Leadership communication, stress, and burnout among frontline emergency department staff amid the COVID-19 pandemic: A mixed methods approach

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ABSTRACT

Background: Organizations have a key role to play in supporting healthcare workers (HCWs) and mitigating stress during COVID-19. We aimed to understand whether perceptions of support and communication by local leadership were associated with reduced reports of stress and burnout among frontline HCWs.

Methods: We conducted cross-sectional surveys embedded within emergency department (ED) workflow during the first wave of COVID-19 from April 9, 2020 to June 15th, 2020 within three EDs of a multisite health system in the Northeast United States. All ED HCWs were administered electronic surveys during shift via text message. We simultaneously conducted 64 qualitative interviews to better characterize and validate survey responses. Primary survey outcomes were levels of work stress and burnout.

Results: Over 10 week study, 327 of 431 (76%) frontline HCWs responded to at least one round of the survey. More useful communication mediated through higher perception of support was significantly associated with lower work stress ($B = -0.33$, $p < 0.001$) and burnout ($B = -7.84$, $p < 0.001$). A one-point increase on the communication Likert scale was associated with a 9% reduction in stress and a 19% reduction in burnout. Three themes related to effective crisis communication during COVID-19 emerged in interviews: (1) information consolidation prior to dissemination, (2) consistency of communication, and (3) bi-directional communication.

Conclusion: This work suggests that effective local leadership communication, characterized by information consolidation, consistency, and bi-directionality, leads to higher perceptions of support and lower stress and burnout among ED frontline workers. As the pandemic continues, these results present an evidence-based framework for leaders to support frontline HCWs through effective crisis communication.

1. Introduction

COVID-19 has placed extraordinary burden and prolonged stress on frontline healthcare workers (HCWs). The emotional toll that working on the frontline, especially in the emergency department (ED) during COVID-19, has taken is evidenced in elevated rates of stress and stress-related conditions.[1–3] This is superimposed on the already high levels of stress and burnout seen in HCWs.[4]

Organizations and leaders have a key role to play in supporting HCWs and mitigating stress. It is not possible to avoid crises with detailed planning alone, and so leaders must reduce the impact of crisis and promote adaptation and flexibility to advance through the crisis.

This involves building trust, coordinating multiple groups of stakeholders, and helping teams (managers, staff etc) make sense of new information.[5] Effective crisis communication and information dissemination is critical for stress reduction. Additionally, COVID-19 has created challenges in information access which increases anxiety for HCWs.[6–8] Therefore, a key challenge presented by COVID-19 was providing HCWs with essential information while managing constantly changing guidelines, policies and resources. For example, the World Health Organization guidance on clinical management expanded from 10 to 62 pages between January 2020 and May 2020 illustrating the rapid influx of new information.[9,10]

The nature of the crisis necessitated simultaneously managing two

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paradoxical information pathologies: information anxiety and information overload.[11] The challenge for frontline leaders was to reduce anxiety that arises from uncertainty while not increasing stress from information overload. Managing information effectively is one critical way in which organizations can support employees during times of crises. Previous work has shown that organizational support is an important mechanism for reducing employee burnout during crises or trauma.[12]

To our knowledge, studies have not empirically examined the extent to which effective communication can directly and indirectly through perceptions of support help reduce work-related stress during COVID-19. Using surveys and interviews collected over 10 weeks during the first wave of COVID-19 in three affiliated EDs, we examined the relationship between communication, organizational support and stress.

2. Methods

2.1. Design and setting

Mixed-methods including surveys and semi-structured interviews of ED HCWs across three EDs within one of the United States' largest multisite health systems located in the Northeast between April 9, 2020 and June 15, 2020. Frontline HCWs rotate between sites including an academic hospital, community hospital and free-standing ED with a combined annual visit volume greater than 190,000.

