

Pandemic preparedness from the perspective of Occupational Health professionals

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Background: Prior to any infectious disease emergence as a public health concern, early occupational preparedness is crucial for protecting employees from novel pathogens— coronavirus disease 2019 (COVID-19) is no different.

Aims: This study ascertains how occupational safety and health (OSH)/Human Resource (HR) professionals in the Republic of Ireland had managed to prepare their workplaces prior to the advent of COVID-19.

Methods: As part of a larger COVID-19 workplace study, online focus groups were conducted with OSH/HR professionals. Collected data were transcribed verbatim and entered into NVivo for thematic analysis incorporating intercoder reliability testing.

Results: Fifteen focus groups were conducted with OSH/HR professionals ($n = 60$) from various occupational settings. Three levels of organizational preparedness were identified: ‘early awareness and preparation’; ‘unaware and not ready’ and ‘aware, but not ready’. Most organizations were aware of the COVID-19 severity, but not fully prepared for the pandemic, especially stand-alone enterprises that may not have sufficient resources to cope with an unanticipated crisis. The experiences shared by OSH professionals illustrate their agility in applying risk management and control skills to unanticipated public/occupational health crises that arise.

Conclusions: General pandemic preparedness such as the availability of work-from-home policies, emergency scenario planning and prior experience in workplace outbreaks of infectious diseases were helpful for workplace-associated COVID-19 prevention. This is the first study conducted with OSH/HR professionals in Ireland regarding COVID-19 preparedness in workplaces, which provides valuable insights into research literature, as well as empirical experience for the preparation of future public health emergencies.

INTRODUCTION

The early stages of the coronavirus disease 2019 (COVID-19) pandemic, as they arose in China in late 2019, were critical periods for organizations globally to consider the adequacy of their emergency response planning. The extent to which global organizations adapted or developed comprehensive preparedness plans would shape the speed, coordination, effectiveness and flexibility of their subsequent emergency response [1].

The first official COVID-19 case was reported by the Wuhan Municipal Health Commission on 31 December 2019, in the Hubei Province, China [2]. Despite news of an emerging novel pathogen circulating in global public health (PH) and occupational safety and health (OSH) circles as early as November 2019, it is understood that many organizations did not start preparing for COVID-19 until March 2020, when the World Health Organization (WHO) officially announced the global

pandemic [3]. This likely impacted organizations’ ability to prevent and control workplace outbreaks. In (the Republic of) Ireland, for example, where our research team is based, nearly one-third of COVID-19 outbreaks were linked to workplaces as of August 2021 [4].

Effective emergency response involves planning for the hierarchy of control measures including engineering controls, administrative controls and the use of personal protective equipment (PPE) [5]. Engineering controls aim to separate employees from a hazard and associated risk(s), such as the separation of symptomatic employees from others to halt the spread of the disease or the separation of staff from customers using plastic or glass barriers [6]. Administrative controls limit the number of employees in working areas through social distancing [7], for example, implementing teleworking strategies, reducing working hours or even temporarily shutting

KEY LEARNING POINTS

What is already known about this subject:

- A considerable number of studies discuss the effectiveness of workplace safety measures for controlling coronavirus disease 2019 risk, but few have focused on pandemic preparedness in occupational settings beyond the health care sector prior to the national/regional spread of the virus.

What this study adds:

- Occupational safety and health personnel play a vital role in workplace coronavirus disease 2019 preparedness; however, the initiation of preparedness efforts requires senior management to realize the severity of the emergency, and that occupational safety and health personnel should also be included in PH emergency decision-making process.

What impact this may have on practice or policy:

- Lessons learnt from previous emergencies or simulations should be incorporated into workplace emergency response plans and regularly reviewed and updated by occupational safety and health personnel during normal times to ensure agile organizational adaptation to an emergency context.

down the workplace [8]. PPE such as face masks can effectively prevent the spread of infection in settings where people work in close contact with others [9]. Periodic surveillance either symptomatically or with testing, if tests are available, also demonstrated effectiveness in protecting employees even in the context of high community transmission [10]. Beyond the implementation of preventive and protective measures, effective emergency planning requires the establishment of policies to mitigate financial and other pandemic risks (e.g. paid sick leave, childcare planning) and ongoing communication of and workforce involvement in an organization's evolving emergency response [7].

