al., 2019).

Currently, changes in the environment of organizations are characterized by great unpredictability, with rapid, radical and discontinuous changes. This uncertain environment makes the ability of organizations to adapt and acquire knowledge essential features (Vieira et al., 2015). Knowledge acquisition and learning competencies are the basis for the development and improvement of Organizational Intelligence, leading the organization to robust, competitive and sustainable entrepreneurship (Carayannis et al., 2017).

Organizational Intelligence is defined as an organization's ability to learn and manage available knowledge, applying it in decision-making to adapt to business environments. Organizational Intelligence thus becomes a reflection of the organization's decision-making ability in critical situations arising from changes in the business environment and various situations that will arise over time (Malekzadeh et al., 2016). Dobre and Hăhăianu (2016) consider that Organizational Intelligence depends on four criteria: (i) ability to adapt to dynamic environ-

ments; (ii) ability to influence the environment in which it is embedded; (iii) ability to reconfigure itself according to the new environment and, finally, (iv) ability to contribute sustainably to the environment in which it is embedded.

Thus, if knowledge possession appears to be relevant for competitiveness and sustainability, it is, above all, its effective management capacity that can have a positive effect on organizational performance and the production of economic value. In this sense, the role of management is highlighted, as knowledge is not a static asset, but a dynamic one. Only proper management will allow for the construction of the bases for organizational intelligence, facilitating market surveillance and a capacity for reaction or pro-action towards it (Briones-Penãlver et al., 2012; Briones-Penãlver et al., 2020).

It is the dynamics of the economy, expressed in the volatility of consumer needs, the increasingly smaller timings of the market, among other examples, that explains effective knowledge management gaining relevance in the organizational context through the ability to generate better organizational performance indices as well as competitive advantages (Leal-Rodríguez et al., 2013; Lee et al., 2014; Nisar et al., 2019). The trademarks of the 21st century's information society, namely an organization's ability to obtain value from their knowledge and information assets (Gold et al., 2001; Lee et al., 2014), will tend to evolve rapidly towards organizational capacity for generating and using knowledge and for developing intelligence.

In the current economic context, knowledge is a requirement for the sustainability of any economic sector and any organization. As a condition for the development of organizational intelligence, the ability to develop an effective flow of information and knowledge in permanent interaction with the environment and between the various organizational areas is important. Conceptually thinking from a perspective of intelligence at the organizational level assumes the adoption of practices of different dimensions: information systems governance, organizational urbanism, functional organic, and metabolism (Briones-Peñalver et al., 2012).

All these dimensions are critical requirements for maintaining competitiveness in the market, especially in an information society context, where intangible assets, such as information and knowledge, are quickly disseminated and used (Daňa et al., 2020). These perspectives for economic organizations and the aspect of organizational intelligence constitute important management paradigms that tend to minimize functional asymmetries between the various organizational units. In the scope of organizational intelligence, we could also add communication structure to these perspectives. Without a communication structure adequate to the requirements and decision timings, as well as to the requirements of knowledge management, people cannot develop their activities or make decisions because they do not receive the necessary inputs (Nisar et al., 2019).

All perspectives must be articulated in a real scenario of the market, economy and society. All requirements, such as increasingly shorter decision timings, more volatile consumer needs and expectations, coverage of the contingency of phenomena (as was the case with the covid-19 pandemic), among other aspects, not only show the relevance of effective knowledge management, especially in turbulent environments (Martinez-Conesa et al., 2017), but also the importance of the ability to have an effective events' response (Lim et al., 2020). Organizations

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need to develop mechanisms that provide organizational intelligence which is particularly evident in health organizations and their professionals during the covid-19 pandemic worldwide (Comfort et al., 2020).

The contingency of the pandemic has shown that an increasing demand for medical services may result in a reduction or complete interruption of other structures and services, such as the acquisition of medical supplies and equipment, and the availability of health professionals (Lim et al., 2020). This means that an effective response during times of crisis depends on planning (Lim et al., 2020) and the ability to share information in real-time, especially during complex situations when information about hospitals (bed occupancy rate, patient conditions, etc.) is essential for decision-making and to resource-allocation (Abbo et al., 2020). For this reason, an effective response depends largely on the effectiveness in carrying out the various integrated activities related to the identification, capture, evaluation, recovery and sharing of the organization's information (Gold et al., 2001; Leal-Rodríguez et al., 2013; Nisar et al., 2019), which represents, in other words, the need for effective knowledge management. This identification, capture, evaluation, recovery and sharing of the organization's information must be supported by the various perspectives previously indicated for an intelligent organizational functioning.

2.2. Knowledge and performance management of social healthcare institutions

The health sector is of great management and organizational complexity. In these institutions, multiple functions, professions, stakeholders, the interdependence of individuals and teams, powers, and autonomy of health professionals, among other aspects, converge. On the other hand, it is a sector where innovation, namely technological, is evidently felt, whether in terms of processes, diagnosis, treatment, and information systems, with often substantial differences between public, private and social sector institutions. Different requirements from patients, society, and governments also converge. However, it is, above all, a sector that supports its activity in knowledge and experience shared between different professionals, areas of expertise and stakeholders.

