

# COVID-19 deaths among nurses: a cross-sectional study

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<b>Background</b>	Nurses who are one of the pivotal elements of countries' strategic responses to COVID-19 are being exposed to COVID-19.
<b>Aims</b>	To investigate the underlying characteristics of nurses who died due to COVID-19.
<b>Methods</b>	On 1 September 2020, a grey literature search was conducted. Data obtained through Medscape, Google, PubMed, government and non-government websites. The search strategy was carried out using variants and combinations of keywords related to 'nurse' and 'COVID-19' in English. Abstracted data included age, gender, type of nurse, department of nursing, country, date of death and publication characteristics.
<b>Results</b>	Out of reported 1518 COVID-19-related nurse deaths, details of age, gender and department of nursing were available for 766 (50%), 945 (62%) and 153 (10%) of nurses, respectively. The median age of the nurses was 56 years. The majority of deaths were reported in the 46- to 65 (32%)-year age range. While the registered nurses had the highest number of deaths according to types of nurses (680/957; 71%), they are mental health nurses (42/153; 28%) in the department of nursing. The countries with the most reported nurse deaths were USA, South Africa, Mexico and Russia.
<b>Conclusions</b>	The predominance of deceased mental health nurses among nursing departments can be examined in future studies. Supportive health policies can be developed to increase the motivation of nurses.
<b>Key words</b>	Coronavirus; COVID-19; death; mental health nurse; nurse.

## Introduction

On 11 March 2020, the World Health Organization announced the COVID-19 outbreak as a pandemic [1]. In June, the International Council of Nurses (ICN) reported that more than 230 000 healthcare workers and more than 600 nurses had died from COVID-19 [2]. In August, ICN updated the number as 1097 [3]. The reported numbers only cover countries with a surveillance system; the real numbers are likely to be beyond these figures.

Nurses have put their health and lives at risk to ensure that people can access the essential healthcare services they need in the pandemic. In this study, we aimed to

investigate the underlying characteristics of nurses who died due to COVID-19 disease.

## Methods

This cross-sectional study is an investigation of nurse deaths from COVID-19 disease through open-source electronic data. This study was approved by the Research Ethics Committee (Approval number: 20/408).

A grey literature search was conducted as of 1 September 2020. Data obtained through Medscape, Google, PubMed, governmental (national status reports and documents from health ministries) and non-governmental websites

## Key learning points

### What is already known about this subject:

- COVID-19 pandemic has affected almost all countries.

### What this study adds:

- Nurse deaths from COVID-19 occurred in almost all nursing departments, particularly mental health nursing.
- Telehealth services may be an option for minimizing the risk of exposure to COVID-19.
- Surveillance systems can be useful to assess the impact of the pandemic and take preventive measures.

### What impact this may have on practice or policy:

- Effective health policies can be established to increase the motivation of nurses.
- The use of telehealth services can be expanded in the delivery of healthcare.

(social media sites, national and international nurse associations, media reports, online obituaries and local media). The search strategy was carried out using variants and combinations of keywords related to ‘nurse’ and ‘COVID-19’ in English. Where available, data were sorted on age, gender, type of nurse, country, date of death, department of nursing and publication characteristics.

The types of nursing differ in every country. Types of nursing were evaluated as non-degree, degree and an advanced degree. The non-degree category includes nurse’s aides, practical nurses, vocational nurses, nursing assistants and nursing technicians. The degree category refers to registered nurses. The advanced degree category refers to those with master’s degrees includes nurse practitioners, clinical nurse specialists and midwives.

Since in many countries, nurses may work outside of their roles or retired nurses may return to work in a pandemic [4]. As a result, all reported COVID-19-related nurse deaths, including retired nurses, were incorporated into the final analysis.

All statistical analyses were performed using the Statistical Package for the Social Science (IBM SPSS, Version 25.0. Armonk, NY: IBM Corp.) for Windows software.

## Results

A total of 1518 COVID-19-related nurse deaths were recorded in 50 countries, as of 1 September 2020.

Of the 1518 nurses, 766 (50%) had age details, the median age was 56 (20–97), most of the deaths were in the age range of 46–65 (32%) (Table 1).

Gender information was available for 945 nurses, of whom 686 (72%) were female, 259 (28%) were male (Table 1).

The countries with the most reported nurse death were as follows: the USA (363/1518), South Africa (240/1518), Mexico (212/1518) and Russia (189/1518) (Table 1).

Details of the type of nurses and department of nursing were available in 971 (64%) and 153 (10%)

nurses, respectively. While the registered nurses have the highest number of deaths according to types of nurses (680/957; 71%) (Table 2), they are mental health nurses (42/153; 28%) in the department of nursing (Table 3).

## Discussion

COVID-19 pandemic is affecting the whole world. We present our research examining the underlying characteristics of COVID-19 deaths among nurses during this unprecedented period.

