

ORIGINAL RESEARCH: EMPIRICAL
RESEARCH - QUANTITATIVE

Impact of family visit restrictions due to COVID-19 policy on patient outcomes: A cohort study

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Funding Information

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Abstract

Aim: To investigate the impact of family visit restrictions during the COVID-19 pandemic on deliriums, falls, pneumonia, pressure ulcers and readmissions among surgical inpatients with gastrointestinal (oncologic) diseases.

Design: Cohort study.

Methods: This study was conducted among adult inpatients undergoing gastrointestinal surgery in two academic hospitals. During the COVID-19 outbreak in 2020, over a 10-week period, one cohort was subjected to family visit restrictions. Per patient, one person per day was allowed to visit for a maximum of 30 min. This cohort was compared with another cohort in which patients were not subjected to such restrictions during a 10-week period in 2019. Logistic regression analyses were used to investigate the impact of the restrictions on deliriums, falls, pneumonia, pressure ulcers and readmissions.

Results: In total, 287 patients were included in the 2020 cohort and 243 in the 2019 cohort. No differences were observed in the cohorts with respect to baseline characteristics. Logistic regression analyses showed no significant differences in deliriums, falls, pneumonia, pressure ulcers and readmissions between the cohorts.

Conclusion: We cautiously conclude that the family visit restrictions during the COVID-19 pandemic did not contribute to deliriums, falls, pneumonia, pressure ulcers or readmissions in surgical patients with gastrointestinal (oncologic) diseases.

Impact: COVID-19 influenced family-centred care due to family visit restrictions. Nurses need to continue monitoring outcomes known to be sensitive to family-centred care to gain insight into the effects of visit restrictions and share the results in order to include nurses' perspectives in COVID-19-decision-making. Re-implementing of family visit restrictions should be carefully considered in policy-making.

KEYWORDS

cohort study, COVID-19, delirium, falls, family-centred care, nursing, pneumonia, pressure ulcer, readmission, surgical procedure

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1 | INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by a newly discovered coronavirus (Yahav et al., 2020). The novel virus has spread rapidly worldwide, and the World Health Organization has characterized COVID-19 as a pandemic (Cucinotta & Vanelli, 2020). The pandemic has upended global healthcare systems, placing exceptional pressure on healthcare facilities and critical care systems (Capolongo et al., 2020). Worldwide, hospitals have been forced to rapidly adapt and implement emergency solutions (Capolongo et al., 2020). Adaptations have been made to increase the required capacity of inpatient beds and medical care delivery (Tumlinson et al., 2020), including the use of medical care spaces (Capolongo et al., 2020).

Furthermore, a shift was made from the provision of regular healthcare towards urgent services only (Moletta et al., 2020; Schuivens et al., 2020). One of the non-COVID-19 populations whose routine care continued during the outbreak consists of surgical patients with gastrointestinal (oncologic) diseases (Moletta et al., 2020). This type of care continued because oncology care is considered to be a life-saving procedure (Søreide et al., 2020). A delay in surgical treatment may cause a deterioration of patient outcomes (Collaborative, 2020), such as an increase in non-COVID-19-related morbidity and mortality (Chudasama et al., 2020).

Although most of the routine care for surgical patients with gastrointestinal (oncologic) diseases continued during the COVID-19 pandemic, the ability to maintain high-quality care may have been affected by radical transformations of the healthcare system (Rosenbaum, 2020). Hospitals adopted local policies to prevent the spread of the virus among patients and healthcare professionals (Adhikari et al., 2020). Widespread restrictions and complete bans on family presence were implemented (Frampton et al., 2020), which directly threatened the delivery of family-centred care (Hart et al., 2020).

2 | BACKGROUND

In family-centred care, patients' family members provide information of the patient and physical support (Park et al., 2018). Moreover, family members contribute to the empowerment of the patient (Park et al., 2018). In the past few decades, family-centred care has become widely accepted and it has shown itself to be beneficial in reducing adverse patient outcomes (Park & Giap, 2020). Reducing these outcomes in the gastrointestinal (oncologic) surgical population is considered a priority since this population is known for its high complication and readmission rates (Jakobson et al., 2014; Martin et al., 2011) and as a result, patients' short- and long-term quality of life is threatened (Brown et al., 2014).

In family centred-care, patients' family members could play a role in the prevention of adverse patient outcomes. In more detail, opportunities for family members to stay with patients overnight are found to be beneficial in the prevention and, to some extent, treatment of delirium (Halloway, 2014). In addition, the assistance

of family members in early mobilization after surgery reduces the risk of postoperative pneumonia (Cassidy et al., 2013). Furthermore, engaging family members in preventive fall- and pressure ulcer programmes reduces these outcomes in patients (Al Mutair et al., 2020; Duckworth et al., 2019). Moreover, the number of readmissions might decrease when involving family members after surgery (Schreuder et al., 2019). Thus far, it remains unclear whether patient outcomes were affected due to an almost complete ban on family presence during the COVID-19 outbreak.

3 | THE STUDY

3.1 | Aim

This study investigated the impact of family visit restrictions during the COVID-19 pandemic on deliriums, falls, pneumonia, pressure ulcers and readmissions among surgical inpatients with gastrointestinal (oncologic) diseases.

3.2 | Design

A cohort study was conducted at two affiliated tertiary referral hospitals in the Netherlands. We sought insight into the impact of family visit restrictions during the pandemic on adverse patient outcomes by comparing a cohort of admitted surgical patients with gastrointestinal (oncologic) diseases subjected to family visit restrictions in 2020 with a cohort of patients in 2019. Patients were included in one of the cohorts when they were admitted to the hospital during the 10-week period from 23 March until 1 June 2019, or the same period in 2020. During this period in 2020, hospitals adapted their visitor policies due to the COVID-19 outbreak. Patients' follow-up periods were from their day of admission to their day of discharge, except for outcome readmission, for which patients were followed up 30 days after admission.

3.3 | Participants

All admitted adult patients (≥ 18 years) with (malignant-) gastrointestinal diseases who underwent surgery in one of the affiliated hospitals during the specified timeframes of the cohorts were eligible for inclusion. Surgical procedures comprised colorectal, hepato-pancreatic-biliary and oesophagogastric surgery. When multiple admissions occurred within the specified timeframe of the cohort, only the first admission was included in the study.

3.3.1 | 2020 cohort: COVID-19 family visit restrictions

During the COVID-19 outbreak, the hospital visiting policy was adapted by restricting patients' visitors to minimize the risk of a

TABLE 1 COVID-19 screening questions of visitors at hospital entrance

Screening questions ^a
1. Do you have a cough?
1. Are you experiencing shortness of breath?
1. Do you have to sneeze often?
1. Do you often have a runny nose lately?
1. Do you have a fever?