Substantial research has focused on how health care sectors (e.g. nursing homes) or hospital departments [11] prepared for the pandemic in the early stages. To date, few studies have focused on general working environments such as building sites, food-processing plants and high-volume office, transportation or retail settings that proved to be at increased risk for COVID-19 outbreaks [12]. Furthermore, while research details the hierarchy of control measures, there is a lack of research on the decision-making processes leading to those actions. Understanding how employers/management perceived the threat of COVID-19 in its early stages, their motivation to prioritize certain measures and/or to initiate timely COVID-19 preparations is critical for identifying drivers of effective emergency planning and preparedness. To investigate and evaluate these decision-making processes, we conducted a series of focus group interviews with OSH and/or HR professionals from various settings to explore how workplaces in the Republic of Ireland prepared for the pandemic as the world began to develop an understanding of COVID-19.

METHODS

The involvement of companies' OSH practitioners is crucial to the development/implementation of successful emergency planning measures. Understanding their lived experiences and how their organizations adapted and were impacted could not be conducted through surveys as nuances of their experiences could be lost [13]. Thus, a qualitative study was adopted to collect in-depth information from this cohort using semi-structured focus groups. A non-probability purposive sampling method was used to identify OSH/HR professionals that met the following criteria: knowledge of and experience with organizational emergency preparedness for COVID-19 based on their professional role during the pandemic; ability to communicate that knowledge to the researchers in English and willingness to take part in the study. Participants were recruited mainly through academic connections to key OSH national stakeholder groups and OSH communication networks [14], and were categorized into groups by work sectors and organization size classified by the Irish Central Statistics Office (e.g. small = 10–49 employees; medium = 50–249 employees and large = 250 + employees).

The focus groups were conducted via Zoom from April to May 2021, complying with prevailing National COVID-19 regulations and ethical guidance. This study was granted ethical approval from University College Dublin's human research ethics committee (LS-E-20-182-Buggy). The participants in each group were limited to 4–6 per session to ensure discussion efficiency. As part of our larger project [15], the protocol (Table 1, available as Supplementary data at *Occupational Medicine Online*) [16] was reviewed and refined by experts from multiple disciplines after conducting a 2-hour pilot test within the research team. Additionally, all groups incorporated anonymous mini-surveys of five questions built around each theme, with the participants taking part in these polls as a supplement to the qualitative data. Funded by Science Foundation Ireland, follow-up individual interviews were also conducted at the project level upon the completion of this study [17].

The qualitative data, namely recorded focus group discussions, were transcribed verbatim by Y.C., V.D. and C.I. To align with ethical requirements, participants were assigned pseudonyms according to their working sector after de-identification. Open coding of data was conducted deductively based on the interview protocol, followed by deductive and inductive axial coding to create concepts. These concepts were subsequently grouped into themes and sub-themes using thematic analysis [18]. The final coding of all qualitative data was divided between five researchers (Y.C., V.D., C.I., M.A. and S.S.) using NVivo, following the consensus through intercoder reliability (ICR) assessment [19]. The quantitative data collected from the surveys were analysed descriptively using Microsoft Excel by C.B. and were cross-checked by Y.C. and C.I.

Rigour and trustworthiness were considered throughout the study implementation. To ensure data collection consistency, all focus groups were conducted by C.B., with Y.C. and M.R. in attendance to observe and take notes as a backup if connection issues could occur during the interviews. To reduce any subjectiveness of data interpretation, multiple coders participated in data analysis processes, followed by critical dialogues with multidisciplinary experts in the research team [20].

Meanwhile, ICR assessment was adopted prior to formal coding processes to ensure coding consistency of the qualitative data between different coders [16]. Divergences were discussed between the coders until an agreement was reached regarding the coverage of each code [21], the remaining transcripts were then assigned to the coders for thematic analysis. The quantitative data also triangulated the findings by complementing the focus group data, providing a thorough picture of the topic explored.

RESULTS

Sixty participants (42 males and 18 females) were interviewed from 15 focus groups with data collection ceasing when data saturation was reached, at which point researchers agreed that further interviews would not yield additional themes/codes relevant to the research topic. Participants' information is presented in Table 1 (available as Supplementary data at *Occupational Medicine Online*). Identified themes exemplified by sample quotes are presented in Tables 2 and 3 (available as Supplementary data at *Occupational Medicine Online*).