2.2. Survey development, outcomes and administration

To examine whether communication and support were associated with lower levels of work stress and burnout, we relied on existing measures of our primary outcomes, work stress and burnout (See supplement for full survey). The Copenhagen Burnout Inventory was used to assess burnout.[13] Stress was measured based on a three-item scale developed by Littman et al.[14] Both measures have been used and validated in health care professionals.[13–18]

To examine communication and support, we adapted two survey items from existing scales.[12,19,20] Previous work has found that survey items evaluating communication are context specific.[19,20] Accordingly, items were adapted to specifically test the efficacy of leadership communication and perceptions of support in this context. To assess communication, we asked on a five point Likert scale "How useful are the communications you're receiving from the ED COVID Task Force." To assess perceptions of support, we asked "How supported do you feel by YNHH right now to do your job effectively." This measure was adapted from the organizational support item in the Trauma-Informed Organizational Culture survey.[12] We focus on organizational support since it has previously been found to have a larger than typical effect on burnout reduction.

The questions were first pilot-tested in a six person panel with clinical, leadership, and survey design expertise. In addition, an open response text box allowed frontline staff to provide feedback and suggest changes which were later used for qualitative analyses. The survey items were then pilot tested among a broader group of twelve respondents who provided feedback on item clarity, instructions, and survey length.

2.3. Survey administration

We conducted repeated cross-sectional surveys of all ED HCWs including attending and resident physicians, advanced practice providers, clinical and administrative nurses, and patient care associates (ED technicians). Given time pressure on the frontline, survey questions were rotated through survey iterations to increase the spread of data desired, surveys were kept brief, and surveys were sent out at times that would be least disruptive to workflow. For example, since burnout is a result of longer term stress, such questions were asked in later weeks of the study. HCWs were contacted via text message 15 min after their shift ended. All frontline HCWs were eligible to participate in the survey including environmental services, registration and security. Each HCW received a text every six shifts with an opt-out option. Additional recruitment materials were provided in department announcements and bulletin board materials. All communications were done in English.

2.4. Semi-structured interviews

In addition to surveys, we conducted in depth interviews with ED HCWs between April 14, 2020 and June 21, 2020 via telephone. Interviews followed a semi-structured interview protocol (See supplementary for protocol), which included questions about communication, support, and burnout. Interviewees were recruited via email snowball sampling. We reached out to 121 individuals asking them to participate and completed 64 interviews. Interviews were conducted by a team of three professors and two PhD students led by one of the authors (MK) with expertise in qualitative methods and healthcare and had no prior relationship to interviewees. Interviews were conducted over the telephone and recorded with the permission of interviewees and professionally transcribed. Interview summary notes were completed using a standardized form immediately after the completion of the interview and individual interviewers reviewed the transcriptions. Since the data was collected without identifiers, transcripts and quotes were not returned to participants for comments and/or corrections. Data collection for this study ended in mid-June 2020 as COVID-19 cases in the hospital approached a nadir.

2.5. Analysis

We examined survey data for associations between communication and perceptions of organizational support and our primary outcome variables of burnout and work stress. We estimated two sets of regression models: linear regressions and structural equation models for the primary outcome. Regression models were adjusted for COVID-19 volume, the ED total volume, and staff occupation since these are likely to be associated with stress. Standard errors were clustered by day to account for the likely correlation among responses received on the same day. The first set of models relied on cross-sectional data to establish an association between communication and the primary outcomes.

To investigate the possibility that perceptions of support mediated the relationship between communication and our dependent variables of interest (work stress and burnout), we performed structural equation modeling (SEM) using the SEM command in Stata. SEM is a general, multivariate statistical modeling technique which can be viewed as a combination of regression and factor analysis.[21] This technique captures the relationships within a web of variables using a system of linked regression-style equations following from a conceptual model and path diagram.[22] SEM can be used to perform mediation analysis and has some advantages over standard regression methods because it is designed to test mediation models in a single analysis. This allows for the model to capture the simultaneous nature of the indirect and direct effects as well as the mediator's dual role as both an effect of the intervention and a cause of the outcome.[22] Mediation analysis performed using SEM captures the direct effect of the independent variable on the outcome, the indirect effect of the independent variable to the outcome through the mediator, and the total effect, or the sum of the direct and indirect effects, of the independent variable on the outcome.

By implementing a structural equation approach, we could estimate multiple equations within one model, calculating both the direct effect of communication on work stress as well as the indirect effect through which support mediates the relationship. Standard errors were clustered by date.