^aWhen ≥ 1 screening questions were answered 'yes' by visitors, permission to entrance the hospital was declined.

COVID-19 infection for patients and hospital staff. Visitors were required to wear a mouth-nose facemask when visiting the hospital and were screened at the hospital entrance for COVID-19-related symptoms (Table 1).

Ward-specific policies were implemented for the surgical wards in which only non-COVID-19 patients were admitted with (malignant-) gastrointestinal diseases. Patients who tested positive for COVID-19 during their admission were directly transferred to the isolated COVID-19 ward. In the surgical wards, only one visitor per day was allowed per patient, for a maximum of 30 min between 11:00 a.m. and 08:00 p.m (Figure 2). Family members were not permitted to stay with the patient overnight. Visitors were registered at the ward entrance, and permission to enter the ward was given after the nursing staff confirmed that the patient had not yet had a visitor that day. Visitors were placed in a chair at a marked spot at the end of the patient's bed and were required to keep 1.5 m away from the patient and hospital staff. Patients were strongly advised to have the same person visit them throughout their admission.

3.3.2 | 2019 cohort: Pre-COVID-19 family visit policy

The pre-COVID-19 hospital visiting policy for the surgical wards was characterized by continuous family visitations between 11:00 a.m. and 08:00 p.m (Figure 2). Family members provided patient information and were allowed to stay with patients overnight when those patients developed delirium during admission. In addition, family members could provide physical support in early postoperative mobilization. Furthermore, strategies to prevent the risk of falls and pressure ulcers were also explained to family members. The only restriction on family visits consisted of a limit of two visitors at patients' bedsides; however, patients were permitted to have different people visit them from day to day.

3.3.3 | Standards of care

Admitted patients in both of the cohorts received care based on the Enhanced Recovery After Surgery (ERAS®) principles, which include early mobilization, early postoperative feeding, goal-directed fluid

therapy and non-narcotic analgesia (Varadhan et al., 2010). In addition, on the day of admission, patients were screened for delirium risk, fall risk and pressure ulcer risk (Vms, 2009). Based on their risk level, patients received preventive interventions. Additionally, patients were treated with care plans tailored to their type of surgery. In these plans, mobilization goals were described and patients were encouraged to stay out of bed for at least 6 h per day after surgery to minimize adverse outcomes.

3.4 | Data collection

All data concerning patient characteristics and primary study outcomes were obtained by the Clinical Research Unit (CRU). The CRU obtained outcome variables dichotomously. Inclusion- and exclusion criteria were assessed by the researcher and colleagues. Only the data of patients who met the inclusion criteria were used for analysis. The primary study outcomes were defined as the number of delirium and pneumonia cases, falls, pressure ulcers and readmissions among the surgical inpatients with gastrointestinal (oncologic) diseases.

The presence of delirium was defined as at least one mean Delirium Observation Screening (DOS) scale score ≥ 3 over 24 h during hospital admission (Schuurmans et al., 2003; Table 2). The DOS scale score was calculated by taking the mean of three DOS scale scores per nursing shift, 8 h each, per 24 h (Grover & Kate, 2012). During hospital admission, the DOS scale score was calculated per shift by the nursing staff (Grover & Kate, 2012). Furthermore, we collected data on the presence of falls during admission. The presence of falls was defined as at least one fall during admission. Fall events were extracted from the fall reports of the specific surgical wards. Moreover, data on the presence of pneumonia during hospital admission were extracted from the discharge letters that were written by the surgical residents of the wards to patients' general practitioners. If pneumonia occurred during admission, it was stated in the discharge letter. Data on the presence of pressure ulcers developed during admission were extracted from the patients' records when the nursing staff filled in the European Pressure Ulcer Advisory Panel (EPUAP) classification system (Coleman et al., 2014; Table 2). In this study, the presence of pressure ulcers was defined as at least one pressure ulcer developed during admission. Lastly, the presence of unplanned readmission was defined as at least one unplanned readmission within 30 days after discharge. Readmission data were extracted from the patients' records.

3.4.1 | Patient characteristics

Patient demographics and characteristics comprised age (in years), sex, body mass index (BMI, in kg/m²), type of surgery (i.e. colorectal, hepato-pancreatic-biliary or oesophagogastric), oncological surgery indication (yes/no), length of hospital stay (in days) and

TABLE 2 Description of measurement instruments used in study

Instrument	Description
DOS	The DOS scale is a tool to recognize a delirium in admitted patients (Schuurmans, Deschamps, Markham, Shortridge-Baggett, & Duursma, 2003). The DOS scale consists of 13 items that were scored dichotomously as 'present' or 'absent' (Grover & Kate, 2012)
EPUAP	Grade I: Non-blanchable erythema of intact skin Grade II: Partial-thickness skin loss involving epidermis, dermis or both. Grade III: Full-thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. Grade IV: Full-thickness skin loss, with extensive destruction, tissue necrosis, or damage to muscle, bone or supporting structures (Bours et al., 1999)
Katz ADL	Assessment of six primary and psychosocial functions, range of 0 to 6, with higher scores indicating greater independence in physical functioning on the following activities of daily living: 1) bathing, 2) dressing, 3) going to the toilet, 4) transfer, 5) continence and 6) feeding (Katz & Akpom, 1976)
AMEXO	Observed activity score as a 1-item scale with 12 ordinal response categories. Each category is numbered, with 1 meaning 'only bedridden' to 12 meaning 'walking approximately 1125 m or more' (Boerrigter et al., 2022)
Delirium risk	Three questions consisting of the presence of memory issues, need for help with self-care in the last 24-h and previous confusion during admission to hospital; at risk of delirium if one of the questions is answered with 'yes' (VMS, 2009)
Braden scale	Scale for prediction of pressure sore risk, with six subscales that reflect 1) sensory perception, 2) skin moisture, 3) activity, 4) mobility, 5) friction and shear and 6) nutritional status (Bergstrom, 1987). A score of ≥ 16 indicated being at risk for pressure ulcer development (Bergstrom, 1987)
JHFRAT	Assessment of fall risk by six areas including 1) age, 2) fall history, 3) elimination, bowel and urine, 4) medications, 5) patient care equipment 6) mobility and 7) cognition. Total scores of 6-13 indicate moderate fall risk, total scores of >13 indicate high fall risk (Poe et al., 2018)
SNAQ	Early detection of malnourishment in hospital patients with a scale consisting out of three questions (Kruizenga et al., 2005). A score ≥ 3 indicates sever malnourishment (Kruizenga, Seidell, de Vet, Wierdsma, & van Bokhorst-de van der Schueren, 2005)

