






BMJ Open Comparative end-of-life communication and support in hospitalised decedents before and during the COVID-19 pandemic: a retrospective regional cohort study in Ottawa, Canada

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ABSTRACT

Objective To compare end-of-life in-person family presence, patient–family communication and healthcare team–family communication encounters in hospitalised decedents before and during the COVID-19 pandemic.

Design In a regional multicentre retrospective cohort study, electronic health record data were abstracted for a prepandemic group (pre-COVID) and two intrapandemic (March–August 2020, wave 1) groups, one COVID-19 free (COVID-ve) and one with COVID-19 infection (COVID+ve). Pre-COVID and COVID-ve groups were matched 2:1 (age, sex and care service) with the COVID+ve group.

Setting One quaternary and two tertiary adult, acute care hospitals in Ottawa, Canada.

Participants Decedents (n=425): COVID+ve (n=85), COVID-ve (n=170) and pre-COVID (n=170).

Main outcome measures End-of-life (last 48 hours) in-person family presence and virtual (video) patient–family communication, and end-of-life (last 5 days) virtual team–family communication encounter occurrences were examined using logistic regression with ORs and 95% CIs. End-of-life (last 5 days) rates of in-person and telephone team–family communication encounters were examined using mixed-effects negative binomial models with incidence rate ratios (IRRs) and 95% CIs.

Results End-of-life in-person family presence decreased progressively across pre-COVID (90.6%), COVID-ve (79.4%) and COVID+ve (47.1%) groups; adjusted ORs=0.38 (0.2–0.73) and 0.09 (0.04–0.17) for COVID-ve and COVID+ve groups, respectively. COVID-ve and COVID+ve groups had reduced in-person but increased telephone team–family communication encounters: IRRs=0.76 (0.64–0.9) and 0.61 (0.47–0.79) for in-person, and IRRs=2.6 (2.1–3.3) and 4.8 (3.7–6.1) for telephone communications, respectively. Virtual team–family communication encounters occurred in 17/85 (20%) and 10/170 (5.9%) of the COVID+ve and COVID-ve groups, respectively; adjusted OR=3.68 (1.51–8.95).

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ There were no missing data in a decedent cohort that was representative of the source population in all adult acute care hospitals in a large urban region.
- ⇒ Although cohort groups were effectively matched on the basis of age, sex and care service, other baseline differences could have existed between the groups.
- ⇒ In data abstraction, we cannot exclude the possibility of misclassification bias, which could have occurred despite rigorous training and data accuracy checks; the absence of abstractor blinding in relation to the study hypothesis was also a potential source of bias.
- ⇒ The retrospective nature of the study and the absence of a qualitative assessment to assess the depth and more detailed content of communication during encounters are acknowledged limitations.
- ⇒ The generalisability of our study findings is largely limited to end-of-life care for hospitalised decedents, whereas many of the COVID-19 pandemic related deaths occurred in nursing homes.

Conclusions In hospitalised COVID-19 pandemic wave 1 decedents, in-person family presence and in-person team–family communication encounters decreased at end of life, particularly in the COVID+ve group; virtual modalities were adopted for communication, and telephone use increased in team–family communication encounters. The implications of these communication changes for the patient, family and healthcare team warrant further study.

INTRODUCTION

COVID-19 emerged in late 2019 and became a global pandemic within 3 months.^{1 2} COVID-19 infection is associated with high

rates of hospitalisation, intensive care unit (ICU) admission and increased mortality, particularly in older people, the frail and those with chronic medical conditions.^{3–5} These metrics underscore the need to integrate a palliative approach that includes shared decision making, sensitive goals of care discussions respecting patient and family preferences, and meeting the psychosocial and spiritual needs of patients and their families facing a life-threatening illness.^{6–8} Communication involving the patient, family and healthcare team triad, particularly in-person, is an integrative component of a proactive palliative approach in non-pandemic times⁸ and highly valued by family members in their subsequent bereavement.^{9–11} Moreover, in-person communication is a fundamental human need, and inability to say goodbye prior to death of a loved one has been identified as a predictor of complicated grief in bereavement.¹²

