Article

COVID-19 preparedness and perceived safety in 138 nursing homes in Southern Portugal: a cross-sectional survey-based study in the initial phases of the pandemic

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Abstract: (1) Background: Nursing homes' preparedness in managing a public health crisis has been fragile, with effects on safety culture. The objective of this study was to assess nursing homes' COVID-19 preparedness in Southern Portugal, including personnel's work experiences during the pandemic. **(2) Methods:** We used a COVID-19 preparedness checklist to be completed by management teams, followed by follow-up calls to nursing homes. Thereafter, a survey to personnel was applied. Data analysis included descriptive statistics, exploratory factor analysis, and thematic analysis of open-end questions. **(3) Results:** In total, 71% (138/195) of eligible nursing homes returned the preparedness checklist. We conducted 83 follow-up calls and received 720 replies to the personnel survey. On average, 25% of nursing homes did not have an adequate decision-making structure to respond to the pandemic. Outbreak capacity and training were fragile areas among nursing homes' contingency plans. We identified compliance with procedures and nonpunitive response to mistakes as fragile areas of safety culture, and teamwork as a strong safety area. **(4) Conclusions:** To strengthen how nursing homes cope with upcoming phases of the COVID-19 pandemic or future public health emergencies, nursing homes' preparedness and safety culture should be fostered and closely monitored.

Keywords: SARS-CoV-2; Care home; Long-term care; Social care; Preparedness; Contingency plan; Safety culture; Workforce; Survey

1. Introduction

It has been more than a year since the World Health Organization (WHO) declared the coronavirus outbreak a pandemic. Currently, as the pandemic unfolds, countries are still struggling to contain the spread of different virus strains and their effects on the population's health. Each country has been facing its specific challenges, depicted by the large variability in countries' set of responses to this global health crisis [1-3]. A common denominator across countries is how older people are vulnerable to this pandemic. In many countries, nursing homes are of special concern given their residential setting and the

characteristics of its users [4, 5]. Thus, nursing homes are particularly prone to becoming an epicenter for an outbreak of coronavirus [3, 6].

The effects of the pandemic in nursing homes worldwide have taken a toll on all of us and in our humanity, as these facilities have been affected in an unprecedented manner [5]. The initial responses to the coronavirus disease (COVID-19) in nursing homes were limited. This depicts a fragile preparedness of nursing homes in managing a public health crisis, albeit past serious concerns of potential threats [7, 8]. This concerning unprepared- ness uncovered long-lasting caveats in nursing homes, such as insufficient coordination with the health care system, generalized underfunding, and insufficient and inadequate workforce in the sector [9, 10].

Whilst caring for residents, nursing home personnel are also managing concerns about their health and well-being, and the safety of their family members. In the first stages of the pandemic, the focus on nursing home personnel health and well-being was not immediately prioritized. Only later, balancing safety, well-being, and quality of life among personnel became a topic of discussion, leveraging from the focus attributed to these topics by international organizations, such as the Organisation for Economic Co- operation and Development (OECD) [9] and WHO [11]. The latter, on 17 September 2020, to mark the World Patient Safety day even chose the theme 'Health Worker Safety: A Pri- ority for Patient Safety.' This theme is aligned with evidence suggesting that a stronger perception of safety culture is associated with greater care quality to nursing home resi- dents [12]. In addition, it is reasonable to expect that safety culture has a large influence on personnel job satisfaction, turnaround, and well-being. However, little is known about safety culture in long-term care facilities [13-15].

In Portugal, the first death from COVID-19 occurred on 16 March 2020. During the initial phases of the pandemic, 40% (450/1126) of the deaths from COVID-19 were among residents in nursing homes [16]. At that time, testing of residents and personnel for COVID-19 was slow and coordination of agencies reportedly poor. By mid-March 2020, the Algarve Biomedical Center (ABC) was mandated by the Ministry of Labour, Solidarity and Social Security (MLSSS) to test personnel and residents at nursing homes, whether these were operating under a valid license or not. In total, 194 nursing homes from South- ern Portugal (Algarve and Alentejo regions) benefited from this protocol.