Abbreviations: AMEXO, AMsterdam UMC Extension of the JOhn HOPkins Highest Level of mObility; DOS, Delirium Observation Scale; EPUAP, European Pressure Ulcer Advisory Panel; JHFRAT, Johns Hopkins Fall Risk Assessment Tool; Katz ADL, Katz Activities of Daily Living; SNAQ score, Short Nutritional Assessment Questionnaire.

pressure ulcer presence on the day of admission. Furthermore, patients' pre-anaesthesia medical comorbidity levels were obtained through the American Society of Anaesthesiologists Physical Status Classification (Sankar et al., 2014). Additionally, patients' levels of independence in physical functioning were obtained through the Katz Activities of Daily Living (ADL) scale (Katz & Akpom, 1976; Table 2). Lastly, the following routine risk assessment measures were collected on the day of hospital admission: the Braden scale (Bergstrom, 1987), the Johns Hopkins Fall Risk Assessment Tool (JHFRAT) (Poe et al., 2018), the Short Nutritional Assessment Questionnaire (SNAQ; Kruizenga et al., 2005) and delirium risk (Table 2).

3.5 | Ethical considerations

The study is reported according to the applicable criteria of the Strengthening the Reporting of Observational Studies in Epidemiology guidelines (Von Elm et al., 2007). We conducted the study according to the principles of the Declaration of Helsinki (64th version; World Medical Association, 2013), the Dutch Code of Conduct for Research Integrity and the Medical Research Involving Human Subjects Act (WMO). The study was not subject to the WMO, as confirmed by the Medical Research Ethics Committee of Amsterdam UMC (reference number: W20_521 # 20.578). We

received an encrypted anonymous data file from the local CRU. Therefore, no informed consent of the included patients was necessary.

3.6 | Data analysis

Statistical analyses were conducted using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp.). Descriptive statistics were used to provide insight into categorical variables using absolute (n) and relative (%) frequencies and into continuous variables using means and standard deviations (SD) or medians and interquartile range (IQR) as appropriate for the distribution of the data. All continuous risk assessment measures were transformed into categorical values matching the specific risk level (Table 2).

The equality of baseline characteristics of the cohorts was checked by calculating 95% confidence intervals (CI s) of mean differences in continuous variables and proportions in ordered categorical variables. Continuous variables in which the CI s contained the null value were considered as indicating no differences between the cohorts. Ordered categorical variables in which one or no categories contained the null value were considered as indicating no differences between the cohorts.

Consequently, we performed logistic regression analyses to investigate the association between the family visit restrictions

and the independent outcomes. The CIs of the baseline characteristics indicated no differences and therefore no adjustments in the logistic regression analyses were made. The following assumptions of logistic regression analyses were checked: 1) linearity in the logit for continuous variables, 2) absence of multicollinearity among independent variables and 3) lack of strongly influential outliers of residuals (Stoltzfus, 2011). The associations between the independent variable and each of the outcomes were considered significant if the p value was ≤ 0.05 . The outcomes of the logistic regression analyses were the odds ratio (OR), a 95% CI and the p -value. Two-sided statistical significance was calculated and set at $p \leq 0.05$.

3.6.1 | Handling of missing data

Missing data ranged between 13.4% (Braden scale) and 15.5% (SNAQ). We therefore used multiple imputation methods (Pedersen et al., 2017). Ten independent copies of the data were computed using predictive mean matching, and the outcomes of the analyses were pooled according to Rubin's rules (Pedersen et al., 2017). A sensitivity analysis was performed on the observed data set.

3.7 | Validity and reliability

The internal validity of this study was increased by including all patients in the registry for both of the cohorts (Polit & Beck, 2017). Moreover, we used validated measurement instruments in this study. For example, the validated DOS scale showed acceptable sensitivity and specificity in admitted hospital patients (sensitivity [Se] 94%; specificity [Sp] 77%; Schuurmans, 2007). In addition, in the original development and validation study, high internal consistency was seen (Cronbach's alpha: 0.93–0.96; Schuurmans et al., 2003). Furthermore, in both hospitals, the definition of a fall event corresponded with the definition in literature: "an event resulting in a person coming to rest inadvertently on the ground, floor, or other lower level" (Morello et al., 2015). No additional information on validity and reliability was available for the presence of developed pneumonia during hospital admission. The EPUAP classification system used for classifying pressure ulcers showed acceptable interrater reliability in nurses in a university hospital (Cohen's kappa: 0.97; 95% CI [0.92–1.00]; Bours et al., 1999). Additional validated measurement instruments used in this study were the Katz ADL scale (coefficient of scalability ranging from 0.74 to 0.88; Brorsson & Asberg, 1984); the SNAQ (Se: 76%; Sp: 83%; Kruiuzenga et al., 2005); the JHFRAT (Se: 87%; Sp: 28%; Poe et al., 2018) and the Braden scale (Se: 100%; Sp: 64%; Bergstrom, 1987). Delirium risk (Vms, 2009) and the Amsterdam UMC extension of the John Hopkins highest level of mobility (AMEXO) scale (Boerrigter et al., 2022) were non-validated instruments used in this study. Lastly, to increase the reliability of the

study results, multiple imputation methods were used for missing data (Pedersen et al., 2017).

4 | RESULTS

4.1 | Patient characteristics

A sample of 1129 patients was gathered from the two affiliated hospitals. From both cohorts, 530 patients were eligible for inclusion: 287 patients from the 2020 cohort exposed to family visit restrictions and 243 patients from the 2019 cohort exposed to the pre-COVID-19 family visit policy (Figure 1). Baseline characteristics are presented in Table 3 and no differences between the cohorts were observed. Similar results were obtained when the imputed dataset was analysed (Table S1).

4.2 | Primary study outcomes

In the 2020 cohort, 12 patients (4.2%) developed delirium, compared with 9 patients (3.7%) in the 2019 cohort (Figure 3). In the 2020 cohort, no fall events occurred, and in the 2019 cohort, one fall event occurred. Pneumonia events occurred in both cohorts in nine patients (2020, 3.1%; 2019, 3.7%). In the 2020 cohort, 12 patients (4.2%) developed pressure ulcers during admission, compared with 16 patients (6.6%) in the 2019 cohort. Within 30 days after discharge, 40 patients (13.9%) were readmitted in the 2020 cohort, compared with 30 patients (12.3%) in the 2019 cohort. The absolute numbers and frequencies of the adverse patient outcomes are presented in Figure 2.