The pandemic associated increase in end-of-life care communicative needs has been further compounded by the introduction of strict infection control measures, including visitor restriction and patient isolation policies for hospitalised patients.^{13–15} Although mandated from a public health perspective, these measures pose obstacles to end-of-life communication.^{11 13 16}

Studies specifically examining end-of-life communication issues during the COVID-19 pandemic have, to date, been mostly qualitative and relatively limited in quantifying these phenomena, or were restricted in focus, such as resuscitation status,^{17 18} or reliant on voluntary reporting.^{19 20} To address these gaps, we retrospectively examined end-of-life care in relation to the COVID-19 pandemic in adult acute care hospitals in an urban region. We hypothesised that the pandemic-related visitor and isolation restrictions imposed in these hospitals were associated with a reduced number of in-person, face-to-face, healthcare team–family and family–patient communications and an increase in alternative communication modalities, such as teleconferencing or virtual (video) conferencing. The primary study objective was to examine the impact of COVID-19 status on patient–family and healthcare team–family communication encounters during end-of-life care. We compared those dying prepandemically versus those dying during wave 1 of the pandemic, due to recorded COVID-19 infection itself versus other causes, without COVID-19 infection. Comparative allied health involvement, palliative medicine consultation and resuscitation order status were examined as additional objectives.

METHODS

Study design

We conducted a multicentre retrospective matched cohort study of decedents' documented end-of-life care in adult acute tertiary or quaternary care hospitals. The study is reported in accordance with the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) criteria.²¹

Setting

The source population consisted of inpatients in Ottawa (population 1.4 million), Canada, who died in the city's three adult acute care hospital sites between 1 November 2019 and 31 August 2020. Site 1, The Ottawa Hospital, is a quaternary acute care hospital with 1271 inpatient beds. Site 2, The Hôpital Montfort, is a tertiary acute care francophone academic hospital with 289 inpatient beds. Site 3, The Queensway-Carleton Hospital, is a tertiary acute care hospital with 264 inpatient beds. All sites used established electronic health records (EHR) systems, Epic (Epic Systems Corporation) at site 1 and MEDITECH (Medical Information Technology, Inc) at sites 2 and 3, for documentation of patient care and encounters with family.

Approximately 2487 people were diagnosed with COVID-19 in Ottawa between 1 March and 31 August 2020, of whom 266 died, including 85 in acute care hospitals.²² Public health measures and restrictions were applied throughout Ontario, including in acute care hospitals, in early March 2020, and remained largely in place until the end of the study period.

The study's key exposures related to COVID-19 infection status during decedents' hospital admission and the timing of the admission in relation to the pandemic. Based on these exposures, three study groups were designated: a pre-COVID group who died prior to the COVID-19 pandemic (deaths occurring between 1 November 2019 and 29 February 2020) and two groups whose deaths occurred within the initial, wave 1 of the pandemic (1 March 2020–31 August 2020), one without any record of COVID-19 during their hospital admission and the other who died of COVID-19 infection, designated COVID-ve and COVID+ve, respectively.

Participants

Adult (≥ 18 years old) decedents were eligible for inclusion if they died in ICU or under the care of a medical service in the study period. Emergency department decedents and those primarily under surgical care were excluded. The index study group was COVID+ve; all ($n=85$) of these decedents were included. The pre-COVID ($n=170$) and COVID-ve ($n=170$) group members were matched 2:1 with the COVID+ve members from each site on the basis of age (± 5 years), sex and care service (medicine or ICU) at the time of death.

Data sources/measurement

Using a common electronic study database across sites, anonymised EHR data, including study variables, were abstracted by teams of internal/palliative medicine physicians and two research assistants. All abstractors received training regarding abstraction requirements. Of all patient records, 154 (35%) underwent duplicate abstraction to confirm accuracy of details.