The main goal of this study is to assess the COVID-19 preparedness of nursing homes and explore its effects on nursing home personnel safety culture and well-being in the early phases of the pandemic (March to July 2020). Thus, the objectives of this study are: 1) To assess COVID-19 preparedness of nursing homes in 2 regions of Southern Portugal (Algarve and Alentejo) in the early phases of the pandemic; 2) To better understand safety concerns and well-being of nursing home personnel; and 3) To understand nursing home personnel work experiences during the pandemic, including resident safety culture. Find- ings will be used to inform current ongoing responses targeting nursing homes, optimize dealing with upcoming phases of the SARS-CoV-2 pandemic, and strengthen nursing home preparedness to other public health emergencies.

2. Materials and Methods

2.1. Study Design and Population

We conducted a cross-sectional survey-based study in nursing homes of 2 regions in Southern Portugal (Algarve and Alentejo), in the early phases of the COVID-19 pandemic (March to July 2020). Nursing homes were identified by the district offices of the Social Security Institute. Nursing homes participated in our study voluntarily and inde- pendently of parallel ongoing COVID-19 testing initiatives. Participating nursing homes self-assessed COVID-19 preparedness using a checklist filled by managers; thereafter, a web-based self-administered survey was conducted among personnel. For this study, a formal ethics approval was waived because of the non-intrusive characteristics of the study; the existing protocol between the Social Security Institute and the ABC; and the urgency of gathering key information about the problems that nursing homes had been

facing in a timely fashion. Nursing home personnel responding to our survey granted consent at two moments: before answering the survey and with the submission of their answers. All data were pseudonymized before analysis and reporting.

2.2. Instruments

2.2.1. COVID-19 Preparedness Checklist

The checklist (Supplementary File 1) was developed based on that of the Centers for Disease Control & Prevention (USA) [17]. Cultural and contextual adaptations were considered during translation (eg, we included or adapted items in the checklist considering the guidelines issued by the Portuguese Directorate-General of Health). The checklist encompassed four parts: 1) nursing home characteristics; 2) structure for planning and decision-making; 3) development of a contingency plan; and 4) general features of the contingency plan. In April 2020, the checklist was sent to nursing homes. A 2-stage voluntary-basis engagement followed: first, nursing homes self-assessed their preparedness using the checklist and submitted their responses to the research team; and second, a research team representative set up a follow-up video/phone call with a nursing home for a checklist walkthrough discussion (Supplementary File 2). At this time, Portugal was experiencing its third emergency state period, which ended on 3 May 2020. By the end of that period, Portugal was reporting 25,524 cases and 1,063 deaths by COVID-19, of which 87% were among people aged 70 years old and over (lethality rate of 4.2% for the general population vs 14.9% for people aged 70+) [18]. Up to that moment, 1,757 nursing home residents and 141 nursing home workers had been infected with SARS-CoV-2, and the death tolls were 243 in nursing homes [18].

2.2.2. Personnel Survey

The *Safety concerns and well-being of nursing home personnel* survey (Supplementary File 3) drew on existing validated instruments in the Portuguese language, such as the nursing home survey on patient safety culture developed by the Agency for Healthcare Research and Quality (USA) [19], the WHO-5 well-being index [20], and the Minimum European Health Module [21]. Novel questions and other survey design features (eg, question ordering) were previously discussed with experienced international researchers in long-term care. We asked respondents through an 11-point Likert scale (0=very low to 10=very high) how they perceived the risk of becoming infected with coronavirus and becoming severely ill in case of infection. A 10-item list with a 6-point Likert scale (1=All of the time to 6=At no time) assessed the extent to which personnel have been working in an environment where fear/anxiety and unusual absenteeism among peers are perceived. Two items were positively worded (item 4 and 6), for which we used reversed coding. Lower scores across items suggest greater perceived fear/anxiety and absenteeism amongst personnel. We used an 18-item set from the nursing home patient safety culture questionnaire with a 5-point Likert scale (1=Strongly disagree to 5=Strongly agree) and a *Does not apply/Don't know* answer option. Items were grouped into 5 safety culture composites: teamwork, staffing, compliance with procedures, training and skills, and nonpunitive response to mistakes [19]. The WHO-5 well-being index was computed as the composite raw score that resulted of totaling the scores of the answer to 5 statements using a 6-point Likert scale (0=At no time to 5=All of the time) on how a respondent has been feeling over the last two weeks; a score below 13 is indicative of poor well-being. The Minimum European Health Module asked about respondents' self-perceived health, chronic morbidity, and activity limitations. We also asked about respondents' characteristics, those of their job and household, and in which areas there was a need for support from others. The survey ended with an open question where respondents could share any aspect related to how they have been experiencing the pandemic crisis.