Univariable logistic regression analyses showed no statistically significant differences in the 2020 cohort compared with the 2019 cohort for deliriums (OR: 1.14; 95% CI [0.47–2.74]; $p = 0.78$), falls (OR: 0.10), pneumonia (OR: 0.84; 95% CI [0.33–2.16]; $p = 0.72$) or readmissions (OR: 1.15; 95% CI [0.69–1.91]; $p = 0.59$; Table 4). Similar results were obtained when the data set of complete cases was analysed (Table S2).

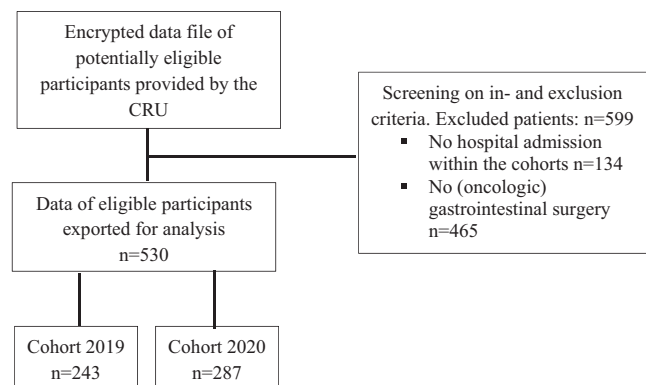


FIGURE 1 Flowchart of the study population.

TABLE 3 Baseline characteristics of the patients

Patient characteristics ^a	NA (%)	Cohort 2019n = 243		NA (%)	Cohort 2020n = 287		Δ	95% CI	
		n	%		n	%		Lower bound	Upper bound
Gender									
Female		112	46.1		132	46.0	-0.0	-0.13	0.12
Male		131	53.9		155	54.0	0.00	-0.11	0.12
Type of surgery									
Oesophagogastric		54	22.2		56	19.5	-0.03	-0.18	0.12
Hepato-Pancreatic-Biliary		84	34.6		102	35.5	0.00	-0.13	0.15
Colorectal		91	37.4		114	39.7	0.02	-0.11	0.16
Other type of surgery		14	5.8		15	5.2	-0.01	-0.17	0.16
Oncological surgery indication									
Yes		150	61.7		177	61.7	0	-0.11	0.11
No		93	38.3		110	38.3	0	-0.13	0.13
ASA PS classification									
1		11	4.5		23	8.0	0.04	-0.13	0.20
2		144	59.3		152	53.0	-0.06	-0.18	0.05
3		82	33.7		105	36.6	0.03	-0.11	0.17
4		6	2.5		7	2.4	-0.00	-0.17	0.17
5		0	0		0	0	0	NA ^b	NA ^b
6		0	0		0	0	0	NA ^b	NA ^b
Pressure ulcer prevalence at admission									
Yes	23 (9.5)			58 (20.2)					
No		8	3.3		1	0.3	-0.03	-0.19	0.13
		212	87.2		228	79.4	-0.08	-0.14	-0.01
Braden scale score									
High risk of pressure ulcers (6-18)	17 (7)			54 (18.8)					
Low risk of pressure ulcers (>18)		20	8.2		13	4.5	-0.04	-0.20	0.13
		206	84.8		220	76.7	-0.08	-0.16	-0.01
JHFRAT score									
No fall risk (0-5)	20 (8.2)			54 (18.8)					
Moderate fall risk (6-13)		198	81.5		210	73.2	-0.08	-0.16	-0.00
High fall risk (>13)		21	8.6		21	7.3	-0.01	-0.18	0.15
		4	1.6		2	0.7	-0.00	-0.18	0.16
SNAQ score									
No malnourishment (0-2)	22 (9.1)			60 (20.9)					
Malnourishment (3-7)		161	66.3		174	60.6	-0.06	-0.16	0.05
		60	24.7		53	18.5	-0.06	-0.21	0.09
Delirium risk score									
Not at risk of delirium (0)	19 (7.8)			55 (19.2)					
At risk of delirium (1-3)		199	81.9		212	73.9	-0.08	-0.16	-0.00
		25	10.3		20	7.0	-0.03	-0.20	0.13
Katz ADL score									
0	20 (8.2)			54 (18.8)					
1		192	79.0		209	72.8	-0.06	-0.14	0.02
2		11	4.5		5	1.7	-0.03	-0.19	0.14
		3	1.2		8	2.8	0.02	-0.15	0.18

TABLE 3 (Continued)

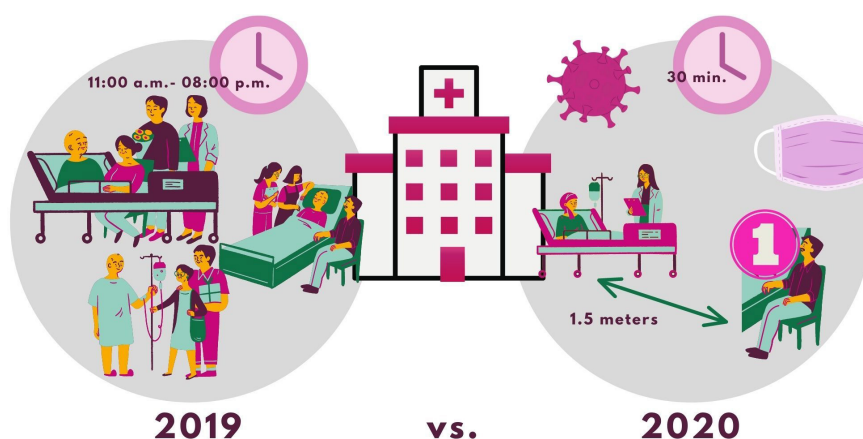
Patient characteristics ^a	NA (%)	Cohort 2019n = 243		NA (%)	Cohort 2020n = 287		Δ	95% CI	
		n	%		n	%		Lower bound	Upper bound
3		2	0.8		3	1.0	0.00	-0.17	0.17
4		7	2.9		5	1.7	-0.01	-0.18	0.16
5		4	1.6		3	1.0	-0.00	-0.16	0.17
6		4	1.6		0	0	1.6	NA ^b	NA ^b
		Mean	SD		Mean	SD		95% CI	
Age (years)		61.7	14.4		62.5	15.7	0.79	-1.79	3.37
BMI (kg/m ²)		24.9	4.4		25.1	4.7	0.20	-0.61	1.00
		Median	IQR		Median	IQR		95% CI	
Hospital length of stay		7	5-13		7	4-12	0.65	-3.11	1.80

Abbreviations: 95% CI, 95% Confidence Interval of difference in proportions/means; ASA PS Classification, American Society of Anaesthesiologists Physical Status Classification; BMI, Body Mass Index; IQR, Inter Quartile Range; JHFRAT score, Johns Hopkins Fall Risk Assessment Tool; Katz ADL score, Katz Activities of Daily Living; N, Number of patients; NA, Not Applicable; SD, Standard Deviation; SNAQ score, Short Nutritional Assessment Questionnaire; Δ difference in proportions (ordered categorical variables)/mean difference (continuous variables).