Participants felt that management's decisions regarding COVID-19 prevention in the workplace were influenced by their awareness of COVID-19 as a serious threat. Some participants noted early COVID-19 awareness in their workplace (Table 2, Theme 1; available as Supplementary data at *Occupational Medicine Online*), especially organizations in Ireland with international branches in Asia. In stand-alone organizations without support from corporate groups, some managers initiated COVID-19-related arrangements before the global pandemic was announced by the WHO by observing the unfolding situation in nearby European countries. Participants also felt that OSH professionals foresaw the risk earlier than others based on the knowledge accrued through their education, work experience and information networks.

Construction 4: What Italy was going through was the alarm bells for us ... when it was getting closer to home. (FG11)

Participants noted other instances where organizations underestimated both the threat of COVID-19 and the emergency preparations required (Table 2, Theme 2; available as Supplementary data at *Occupational Medicine Online*). Before COVID-19 spread to Ireland, OSH professionals from some organizations realized the potential threat to workplace safety. Yet, in many instances, senior managers did not believe that the virus would cause serious interruption to business continuity. Other managers may have understood the risk of COVID-19 but were reluctant to prioritize safety-related measures that could impact business continuity.

Consultant 3: ... I needed permission from people above. I, kind of flagged it to management, you know this thing seems to be growing legs, but ... their demand was, it (COVID-19 preparation) was stripping their capacity so they're more concerned with meeting deadlines and getting product produced. (FG8)

Participants felt blindsided and waited to act until national guidance was available. This situation can be alleviated if OSH experts are included in decision-making processes on PH issues.

A third category of participants worked for organizations that recognized the seriousness of COVID-19 but remained insufficiently prepared for the pandemic. Many participants indicated that although their organizations initiated early preparations, they did not anticipate certain aspects of the crisis (Table 2, Theme 3; available as Supplementary data at *Occupational Medicine Online*). This included its impact on personal lives (Subtheme 3.1), the constant stream of new information, need for adjusted policies (Subtheme 3.2) and rolling with the punches of a changing pandemic (Subtheme 3.3). These organizations had to reactively prepare by quickly learning from accessible sources and the personal connections and professional networks of their OSH personnel.

Infrastructure 2: ... like Mike Tyson said everybody has a plan until they get punched in the head, you know and it's a bit like that you put your best plans in place and then you're in reactive mode, depending on how things pan out. (FG4)

For most workplaces, general preparedness for PH emergencies including work-from-home (WFH) availability, infectious disease experience and prior emergency scenario simulations was deemed useful for COVID-19 preparations according to the OSH/HR professionals interviewed (Figure 1). Some organizations had adopted WFH policies prior to COVID-19 in response to other emergency situations (e.g. extreme weather), making it simpler to upscale similar arrangements at the onset of the pandemic. However, in industries where WFH policies are less applicable (e.g. construction, manufacturing), reducing the number of workers on site posed a challenge to business continuity. Organizations without a pre-existing WFH culture struggled to adapt to new arrangements. Empirical challenges such as equipment and IT connection issues were also frequently mentioned by the participants (Table 3, Theme 1; available as Supplementary data at *Occupational Medicine Online*).

Manufacturing 2: We understood like that it was serious, but the company didn't have a culture of working from home ... they wanted to wait as long as possible and see how things pan out before they actually made structural changes. (FG2)

While some organizations drew upon prior experience in infectious disease prevention in the workplace to cope with the pandemic, OSH/HR professionals had experienced nothing on the scale of COVID-19 (Table 3, Theme 2; available as Supplementary data at *Occupational Medicine Online*). Some organizations had prepared for an emergency epidemic scenario (e.g. avian bird flu pandemic) via simulation or preparedness plans, making them more confident in their response to COVID-19 (Table 3, Theme 3; available as Supplementary data at *Occupational Medicine Online*).

To summarize, some organizations failed to initiate in-time preparation for COVID-19 due to misperception of the risk (e.g. underestimation of airborne transmission speed/severity); some organizations prioritized workplace safety measures but