We conducted pre-testing and cognitive testing, involving one interviewer and 3 respondents representing essential care workers. Survey data collection started after the completion of an initial round of COVID-19 testing across nursing homes: from 19 May to

9 June 2020 in Algarve and from 29 June to 21 July 2020 in Alentejo. A weblink to the survey was sent to each nursing home focal point; thereafter, the link was disseminated among personnel through internal communication channels. Follow-up calls and emails occurred one week prior data collection due date. On the last day of administering the survey, 389 cases had been reported in Algarve (11‰ of total confirmed cases in Portugal) [22], which represented a 9% increase from the first day of the survey [23]; in Alentejo, 636 cases had been reported by the last day of administrating the survey (13‰ of total confirmed cases) [24], which represented a 33% increase from the first day of the survey [25].

2.3. Statistical Analysis

We used descriptive statistics to characterize attributes of participating nursing homes and survey respondents and to examine missing data patterns. We summarized the share of facilities that had fully implemented each set of items in the preparedness checklist by computing the geometric mean across items. Composite response frequencies relative to the personnel's resident safety culture were computed by averaging positive responses. We used a spreadsheet to group data from open-ended questions from participating nursing homes and survey respondents into meaningful emerging categories.

We used Goodman and Kruskal's Gamma test to measure the correlation between ordinal variables in the survey. We performed exploratory principal axis factor analysis via oblimin rotation with Kaiser normalization on the 10-item questions about perceived fear/anxiety and absenteeism amongst personnel. Missing values were excluded listwise. Number of factors were determined based on parallel analysis, Kaiser criterion of eigenvalues (eigenvalues greater than 1 were kept), and a visual inspection of the scree plot. We assessed the final factor loading structure for internal consistency with Cronbach's alpha. Thereafter, we conducted a K-means cluster analysis with regression method.

We used IMB SPSS Statistics version 26 for all analyses. The confidence level was set at 95%.

3. Results

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

3.1. Nursing Home COVID-19 Preparedness

Between March and July 2020, 96 nursing homes in Algarve (all the 81 licensed and 14 non-licensed facilities) and 99 licensed nursing homes in Alentejo were engaged in the COVID-19 initiatives set forth by the ABC (Figure 1). Seventy-one percent (n=138) of nursing homes returned the COVID-19 preparedness checklist: return rate of 53% in Algarve (51/96) and 88% in Alentejo (87/99). In parallel, we conducted 83 follow-up calls with nursing homes, of which 65 (78%) were with a facility that had previously returned its COVID-19 preparedness checklist. In total, 720 nursing home staff replied to the safety and well-being survey.
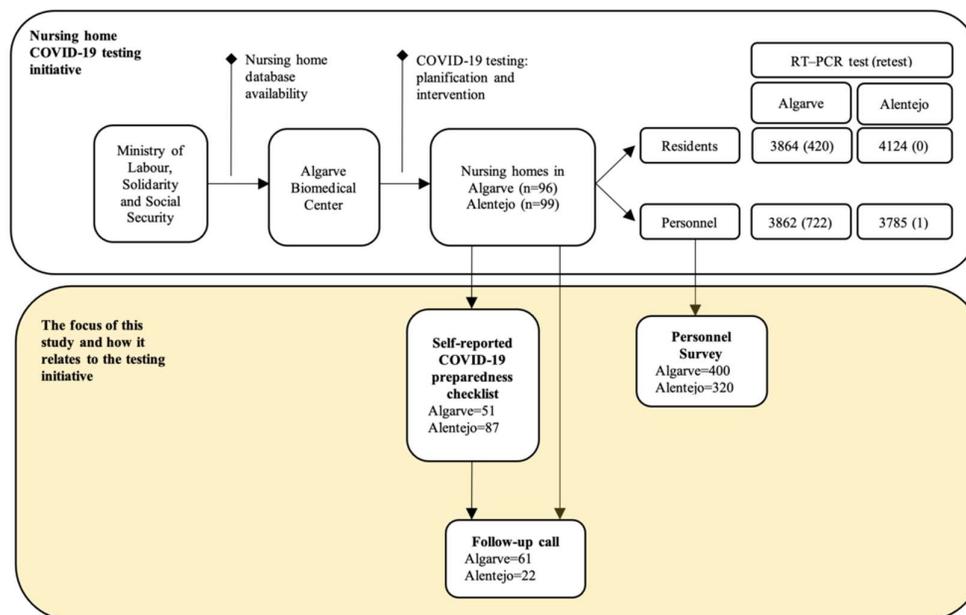
Figure 1. Descriptive frequencies of the nursing home COVID-19 testing initiative and the unfolding of this study, in Algarve and Alentejo (Portugal), amid the initial phases of the pandemic (March to July 2020).