Variables

Study group designation was based on EHR documentation of COVID-19 infection status, date of death and

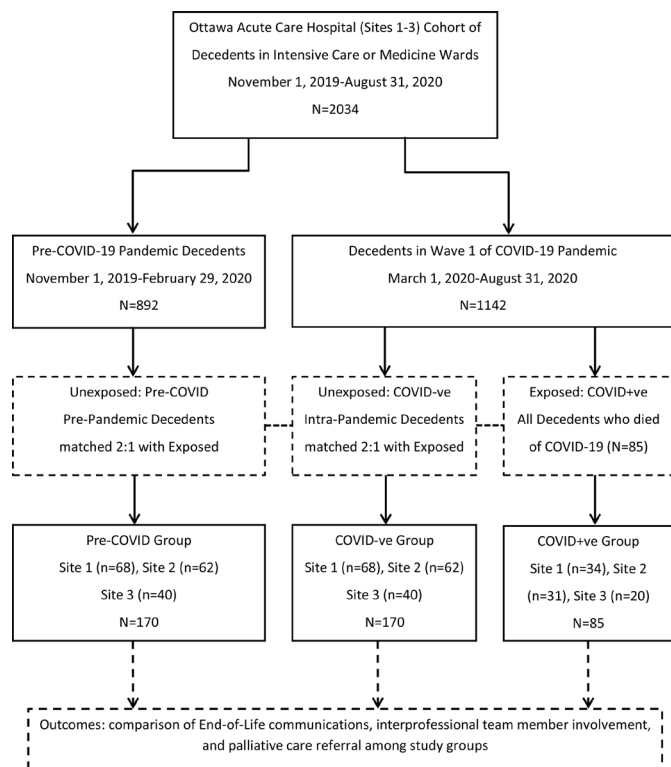


Figure 1 Study flow diagram of study group derivation, exposures, matching and outcomes.

death certification. Demographic variables included age, sex, admission referral source, acute care site, care service at death and admission duration (days). The association of these variables was examined in relation to the occurrence of patient–family and healthcare team–family communicative encounters. Admission duration was included as a potential confounder, as decedents were not matched on this criterion. Clustering in association with either location or actual presence of family in the last 48 hours was anticipated and adjusted for in multivariable analyses.

Documented family–patient communicative interactions involving physical presence and virtual presence in the last 48 hours of life, were each recorded as outcomes and each treated as binary (yes/no) variables. The outcomes of documented healthcare team (physician, nursing and allied health)–family interactive encounters (physical presence, telephone conversations and virtual presence) in the last 5 days of life were each recorded as a total count, based on individual note entries in the EHR. As an implicit measure of quality end-of-life care across our study sites, and for legal reasons, any family–healthcare team communication, irrespective of modality, that involves patient care decisions would be expected to be recorded in the EHR. In the absence of family, the decedent’s substitute decision maker was included within the category of family. The involvement of allied health professionals, palliative medicine consultation and the documented presence of a no cardiopulmonary resuscitation (CPR) order were recorded as binary variables and

represented additional indices of end-of-life communication and support.

Patient and public involvement

The retrospectively acquired decedent data in this study are part of an overall project that involves an ongoing prospective evaluation of grief in decedents’ bereaved family members. Although there was no direct patient or public involvement in the retrospective component of the project, we engaged with three different knowledge user organisations (Bereaved Families of Ontario, Canadian Virtual Hospice and Champlain Hospice Palliative Care Program), whose representatives collaborated with the study planning team and were coapplicants in funding applications for the overall project.

Bias

Data abstractors were not blinded as to the study objectives and consequently misclassification bias cannot be ruled out. Matching variables were included a priori in multivariable models of the main outcomes.

Study size

The sample size was determined by the inclusion of all wave 1 deaths due to COVID-19 (COVID+ve, n=85) and the subsequent 2:1 matching to generate the other two study groups.

Quantitative variables

Healthcare team–family interactions in the last 5 days of life were treated as count data and summarised as median (interquartile, Q1–Q3 range); other continuous variables were expressed as mean±SD unless otherwise indicated.