Social healthcare institutions, or private institutions of social solidarity, like "Santa Casa de Misericórdia", are institutions regulated by law whose management is independent from the State. They are classified as collective organizations of public utility, thus having some benefits, mainly related to taxation. These institutions are also characterized by having limited resources, besides being inserted in an environment of high complexity and dynamism (Anunciação and Geada, 2021). Hence, they operate in a rather unpredictable and volatile environment, given that they are required to provide social responses conditioned by the specificity of the population's health problems (e.g. pandemic, outbreaks), as well as economic (e.g. unemployment, cost of living, poverty) and social conditions (e.g. ageing population, a network of health institutions).

This was a fact during the efforts to minimize the effects of the covid-19 pandemic. The requirements associated with the management of response timings to save human lives and the management of infrastructure and equipment was critical to minimize the high number of human life losses that health institutions faced daily at the height of the pandemic (Hodgins et al., 2021; Li et al., 2021). Management and sharing of knowledge was a critical success factor in minimizing the effects of the pandemic by health institutions, highlighting the development of specific mechanisms for knowledge management (Gold et al., 2001; Santoro et al., 2018) and thus improving their ability to innovate and respond to environmental changes (Santoro et al., 2018; Teece, 2007).

For Li et al. (2021), hospitals' covid-19 response effectiveness can be defined through three aspects related to management and infrastructure, these being: the massive capacity to track and care for patients diagnosed with the disease, having a closed-loop management system to prevent outsiders from coming into contact with patients, and a centralized response and action system. This last feature includes centralizing management of healthcare professionals and centralizing knowledge to improve the quality and speed of patient rescue.

Despite recognizing the importance of effective knowledge management and intelligence, there is still little research on the subject in the health sector (Känsäkoski, 2017; Massaro et al., 2015; Sibbald et al., 2016) focused on the growth of interest in the areas of knowledge and information management (Ferlie et al., 2012; Kothari et al., 2011).

Knowledge management can be grouped into two dimensions: facilitators and processes. Facilitators bring together the mechanisms used to facilitate codification and sharing of knowledge between individuals and teams (Santoro et al., 2018), as information and communication technologies are essential to obtain competitive advantage and implement innovations (Briones-Peñalver et al., 2018), stimulating the creation, sharing, protection, and improving the processes involved in knowledge activities (Yeh et al., 2006; Briones-Penãlver et al., 2020).

Processes of knowledge activities, on the other hand, refer to structured coordination activities like creation, sharing, storage, and application of knowledge, in order to obtain effective knowledge management (Lee and Choi, 2003; Santoro et al., 2018). This division of knowledge management becomes more prevalent when analyzing the work of physicians and nurses. The nature of health professionals' work requires them to keep constantly updated on new procedures to apply this information to their daily activities (Känsäkoski, 2017).

An example of the importance of effective knowledge management in healthcare is the pharmaceutical field and the process of developing new drugs. The wealth of data generated by clinical studies and experimental trials will result in new drugs only if the data are collected, managed, and shared appropriately, that is, if there is an effective knowledge management (Szalma et al., 2010).

2.3. Research hypotheses

As mentioned, knowledge management can generate benefits for the organization (Gold et al., 2001; Santoro et al., 2018) to improve its performance (Daňa et al., 2020; Gaviria-Marin

et al., 2019; Keshavarz et al., 2018; Nisar et al., 2019; Santoro et al., 2018). As Almeida et al. (2016) and X. Zhang et al. (2012) state an organization's performance in the actual economy is related to its ability to obtain, process, and interpret available information, going far beyond the simple activity of obtaining this information. Therefore, through effective knowledge management, social healthcare institutions are able to improve the process of knowledge extraction and application to improve their level of service (Li and Hung, 2009; Hosseini et al., 2019). An example of a direct benefit generated by effective knowledge management in health institutions is the greater ability for innovation (Du Plessis, 2007; Jad et al., 2017), considered a decisive factor for the long-term growth and survival of these organizations (Dalkir, 2013), and their ability to promote improved performance of hospitals by impacting on the quality of health professionals (Lee et al., 2014).

Additionally, the construction and sharing of knowledge are considered critical to ensure effectiveness in response coordination in moments of crisis and relief efforts (Bdeir et al., 2013), as required during the spreading of covid-19 worldwide.

The covid-19 pandemic required quick and consolidated decisions from health organizations and governments, and a new ability to respond and adapt to the new environment (Comfort et al., 2020) to rapidly manage and mitigate the pandemic effects (Ammirato et al., 2020) and reduce death-risk (Huang and Shih-Wei, 2020). The availability and sharing of knowledge through global clinical reports on the covid-19 pandemic are considered one of the contributing factors for the fast learning about the disease, helping to reduce the average mortality rate in ICUs in several countries, with rates falling from over 50% in March to an average rate of 41.6% in May (Armstrong et al., 2020). So, knowledge management may have a significant and positive effect on the effective response to covid-19.