On average, a quarter of nursing homes did not fully observe an adequate structure for planning and decision-making in response to the pandemic, and 17% did not have a fully implemented and disseminated contingency plan, with designated key people to operationalize thereof (Table 1). The key areas of a contingency plan oftentimes overlooked were those of outbreak capacity, and education and training. On average, 41% of nursing homes fully fulfilled the items grouped under 'outbreak capacity', often overlooking postmortem care and morgue capacity planning. With regards to education and training, 43% of nursing homes had a training plan implemented to address the needs of key people (residents, staff, volunteers, family members, or visitors). A full breakdown of the items in the checklist is available in Supplementary File 4.

Table 1. Nursing home COVID-19 preparedness checklist compliance scores.

Item grouping	COVID-19 preparedness compliance (%) [a]		
	Algarve (n=51)	Alentejo (n=87)	Total (n=138)
Structure for planning and decision-making	65%	79%	74%
COVID-19 contingency plan	75%	87%	83%
Elements of a COVID-19 contingency plan			
General	66%	72%	70%
Outbreak capacity	35%	45%	41%
Communication	79%	76%	77%
Supplies and resources	68%	79%	75%
Education and training	44%	43%	43%
Occupational health	71%	75%	74%
Identification and management of ill residents	87%	81%	83%
Access control	83%	81%	82%

[a] Scores were computed as the geometric mean of items fully implemented within each group.

Based on the returned checklists and follow-up calls with nursing homes, we identified key items that were most frequently overlooked:

- poor communication channels, both internal and external, often failing to disseminate the contingency plan among key stakeholders (e.g., personnel) and engaging with health and other competent authorities;

- inexistent or poor planning to isolate or transfer residents if need be;
- poor surveillance systems to monitor for symptoms among residents and staff;
- insufficient planning to overcome hindrances with personnel shortages and absenteeism, and infrastructure constraints (e.g., bed overcapacity in isolation rooms);
- inexistent monitoring system of the effectiveness of the measures aiming at addressing behavioral factors, both at the institutional and individual level;
- misuse of personal protective equipment (PPE) attributed to poor training and a generalized shortage of specific equipment (e.g., gowns and FFP2 face masks).
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- We also highlight good practices found at some facilities:
- continuous revision of the contingency plan to reflect any updates to the guidelines set forth by the Directorate-General of Health and other relevant competent authorities;
- emergency protocol with the nearest primary health care centers for a quick response in case of an outbreak;
- systematically maintaining an inventory of PPE in close collaboration with governmental authorities;
- using social media and other platforms to update families and carers on residents' well-being, and on the public health measures that the nursing home is developing.

  A detailed list is available in Supplementary File 5.

3.2. Perceived Safety and Well-being among Nursing Home Personnel

Most of the 720 survey respondents were female (93%) and the average age was 45 years old. The highest educational level attained by 41% (297/720) of respondents was lower than secondary education and 29% (212/720) concluded university studies. Most of the respondents (606/720, 84%) self-reported good or fair health; only 10 people (1%) referred to their health as bad or very bad. Average well-being index was 15 (out of 25) and 22% (158/720) of the respondents reported having a longstanding health problem. Respondents' household context varied: 20% (147/720) lived with people older than 65 years old; 35% (255/720) lived with children less than 12 years old; and 22% (161/720) lived with people considered an essential worker. Workwise, most of the respondents worked directly with nursing home residents (525/720, 73%), had a long-lasting work contract (399/720, 55%), and worked full-time (649/720, 90%).

Table 3. Characteristics of the respondents of the *safety concerns and well-being of nursing home personnel* survey, and those of their household and work contexts.