Statistical methods

Demographic characteristics, allied health involvement, palliative medicine consultation and resuscitation order status were compared among study groups, using a χ^2 test for categorical variables and an analysis of variance or Kruskal-Wallis test for continuous variables, as appropriate. The presence of family was reported using unadjusted and adjusted multivariable logistic regression, reporting ORs and corresponding 95% CIs. The comparison of virtual patient–family encounters was restricted to the intrapandemic groups, as these encounters were rarely documented prepandemically. The count distribution of healthcare team–family in-person (online supplemental appendix 1) and telephone interactions (online supplemental appendix 2) were zero inflated and overdispersed, with potential clustering both by site and family presence in the last 48 hours of life. Consequently, mixed effects negative binomial models were used, including site and family presence in the last 48 hours as random effects, and reporting incidence rate ratios (IRRs) with 95% CIs for in-person and telephone interactions among the groups. Due to absence of virtual healthcare team–family encounters prepandemically, and their infrequent occurrence in the intrapandemic groups, the initial total counts underwent binary transformation to reflect

Table 1 Demographic characteristics among study groups designated according to COVID-19 status

Demographic characteristics	Time periods and designated study groups			P values
	November 2019–February 2020	March 2020–August 2020		
	Pre-COVID group n=170 (%)*	COVID-ve group n=170 (%)*	COVID+ve group n=85 (%)*	
Age				
Years, mean±SD	79.5±12.3	79.2±12.3	78.9±12.2	0.942
Sex				
Male	100 (58.8)	100 (58.8)	50 (58.8)	1.0
Admission referral source				
Home	99 (58.2)	109 (64.1)	31 (36.5)	<0.001
Retirement home	36 (21.2)	34 (20.0)	11 (11.8)	
Nursing home/long-term care	22 (12.9)	8 (4.7)	43 (50.6)	
Complex continuing care	2 (1.2)	2 (1.2)	0 (0.0)	
Other	11 (6.5)	17 (10.0)	1 (1.2)	
Care service at death				
Medicine service/unit	118 (69.4)	122 (71.7)	62 (72.9)	0.814
Intensive care unit	52 (30.6)	48 (28.2)	23 (27.1)	
Admission duration				
Days, median (Q1–Q3)	6 (2–15)	9 (4–21)	6 (4–13)	0.062
Documented no CPR order				
Present	160 (94.1)	161 (94.7)	82 (96.5)	0.724
Median days (Q1–Q3) pre-death if order present	3 (1–10)	5 (1–16)	5 (3–11)	0.184

Bold values were statistically significant
*Column numbers refer to number of persons (%) in respective study groups unless stated otherwise.
CPR, cardiopulmonary resuscitation.

occurrence or non-occurrence, and group comparison was restricted to the intrapandemic groups. Stata (StataCorp LP, 2015, *Stata Statistical Software: Release 14*) was used for statistical analysis, and statistical significance was set at $p < 0.05$.

RESULTS

Study sample derivation and demographic data

The final study sample of 425 decedents consisted of the pre-COVID (n=170), COVID-ve (n=170) and COVID+ve (n=85) groups (figure 1).

Comparison of demographic data revealed no statistically significant difference among the study groups regarding the matching criteria (table 1).

The overall mean age was 79.3 ± 12.2 and the majority (58.8%) were male. Admission referrals from nursing homes were higher in the COVID+ve (50.6%) group compared with pre-COVID (12.9%) or COVID-ve (4.7%) groups ($p < 0.001$).

Family–patient communication encounters

In the last 48 hours of life, family member presence decreased progressively across the pre-COVID (90.6%),

COVID-ve (79.4%) and COVID+ve (47.1%) groups (table 2).

The unadjusted OR for family physical presence in the last 48 hours of life was 0.40 (0.21–0.76) and 0.09 (0.05–0.18) for the COVID-ve ($p = 0.005$) and COVID+ve ($p < 0.001$) groups, respectively, and 0.53 (0.32–0.89) for site 2 ($p = 0.017$). These findings were maintained with marginal differences in the multivariable model.