^aAnalyses baseline characteristics on observed data.

^bNo 95% CI could be calculated when proportion and/or percentages is zero.

FIGURE 2 Family visit policy in 10-week period from 23 March until 1 June in 2019 versus 2020 during the COVID-19 pandemic.



5 | DISCUSSION

In this cohort study, we did not find a significant association between family visit restrictions due to the COVID-19 pandemic and the presence of deliriums, falls, pneumonia, pressure ulcers and readmissions. This result is surprising, as family involvement is widely recommended to improve patient safety and quality of care (Berger et al., 2014; Calvert et al., 2015; Feo & Kitson, 2016). Nevertheless, in this study, family members only came to visit the patient and there was no active family participation, which might be the reason we did not find differences in patient outcomes between the two cohorts.

Moreover, a possible reason for not finding differences between the cohorts could be due to the communication opportunities that existed for families. During the pandemic, patients were able to

contact their family members by making video and telephone calls (Maaskant et al., 2021).

These virtual opportunities were an innovative approach to ensure high-quality and safe nursing care (Stifter et al., 2021). In addition, physical presence of family in hospital was allowed for 30 min per day per patient. Family members who visited the patients might have paid more attention to the physical condition of the patient and could have possibly prevented some of the outcomes. This was also seen in hospitalized COVID-19 patients (Maaskant et al., 2021).

Besides, in both cohorts, qualitative care standards, including the ERAS® principles and surgical pathways, were maintained. These care standards are known to be beneficial in reducing complications and readmissions (Varadhan et al., 2010). This could be another reason for not finding differences between the two cohorts.

Delirium, falls, pneumonia, pressure ulcers and readmissions in both of the cohorts

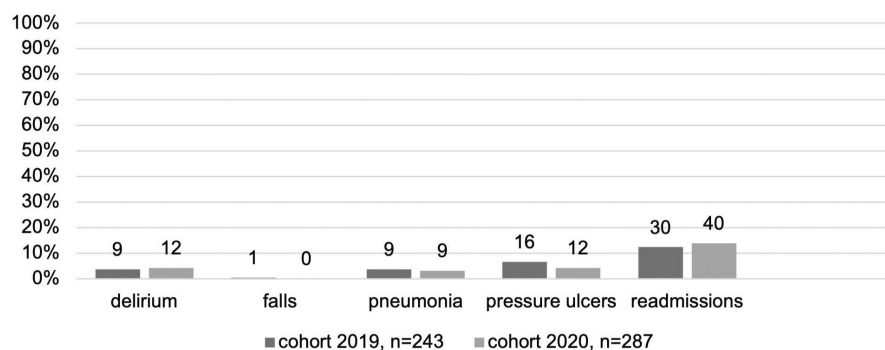


FIGURE 3 Absolute numbers and frequencies of deliriums, falls, pneumonia, pressure ulcers and readmissions.

TABLE 4 Association between cohorts and delirium, falls, pneumonia, pressure ulcers and readmissions

	Presence outcome of interest ^a		Absence outcome of interest ^b		OR	95% CI		p-value
	n	%	n	%		Lower bound	Upper bound	
Delirium					1.14	0.47	2.74	0.78
Cohort 2019 ^c	9	3.7	234	96.3				
Cohort 2020 ^c	12	4.2	275	95.8				
Falls					0.10	^d	^d	^d
Cohort 2019 ^c	1	0.4	242	99.6				
Cohort 2020 ^c	0	0	287	100				
Pressure ulcers					0.62	0.29	1.34	0.22
Cohort 2019 ^c	16	6.6	227	93.4				
Cohort 2020 ^c	12	4.2	275	95.8				
Pneumonia					0.84	0.33	2.16	0.72
Cohort 2019 ^c	9	3.7	234	96.3				
Cohort 2020 ^c	9	3.1	278	96.9				
Readmissions					1.15	0.69	1.91	0.59
Cohort 2019 ^c	30	12.3	213	87.7				
Cohort 2020 ^c	40	13.9	247	96.1				

Note: N, Number of patients; OR, Odds Ratio; 95% CI, Confidence Interval.

^aUnivariable logistic regression analysis used.

^bOutcome of interests are delirium, falls, pressure ulcers, pneumonia and readmissions.

^cCohort 2019 (n = 243), Cohort 2020 (n = 287).

^dFor falls, no OR, 95% CI and p-value was calculated due to the low event rate.

Another explanation might be that, during the COVID-19 outbreak, nurses felt the need to compensate for the absence of family by giving even more attention to the patient. During the pandemic, nurses had exceptional high work pressure and even though their own well-being was affected, nurses took multiple roles including caring for distressed patients and their families (Rasmussen et al., 2022). This compensation by nurses could be another explanation for why no differences in patient outcomes were observed in this study. However, nurses compensating for family absence should not be a long-term solution.

Some of our results are in line with a previous study conducted in the United States (US) that showed that fall rates in COVID-19-infected patients did not rise due to COVID-19 restrictions (Stifter et al., 2021). In the US COVID-19 policy also consisted of isolation and visitor restrictions (Stifter et al., 2021). However, the study observed higher pressure ulcer rates during the COVID-19 pandemic, which is contradictory to the results of the current study (Stifter et al., 2021). This may be explained by the fact that COVID-19 patients are not comparable with the surgical non-COVID-19 population included in the current study.

Even though we did not find a significant association between family restrictions and the independent outcomes, a recent review in which the consequences of visitor restrictions were investigated in a varied patient population showed negative outcomes (Hugelius et al., 2021). Physical health consequences for patients were observed, such as reduced nutritional intake, increased physical pain and increased symptoms of disease (Hugelius et al., 2021). For both patients and families, negative mental health consequences were reported (Hugelius et al., 2021). Therefore, possible negative effects should be taken into consideration when implementing family visit restrictions in the future.

A strength of this study was the evaluation of quality of care using nursing-sensitive outcomes (NSOs; Twigg et al., 2015). NSOs are not only relevant for the scope and domain of nursing practice (Veldhuizen et al., 2021) but could also be considered relevant for investigating the effects of family participation. Another strength of this study is the sample size of 530. A consecutive sampling method was used to include all patients in the registry of participating nursing wards who met the selection criteria of our study (Polit & Beck, 2017). Except for pressure ulcer prevalence at admission, no differences in the baseline characteristics of the cohorts were observed in this study, implying that the cohorts were equal at baseline.

