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Short Communication

Preparedness in a public health emergency: determinants of willingness and readiness to respond in the onset of the COVID-19 pandemic

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ABSTRACT

Objectives: Healthcare professionals' high risk of infection and burnout in the first months of the COVID-19 pandemic probably hindered their much-needed preparedness to respond. We aimed to inform how individual and institutional factors contributed for the preparedness to respond during the first months of a public health emergency.

Study design: Cross-sectional study.

Methods: We surveyed healthcare workers from a Local Health Unit in Portugal, which comprises primary health care centers and hospital services, including public health units and intensive care units, in the second and third months of the COVID-19 epidemic in Portugal. The 460 answers, completed by 252 participants (about 10% of the healthcare workers), were analyzed using descriptive statistics and multiple logistic regressions. We estimated adjusted odds ratios for the readiness and willingness to respond. **Results:** Readiness to respond was associated with the perception of adequate infrastructures (aOR = 4.04, $P < 0.005$), lack of access to personal protective equipment (aOR = 0.26, $P < 0.05$) and organization (aOR = 0.31, $P < 0.05$). The willingness to act was associated with the perception of not being able to make a difference (aOR = 0.05, $P < 0.005$), risk of work-related burnout (aOR = 21.21, $P < 0.01$) and experiencing colleagues or patients' deaths due to COVID-19 (aOR = 0.24, $P < 0.05$).

Conclusions: Adequate organization, infrastructures, and access to personal protective equipment may be crucial for workers' preparedness in a new public health emergency, as well workers' understanding of their roles and expected impact. These factors, together with the risk of work-related burnout, shall be taken into account in the planning of the response of healthcare institutions in future public health emergencies.

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Introduction

SARS-CoV-2 has spread rapidly worldwide.¹ Most infected persons present mild symptoms or none,² but the diagnosis of SARS-CoV-2 infection, treatment of persons with moderate or severe symptoms, and contact tracing require major efforts from resources that healthcare services may not have, especially during periods of high incidence.^{1,2}

It is predictable that healthcare services may not be able to respond as promptly and with the same quality during public health emergencies — as during pandemics — as it would without this pressure. However, healthcare services are expected to prepare and promptly react to public health emergencies, and to adapt and upscale their response to face new demands.^{1,2}

The capacity of response of healthcare services depends on their infrastructure, available materials, equipment, and number of human resources — and their preparedness. McCabe et al. (2010)³ proposed three key ingredients for improving the public health emergency preparedness system: willingness — the emotional or affective dimension that depends on personal and contextual factors, readiness — the availability to respond, and the possession of

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the necessary resources in terms of staff, structure, equipment and (personal and institutional) plans for an adequate response, and ability – the aptitudes, traits, skills, and knowledge earned during education or training.

However, this pandemic has been striking healthcare workers, directly and indirectly, which can impact their preparedness. Burnout risk increased among healthcare workers,⁴ and some authors have shown that having had COVID-19 symptoms or risk contacts is associated with psychological distress and lower sense of coherence.⁵

Nonetheless, little is known about how the experience of this pandemic – including burnout – contributed to the willingness and readiness to act, nor what factors drove to a higher preparedness. We hypothesize that, if little or no institutional and psychological support is given to healthcare workers, factors like the lack of formal organizational support, training or equipment, and workers' experience of the pandemic (in terms of burnout, SARS-CoV-2 infection, and transmission to others, and contact with COVID-19-related deaths) may affect their willingness and readiness to act. This study aims to understand the individual and organizational factors that have contributed to the willingness and readiness of healthcare workers to respond during the first phase of the SARS-CoV-2 pandemic.

Methods

This is an observational cross-sectional study based on a self-administered survey that explored the underlying factors that could contribute to the readiness and willingness to respond in the COVID-19 pandemic, including personal, patients- and work-related burnout.⁶

This questionnaire was sent to all workers from a Local Health Unit from an area with about 180,000 inhabitants (Matosinhos), especially affected in the first months of the pandemic. This Unit comprises a hospital, which provides infectiology, internal medicine and intensive care services, and primary health care units, including a public health unit. The questionnaire was sent between May and June 2020 (first and second fortnights of May, and in the first fortnight of June); and 460 questionnaires were completed by 252 participants (about 10% of all staff; 110 filled the questionnaire once, while 88 filled it twice and 58 three times, i.e. each fortnight). The study was approved by the ethics committee from the Matosinhos' Local Health Unit (44/20/RS).

We stratified the descriptive analysis by working or not at the frontline, as respondents' and institution's characteristics were likely to differ, and performed logistic regression analyses, mutually adjusting all models, and adjusting for sex, age, working (or not) in the frontline, education, and questionnaire wave (Table 1).