In the pre-COVID group, only two virtual patient–family encounters were documented in the last 48 hours of life, compared with occurrence rates of 31.8% and 10% in the COVID-ve and COVID+ve groups, respectively. In a multivariable model restricted to the intrapandemic decedents (n=255), the adjusted OR for the occurrence of a virtual encounter was 3.45 (1.67–7.15) and 2.14 (1.01–4.53) for the COVID+ve group ($p = 0.001$) and for absence of a family member in the last 48 hour of life ($p = 0.048$), respectively (table 3).

Healthcare team–family communication encounters

In the last 5 days of life, there was a 15% reduction in physical or in-person healthcare team communication

Table 2 In-person family presence in the last 48 hours of life and variables examined in logistic regression analyses

Variables examined	Proportion of patients* (%)	Unadjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
In-person family presence	329/425 (77.4)				
Age of decedent†		0.997 (0.98 to 1.02)	0.774	0.99 (0.97 to 1.02)	0.608
Sex of decedent					
Female	139/175 (79.4)	1		1	
Male	190/250 (76.0)	0.82 (0.51 to 1.31)	0.406	0.75 (0.44 to 1.26)	0.272
Study group					
Pre-COVID	154/170 (90.6)	1		1	
COVID-ve	135/170 (79.4)	0.40 (0.21 to 0.76)	0.005	0.38 (0.199 to 0.73)	0.003
COVID+ve	40/85 (47.1)	0.09 (0.05 to 0.18)	<0.001	0.09 (0.04 to 0.17)	<0.001
Hospital site					
Site 1	138/170 (81.2)	1		1	
Site 2	108/155 (69.7)	0.53 (0.32 to 0.89)	0.017	0.46 (0.26 to 0.84)	0.011
Site 3	83/100 (83.0)	1.13 (0.59 to 2.17)	0.707	1.15 (0.56 to 2.34)	0.701
Care service at death					
Medicine	231/302 (76.5)	1		1	
Intensive care unit	98/123 (79.7)	1.21 (0.72 to 2.01)	0.477	0.92 (0.47 to 1.79)	0.801
Admission duration†		1.004 (0.99 to 1.01)	0.411	1.004 (0.99 to 1.02)	0.428

Bold values were statistically significant.

*Proportion of patients=proportion of total number for each categorical variable.

†Treated as a continuous variable or covariate.

encounters in male decedents compared with females, with IRR=0.85 (0.72–0.99), $p=0.041$ (table 4).

There was an approximate 24% and 39% reduction in the incidence rate of these communications in the COVID-ve and COVID+ve groups, with IRRs of 0.76 (0.64–0.90) and 0.61 (0.47–0.79), $p=0.001$ and $p<0.001$, respectively. Compared with a medicine ward, death in ICU was associated with a 32% reduction in the incidence rate of in-person communications; IRR=0.68 (0.55–0.84), $p<0.001$.

In the model examining telephone communications between the healthcare team and family members in the last 5 days of life, there was a relative increase in the incidence rate of these communications in the COVID-ve and particularly in the COVID+ve groups, with IRRs of 2.6 (2.09–3.25) and 4.77 (3.72–6.12), $p<0.001$ for both, respectively.

Virtual healthcare team–family communication encounters occurred in 17 (20%) of the COVID+ve and 10 (5.9%) of COVID-ve decedents ($p=0.001$). Both COVID+ve status and death in the ICU were associated with an increased occurrence of virtual communication encounters, with unadjusted ORs of 4.0 (1.74–9.18) and 2.29 (1.01–5.18), $p=0.001$ and $p=0.046$, respectively (online supplemental appendix 3). Hospital site 2 was associated with an unadjusted OR of 0.33 (0.12–0.95), $p=0.039$, for virtual communication encounters, compared with hospital site 1. However, only COVID+ve status had an independent

association with virtual communications in a multivariable model, with an adjusted OR of 3.68 (1.51–8.95), $p=0.004$.