		Total N=720		Missing data[a]	
		n	%	n	%
	Sex				
	Female	667	93	7	1
	Male	46	6		
	Age				
	Mean (SD[b])	45 (11)	–	3	0.4
	Education[c]				
Individual	Primary	297	41	12	1.7
	Secondary	199	28		
	Tertiary	212	29		
	Self-perceived health status				
	Very good	104	14	0	0
	Good	365	51		
	Fair	241	33		
	Bad or Very bad	10	1		
	WHO well-being index				
	Mean (SD)	15.5 (5.5)	–	0	0
	Longstanding health problem				
	Yes	158	22	72	10
House-hold	**Living with people aged 65 and over**				
	Yes	147	20	8	1.1
	Living with children (up to 12 years old)				

	Yes	255	35	2	0.3
	Living with people in a professional group with increased risk				
	Yes	161	22	5	0.7
	Works directly with residents				
	Yes	525	73	0	0
	Work contract duration				
Work	Less than a year	100	14		
	1 to 2 years	94	13	0	0
	3 to 5 years	127	18		
	More than 5 years	399	55		
	Weekly working hours				
	Less than 20h	52	7		
	21h up to 31h	19	3	0	0
	More than 31h	649	90		

[a] Missing data also include answer options 'Decline to answer' or 'I don't know'. [b] SD: Standard deviation. [c] Primary education: up to 9 years of formal education; Secondary education: 12 years of education; Tertiary education: University education.

Our data suggested a strong positive association (G=0.530; *P*<.001) between the risk perception of becoming infected with coronavirus and that of becoming severely ill with COVID-19 (Figure 2). Nursing home personnel perceived the testing of both residents and workers as a suitable approach to support nursing homes (G=0.884; *P*<.001). Our results did not suggest a strong or significant association between the importance of being tested for COVID-19 and a respondent's risk perception of becoming infected or severely ill with COVID-19.
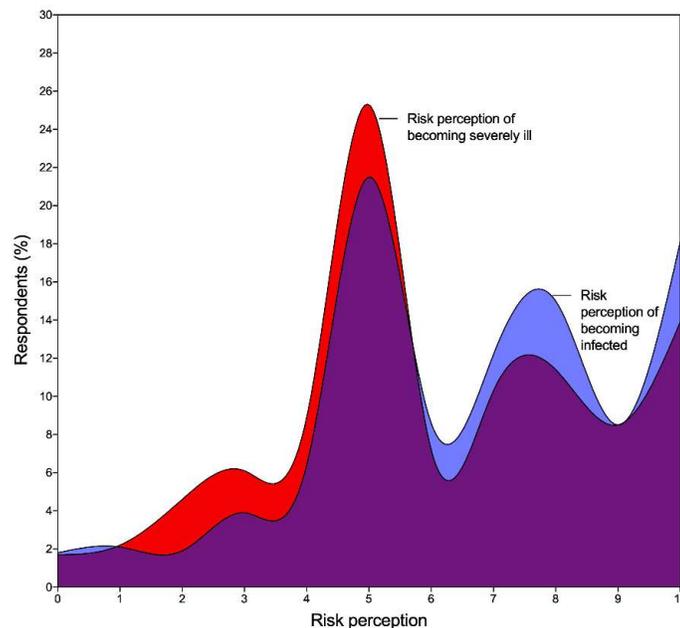
Figure 2. Overall risk perception of becoming infected with coronavirus and becoming severely ill with COVID-19.

3.3. Fear and Absenteeism Attributed to COVID-19

Our data suggested a correlation of 0.336 between fear and absenteeism attributed to COVID-19 (Supplementary File 6). We observed 6 clusters for respondents' perception of fear and absenteeism (Figure 3). Cluster 1 comprises 170 respondents, 17 in cluster 2, 123 in cluster 3, 68 in cluster 4, 188 in cluster 5, and 33 in cluster 6. Respondents in cluster 1, 3, and 5 were very homogeneous with regards to their perception of absenteeism amongst personnel, yet fear perception varied widely. On the other hand, respondents in cluster 4 and 6 perceived fear amongst personnel in a comparable manner (i.e., they perceived colleagues experiencing fear most of the time), yet respondents in cluster 6 perceived greater