Consequently, the performance of social healthcare institutions and their effective response to the challenges of the new scenario imposed by covid-19 has become determinant to mitigate the effects of the pandemic. To manage and achieve an effective response to the crisis (Huang and Shih-Wei, 2020) caused by covid-19, it is expected that social healthcare institutions with effective knowledge management also achieve high organizational performance (Lee et al., 2014), with greater ability to solve arising problems and challenges, acquire new expertise and increase their organizational learning (Nisar et al., 2019), as well as manage and achieve an effective response to the crisis (Huang and Shih-Wei, 2020) caused by covid-19. Consequently, we can assume that knowledge management, organizational intelligence and performance of social healthcare institutions may have a significant and positive effect on the effective response to covid-19

Based on these arguments, the following hypotheses in this study were elaborated:

H1: Effective knowledge management has a significant and positive effect on the organizational intelligence of healthcare social institutions.

H2: Effective knowledge management has a significant and positive effect on the effective response of healthcare social institutions to covid-19.

H3: Effective knowledge management has a significant and positive effect on the organizational performance of healthcare social institutions.

H4: Organizational intelligence has a significant and positive effect on the organizational performance of healthcare social institutions.

H5: Organizational intelligence has a significant and positive effect on the effective response of healthcare social institutions to covid-19.

H6: Organizational performance has a significant and positive effect on the effective response of healthcare social institutions to covid-19.

From the studies, theories and hypotheses, the conceptual model of this research was elaborated, as presented in Figure 1.

Figure 1. Conceptual model of the research
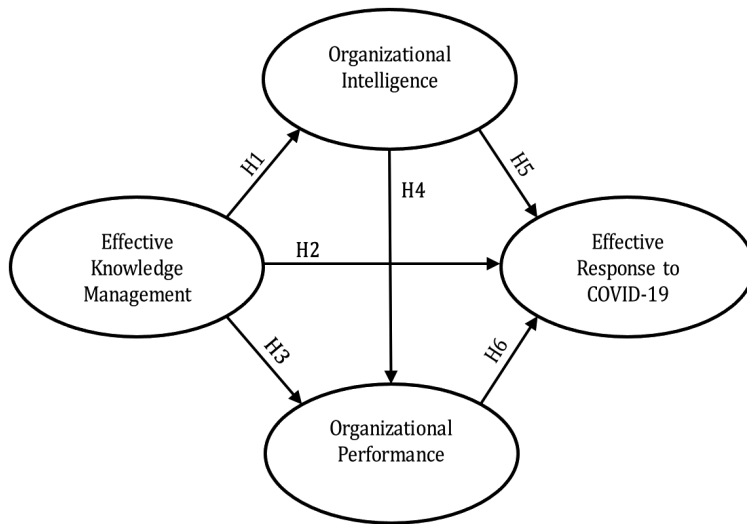
Source: Own elaboration.

3. Methodology

To examine the impact of effective knowledge management, organizational intelligence and organizational performance on the effective response of social healthcare institutions to covid-19, we collected and analyzed the responses of physicians and nurses who worked in social healthcare organizations (for example, "Santa Casa de Misericórdia") in Brazil and Portugal, during the pandemic, about the effective response of these organizations to covid-19.

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The choice of studying social healthcare institutions came from the fact that they had a seemingly less important role in the fight against the pandemic. However, especially in Portugal, they were discreetly at the back of public health institutions, supporting the variations registered in the demand for healthcare at public hospitals (Briones-Peñalver et al., 2012), helping to prevent the public health system from collapsing, especially in periods when the determined capacity for admission of covid-19 patients was overreached.

For the data analysis, PLS-SEM (Partial Least Square - Structural Equation Modeling) technique was used. The PLS-SEM technique has been widely used in the social sciences (Hair, Black, Babin, and Anderson, 2018) for several reasons that go far beyond the requirement of a smaller sample size (Bido and Silva, 2019), such as being an excellent technique for assessing the relationship between constructs, being robust to the lack of multivariate normality of the data, and advised when working with complex models (Bido and Silva, 2019; Hair et al, 2014; Hair et al., 2017; Hair et al., 2018; Hair et al., 2017; Latan, 2018).

Additionally, the choice of these two countries is derived from the cultural closeness between them and the presence of these social healthcare institutions in both countries. One of the main contributions of this work will be the proposition and validation of the theoretical model relating to effective knowledge management, organizational intelligence and organizational performance to achieve an effective response to covid-19. From these results, social healthcare institutions will be able to improve their effectiveness in responding to new disease outbreaks.

As for originality, this work will present a model to manage the effectiveness of healthcare organizations' response to pandemics, in addition to being one of the first surveys carried out with physicians and nurses who worked during the covid-19 pandemic.

3.1. Measuring instrument

To analyze the relationships between effective knowledge management, organizational intelligence, organizational performance and effective response to covid-19 in this study, a standardized questionnaire, combined with a Likert scale of five points ranging from "totally disagree" to "totally agree", was developed based on the proposal of authors Albrecht (2003), Darroch (2005), De Angelis (2013), Ghosh and Scott (2006), Peters et al. (2016), Preece (2015), Zangoueinezhad and Moshabaki (2009), Wamba et al. (2017), and Wu and Hu (2012).