Interprofessional supportive care team involvement

Relative to the pre-COVID group, with proportions of 41.2%, 45.9% and 30.4% for the respective involvement of physiotherapy, medical social work and occupational therapy during admission, the COVID-ve group had greater involvement (50.6%, 58.2% and 42.9%, respectively), whereas the COVID+ve group had lesser involvement of these disciplines with rates of 22.4%, 30.6% and 12.9%, respectively, $p<0.001$ for all (table 5).

There were no statistically significant study group differences with respect to spiritual care or palliative care involvement, though the proportion with spiritual care involvement decreased from 28.8% in the pre-COVID group to 12.9% in the COVID+ve group ($p=0.098$).

DISCUSSION

Study findings and putative explanations

Our study found reduced physical presence of family at end of life for pandemic decedents, particularly in those dying with COVID-19 infection, with a reduction of almost 50% when compared with matched prepandemic controls. Although we adjusted for family presence at end of life, we found a reduced incidence rate of in-person

**Table 3** Virtual family presence in the last 48 hours of life and variables examined in logistic regression analyses

Variables examined	Proportion of patients* (%)	Unadjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Virtual family presence†	44/255 (17.3)				
Age of decedent‡		1.01 (0.98 to 1.04)	0.402	1.02 (0.98 to 1.05)	0.334
Sex of decedent					
Female	19/105 (18.1)	1		1	
Male	25/150 (16.7)	0.91 (0.47 to 1.75)	0.766	0.88 (0.44 to 1.80)	0.734
Study group					
COVID-ve	17/170 (10.0)	1		1	
COVID+ve	27/85 (31.8)	4.19 (2.13 to 8.25)	<0.001	3.45 (1.67 to 7.15)	0.001
Hospital site					
Site 1	21/102 (20.6)	1		1	
Site 2	16/93 (17.2)	0.80 (0.39 to 1.65)	0.548	0.75 (0.33 to 1.70)	0.486
Site 3	7/60 (11.7)	0.51 (0.20 to 1.28)	0.152	0.55 (0.21 to 1.47)	0.235
Care service at death					
Medicine	31/184 (16.9)	1		1	
Intensive care unit	13/71 (18.3)	1.11 (0.54 to 2.26)	0.782	1.44 (0.58 to 3.53)	0.424
Admission duration‡		0.997 (0.98 to 1.01)	0.600	1.001 (0.99 to 1.01)	0.855
Family present in-person in last 48 hours of life					
Yes	21/175 (12.0)	1		1	
No	23/80 (28.8)	2.96 (1.52 to 5.75)	0.001	2.14 (1.007 to 4.53)	0.048

Bold values were statistically significant

*Proportion of patients=proportion of total number for each categorical variable.

†Pre-COVID group (n=170) were excluded from the bivariable analyses and the multivariable model.

‡Treated as a continuous variable or covariate.

healthcare team–family meetings in the last 5 days of life, most notably in the COVID+ve group, but also in male decedents and those dying in ICU, when compared with matched prepandemic controls. It is unclear if the matching process contributed to this finding in male decedents, whereas reduced in-person healthcare team–family encounters have previously been reported in ICU during the COVID-19 pandemic.²³

The reductions in both types of in-person encounters in our study occurred in the context of pandemic-related patient isolation policies and visitor restrictions. Although visitor restrictions were introduced, there were efforts to make exceptions for end-of-life situations both locally and nationally in wave 1 of the pandemic, as reported in an environmental scan of ICU visitation policies.¹⁴ Other factors potentially contributing to reduced in-person encounters include fear of contagion in relation to COVID-19 infection and reduced access to hospital due to limitations in public or possibly personal transport as a result of the pandemic.²⁰ Although site difference in access policy might be considered as an explanation for lesser family presence in the last 48 hours of life at site 2, we found no evidence of such difference, and the cause of this finding is unclear.