5.1 | Limitations

A few limitations of this study must be mentioned. First, a possible explanation for the findings in favour of unaltered quality of care during the COVID-19 pandemic could be underreporting of patient outcomes. This underreporting could be caused by a high workload and a shift in tasks and responsibilities, which are a characteristics of this pandemic (Nieto-García et al., 2022). Underreporting, with the resulting missing data, is a typical problem of retrospective data collection (Grobbee & Hoes, 2014). However, the multiple imputation methods used to prevent bias are known to be valid general methods for handling missing data (Jakobsen et al., 2017). Second, we did not collect data on major adverse patient outcomes (e.g., anastomotic leakages and intra-abdominal abscesses) or intensive care unit admissions after gastrointestinal (oncologic) surgery. Major adverse events after surgery and intensive care unit admission could increase the risk of developing outcomes such as pneumonia (Kassis et al., 2013), deliriums (Van Den Boogaard et al., 2012) and pressure ulcers (Manzano et al., 2010). The presence of these major adverse events could influence the results if the number of events is not equally distributed between cohort groups. However, it is unlikely that the presence of family influences major adverse patient outcomes therefore, confounding is not considered plausible. Lastly, due to the design of the study, the results may be biased because of a lack of information on unknown confounders, and no adjustments within the multiple regression analysis could be performed.

6 | CONCLUSION

COVID-19 influenced family-centred care due to family visit restrictions. However, in this study, we cautiously conclude that family visit restrictions during the COVID-19 pandemic did not contribute to deliriums, falls, pneumonia, pressure ulcers or readmissions in surgical patients with gastrointestinal (oncologic) diseases. Nevertheless, multiple factors could have played an important role in the study outcomes. Therefore, nurses need to continue monitoring outcomes that are known to be sensitive to family-centred care to gain insight into the effects of COVID-19 family restrictions. These results should be shared to include nurses' perspectives, experiences and knowledge in COVID-19 decision-making. Moreover, in policy-making towards possible new pandemics, re-implementing family restrictions should be carefully considered.

AUTHOR CONTRIBUTIONS

DB and SM made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data. SM, HW, SD, EN and AE involved in drafting the manuscript or revising it critically for important intellectual content. DB, SM, HW, SD, EN and AE given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. DB, SM, HW, SD, EN, AE agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ACKNOWLEDGEMENTS

The authors would like to thank lecturers of the department Nursing Science, Clinical Health Sciences, Utrecht University and Joost van Galen RN, Roos Enzlin RN MSc, Anouk Gorka MD and Marlies Veen RN for their support in this study.

FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

Adhikari, S. P., Meng, S., Wu, Y. J., Mao, Y. P., Ye, R. X., Wang, Q. Z., Sun, C., Sylvia, S., Rozelle, S., Raat, H., & Zhou, H. (2020). Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak

- period: A scoping review. *Infectious Diseases of Poverty*, 9(29), 1–12. <https://doi.org/10.1186/s40249-020-00646-x>
- Al Mutair, A., Ambani, Z., Al Obaidan, F., Al Salman, K., Alhassan, H., & Al Mutairi, A. (2020). The effectiveness of pressure ulcer prevention programme: A comparative study. *International Wound Journal*, 17(1), 214–219.
- Berger, Z., Flickinger, T. E., Pfoh, E., Martinez, K. A., & Dy, S. M. (2014). Promoting engagement by patients and families to reduce adverse events in acute care settings: A systematic review. *BMJ Quality and Safety*, 23(7), 548–555. <https://doi.org/10.1136/bmjqs-2012-001769>
- Bergstrom, N. (1987). The Braden Scale for predicting pressure sore risk. *Nursing Research*, 36(4), 205–210.
- Boerigter, J. L., Geelen, S. J., van Berge Henegouwen, M. I., Bemelman, W. A., van Dieren, S., de Man-van Ginkel, J. M., van der Schaaf, M., Eskes, A. M., & Besselink, M. G. (2022). Extended mobility scale (AMEXO) for assessing mobilization and setting goals after gastrointestinal and oncological surgery: a before-after study. *BMC Surgery*, 22(1), 1–10.
- Bours, G., Halfens, R. J., Lubbers, M., & Haalboom, J. (1999). The development of a national registration form to measure the prevalence of pressure ulcers in The Netherlands. *Ostomy/Wound Management*, 45(11), 28–33, 36.
- Brorsson, B., & Asberg, K. H. (1984). Katz index of independence in ADL. Reliability and validity in short-term care. *Scandinavian Journal of Rehabilitation Medicine*, 16(3), 125–132.
- Brown, S. R., Mathew, R., Keding, A., Marshall, H. C., Brown, J. M., & Jayne, D. G. (2014). The impact of postoperative complications on long-term quality of life after curative colorectal cancer surgery. *Annals of Surgery*, 259(5), 916–923. <https://doi.org/10.1097/SLA.0000000000000407>
- Calvert, W., Minford, J., Platt, C., & Chatfield, C. (2015). ImERSE (Improving Experience through Regular Shadowing Events). *BMJ Quality Improvement Reports*, 4(1). <https://doi.org/10.1136/bmjquality.u206748.w2843>
- Capolongo, S., Gola, M., Brambilla, A., Morganti, A., Mosca, E. I., & Barach, P. (2020). COVID-19 and healthcare facilities: A decalogue of design strategies for resilient hospitals. *Acta Biomédica*, 91(9–S), 50–60. <https://doi.org/10.23750/abm.v91i9-S.10117>
- Cassidy, M. R., Rosenkranz, P., McCabe, K., Rosen, J. E., & McAneny, D. (2013). I COUGH: Reducing postoperative pulmonary complications with a multidisciplinary patient care program. *JAMA Surgery*, 148(8), 740–745. <https://doi.org/10.1001/jamasurg.2013.358>
- Chudasama, Y. V., Gillies, C. L., Zaccardi, F., Coles, B., Davies, M. J., Seidu, S., & Khunti, K. (2020). Impact of COVID-19 on routine care for chronic diseases: A global survey of views from healthcare professionals. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, 14(5), 965–967. <https://doi.org/10.1016/j.dsx.2020.06.042>
- Coleman, S., Nixon, J., Keen, J., Wilson, L., McGinnis, E., Dealey, C., Stubbs, N., Farrin, A., Dowding, D., Schols, J. M. G. A., Cuddigan, J., Berlowitz, D., Jude, E., Vowden, P., Schoonhoven, L., Bader, D. L., Gefen, A., Oomens, C. W. J., & Nelson, E. A. (2014). A new pressure ulcer conceptual framework. *Journal of Advanced Nursing*, 70(10), 2222–2234. <https://doi.org/10.1111/jan.12405>
- Collaborative, C. O. (2020). Global guidance for surgical care during the COVID-19 pandemic. *British Journal of Surgery*, 107(9), 1–7. <https://doi.org/10.1002/bjs.11646>
- Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Biomédica*, 91(1), 157–160. <https://doi.org/10.23750/abm.v91i1.9397>
- Duckworth, M., Adelman, J., Belategui, K., Feliciano, Z., Jackson, E., Khasnabish, S., Lehman, I.-F. S., Lindros, M. E., Mortimer, H., & Ryan, K. (2019). Assessing the effectiveness of engaging patients and their families in the three-step fall prevention process across modalities of an evidence-based fall prevention toolkit: an implementation science study. *Journal of Medical Internet Research*, 21(1), e10008.
- Feo, R., & Kitson, A. (2016). Promoting patient-centred fundamental care in acute healthcare systems. *International Journal of Nursing Studies*, 57, 1–11. <https://doi.org/10.1016/j.ijnurstu.2016.01.006>
- Frampton, S., Agrawal, S., & Guastello, S. (2020). Guidelines for family presence policies during the COVID-19 pandemic. *JAMA Health Forum*, 1(7). <https://doi.org/10.1001/jamahealthforum.2020.0807>
- Grobbee, D. E., & Hoes, A. W. (2014). *Clinical epidemiology: principles, methods, and applications for clinical research*. Jones & Bartlett Publishers.
- Grover, S., & Kate, N. (2012). Assessment scales for delirium: A review. *World Journal of Psychiatry*, 2(4), 58–70. <https://doi.org/10.5498/wjp.v2.i4.58>
- Halloway, S. (2014). A family approach to delirium: a review of the literature. *Aging & Mental Health*, 18(2), 129–139.
- Hart, J. L., Turnbull, A. E., Oppenheim, I. M., & Courtright, K. R. (2020). Family-centered care during the COVID-19 Era. *Journal of Pain and Symptom Management*, 60(2), 93–97. <https://doi.org/10.1016/j.jpainsymman.2020.04.017>
- Hugelius, K., Harada, N., & Marutani, M. (2021). Consequences of visiting restrictions during the COVID-19 pandemic: An integrative review. *International Journal of Nursing Studies*, 121, 104000.
- Jakobsen, J. C., Gluud, C., Wetterslev, J., & Winkel, P. (2017). When and how should multiple imputation be used for handling missing data in randomised clinical trials—A practical guide with flowcharts. *BMC Medical Research Methodology*, 17(1), 162. <https://doi.org/10.1186/s12874-017-0442-1>
- Jakobson, T., Karjagin, J., Vipp, L., Padar, M., Parik, A.-H., Starkopf, L., Kern, H., Tammik, O., & Starkopf, J. (2014). Postoperative complications and mortality after major gastrointestinal surgery. *Medicina*, 50(2), 111–117.
- Kassis, E. S., Kosinski, A. S., Ross, P., Jr., Koppes, K. E., Donahue, J. M., & Daniel, V. C. (2013). Predictors of anastomotic leak after esophagectomy: An analysis of the society of thoracic surgeons general thoracic database. *The Annals of Thoracic Surgery*, 96(6), 1919–1926.
- Katz, S., & Akpom, C. A. (1976). A measure of primary sociobiological functions. *International Journal of Health Services*, 6(3), 493–508. <https://doi.org/10.2190/UURL-2RYU-WRYD-EY3K>
- Kruizenga, H. M., Seidell, J. C., de Vet, H. C. W., Wierdsma, N. J., & Bokhorst-de van der Schueren, M. A. E. (2005). Development and validation of a hospital screening tool for malnutrition: The short nutritional assessment questionnaire (SNAQ®). *Clinical Nutrition*, 24(1), 75–82. <https://doi.org/10.1016/j.clnu.2004.07.015>
- Maaskant, J. M., Jongerden, I. P., Bik, J., Joosten, M., Musters, S., Storm-Versloot, M. N., Wielenga, J., & Eskes, A. M. (2021). Strict isolation requires a different approach to the family of hospitalised patients with COVID-19: A rapid qualitative study. *International Journal of Nursing Studies*, 117, 103858. <https://doi.org/10.1016/j.ijnurstu.2020.103858>
- Manzano, F., Navarro, M. J., Roldán, D., Moral, M. A., Leyva, I., Guerrero, C., Sanchez, M. A., Colmenero, M., & Fernández-Mondejar, E. (2010). Pressure ulcer incidence and risk factors in ventilated intensive care patients. *Journal of Critical Care*, 25(3), 469–476. <https://doi.org/10.1016/j.jcrc.2009.09.002>
- Martin, R. C., Brown, R., Puffer, L., Block, S., Callender, G., Quillo, A., Scoggins, C. R., & McMasters, K. M. (2011). Readmission rates after abdominal surgery: The role of surgeon, primary caregiver, home health, and subacute rehab. *Annals of Surgery*, 254(4), 591–597.
- Moletta, L., Pierobon, E. S., Capovilla, G., Costantini, M., Salvador, R., Merigliano, S., & Valmasoni, M. (2020). International guidelines and recommendations for surgery during Covid-19 pandemic: A systematic review. *International Journal of Surgery*, 79, 180–188. <https://doi.org/10.1016/j.ijsu.2020.05.061>