Results

In all, 60.2% of the questionnaires were answered by frontline workers; 78.0% were females, and 72.4% were younger than 44 years old. Most were ready to answer to the pandemic, and readiness was higher among those in the frontline (83.3% vs 71.7%, P -value<0.005); 85% were willing to answer, but 40.1% reported not having enough knowledge to answer (Table 1). A third (29.6%) of those in the frontline perceived they did not have enough training, which contrasts with 52.8% of those not working in the frontline. These results did not significantly change over time.

Regarding the potential determinants of readiness, most participants considered infrastructures, equipment, and information systems as adequate. The institution was perceived as organized for the response, and contingency plans were known by the largest majority. Most reported adequate psychological work conditions:

58.9% of respondents in the frontline and 70.6% of those not in the frontline (P -value<0.05).

Differences regarding the factors related to the willingness to respond were found: the perception of not being able to make any difference was higher among those not working in the frontline (11.6% vs 22.7%, P -value<0.005), as it was regarding the perception of their action not being effective to control the pandemic (20.0% vs 36.2%, P -value<0.001), and not knowing how to contribute (6.9% vs 25.3%, P -value<0.001). Over a quarter of responders had high or severe risk of burnout, but the proportion was higher among those not in the frontline, with statistically significant differences. Those in the frontline experienced more frequently COVID-19-related death of patients or colleagues (27.2% vs 8.2%, P -value<0.001).

The workers' readiness to respond to COVID-19 was strongly associated with the perception of adequate infrastructures (aOR = 4.04, P -value<0.005) (Table 1). The readiness to respond was reduced when workers perceived lack of access to adequate PPE (aOR = 0.26 P -value<0.05), as well as lack of organization in the institution (aOR = 0.31, P -value<0.05).

Willingness to respond was negatively associated with the perception of not being able to make a difference (aOR = 0.05, P -value<0.005) and positively associated with the risk of work-related burnout (aOR = 21.21, P -value<0.01). Having experienced the death of colleagues or patients due to COVID-19 reduced the willingness to respond (aOR = 0.24, P -value<0.05).

Discussion

In the first months of the response to a pandemic – caused by an unknown agent – the perception of adequate infrastructures, access to PPE, and organization of the institution determined the workers' readiness to respond. The perception of not being able to make a difference, moderate and higher risk of work-related burnout and having experienced colleagues or patients' death due to COVID-19 affected their willingness to respond.

These results are partially aligned with the framework proposed by McCabe et al. (2010):³ physical conditions, equipment, and organization are needed to inspire readiness to act. It must be noted that in the first phase of the pandemic, there were limitations on PPE availability,⁷ and hospitals faced an unprecedented need of large numbers of isolation rooms and ventilators and the need to reorganize to better answer to the pandemic. Thus, equipment and conditions were perceived as important for the readiness of healthcare workers to act, as well as organizational factors. As hypothesized,³ the perception of not being able to make any difference diminished the willingness to respond. This finding is valuable for managers: every worker must clearly know what his/her role is and its contribution for the response. The scarcity of evidence about the disease or its treatment specificities may have lowered the importance of training and perceived knowledge on the willingness to act.

Regarding the positive association between willingness to respond and work-related burnout, a higher willingness may be associated with a higher work intensity and, indirectly, to a higher risk of burnout, especially during the first phase of the pandemic. A review showed that higher responsibility and higher working hours increased the risk of suffering from mental distress during the COVID-19 pandemic,⁸ and frontline healthcare professionals showed a higher risk of insomnia, stress, and burnout.⁹ Our results do not show any significant association between having experienced transmission of COVID-19 in the workplace or in the family or friends' milieu and the willingness to respond to the pandemic, except for the contact with the death of patients or colleagues due to COVID-19. The high sense of duty could have attenuated the importance of these experiences in the worker's willingness to

Table 1
Sample description and factors associated with the readiness and willingness to respond in the COVID-19 pandemic. Models are mutually adjusted and for sex, age, workplace, education, role in the pandemic response (working or not in the frontline), and waves.