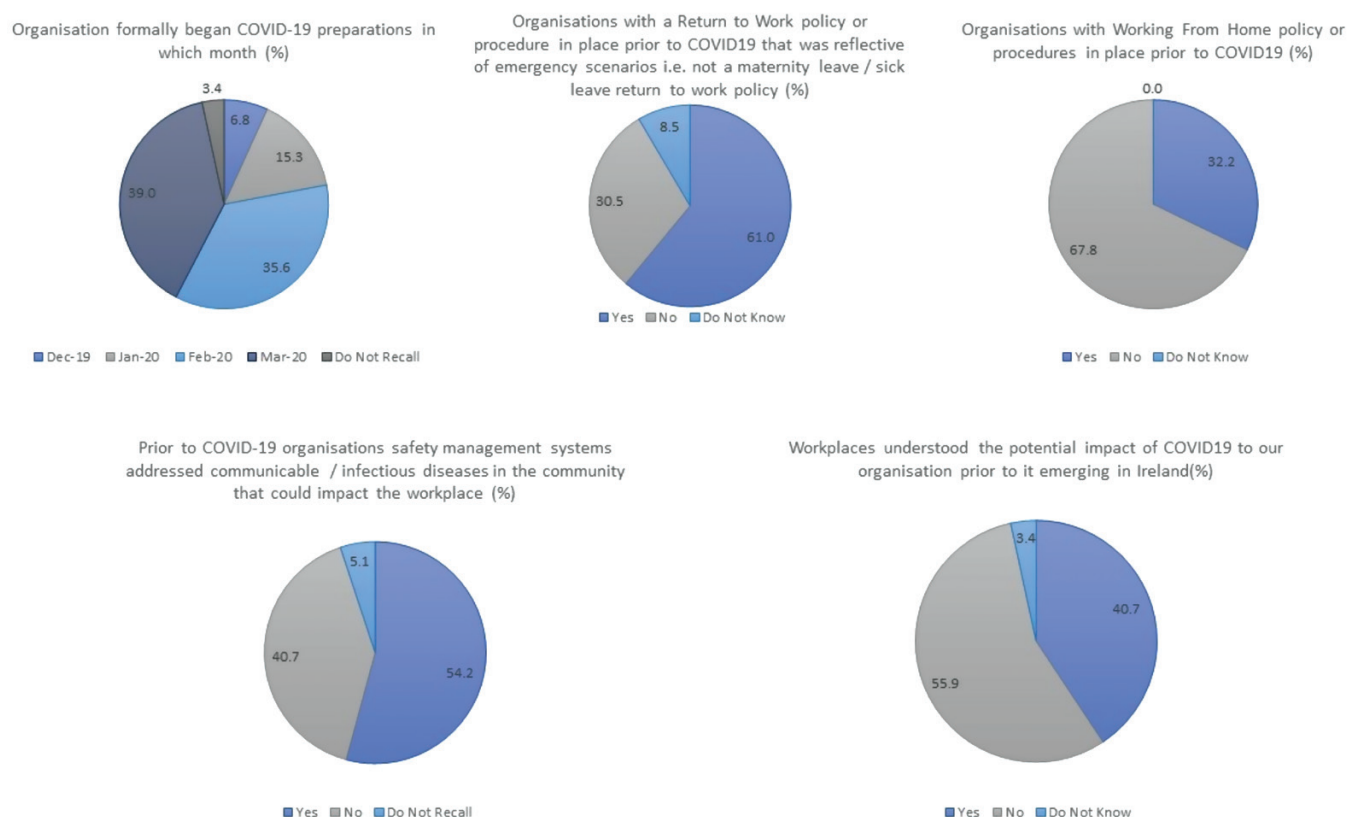


Figure 1. Participating organizations' previous experience on infectious disease and emergency plans.

could have prepared more efficiently if OSH personnel were more fully empowered to take initiative in developing related actions; and many organizations were not confident about preparations made despite the self-reported adequate perception of risk. Available WFH policies and contingency plans to cope with infectious disease were useful in facilitating PH emergency preparedness, while workplace simulations complemented a lack of practical infectious disease experience.

DISCUSSION

This study found that most OSH/HR professionals were not confident about preparations made in their organizations to cope with the emergence of COVID-19 in Ireland. This is the first study to investigate COVID-19 occupational preparedness in Irish workplaces by interviewing OSH/HR professionals through the method of focus group, which provides invaluable insights to the wider research community, as well as empirical experience for the preparation of future PH emergencies. This study's qualitative design enabled the gathering of rich data during a period of significant occupational and societal flux and for triangulation of findings with quantitative survey data embedded in the protocol. However, in addition to response bias, the opinions provided by OSH/HR professionals may not represent other professional roles, who may have different views on the topic.