To date, published quantitative data on frequency estimates of changes in in-person family presence or

healthcare team–family communication in relation to end-of-life care in the pandemic is limited to a Swedish Register of Palliative Care (SRPC) study of hospitalised COVID-19 decedents (n=438), which reported family members were present at the time of death in only 24% of cases.²⁰ The study also reported that end-of-life discussions occurred with relatives in 87% of hospitalised decedents but without a specific time reference and without distinguishing between in-person and telephone or other modality.²⁰ The SRPC data collection process relies on voluntary reporting and is designed to only record expected deaths, possibly resulting in missed cases, whereas the number of COVID-19 deaths (n=85) in our study is smaller but included all regional acute care hospital decedents in the study period. Consistent with published data,^{4 20 24} our COVID+ve decedent cohort were on average relatively old, referred to hospital mostly from nursing home (long-term care) facilities and mostly male. Despite the reduction in healthcare team–family in-person encounters, almost all patients (95%–97%) in the pandemic groups had a no CPR order in place at death, which compares favourably with published data on this metric,^{17 18} and indicates that goals of care discussions likely occurred using modalities other than in-person communication.

Table 4 Number of healthcare team–family communication encounters in the last 5 days of life in mixed effects negative binomial models (A: in-person and B: telephone)*

ModelsAnd variables examined	Count†	Incidence rate ratio (95% CI)	P value
A. In-person encounter	2 (1–4)		
Age of decedent‡		0.997 (0.99–1.004)	0.396
Sex of decedent (female)	2 (1–5)	1	
Sex of decedent (male)	2 (1–4)	0.85 (0.72–0.99)	0.041
Study group: exposure status			
Pre-COVID	3 (2–5)	1	
COVID-ve	2 (1–4)	0.76 (0.64–0.90)	0.001
COVID+ve	0 (0–2)	0.61 (0.47–0.79)	<0.001
Care service at death			
Medicine service	2 (0–5)	1	
Intensive care unit	2 (1–3)	0.68 (0.55–0.84)	<0.001
Days in hospital‡		1.003 (0.999–1.006)	0.411
B. Telephone communications	1 (0–3)		
Age of decedent‡		1.005 (0.996–1.01)	0.283
Sex of decedent (female)	1 (0–3)	1	
Sex of decedent (male)	1 (0–3)	1.002 (0.84–1.19)	0.984
Study group: exposure status			
Pre-COVID	1 (0–1)	1	
COVID-ve	2 (1–3)	2.60 (2.09–3.25)	<0.001
COVID+ve	4 (2–5)	4.77 (3.72–6.12)	<0.001
Care service at death			
Medicine	1 (0–3)	1	
Intensive care unit	1 (0–3)	1.16 (0.93–1.43)	0.189
Days in hospital‡		0.998 (0.99–1.001)	0.203

Bold values were statistically significant

*Hospital site and family’s physical presence in the last 48 hours of life were both included as random effects in both models.

†Counts for categorical variables, median (Q1–Q3).

‡Treated as a continuous covariate in models.

Our study found that healthcare team–family telephone encounters increased markedly during the pandemic, particularly in relation to COVID+ve decedents. Virtual communication encounters occurred rarely in the pre-pandemic period, perhaps due to lesser need with the availability of preferred in-person encounters. Virtual communications at end-of-life were adopted intrapandemically and were used by 42% of both decedent groups for family–patient encounters in this period, especially in COVID+ve decedents.

Compared with the pre-pandemic period, there were statistically significant changes in involvement of medical social work, physiotherapy and occupational therapy, with increases occurring in the COVID-ve group and decreases in the COVID+ve group. It is unclear whether these findings reflect greater intensity of discharge planning activity in the COVID-ve group, or greater availability of these personnel due to reduced involvement with the COVID+ve group. Intrapandemically, the proportions of palliative care consultations and spiritual

care involvement were largely maintained, with a non-statistically significant reduction of both in the COVID+ve group.