absenteeism among colleagues relative to respondents in cluster 4. Respondents in cluster 2 and 4 were younger than average, with the former being the youngest group (on average). Respondents from cluster 1 and 2 showed above average well-being, whereas in cluster 6 we observed respondents with lower well-being. Remaining clusters showed similar close to zero Z-scores regarding age and well-being.
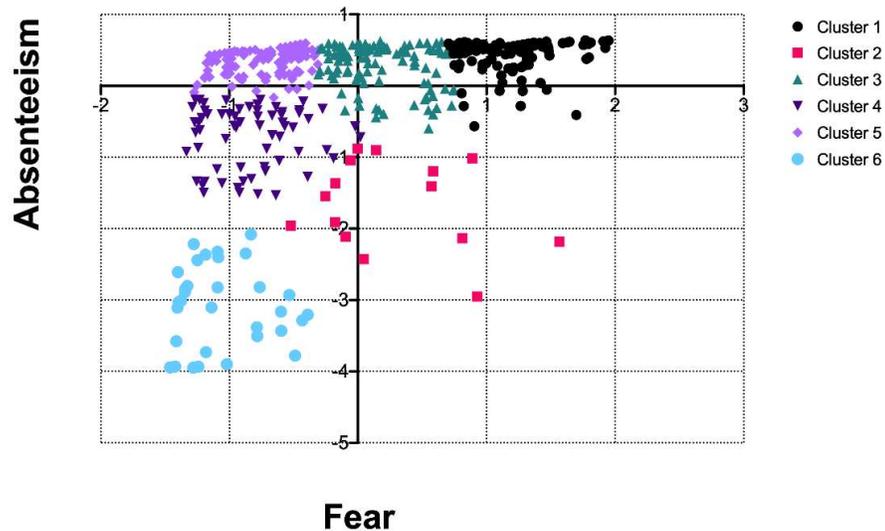
Figure 3. Clusters based on fear and absenteeism attributed to COVID-19 (Z-scores).

3.4. Experiences with Coping with the Pandemic

We grouped into 3 categories the 71 answers to the open-end survey question on how respondents were experiencing the pandemic. The first category focused on how respondents perceived support from competent authorities to inform decision-making. Some respondents referred to the poor coordination between public health authorities (Ministry of Health) and district offices of the Social Security Institute (MLSSS), which resulted in increased administrative burden and increased waiting time in receiving support. Some respondents also perceived that the competent authorities had little knowledge of the real context and circumstances of most nursing homes, and thus, were not aware of the structural hindrances these institutions were facing to follow many of the guidelines set forth by health authorities.

A second category focused on the psychological support available to residents and personnel throughout the pandemic crisis, or the lack thereof. The availability of psychological support to personnel was highlighted as an important tool to manage the stress and emotions of colleagues, residents, and those of residents' families and carers. Some respondents also highlighted increased levels of stress and anxiety amongst nursing home managers, which made them more reactive and less supportive towards personnel. Notwithstanding, some respondents found in other colleagues the much-needed support to cope with fear and other daily challenges.

The third category refers to generalized misinformation regarding the contingency plan, where respondents identified not knowing its content or how to best proceed to activate and comply with the foreseen planning. Related to this is the common misuse of PPE, which may reflect inadequate and insufficient training, and shortage of critical resources.

We observed statistically significant differences in the proportion of respondents from Algarve and Alentejo identifying the need for psychological support (Algarve: 1:67 vs Alentejo: 1:25; *P*=0.035) and support with dealing with fear/anxiety (Algarve: 1:4 vs Alentejo: 1:3; *P*=0.014) (Supplementary File 7).

3.5. Nursing home resident safety culture

We computed composite percent positive scores related to the constructs of teamwork, staffing, compliance with procedures, training and skills, and nonpunitive response to mistakes (Figure 4). The lowest composite percent positive was relative to *compliance with procedures* (51%), followed by *nonpunitive response to mistakes* (55%), and *staffing* (60%). The largest composite percent positive was that of teamwork (78%), followed by training and skills (70%). A detailed scoring list of safety culture survey items and respective percent positive, neutral, and negative composites for Algarve and Alentejo is available in Supplementary File 8.
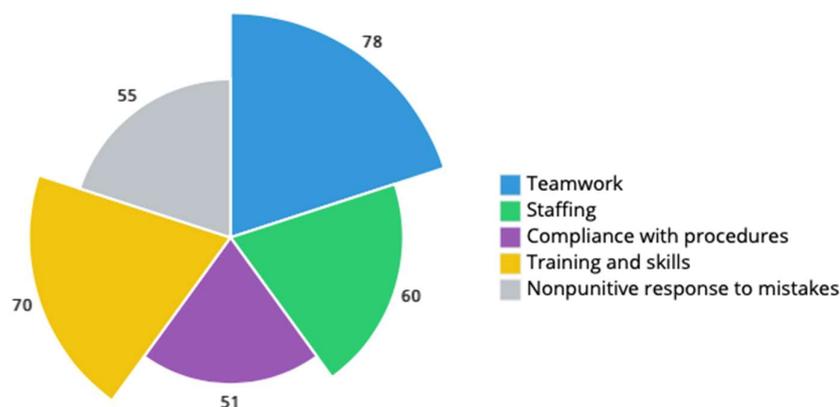
Figure 4. Nursing home resident safety culture composite average positive response (%).