Aligned with other studies, access to reliable information was crucial for enabling management to evaluate the implications of COVID-19 in its early stages, especially in stand-alone

organizations faced with an 'infodemic' [22]. Senior management in stand-alone organizations should respect suggestions from OSH professionals who have professional sensitivity/expertise to emergencies based on their experience in the field. For OSH professionals, timely communication with counterparts from other countries/regions is necessary, as is staying updated on global trends in PH which have occupational implications. The opportunities for international information exchange or peer learning between OSH professionals should be provided by local health authorities/agencies or unions with similar functions [23]. International information exchange should not be limited to academia, but also experiences in empirical practices (e.g. WHO), the participation of which can be considered to integrate with the professional development of OSH education and professional development programmes in the future. This highlights the necessity for better collaboration and integration of interdisciplinary insights into practice for building a more resilient society in line with previous research in COVID-19 prevention [24].

Asian countries were better prepared because of lessons learnt from the previous severe acute respiratory syndrome outbreak [1]. Nevertheless, given the distance between Asia and Ireland, it is understandable that senior management could initially underestimate the overall seriousness of COVID-19. Also, Ireland has the geographic advantage of being separated from mainland Europe which can potentially delay viral contagion when global travel is restricted. Concerned that organizational productivity could slow as a result of COVID-19 preparedness measures, senior management might try to avoid the liability

incurred by overestimating the risk of COVID-19, or that organizations waited to take action until national guidelines were announced as reported in this study. Apart from the health care sector, findings underline the corporate value of OSH as a mechanism for business continuity while the situation was new, essentially when a previously rare risk in workplace settings suddenly became a common risk.

Given that previous epidemics (e.g. swine flu) had more domestic-level impact than occupational impact, OSH management might neglect the lessons learnt considering the transmission agents [25]. However, this may also be because most decisions on health emergencies in the country are largely made by PH experts with limited consideration from an OSH perspective. Specifically, in the process of classifying the COVID-19 virus in the context of the Biological Agents Directive [26], a panel of PH experts downplayed the aerosol transmission route and the contributing factors (e.g. contagiousness and working conditions) [27]. For OSH experts, it was clear from the outset that working conditions contained a built-in risk of multiple contagions, both because of the intrinsic characteristics of various occupational settings (e.g. client/patient contacts) and other work-related factors (e.g. commute to work in packed public transport). If OSH experts are involved in PH emergency decision-making, relevant policies and procedures that arise from the response to the global pandemic can potentially be more sound, far sighted and effective [24].

The findings also echo that experience from infectious disease outbreaks should be incorporated into workplace emergency response plans, and regularly updated by OSH personnel to ensure the organization's ability to quickly adapt [28]. For organizations with limited experience in infectious disease or similar emergency management, a simulated context is recommended for refining emergency response plans and equipping employees with confidence prior to real-world crises. Timely and consistent scenario planning should also account for workplace hazards that emerge, with the implementation of new control measures in an emergency [29]. For example, employees who need safety glasses at work will struggle with glasses fogging if they also wear a mask to reduce COVID-19 risk. Mask-related fogging can result in injuries from a fall via tripping, slipping and misjudging step depth, as a new risk emerged because of COVID-19 PPE [30].

Workplaces will be an important piece of global management of any future pandemics through the crucial involvement of their OSH practitioners [31]. Previously, OSH was deemed less important than business performance at some workplaces, and occupational risk assessments were sometimes considered as bureaucratic paperwork [32]. However, when research proved that workers become more productive if they have a safer working environment, management gradually realized the significance of safety prioritization [33]. Though COVID-19 has negatively impacted worker safety worldwide, it simultaneously emphasized the importance of OSH management, especially during a crisis. OSH professionals became vital advocates for employee safety to senior management, and effective prevention at workplaces also reduces the excess occupational risk to employees' families and community contacts. Thus, OSH can contribute to infection prevention education (e.g. vaccination), the effects of which can be transferred to the community. Finally, PH authorities have

the responsibility to avail of evidence-based guidance as early as possible to allow decision-makers within various organizations to incorporate national/regional guidelines while customizing preparedness to their workplaces.

Another notable point is that most participating organizations focused more on employees' physical safety rather than their mental well-being when preparing for COVID-19 [34], so studies on employee pandemic-related mental health are recommended. Additionally, future research should also focus on effective and practical work modes to avail of 'the evident interaction between OSH and PH' [35]. In summary, the engagement of OSH in PH decision-making is paramount to increase preparedness for potential health crises at workplaces.

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COMPETING INTERESTS

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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