Interview transcripts were first analyzed in NVIVO 12 using a grounded theory method to analyze communication.[23] Transcripts were first analyzed using open coding and tracking issues and themes related to communication by two trained independent coders. Data was

downloaded and did not require double entry. A second round of axial coding was used during which the relationship between communication, support, and burnout emerged. The third phase of analysis focused on the relationship between communication, support, and burnout, with an emphasis on identifying effective communication techniques. The University Institutional Review Board deemed the study exempt. The methods and results for the interview component of this study are presented according to the consolidated criteria for reporting qualitative research (COREQ).[24]

3. Results

3.1. Text-based surveys

Of the 431 frontline staff surveyed, 327 (76%) responded at least once to the text message based survey. Table 1 summarizes the characteristics of survey respondents and shows baseline levels of stress and burnout. Frontline staff reported lower levels of stress (coefficient B=-0.32; $p < 0.001$) and burnout (B=-7.8; $p < 0.001$) when communication was perceived to be more effective controlling for COVID-19 caseload, occupational role, and total ED volume (Table 2). Based on the regression models in Table 2, a one point increase on the communication scale was associated with a 9.45% reduction in stress and an 18.97% reduction in burnout.

3.2. Structural equation model and support

We further aimed to disentangle the extent to which communication directly alleviated stress or worked to reduce stress by increasing perceptions of support. Interviewees suggested that perceptions of support were closely linked to having adequate information. For instance, in response to a question asking how the ED Task Force could better support frontline staff, a resident (Post Graduate Year 4) responded, "I think it's more of a communication thing than anything else."

We examined the relationship between communication and stress using structural equation models. Figs. 1 and 2 show the path diagrams for work stress and burnout, respectively. Line thickness varies with the strength of the relationship between variables. Coefficients, standard errors, and p-values are reported in the path diagrams; the full models are reported in Supplemental Table 1. The results show a positive and significant relationship between communication and support, and a negative and significant relationship between support and work stress. This suggests that ED HCWs who perceived communication to be more

Table 1
Summary statistics based on survey responses.

Variable	Mean (%)	Std. Dev.	Min.	Max.	N
Sample Demographics					
Female	0.58	–	–	–	230
Tenure (Years)	6.57	5.20	0	15	253
Occupation					
Tech	0.13	–	–	–	393
Attending	0.24	–	–	–	393
Nurse	0.28	–	–	–	393
Resident	0.15	–	–	–	393
APP	0.05	–	–	–	393
Other[b]	0.15	–	–	–	393
Possible COVID-19 (patients)[c]	39.84	16.29	5	67	68[a]
ED Census (patients)	161.05	17.40	125	216	68[a]
Survey Scores (1–5 Likert Scale)					
Communication	3.52	1.27	0	5	423
Work Stress	3.43	1.32	1	6	419
Burnout (0–100 Scale)	41.33	28.62	0	100	147
Support	3.24	1.31	0	5	423

[a] Days.
[b] Includes all groups not already specified (environmental, registration, security etc).
[c] Patient under isolation for presumed COVID-19.

Table 2
Regression models showing association between perceptions of communication and work stress and burnout.

	(1)	(2)
	Work Stress	Burnout
Communication (1–5 Scale)	−0.324***	−7.839***
	(0.0492)	(1.325)
Possible COVID-19 Cases[a]	0.00576	0.0414
	(0.00438)	(0.253)
Total ED Census	−0.000261	−0.0731
	(0.00395)	(0.174)
Job		
Attending	−0.112	−1.158
	(0.222)	(8.977)
Nurse	0.326	−3.628
	(0.236)	(8.701)
Resident	0.276	−4.328
	(0.257)	(11.55)
APP	−0.253	−15.54*
	(0.263)	(7.467)
Other	−0.151	−25.78
	(0.276)	(12.72)
Constant	4.318***	86.13*
	(0.745)	(32.70)
Observations	392	137

Clustered standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
[a] Patient under isolation for presumed COVID-19.

effective felt more supported, which in turn reduced reported levels of stress at work. The indirect effect of communication on work stress (through support) was B=-0.22 ($p < 0.001$). This means that a one unit increase in communication (on a five point scale) is associated with a decrease of 0.22 in work stress (on a six point scale) as a result of the effect of communication on support, which in turn effects stress. The total effect of communication on work stress is equal to the indirect effect (B=-0.22; $p < 0.001$) plus the direct effect (B=-0.13; $p = 0.015$); a one unit increase in communication is associated with a 0.35 decrease ($p < 0.001$) or 26.7% of a standard deviation decrease in work stress overall.