	Description of the sample			Factors associated with readiness to respond		Factors associated with willingness to respond	
	In the frontline	Not in frontline	P-value	Adjusted odds Ratio	P-value	Adjusted odds Ratio	P-value
Ready to respond	229 (83.3%)	129 (71.7%)	0.003				
Adequate physical conditions	189 (68.2%)	132 (72.9%)	0.280	4.04 (1.75–9.30)	0.001		
Adequate equipment and materials	200 (73.0%)	145 (79.2%)	0.130	0.73 (0.25–2.15)	0.570		
No access to adequate PPE	37 (13.4%)	13 (7.3%)	0.046	0.26 (0.08–0.88)	0.030		
Information system was not adequate	106 (38.8%)	58 (32.2%)	0.150	0.84 (0.32–2.20)	0.710		
Information system was unable to answer	88 (32.2%)	41 (23.0%)	0.035	0.95 (0.33–2.77)	0.928		
Institution was not organized	45 (16.3%)	27 (15.0%)	0.710	0.31 (0.12–0.81)	0.016		
Does not know contingency plan	21 (7.6%)	16 (8.8%)	0.640	0.42 (0.13–1.38)	0.153		
Adequate psychological work conditions	162 (58.9%)	127 (70.6%)	0.012	1.70 (0.73–3.97)	0.216		
Willing to respond	234 (85.4%)	153 (85.0%)	0.910				
Perception action makes no difference	32 (11.6%)	41 (22.7%)	0.002			0.05 (0.01–0.32)	0.001
Perception that action was not effective	55 (20.0%)	64 (36.2%)	<0.001			1.60 (0.34–7.46)	0.546
Does not know to contribute	19 (6.9%)	45 (25.3%)	<0.001			2.25 (0.34–14.62)	0.397
Does not have enough knowledge	111 (40.1%)	59 (32.6%)	0.110			1.00 (0.28–3.58)	0.995
Does not have enough training	81 (29.6%)	95 (52.8%)	<0.001			0.38 (0.10–1.46)	0.161
Personal burnout - Moderate/High/Severe risk ^a	159 (57.8%)	115 (68.0%)	0.034			0.86 (0.14–5.50)	0.877
Work-related burnout - Moderate/High/Severe risk ^a	128 (48.1%)	103 (64.0%)	0.002			21.21 (2.11–212.78)	0.009
Patient-related burnout - Moderate/High/Severe risk ^a	192 (70.6%)	115 (73.2%)	0.001			3.49 (0.65–18.87)	0.146
Was tested for SARS-CoV-2 infection	129 (47.1%)	62 (34.1%)	0.006			0.81 (0.20–3.24)	0.768
Was diagnosed for SARS-CoV-2 infection	38 (13.7%)	26 (14.5%)	0.810			0.37 (0.03–4.05)	0.413
Had contact with colleague or patient with COVID-19	237 (86.2%)	110 (61.5%)	<0.001			1.59 (0.24–10.51)	0.636
Transmitted COVID-19 to colleagues or patients	19 (6.9%)	7 (3.9%)	0.180			0.58 (0.08–4.38)	0.599
Transmitted COVID-19 to family or friends	12 (4.5%)	14 (7.7%)	0.150			0.41 (0.03–5.21)	0.490
Friends or family diagnosed with COVID-19	79 (28.7%)	58 (31.7%)	0.500			0.34 (0.09–1.32)	0.120
Experienced death of colleagues or patients due to COVID-19	74 (27.2%)	15 (8.2%)	<0.001			0.24 (0.06–0.97)	0.045
Experienced death of family or friends due to COVID-19	9 (3.3%)	7 (3.9%)	0.740			^b	
Had psychological care in the last 2 weeks	13 (4.7%)	3 (1.6%)	0.082			^b	

Note: In bold the results that were statistically significant.

^a Reference category: no/low risk.

^b The variables “Experienced death COVID-19 of family or friends” and “Psychological care last two weeks” were omitted due to collinearity (small number of observations).

respond.¹⁰ The small number of workers using psychological support may have also attenuated the effect of this strategy for improving their well-being and the willingness to act.

These results must be interpreted considering that, first, the sample corresponds to healthcare workers from a single center. Although, we believe these results could be observed in other centers that congregate primary care units, infectiology, internal medicine, and intensive care services located in a predominantly

urban context strongly affected in the first months of the pandemic. Second, only about 10% of the whole study population agreed to participate in the survey. Support staff or older workers were underrepresented, probably due to lower digital literacy. Third, invitations to participate were repeated in time. Although responses may not be not fully independent, the existing resources and organization may have changed and, accordingly, the willingness and readiness to respond; as such, we adjusted the analysis for the wave

of questionnaires. Fourth, we cannot assume causality but only association, which can be reversely set, as we discussed regarding willingness and work-related burnout. However, it is unlikely that a higher readiness to act increased the perception of better physical conditions, organization, or accessibility to PPE.

Public health emergencies — as the COVID-19 pandemic — can put healthcare services under strain, and healthcare workers may respond differently to it. The perception of adequate infrastructures, organization, and access to PPE are crucial in creating a sense of readiness, and the knowledge that one's own actions can make a difference contributes to the willingness to act. Team manager's awareness of these factors, as well as of the risk of work-related burnout, is much needed to provide safe and healthy workplaces and an adequate response to this public health emergency, and others that may emerge in the future.

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Ethical approval

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Competing interests

The authors declare that there are no conflicts of interest.

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