4. Discussion

We examined nursing home COVID-19 preparedness and the personnel's perceived well-being and safety, including nursing home resident safety culture, in the early phases of the pandemic, in 2 regions of Southern Portugal. Our findings suggest that COVID-19 preparedness in nursing homes was poor. Often, nursing homes overlooked the importance of planning a thorough contingency plan and of having an adequate structure for planning and decision-making to respond to the COVID-19 pandemic. In general, nursing home personnel showed concerning well-being scores. Our data support that personnel perceived fear and absenteeism among peers differently, with greater variability regarding the latter. We identified *compliance with procedures* and *nonpunitive response to mistakes* as fragile areas of resident safety culture; *training and skills,* and *staffing* as moderate; and *teamwork* as a strong safety area.

Some nursing homes did not use the preparedness checklist as a tool to inform the preparation of a contingency plan. We explain non-response by considering 3 key factors. First, the use of the preparedness checklist by nursing homes occurred on a voluntary basis and independent of getting access to COVID-19 testing. Second, nursing homes had to quickly react to threats posed by COVID-19 and adapt their operations; hence, non-responders may have felt overconfident with the actions implemented in their facility and did not assign substantial importance to other initiatives wherein no additional value is perceived. And third, by the time when news in the Portuguese media started linking fragilities in nursing homes' contingency plans and COVID-19 outbreaks, these facilities were overwhelmed with mandatory and uncoordinated daily data requests from different agencies; contrary to governmental data-driven initiatives targeting hospitals, this was not the case for social care. Contributing to this context could be the current health information landscape, which is often uncoordinated and poor regarding data interoperability [26]. In the future, initiatives for collecting actionable performance intelligence [27] in a

timely fashion should be outlined in a concerted manner, prioritizing those data that could inform context-specific decision-making [28], namely via *actionable dashboards* [29].

Our findings suggest that many nursing homes overlooked the importance of thorough and exhaustive planning, and the role of the contingency plan in that. For example, in Portugal, one of the most serious events in a nursing home which resulted in the death of 18 people seem to be strongly related to the absence of a proper contingency plan; a few months later, little had improved [30]. This is concerning when our data suggest that many other nursing homes did not have a suitable decision-making structure to cope with the pandemic. Furthermore, planning for key aspects of a contingency plan was overlooked, such as those of outbreak capacity, education and training, proper in-house communication mechanisms with personnel, and adequate use and access to PPE. These aspects were of concern also internationally [6, 11, 31-34]. To address these concerns, and informed by preliminary results of this study, the MLSSS commissioned in October 2020 a national support line operating 24/7 [35], and in December 2020 a national training programme on outbreak management targeted at social workers in nursing homes [36]. These initiatives highlight the potential of partnerships with research centers such as the ABC, which may have contributed to control the deaths among nursing home residents. In Portugal, since the onset of the pandemic until February 4, 2021, 28% (3,750/13,482) of deaths were among nursing home residents [37], which compares well relative to other countries that were far more affected in that population group [16].

Many of the vulnerabilities in the COVID-19 preparedness of nursing homes occur atop of long-lasting structural barriers (eg, overcrowding and staff shortages) [26, 38], which could exacerbate the effects of the pandemic in nursing homes. Although the MLSSS funded a programme (*MAREESS*) for the emergency recruitment of staff to social facilities [39], the context of decades of disinvestment, not only financially but also strategically, is difficult to address. The scarcity of policies addressing the training and retention of people with adequate skill-mix to manage and work in these facilities depict a lack of a shared strategic vision on how nursing homes fit in the social and health care systems [10]. There is an urgency in effectively bridging social and health care, nudging nursing homes towards more integrated care pathways. This transition could strengthen safety, support, and care quality to the elderly, while nursing homes could become more attractive workplaces.

Nursing home personnel perceived their working realities on fear and absenteeism very differently. Several features may influence how personnel are affected by psychological distress, such as staff-to-bed ratio, access to PPE, safety guidelines, and professional support at the workplace [40-42], and its effects on absenteeism. The extent to which facility and individual-level characteristics contribute to variability amongst nursing home personnel remain. Hence, one-size-fits-all actions to mitigate effects attributed to fear and absenteeism may have little or no consequences in psychologically hazardous environments; rather, a dynamic approach to bolster personnel in accessing their resilience should be set forward [43, 44]. The design of such a set of actions also should be abreast of greater communication mechanisms, including those with competent and governing authorities, but also internally. Strengthening communication channels with personnel, seeking to understand their priorities, experiences with coping with the pandemic, and how to best support them could function as a *psychological PPE* [45], nurturing and instilling hope among personnel. This was crucial at the early stages of the pandemic and will remain key throughout.