Through the Delphi methodology, the questionnaire was validated by a panel of experts to reach a consensus on the conceptual definitions and validity of the items' content (Hasson et al., 2000; Lima et al., 2016; Malekzadeh et al., 2016). The questionnaire was delivered to 6 professors (Ph.D.) and specialized health consulting members as well as 10 health professionals (physicians and nurses) for opinion-collection interactions (Dalkey and Helmer, 1963; Lima et al., 2016). After three interactions, the final version was reached, comprising of 8 questions on knowledge management, 6 questions on organizational intelligence, 6 on organizational performance and 3 questions on effective response to covid-19. The final questionnaire in this survey is available in Appendix 1.

3.2. Data collection and sample

Nurses and physicians are recognized health professionals within hospitals for their intensive knowledge (Wu and Hu, 2012), as well as being more up-to-date and aware about the treatment of various diseases around the world, as in the case of the covid-19 pandemic (WHO, 2020).

For this study, nurses and physicians were contacted through the Linkedin professional social network. Health professionals who met the following criteria were selected: they were working in social healthcare organizations and had a complete profile on Linkedin (information about professional description, photo, position, and current company in which they worked). Table 1 presents the demographic data of the sample.

To calculate the sample size, the GPower 3.1 software was used to obtain an effect size of 0.15 and a power of 0.80, 77 samples were needed considering the total of 3 predictors (Faul et al., 2009).

Table 1. Demographic data of respondents

Measure	Item	Frequency	(%)
Nature of professional activity	Physician	47	46.5%
	Nurse	54	53.5%
Educational level	Undergraduate	81	80.2%
	Master	17	16.8%
	Doctorate	3	3.0%
Professional responsibility	Director-General	4	4.0%
	Area Manager / Department / Service	19	18.8%
	Team Leader	22	21.8%
	Team member	55	54.5%
	Other	1	1.0%
Working time in the current position	Up to 2 years	32	31.7%
	From 3 to 4 years	12	11.9%
	From 5 to 6 years	10	9.9%
	From 7 to 8 years	9	8.9%
	Over 8 years	38	37.6%
	Retired	0	0.0%

Source: Own elaboration.

To this end, 1,150 health professionals were contacted and 101 accepted the invitation to participate and responded to the survey. Of these, 53.5% were nurses and 46.5% physicians, most of them with more than 8 years in their current position (37.6%), in addition to the largest participation of professionals with undergraduate academic level (80.2%).

3.3. Measurement model

In structural equation modeling, the evaluation of the measurement model requires different statistical tests for reflective and formative models. For this study, which uses a reflective measurement model, it is necessary to evaluate reliability, through the internal consistency test, and validity, through convergent and discriminant validity tests (Hair et al., 2017).

The internal consistency was evaluated through the composite reliability (CR) test and Cronbach's alpha (α). For the convergent validity, indicator reliability tests were used (through the analysis of the factor load of the indicators) and the average variance extracted (AVE) (Hair et al., 2017). Finally, for discriminant validity, the analysis of the square root of the AVE was performed (Fornell and Larcker, 1981).

For reliability validation, CR and Cronbach's alpha values higher than 0.7 are expected. For convergent validity, factor load values higher than 0.7 and AVE values higher than 0.5 are expected (Hair et al., 2017). Finally, the square root values of the AVE of each construct are expected to be higher than the correlations of the construct with the others that make up the model (Fornell and Larcker, 1981; Franke and Sarstedt, 2019; Hair et al., 2017).

4. Results

4.1. Confirmatory Factor Analysis

At the first stage of the analysis, an evaluation of the measurements that compose the conceptual model was carried out. For this purpose, through the use of SmartPLS 3 software (Ringle et al., 2015), a Confirmatory Factor Analysis (CFA) was performed (Latan, 2018; Roemer, 2016). The CFA allows for evaluating the contribution of each item of the scale in the formation of the construct, as well as whether the scale adequately measures the concept (Bandalos, 2018; Hair et al., 2018). The results of the CFA and the descriptive statistics are presented in Table 2.

Table 2. Standardized CFA path loadings and descriptive statistics

Questions	Items	Loadings	Mean	SD	t-value	p-value
Effective knowledge management (KM)						
We ask you to evaluate each statement below according to the situation of the organization in which you work, on a scale of **1 (I totally disagree) to 5 (I totally agree). In the organization where I work…**						
Employees receive adequate training from the organization to carry out their activities.	KM1	0.832	0.828	0.035	23.486	0.000
The instructions described in the institution's procedures are easy to understand.	KM2	0.791	0.786	0.048	16.511	0.000
The organization adopts the best practices available in the market.	KM3	0.858	0.857	0.028	30.662	0.000
Meetings in the workplace include discussions related to practices adopted in the market.	KM4	0.849	0.848	0.032	26.538	0.000
There is information available in the organization for employees to consult and solve problems.	KM5	0.821	0.82	0.032	25.665	0.000
The structure of departments and units facilitates interaction and knowledge sharing.	KM8	0.832	0.828	0.035	23.486	0.000
Organizational Intelligence (OI)						
We ask you to evaluate each statement below according to the situation of the organization in which you work, on a scale of **1 (I totally disagree) to 5 (I totally agree). In the organization where I work…**						
One seeks to identify how changes in the business environment influence decision-making.	OI1	0.813	0.811	0.040	20.420	0.000
Knowledge is successfully used to make forecasts to anticipate changes and make decisions.	OI2	0.846	0.843	0.038	22.102	0.000
Information about good work practices and lessons learned are used in decision-making.	OI3	0.868	0.867	0.027	31.958	0.000
Management promotes an atmosphere of openness and acceptance of change.	OI4	0.900	0.900	0.020	45.648	0.000
Communication is clear and efficient.	OI5	0.804	0.804	0.040	20.342	0.000
Processes and norms are defined with the participation of representatives from various areas.	OI6	0.813	0.811	0.040	20.420	0.000