Study implications

Collectively, our findings have implications for patients and their families, and both the healthcare team and administrative policy.^{15 25} For patients, in whom ‘the fear of dying alone is nearly universal’,²⁶ reduced end-of-life contact with family and reduced interprofessional team input may compound their existing distress. Furthermore, patients with end-of-life delirium may be deprived of family reorientation efforts and the presence of a familiar face as a source of comfort.^{27 28}

For family members of dying patients, reduced in-person contact with their loved one increases the risk of complicated grief.¹² It is unclear as to how much virtual communication might mitigate the risks associated with absence of in-person family contact but clearly a modality worthy of further evaluation.^{29–31} Although families

Table 5 Comparison of interprofessional team member involvement among study groups

	Time periods and designated groups				P value
	November 2019– August 2020	November 2019– February 2020	March 2020–August 2020		
	All groups n=425 (%)*	Pre-COVID n=170 (%)*	COVID-ve n=170 (%)*	COVID+ve n=85 (%)*	
Interprofessional team members					
Physiotherapy	175 (41.2)	70 (41.2)	86 (50.6)	19 (22.4)	<0.001
Medical social worker	195 (45.9)	70 (41.2)	99 (58.2)	26 (30.6)	<0.001
Spiritual care	105 (24.7)	49 (28.8)	42 (24.7)	14 (16.5)	0.098
Occupational therapy	129 (30.4)	45 (26.5)	73 (42.9)	11 (12.9)	<0.001
Palliative care					
Consult requested	167 (39.3)	70 (41.2)	71 (41.8)	26 (30.6)	0.184
Consult completed	159 (37.4)	67 (39.4)	67 (39.4)	25 (29.4)	0.234
Days from consult completion to death (median, Q1–Q3)	3 (1–7)	4 (1–9)	3 (1–6)	3 (2–12)	0.577

Bold values were statistically significant
*Column numbers refer to number of persons (%) within respective groups unless stated otherwise.

appreciate the availability of virtual communication with their family member or the healthcare team,^{28 31} their preference clearly remains to have in-person communication.^{32 33} Our study's data will also be used in a prospective evaluation of grief in bereaved family members.

For the healthcare team, conducting in person end-of-life discussions is challenging even in the absence of a pandemic; in the presence of the pandemic, they may resort to alternative communication modalities, as they appeared to do in our study, although with some uncertainty as to whether the process, or quality associated with these modalities meet the desired outcomes that are associated with conventional in-person communication. There are many reports of moral distress in physicians and nurses during the pandemic; caring for patients dying alone without any family present is cited as a major contributor to this.^{34–37} For hospital administrative policy development, there is the ethical challenge of balancing the patient and family need for in-person contact at end-of-life against the measures to reduce infection risk with COVID-19,^{13 38} in addition to legal considerations.³⁸

Study strengths and limitations

There were no missing data in a decedent cohort that was representative of the regional source population in all acute care hospitals. Although cohort groups were effectively matched, the matching was limited to age, sex and care service, and other baseline differences could have existed. We acknowledge that many of the early COVID-19 pandemic deaths occurred in nursing home or long-term care facilities, and our study findings may have limited generalisability in relation to such settings. Other limitations include the retrospective nature of the study, absence of a qualitative assessment of communication encounters, absence of abstractor blinding and the possibility of misclassification bias in data abstraction,

which could have occurred despite rigorous training and data accuracy checks.

CONCLUSIONS

In hospitalised COVID-19 pandemic wave 1 decedents, families' physical presence and in-person healthcare team-family communication encounters were markedly reduced at end-of-life; virtual modalities were adopted to a limited extent, more so in patient-family than healthcare team-family encounters, and telephone use was increased in healthcare team-family communications. Although allied health interprofessional team members had lesser involvement intrapandemically in those dying of COVID-19 infection, spiritual care and palliative care involvement was maintained at just below prepandemic levels. Future studies are required to examine the implications of the pandemic-related communication changes for the patient, the family and the healthcare team.

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