Safety culture studies in social care settings such as nursing homes are widely lacking and much of the available literature refer to the USA context [14]. To the best of our knowledge, there is no peer-reviewed study focusing on safety culture in Portuguese nursing homes. Data on the safety culture of nursing homes could reveal to be crucial to inform decision-making by identifying key areas that are fragile and of concern to residents' safety, which may reflect also on staff's safety, well-being, job satisfaction, and turnover [46]. Our findings highlight fragile and moderate areas on the resident safety culture of nursing homes, such as compliance with procedures, nonpunitive response to mistakes,

and staffing. In our sample, the composite average positive percent for *compliance with procedures* (51%) and *nonpunitive response to mistakes* (55%) were lower than those for nursing homes in Belgium (50% and 61%) [47] and Norway (62% and 71%) [48]. Conversely, the composite average positive percent for *staff* was greater in our sample (60%) relative to those nursing homes in Belgium (38%) and Norwegian (44%) studies. In addition, top average positive composites in our sample – teamwork (78%) and, training and skills (70%) – were greater than those reported in [47] (76% and 65%) and [48] (68% and 51%). These indicators could be used to benchmark and steer where nursing home improvement initiatives are needed the most. The effects of such improvements could have major implications, namely in staff turnover and residents' care quality [49]. However, we suspect that systemic and long-lasting effects in nursing home resident safety culture in Portugal could be achieved not only with greater investment but also with a change of the societal opinions and the public perception on nursing homes.

4.1. Study Strengths and Limitations

Our study strength relies on the large sample of nursing homes involved, the engagement of personnel with our survey, and the use of safety culture indicators. Also, we featured in our survey international standardized measures in hopes of future possible international comparisons. However, this study should be interpreted considering some limitation. First, our sample is not representative of the nursing home population and social workers in Portugal, and thus, hampering the generalizability of our findings. Notwithstanding, these data, in parallel to the COVID-19 testing, were crucial to inform and support health and social authorities in better supporting nursing homes. Second, we only used one section of the resident safety culture questionnaire to reduce the length of our survey. By doing so, we are aware that other areas that may be significantly affecting the safety culture of a nursing home may have not been captured by our data. Finally, we understand that the data collection method chosen for our survey may have limited the ability of some people responding to the survey, particularly people without access to a computer or smartphone, and with lower literacy on information and communications technology. Also, we are aware that to increase the response rate, some nursing homes had a computer available to staff interested in answering the survey. The extent to which this commodity influenced their answers was not considered in data analysis.

5. Conclusions

In Portugal, COVID-19 seems to have exacerbated the long-standing and systemic fragility of social care and the underinvestment in high-quality long-term care, including nursing homes. That disinvestment is partly exposed by the generalized unpreparedness across nursing homes and their difficulties with keeping their residents and personnel safe during the pandemic. Hence, rethinking the positioning of nursing homes in the social and health care systems could potentially strengthen nursing home preparedness. In addition, future response actions to the pandemic should involve nursing homes to the extent where it is feasible and leverage from available evidence at the national and international level.

Communication between competent authorities and nursing homes should be clearer in scope, actions, time, and responsibilities, increasing transparency and accountability in responding to the challenges of the COVID-19 pandemic. Improved communication channels are also key inside nursing homes to better discuss the effects of the pandemic within the facility and as a mechanism to bolster personnel resilience. Also, assessing safety culture amongst nursing home personnel can be a meaningful approach to understanding and dealing with personnel's experiences of fears and anxiety. These could be addressed by involving personnel in decision-making, recognizing their efforts and merits, enhance collective learning and sharing, learn the current priorities of staff, and normalize the sharing of feelings of fear, anxiety, and psychological frailty. Dealing with a sudden threat like the first phase of the COVID-19 pandemic, posed challenges to the nursing home

community as a whole, involving residents, relatives, health care workers and management alike. Lessons learned as discussed in this study on preparedness and perceived safety should result in a more resilient nursing home sector in Portugal for the challenges still to come.

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