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Questions	Items	Loadings	Mean	SD	t-value	p-value
Organizational performance (OP)						
Regarding the performance of the organization where you work, **in the last 2 years**, it is correct to say that the organization...						
Offered a good overall quality of services	OP1	0.868	0.868	0.022	39.134	0.000
Presented good financial health	OP2	0.719	0.716	0.061	11.741	0.000
Presented good reputation in relation to its technical skills	OP3	0.871	0.869	0.028	31.059	0.000
Demonstrated high innovation in services and processes	OP4	0.864	0.863	0.028	30.811	0.000
Increased success rate in treatments / services	OP6	0.689	0.688	0.072	9.598	0.000
Effective response to covid-19 (ER)						
Regarding the effects of covid-19, we ask you to evaluate with notes from 1 (I totally disagree) to 5 (I totally agree). **The organization where I work...**						
Made assertive decisions to anticipate the challenges of covid-19	ER1	0.856	0.854	0.031	28.028	0.000
Adapted quickly to the changes imposed by covid-19	ER2	0.917	0.915	0.025	36.782	0.000
Acquired and effectively applied available information about covid-19	ER3	0.928	0.928	0.016	58.529	0.000

SD = standard deviation. The table shows the values of descriptive statistics for confirmatory factor analysis. The total sample is 101.

After confirmation that their removal did not have a negative impact on the square root of the AVE and CR and did not significantly affect the content of the model, the indicators KM6, KM7 and OP5 were excluded because they have factor loads lower than 0.7. Although indicator OP6 has a factor loading of less than 0.7 (0.689), it was kept in the model due to the importance of its content (Bido and Silva, 2019; DeVellis, 2016; Netemeyer et al., 2003).

The next section presents the implications for other statistical criteria, analyzing the square root of the AVE and the CR.

4.2. Evaluation of the measurement model

For the evaluation of reflective measurement models, it is necessary to perform internal consistency tests and convergent and discriminant validity (Hair et al., 2017). All tests were evaluated using Smart PLS 3 software (Ringle et al., 2015) and their results are presented in Table 3.

The internal consistency analysis was performed through CR and Cronbach's alpha. While Cronbach's alpha provides an estimate of the intercorrelations of the indicators that make up the constructs, CR provides a count of the external loads of these same indicators in order

to inform how much the indicators represent the construct. For research in more advanced stages like this, values above 0.70 for Cronbach's Alpha and CR values above 0.60 are expected. Convergent validity, on the other hand, represents the level of shared variation among the indicators used to measure a reflective construct, which are evaluated through the square root of the AVE and the outer loading of the indicators. As a general rule, values equal to or greater than 0.70 are expected for the outer loading and, consequently, a value equal to or greater than 0.50 for the square root of the AVE (Hair et al., 2017).

Finally, for the discriminant validity analysis, it was compared whether the square root value of the AVE of each construct is higher than the correlations of the construct with the others that make up the model (values in the respective rows and columns) (Fornell and Larcker, 1981; Franke and Sarstedt, 2019; Hair et al., 2017).

Table 3. Results of discriminant validity and convergent validity analysis

	ER	KM	OI	OP
ER	**0.901**			
KM	0.660	**0.825**		
OI	0.492	0.805	**0.850**	
OP	0.605	0.729	0.738	**0.806**
α	0.883	0.906	0.923	0.862
CR	0.891	0.910	0.924	0.878
AVE	0.928	0.928	0.940	0.902

The values in the diagnosis represent the square root of the AVE; all correlations are 1% significant; the lowest outer loading value was 0.689.

All results found for the analyses of internal consistency, discriminant validity and convergent validity are within the limits established by the literature (Fornell and Larcker, 1981; Franke and Sarstedt, 2019; Hair et al., 2017).

4.3. Evaluation of the measurement model

The evaluation of the structural model is performed to verify the predictive capacity of the model in relation to its endogenous constructs (Hair et al., 2014). For this purpose, a series of heuristic criteria is used in the evaluation of reflective models like this one. Among these criteria is the evaluation of the coefficients of determination of the model (R^2), predictive rel-

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evance (Q^2), size and significance of path coefficients and effect sizes (f^2 and q^2) (Hair et al., 2017). The Bootstrapping technique was used with 5.000 samples, 95% confidence level and two-tailed significance test were used to check the significance of paths' coefficients between constructs (Hair et al., 2014). The values of each of these criteria are presented in Table 4.