3.3. Structural equation model and burnout

We also examined another model to examine the effects of communication and support on feelings of burnout. Again, the results show a positive and significant relationship between communication and support, and also show a negative and significant relationship between support and burnout. This suggests that the increased feelings of support associated with communication decreased feelings of being burned out in addition to decreasing stress. The indirect effect of communication on burnout (through support) was $B = −4.64$ ($p < 0.001$), which means that a one unit increase in communication (on a five point scale) is associated with a decrease of 4.64 in feeling burned out (on a 100 point scale). The total effect of communication on burnout is equal to the indirect effect (B=-4.64; $p < 0.001$) plus the direct effect (B=-2.95; $p = 0.076$). This means that a one unit increase in communication is associated with a 7.59 decrease ($p < 0.001$) or 26.5% of a standard deviation decrease in burnout overall.

3.4. Semi-structured interviews

We interviewed 64 ED staff including 25 nurses, 13 attending physicians, 10 advanced practice providers, 6 residents, 7 ED technicians, and 3 members of other occupational groups. Interviews typically lasted an hour (ranging from 26 min to 1 h and 23 min). Analysis of the qualitative interviewed identified three themes related to effective communication which increase perceptions of support and help reduce stress and burnout: (1) information consolidation prior to dissemination,
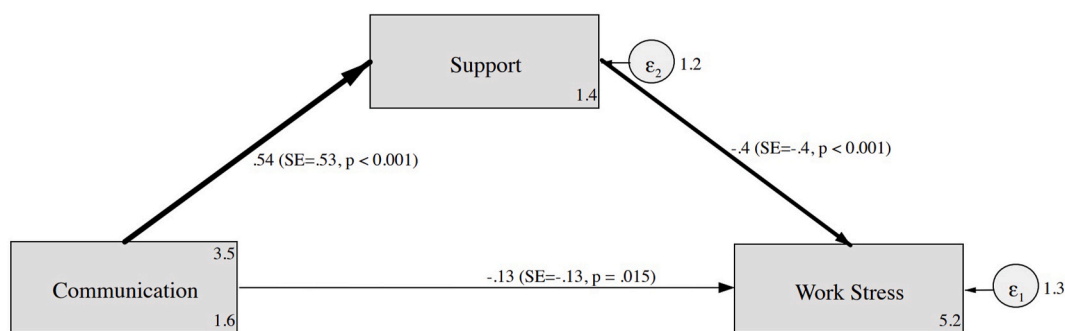
Fig. 1. Path Diagram (Work Stress). Communication has a positive relationship on perceptions of support which results in lower work stress. Line thickness varies with the strength of the relationship between variables. Coefficients, standard errors, and p-values are reported in the path diagrams. All relationships are statistically significant.
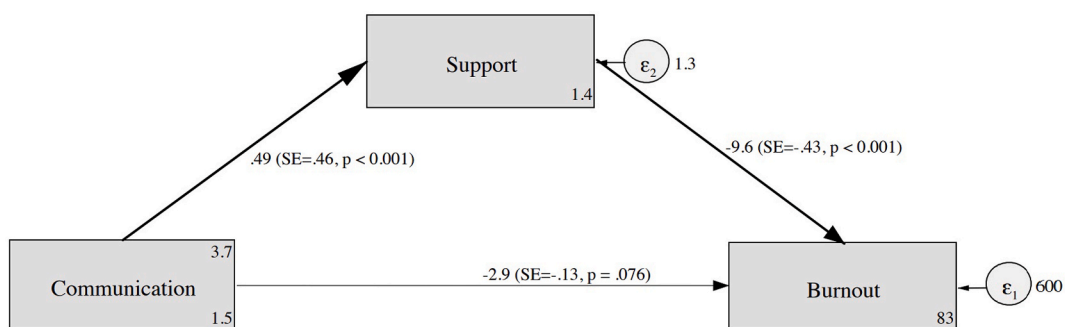

Fig. 2. Path Diagram (Burnout). Communication has a positive relationship on perceptions of support which results in lower burnout. Relationship between communication, perception of support and burnout are statistically significant. Line thickness varies with the strength of the relationship between variables. Coefficients, standard errors, and p-values are reported in the path diagrams.