- Morello, R. T., Barker, A. L., Watts, J. J., Haines, T., Zavarsek, S. S., Hill, K. D., Brand, C., Sherrington, C., Wolfe, R., & Bohensky, M. A. (2015). The extra resource burden of in-hospital falls: A cost of falls study. *Medical Journal of Australia*, 203(9), 367.
- Nieto-García, L., Carpio-Pérez, A., Moreira-Barroso, M. T., Ruiz-Antúnez, E., Nieto-García, A., & Alonso-Sardón, M. (2022). Are there differences between COVID-19 and non-COVID-19 inpatient pressure injuries? Experiences in Internal Medicine Units. *PLoS One*, 17(2), e0263900.
- Park, M., & Giap, T. T. T. (2020). Patient and family engagement as a potential approach for improving patient safety: A systematic review. *Journal of Advanced Nursing*, 76(1), 62–80. <https://doi.org/10.1111/jan.14227>
- Park, M., Giap, T. T. T., Lee, M., Jeong, H., Jeong, M., & Go, Y. (2018). Patient- and family-centered care interventions for improving the quality of health care: A review of systematic reviews. *International Journal of Nursing Studies*, 87(January), 69–83. <https://doi.org/10.1016/j.ijnurstu.2018.07.006>
- Pedersen, A. B., Mikkelsen, E. M., Cronin-Fenton, D., Kristensen, N. R., Pham, T. M., Pedersen, L., & Petersen, I. (2017). Missing data and multiple imputation in clinical epidemiological research. *Clinical Epidemiology*, 9, 157–166.
- Poe, S. S., Dawson, P. B., Cvach, M., Burnett, M., Kumble, S., Lewis, M., Thompson, C. B., & Hill, E. E. (2018). The Johns Hopkins fall risk assessment tool: A study of reliability and validity. *Journal of Nursing Care Quality*, 33(1), 10–19. <https://doi.org/10.1097/NCQ.0000000000000301>
- Polit, D. F., & Beck, C. T. (2017). *Nursing research generating and assessing evidence for nursing practice* (10th ed.). Lippincott Williams & Wilkins. <https://doi.org/10.1016/j.nepr.2013.04.001>
- Rasmussen, B., Holton, S., Wynter, K., Phillips, D. J., David, J. L., Rothmann, M. J., Skjoeth, M. M., Wijk, H., Frederiksen, K., & Ahlstrom, L. (2022). We're on mute! Exclusion of nurses' voices in national decisions and responses to COVID-19: An international perspective. In.
- Rosenbaum, L. (2020). The untold toll - The pandemic's effects on patients without covid-19. *New England Journal of Medicine*, 382(24), 2368–2371. <https://doi.org/10.1056/NEJMms2009984>
- Sankar, A., Johnson, S., Beattie, W., Tait, G., & Wijeyesundera, D. (2014). Reliability of the American Society of Anesthesiologists physical status scale in clinical practice. *British Journal of Anaesthesia*, 113(3), 424–432.
- Schreuder, A. M., Eskes, A. M., van Langen, R. G. M., van Dieren, S., & Nieveen van Dijkum, E. J. M. (2019). Active involvement of family members in postoperative care after esophageal or pancreatic resection: A feasibility study. *Surgery (United States)*, 166(5), 769–777. <https://doi.org/10.1016/j.surg.2019.05.032>
- Schuijvens, P. M. E., Buijs, M., Boonman-de Winter, L., Veen, E. J., de Groot, H. F. W., Buimer, T. G., Ho, G. H., & van der Laan, L. (2020). Impact of the COVID-19 lock down strategy on vascular surgery practice: more major amputations than usual. *Annals of Vascular Surgery*, 21(1), 1–6. <https://doi.org/10.1016/j.avsg.2020.07.025>
- Schuermans, M. J. (2007). The neecham confusion scale and the delirium observation screening scale: capacity to discriminate and ease of use in clinical practice. *BMC Nursing*, 6(1), 1–6.
- Schuermans, M. J., Shortridge-Baggett, L. M., & Duursma, S. A. (2003). The delirium observation screening scale: A screening instrument for delirium. *Research and Theory for Nursing Practice*, 17(1), 31–50. <https://doi.org/10.1891/rtnp.17.1.31.53169>
- Sørdeide, K., Hallet, J., Matthews, J. B., Schnitzbauer, A. A., Line, P. D., Lai, P. B. S., Otero, J., Callegaro, D., Warner, S. G., Baxter, N. N., Teh, C. S. C., Ng-Kamstra, J., Meara, J. G., Hagander, L., & Lorenzon, L. (2020). Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. *British Journal of Surgery*, 107(10), 1250–1261. <https://doi.org/10.1002/bjs.11670>
- Stifter, J., Sermersheim, E., Ellsworth, M., Dowding, E., Day, E., Silvestri, K., Margwarth, J., Korkmaz, K., Walkowiak, N., Boudreau, L., Hernandez, L., Harbert, B., Ambutas, S., Abraham, A., & Shaw, P. (2021). COVID-19 and nurse-sensitive indicators. *Journal of Nursing Care Quality*, 36(1), 1–6. <https://doi.org/10.1097/NCQ.0000000000000523>
- Stoltzfus, J. C. (2011). Logistic regression: A brief primer. *Academic Emergency Medicine*, 18(10), 1099–1104.
- Tumlinson, A., Altman, W., Glaudemans, J., Gleckman, H., & Grabowski, D. C. (2020). Post-acute care preparedness in a COVID-19 world. *Journal of the American Geriatrics Society*, 68(6), 1150–1154. <https://doi.org/10.1111/jgs.16519>
- Twigg, D. E., Gelder, L., & Myers, H. (2015). The impact of understaffed shifts on nurse-sensitive outcomes. *Journal of Advanced Nursing*, 71(7), 1564–1572. <https://doi.org/10.1111/jan.12616>
- Van Den Boogaard, M., Pickkers, P., Slooter, A. J. C., Kuiper, M. A., Spronk, P. E., Van Der Voort, P. H. J., Van Der Hoeven, J. G., Donders, R., Van Achterberg, T., & Schoonhoven, L. (2012). Development and validation of PRE-DELIRIC (PREdiction of DELIRium in ICu patients) delirium prediction model for intensive care patients: Observational multicentre study. *BMJ (Online)*, 344(7845), 17. <https://doi.org/10.1136/bmj.e420>
- Varadhan, K. K., Neal, K. R., Dejong, C. H. C., Fearon, K. C. H., Ljungqvist, O., & Lobo, D. N. (2010). The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open colorectal surgery: A meta-analysis of randomized controlled trials. *Clinical Nutrition*, 29(4), 434–440. <https://doi.org/10.1016/j.clnu.2010.01.004>
- Veldhuizen, J. D., Van den Bulck, A. O. E., Elissen, A. M. J., Mikkers, M. C., Schuurmans, M. J., & Bleijenberg, N. (2021). Nurse-sensitive outcomes in district nursing care: A Delphi study. *PLoS One*, 16, 1–13. <https://doi.org/10.1371/journal.pone.0251546>
- Vms. (2009). *Kwetsbare ouderen*.
- Von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. In (Vol. 147, pp. 573–577): American College of Physicians.
- Yahav, D., Yelin, D., Eckerle, I., Eberhardt, C. S., Wang, J., Cao, B., & Kaiser, L. (2020). Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information. (January).

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How to cite this article: Bloemberg, D., Musters, S. C. W., Wal-Huisman, H. v. d., Dieren, S. v., Nieveen van Dijkum, E. J. M., & Eskes, A. M. (2022). Impact of family visit restrictions due to COVID-19 policy on patient outcomes: A cohort study. *Journal of Advanced Nursing*, 00, 1–12. <https://doi.org/10.1111/jan.15325>

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