The coefficient of determination (R^2) demonstrates the predictive power of the model, explaining the amount of variance of the endogenous variable that is explained by exogenous variables (Hair et al., 2014; Hair et al., 2017), which, according to Cohen (1988), can be classified as high predictive power ($R^2 >= 0.26$) for ER ($R^2 = 0.473$), OP ($R^2 = 0.588$) and OI ($R^2 = 0.644$). Additionally, as shown in Table 4, the results indicate that the relationship between KM and OI, KM and ER, KM and OP, OI and OP, and OI and ER are significant at the 1% level, thus supporting H1, H2, H3, H4, and H6. The relationship between OI and RE (H5) was not supported by the results, with a p-value of 0.172.

Table 4. Results of the structural model

Path	Hypotheses	f²	β	SD	Value t	p-value	R² Adjusted
KM -> ER	H2(+)	0.231	0.615	0.169	3.643	0.000	
OI -> ER	H5(+)	0.040	-0.260	0.191	1.366	0.172	0.473
OP -> ER	H6(+)	0.096	0.349	0.129	2.700	0.007	
OI -> OP	H4(+)	0.162	0.431	0.095	4.558	0.000	
KM -> OP	H3(+)	0.128	0.382	0.096	3.966	0.000	0.588
KM -> OI	H1(+)	1.835	0.805	0.040	20.075	0.000	0.644

ER = effective response. KM = effective knowledge management. OI = organizational intelligence. OP = organizational performance. f² = f square. β = structural coefficient. SD = standard deviation. R² = coefficient of determination.

By evaluating the effect size (f^2), we verify the variance explained by each of the exogenous variables in relation to the endogenous variable. The values are divided between small ($f^2 = 0.02$), medium ($f^2 = 0.15$) and large ($f^2 = 0.35$) effect sizes. The results showed that the KM has a large effect size on the ER (0.216), whereas OI has a large effect size on OP (0.146) and a small effect size on ER (0.023). Finally, OP has a medium effect size on ER (0.085) (Cohen, 1988; Faul et al., 2009; Hair et al., 2017).

Through the blindfolding process, performed through the analysis of Stone-Geisser's Q^2 values, we found that the Q^2 values are greater than zero, which indicates that the model has predictive relevance (Garson, 2016; Hair et al., 2014). The predictive relevance of an exogenous construct for an endogenous construct was evaluated through the size of the q^2 effect. The results showed that KM has a large predictive relevance on the ER (0.143) and the other exogenous constructs have a small predictive relevance over the endogenous constructs, with

the following results: KM > OP (0.050); OI > OP (0.061); OI > ER (0.008) and OP > ER (0.061) (Hair et al., 2017).

The final model resulting from this empirical research is presented in Figure 2.

Figure 2. Results of the structural model
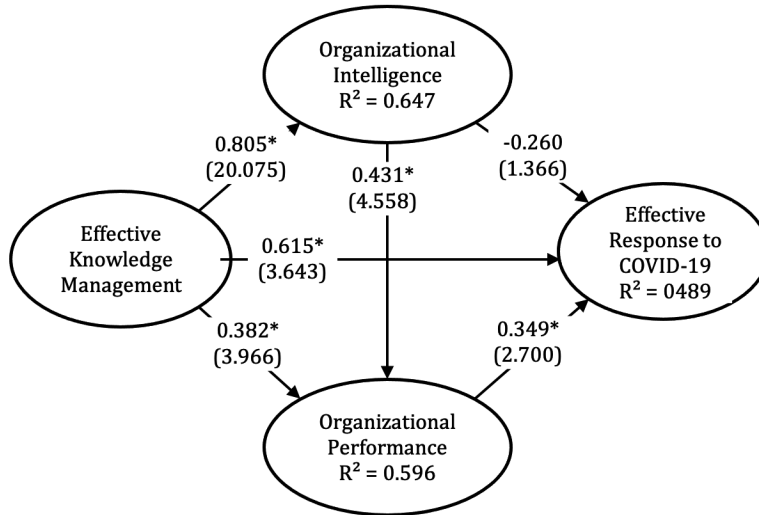
* $p < 0.01$. Significant t value at > 1.96. Path coefficient and t value in parentheses.

Finally, the global adjustment analysis of the model was performed, a necessary condition to perform the confirmatory analysis with PLS-SEM. The value obtained for the standardized root mean square residual (SRMR) was 0.071, which is in accordance with the expected conditions (SMRM ≤ 0.08), confirming the global adjustment of the model (Hair et al., 2017; Henseler, 2018; Hu and Bentler, 1999).

5. Discussion and Future Works

This research aimed to evaluate the impact of effective knowledge management, organizational intelligence and organizational performance on effective hospital response to covid -19. Well-trained health systems are essential to ensure the safety of the population, especially in times of crisis, such as the global pandemic of covid-19. Additionally, having adequate indicators to evaluate these organizations is considered a crucial factor to allow for improvements in the health system.

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As indicated in Table 4, effective knowledge management (β = 0.382, t = 3.966, p < 0.01) and organizational intelligence (β = 0.431, t = 4.558, p < 0.01) have a positive association with organizational performance, thus supporting H3 and H4. This result confirms similar research done previously regarding the benefits generated by effective knowledge management for organizations (Gold et al., 2001; Santoro et al., 2018), as well as the increase in organizational performance generated by effective knowledge management (Daňa et al., 2020; Gaviria-Marin et al., 2019; Keshavarz et al., 2018; Nisar et al., 2019; Santoro et al., 2018).