(2) consistency of communication, and (3) bi-directional communication. These three themes along with illustrative quotes are summarized in Table 3.

3.5. Information consolidation prior to dissemination

In the beginning of the first wave of the pandemic, frontline HCWs simultaneously complained about a lack of information and information overload. One key change that improved communication and helped reduce information overload was the development of a COVID-19 electronic handbook. In large healthcare institutions, leadership is broad and diffuse and a multitude of protocols are created for specific indications. Consolidating protocols into an ED-specific handbook that distilled relevant information for clinical teams helped mitigate information overload. This handbook was available electronically as a searchable, mobile device accessible, portable document format (PDF) resource. It contained ED specific information such as visitor/staff travel policies, triage/main ED workflows, PPE guidance and miscellaneous protocols related to interactions with subspecialty services.

3.6. Consistency of communication

Establishing consistency of communication helped alleviate information anxiety. For example, consolidating the pertinent information into a single email, sent at a specific time of day, allowed the messaging to become as predictable as postal mail delivery. This email update was created by department leadership and sent from the medical, advanced practice provider and nursing directors to their respective staff. The email was formatted the same way with important changes at the top, reminders in the middle and operational data at the bottom. One interviewee stated "… It was like the Bible … You would look for that at exactly 6:00 a.m. in the morning … I know, to me as a leader, that was

huge. I felt like that was, kept me informed. I was able to speak to the points. I felt well informed through this whole thing. So then if I feel good about it, I'm able to articulate that to my people." This is consistent with research that suggests that routines and habits can help reduce performance stress.[25]

3.7. Bi-direction communication

In order to further facilitate open communication, ED town halls were implemented to allow for adaptability and real-time responsiveness.[26] While the health system implemented broader town halls where questions were submitted in advance, having a department specific town hall allowed more personalized interaction and be more of a conversation. Town halls also provided an open forum for issues or questions that needed clarification or further operational refinement. They provided an opportunity for ED HCWs to raise concerns. Town halls were held weekly but the frequency could be adjusted based on pandemic developments. These were moderated by the medical directors, department Chair/Vice-Chair but could be supplemented as needed with updates from the emergency medical services director or residency director. During town halls at the beginning of the crisis, chats frequently contained 150 to more than 200 comments and questions. As one attending physician described, if a problem surfaced that was generating concern they could approach leadership and say, "Hey listen, I'm hearing a lot of concerns about X that you might not have realized is a problem. But maybe you want to address it in your next town hall."

4. Discussion

This study reveals that effective communication is associated with decreased work stress and burnout. These outcomes may be mediated through increased perception of support across frontline staff tackling

Table 3
Major themes and representative quotes for semi-structured interviews.

Problem	Interview Themes	Representative Quotes
April 10th, a resident wrote in the open survey item, "Timely overall medical strategy updates would help. What's in the works about awake proning, experimental treatments inpatient?" "Departments need to be better with communication … I don't understand why it is so hard for everyone to be on the same page. It's very frustrating." Nurse April 14th a physician assistant described being "inundated in the beginning," "the first week, two weeks, you're getting like 20 emails a day and trying to understand what's going on."	*Information Consolidation Prior to Dissemination*	"I think that there was some growing pains in the beginning and less communication than we'd like … I think consolidating it into this is the one big one you need to pay attention to was really important." "It was a little much at first because things were changing so frequently, but it seems like now we have a system in place … the update is being rolled out as usual per every day and if anything new is changed, then it's highlighted within the update … we've kind of figured out what has been working well and we have fewer of those changes to our daily updates. Things seem to be communicated better."
	Consistency of Communication	"It got to the point where it was almost like … It was like the Bible," according to a nurse manager. They continued, "You would look for that at exactly 6:00 a.m. in the morning. Even the charge nurses and the staff would look for it. "Are there any updates?" Preparing for the next shift. Making sure everybody has the information. I know, to me as a leader, that was huge. I felt like that was, kept me informed. I was able to speak to the points. I felt well informed through this whole thing. So then if I feel good about it, I'm able to articulate that to my people."
	Bi-Directional Communication	A physician assistant described the town halls stating, "they have these town halls, which are phenomenal. They're recorded … I have to hand it to them that they are trying to keep the communication open with the staff. They're honest with us. They're like, "Listen, this is what the PPE situation is, this is what the ICU bed situation is."

COVID-19 at a large northeast US academic center with a large COVID-19 burden. Moreover, qualitative interviews allowed us to describe the key elements of effective crises communication. We found that (1) information consolidation prior to dissemination, (2) consistency of communication, and (3) bi-directional communication were critical for overcoming the simultaneous challenges of information overload and information anxiety. These findings can help inform regions encountering a subsequent waves of COVID-19 or future crises.

This work adds to the existing body of literature by examining the link between communication and resilience (the ability to adapt to stressors). While there is literature suggesting a framework of how to effectively communicate in a crisis,[5,27] suprisingly little empirical work has examined how effective communication during crises can increase resilience. HCWs in EDs have a high prevalence of burnout[4,28–30] and were dealing with high levels of uncertainty during the first wave of COVID-19. While large health systems with complex interactions between departments and staff to support function may gravitate toward universal mass messaging, this study demonstrates the value of focusing particular attention to frontline staff who may be disproportionately affected by information overload and information anxiety. Specifically, the consolidation of numerous emails and protocols into an electronic ED specific handbook allowed staff to have a centralized place of relevant information for the ED workflow and environment. By examining resilience during COVID-19, this study validates the importance of effective communication for reducing stress and burnout.

Second this study goes further than suggesting communication alone reduces burnout and stress. Instead, the nature of the communication increases staff perception of leadership support which is important for establishing trust and quelling anxiety. Crises represent an opportunity for information vacuums and thus staff look to leadership for guidance. Honest, open and consistent communication can create a "navigational beacon" for staff to follow. This was achieved through an operational update email sent by the same people, at the same time and formatted identically such that staff could get into a routine with knowing when and where to look for updates.

Third, through this study, staff were able to give feedback to the study team which was sent to the ED leadership. Changes implemented as a result included modifying leadership rounds to focus more on *how* people are doing rather than *what* people are doing and identifying populations that felt marginalized early in the pandemic such as custodial staff or ED technicians and nurses. Other changes based on feedback included prioritizing electronic health record improvement tickets, messaging of HCW infection rates, hospital COVID-19 case count and compiling a collection of support resources related to both mental health and family care (i.e., childcare). Establishing structures for bottom up communication and feedback are critical for learning, which is particularly important during times of uncertainty. Beyond the free responses of the survey, similar bottom up communication was achieved with ED town halls where junior members of staff had direct access to senior leaders to ask questions. This may be of particular benefit to staff occupations with high turnover and thus are new to the ED or those who are implementing patient care orders placed by physicians and feel more exposed to the virus.[3,31] Moreover, ensuring broad participation and inclusivity has been demonstrated in a management research as being critical for surfacing information and harnessing collective intelligence during periods of organizational stability.[32] However, during crises, organizations frequently default to command and control and more hierarchical forms of organizing. Our work demonstrates the benefits of inclusivity and opportunities for broad participation in decision making during crises.[33]

4.1. Limitations

While our sample for a qualitative study is robust, it continues to represent a smaller proportion of the overall workforce. Additionally, the study enrolled those willing to participate and thus may have either a very positive or negative viewpoint to share. Despite this, responses generally aligned to similar themes. It is also important to note that the results are not connected to any specific intervention which limits our ability to causally establish the efficacy of specific interventions. Additionally, while our models control for workplace variables, we did not include non-workplace variables such as housing or financial situation. We hope future research will use field experiments to examine whether the interventions we identify lead to decreased burnout and stress during crises. Finally, perceptions of communication did not consistently increase and began to decrease after the first wave of the crisis passed. Future work is needed to understand how to most effectively

communicate as crises wane.

5. Conclusion

Effective communication is associated with decreased work stress and burnout which was mediated through increased perception of support across frontline HCWs tackling COVID-19. Effective crisis communication during COVID-19 involve bidirectional communication, consistency of communication, and information consolidation prior to dissemination. While further work is needed to causally identify interventions to improve crisis communication, our work suggest that small changes in organizational communication are associated with significantly lower levels of stress and burnout. As the pandemic continues or a second wave is encountered, we provide a framework for leadership to effectively communicate in a crisis.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.hjdsi.2021.100577.

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