Additionally, the results corroborate previous studies on the benefits of organizational intelligence for the performance of organizations, acting in minimizing functional asymmetries between the various organizational units, improving decision-making and the activities developed by employees (Nisar et al., 2019), thus being considered a critical factor for maintaining competitiveness and performance (Briones-Peñalver et al., 2012).

This outcome demonstrates that emphasis on effective knowledge management and organizational intelligence can lead to improved performance in healthcare organizations such as "Santa Casa de Misericórdia", especially those where knowledge can be identified and leveraged through specific mechanisms for its management. This performance improvement is due to a greater flow of knowledge transfer promoted by better knowledge-sharing routines (Daňa et al., 2020; Gaviria-Marin et al., 2019; Keshavarz et al., 2018), as well as an increase in the capacity to create new processes (Thrassou et al., 2012) and innovation (Darroch, 2005; Santoro et al., 2018), positively interfering in the organization's processes and activities.

The results also indicated that effective knowledge management (β = 0.615, t = 3.643, p < 0.01) and organizational performance (β = 0.349, t = 2.700, p < 0.01) have a positive association with effective response to covid-19, thus supporting H2 and H6. Similarly to the increase in organizational performance, effective knowledge management and organizational performance also provide a better effective response to environmental changes, specifically when it comes to the response to covid-19.

The flexibility attributed to the organization due to the increased flow of knowledge transfer (Daňa et al., 2020), as well as its ability to innovate (Teece, 2007; Thrassou et al., 2012), makes its response and adaptation to new needs imposed by the environment more agile, allowing better management of the response to the pandemic (Huang and Shih-Wei, 2020). With this more efficient and agile response, social healthcare organizations with higher levels of effective knowledge management and organizational performance also achieve a better effective response to covid-19, which results in a virtuous cycle of facing new challenges and acquiring new expertise needed to perform their activities (Lee et al., 2014; Nisar et al., 2019).

In this sense, social healthcare organizations, which already had better organizational performance, were also better prepared to face the covid-19 pandemic, making assertive decisions, adapting quickly to new challenges, and acquiring and applying effectively the knowledge acquired during the outbreak period of covid-19.

On the other hand, the hypothesis that organizational intelligence (β = -0.260, t = 1.366, p = 0.172) has a positive effect on the effective response to covid-19 (H5) was not supported, contradicting what was expected regarding the ability of organizational intelligence to ensure

better surveillance, reaction, and adaptation to market changes (Istudor et al., 2016; Malekza-deh et al., 2016, Briones-Penãlver et al., 2012).

This result may be due to the environmental conditions that these healthcare organizations were exposed to during the onset of the pandemic, as environmental conditions directly influence the identification and measurement of organizational intelligence (Boudlaie et al., 2014). Another possibility lies in the slower response speed of these organizations at the onset of the covid-19 pandemic, as the pandemic spread rapidly around the world and affected the ability of healthcare organizations to manage the crisis (Comfort et al., 2020). These problems may have affected fundamental aspects of the organizational intelligence of these organizations, such as their ability to learn and manage the new knowledge available, as well as their ability to adapt and contribute sustainably to their environment (Dobre and Hăhăianu, 2016).

Finally, the study also confirmed there is a positive and significant relationship between knowledge management and organizational intelligence ($\beta = 0.805$, $t = 20.075$, $p < 0.01$), thus supporting H1. This result is in agreement with that advocated by Briones-Penãlver et al. (2012) when asserting the importance of adequate knowledge management for building the foundations of organizational intelligence, as well as the intermediation role that knowledge has for information to be transformed into organizational intelligence (Chang and Chuang, 2011; Gold et al., 2001; Keshavarz et al., 2018; Nisar et al., 2019).

6. Conclusions

This study explored the impact of effective knowledge management and organizational performance on the effective response of social healthcare organizations to covid-19.

The results supported the theoretical model, thus validating the variables included. Significant associations of effective knowledge management with organizational intelligence, effective response to covid-19 and organizational performance were found. Positive associations were also found between organizational intelligence and organizational performance, as well as between organizational performance and effective response to covid-19. The positive relationship between organizational intelligence and effective response to covid-19, on the other hand, was not supported by the results. We recommend for future research to study this lack of relationship found in this research between organizational intelligence and organizational performance in social health institutions.

These findings provide useful information for the practice and role of effective knowledge management, organizational intelligence and organizational performance in the healthcare area, demonstrating the need for a knowledge-based approach to organizational management.

Additionally, knowledge asymmetries must be reduced through adequate communication structures, in order to provide all professionals with adequate knowledge to perform their tasks.

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6.1. Limitations

This study has some limitations that should be observed as suggestions for future studies. The group of respondents comprises mostly of health professionals who work in the operational activities of hospitals and are in direct contact with patients. This limits the insight of professionals who work in management positions. Although collecting data from professionals who work on the front line in the fight against covid-19 allows for a better evaluation of the institution's performance in patient care and enables a faster assessment of the situation, this limitation reduces the overall view of the organization's performance, especially where financial indicators are concerned.

Another point to consider is the low response rate. Direct contact with health professionals through Linkedin's professional social network instead of the institutional route may have contributed to lower participation. This contributed to the existence of a heterogeneous sample of respondents. Future studies could opt for surveying institutional means, thus providing greater control over the organization's performance variables.

6.2. Implications

This study provides empirical evidence of the importance of effective knowledge management to cope with crises. Notably, it validates the relationship between effective management of knowledge, organizational intelligence and organizational performance, and their importance for organizations to respond effectively to the emergence of novel outbreaks and other changes in their environment.

Among the theoretical implications is the importance of effective knowledge management for the effective response of the social healthcare organizations to crises and hospital performance. Moreover, the study identifies a direct and positive relationship between effective knowledge management and the organizational performance of these organizations. This is significant for advances in the field of knowledge about preparation and decision-making to respond to moments of crisis in the health area.

The relevant practical implications are that health care organizations should seek to improve their knowledge management to prepare for new turbulent moments like the one that occurred during the covid-19 pandemic. The results may guide the decision-making of governments worldwide when it comes to defining public health policies, thus encouraging knowledge sharing and increasing knowledge-transfer among health care organizations, such as the "Santa Casa de Misericórdia".

Concerning social healthcare organizations, the results of this study suggest the need for managers to focus efforts on the development of internal activities and programs aimed at effective knowledge management. This would contribute to improving the quality of services provided by their employees, as well as organizational performance and the effective response of the organizations to crises. For this reason, good knowledge management practices should be encouraged, both in regular periods and at times of greater turbulence, in addition to being included in the development of performance evaluation systems for health professionals.

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Appendix 12. Questionnaire

Abbreviation	Questions	References
	Effective knowledge management (KM)	
We ask you to evaluate each statement below according to the situation of the organization in which you work, on a scale of **1 (I totally disagree) to 5 (I totally agree)**. **In the organization where I work...**		
KM1	Employees receive adequate training from the organization to carry out their activities.	(Ghosh & Scott. 2006; Preece. 2015)
KM2	The instructions described in the institution's procedures are easy to understand.	
KM3	The organization adopts the best practices available in the market.	
KM4	Meetings in the workplace include discussions related to practices adopted in the market.	
KM5	There is information available in the organization for employees to consult and solve problems.	
KM6	Employees are encouraged to ask for assistance from other employees when they need it.	
KM7	Employees are encouraged to share and discuss their work with employees from other departments.	
KM8	The structure of departments and units facilitates interaction and knowledge sharing.	
	Organizational Intelligence (OI)	
We ask you to evaluate each statement below according to the situation of the organization in which you work, on a scale of **1 (I totally disagree) to 5 (I totally agree)**. **In the organization where I work...**		
OI1	One seeks to identify how changes in the business environment influence decision-making.	
OI2	Knowledge is successfully used to make forecasts in order to anticipate changes and make decisions.	
OI3	Information about good work practices and lessons learned are used in decision-making.	
OI4	Management promotes an atmosphere of openness and acceptance of change.	
OI5	Communication is clear and efficient.	
OI6	Processes and norms are defined with the participation of representatives from various areas.	

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Abbreviation	Questions	References
Organizational performance (OP)		
Regarding the performance of the organization where you work, in the **last 2 years,** it is correct to say that **the organization...**		
OP1	Offered a good overall quality of services	(Wamba et al.. 2017; Wu & Hu. 2012; Zangoueinezhad & Moshabaki. 2009b)
OP2	Presented good financial health	
OP3	Presented good reputation in relation to its technical skills	
OP4	Demonstrated high innovation in services and processes	
OP5	Increased the number of services performed	
OP6	Increased success rate in treatments/services	
Effective response to COVID-19 (SR)		
Regarding the effects of COVID-19, we ask you to evaluate with notes from 1 (I totally disagree) to 5 (I totally agree). The organization where I work...		
RE1	...has effectively acquired and applied available information about COVID-19.	(Ghosh & Scott. 2006; Lim et al.. 2020)
RE2	...made assertive decisions to anticipate the challenges of COVID-19.	
RE3	...adapted quickly to the changes imposed by COVID-19.	

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Abbreviation	Questions		References
	Characterization of the respondent		
	1) Indicate your level of training	4) Professional Responsibility	
	a) Graduation	a) General-Director	
	b) Master	b) Area / department / service manager	
	c) Doctorate	c) Team leader	
		d) Team member	
	2) Working time in the current position	e) Other (please specify):	
	a) Up to 2 years		
	b) From 3 to 4 years	5) Nature of the property of the institution where it performs its professional duties	
	c) From 5 to 6 years	a) Public	
	d) From 7 to 8 years	b) Private (for profit)	
	e) Over 8 years	c) Private (non-profit)	
	f) Retired	d) Other (please specify):	
	3) Working time in the current institution		
	a) Up to 2 years		
	b) From 3 to 5 years		
	c) From 6 to 10 years		
	d) From 11 to 20 years		
	e) Above 20 years		
	f) Retired		

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