We are aware that our research is limited in several ways. The first is the quality and accuracy of the data. Grey literature searches may be the only source of information available and have insufficient reliability. Second, the data could not cover all countries, as many countries did not have a tracking system that could report data on how many nurses were died. Additionally, there was no exact data on which of the retired nurses returned to work and which did not. The strength of our research lies in the large sample size. Although our study has certain limitations, we believe that our work could be the basis for formulating effective health policies.

Data of nurse deaths due to COVID-19 disease are crucial. In addition to being one of the fundamental dynamics of the healthcare system [5], nurses are a pivotal element of countries’ strategic responses to COVID-19, which cope with the growing healthcare capacity. Healthcare systems could address the data to assess the impact of the pandemic and adjust better mitigation strategies.

The nurse deaths from COVID-19 have occurred in almost all nursing departments, particularly mental health nurses (Table 3). The causes could be a shortage of personal protective equipment (PPE), working in close contact with patients, exposure to patients’ body fluids/respiratory secretions [6]. The preponderance of the deceased mental health nurses could be addressed in further studies.

The countries with the most reported nurse deaths were USA, South Africa, Mexico and Russia. There are several

Table 1. Distribution of COVID-19 nurse deaths by gender, age and country, as of September 2020

Countries	Gender		Age <sup>a</sup>						Total (%)
	Male (%)	Female (%)	Undefined gender (%)	21–45 age (%)	46–65 age (%)	66–75 age (%)	>75 age (%)	Undefined age (%)	
Argentina	9 (53)	8 (47)	0 (0)	4 (24)	13 (76)	0 (0)	0 (0)	0 (0)	17
Australia	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Belarus	1 (7)	13 (93)	0 (0)	5 (36)	9 (64)	0 (0)	0 (0)	0 (0)	14
Belgium	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1
Bolivia	0 (0)	2 (100)	0 (0)	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)	2
Brazil	18 (11)	24 (15)	123 (74)	18 (11)	18 (11)	2 (1)	0 (0)	127 (77)	165
Bulgaria	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	1
Canada	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Czech Republic	0 (0)	0 (0)	1 (100)	3 (50)	2 (33)	0 (0)	0 (0)	1 (17)	6
China	0 (0)	3 (50)	3 (50)	1 (50)	1 (50)	0 (0)	0 (0)	0 (0)	2
Colombia	1 (50)	0 (0)	1 (50)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Dominican Republic	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	1
Ecuador	2 (12)	14 (88)	0 (0)	1 (6)	0 (0)	0 (0)	1 (6)	14 (88)	16
France	1 (20)	3 (60)	1 (20)	2 (40)	3 (60)	0 (0)	0 (0)	0 (0)	5
Germany	0 (0)	2 (100)	0 (0)	0 (0)	1 (50)	1 (50)	0 (0)	0 (0)	2
Ghana	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Guatemala	2 (100)	0 (0)	0 (0)	0 (0)	1 (50)	0 (0)	0 (0)	1 (50)	2
Honduras	0 (0)	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (100)	2
India	0 (0)	4 (80)	1 (20)	1 (20)	2 (40)	1 (20)	0 (0)	1 (20)	5
Indonesia	2 (4)	3 (6)	45 (90)	2 (4)	1 (2)	0 (0)	0 (0)	47 (94)	50
Iran	8 (36)	8 (36)	6 (28)	7 (32)	0 (0)	0 (0)	0 (0)	15 (68)	22
Iraq	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	1
Israel	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Italy	7 (27)	18 (69)	1 (4)	4 (15)	16 (62)	1 (4)	0 (0)	5 (19)	26
Kuwait	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Malaysia	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1
Mexico	27 (13)	38 (18)	147 (69)	15 (7)	5 (2)	0 (0)	0 (0)	192 (91)	212
Moldova	0 (0)	7 (100)	0 (0)	1 (14)	4 (57)	2 (29)	0 (0)	0 (0)	7
Netherlands	2 (67)	1 (33)	0 (0)	2 (67)	0 (0)	1 (33)	0 (0)	0 (0)	3
Pakistan	3 (100)	0 (0)	0 (0)	2 (66,67)	1 (33,33)	0 (0)	0 (0)	0 (0)	3
Panama	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	1
Philippines	3 (60)	2 (40)	0 (0)	1 (20)	1 (20)	1 (20)	0 (0)	2 (40)	5
Poland	0 (0)	2 (100)	0 (0)	1 (50)	1 (50)	0 (0)	0 (0)	0 (0)	2
Puerto Rico	1 (50)	1 (50)	0 (0)	0 (0)	2 (100)	0 (0)	0 (0)	0 (0)	2
Romania	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1
Russia	11 (6)	178 (94)	0 (0)	20 (11)	141 (75)	18 (9)	2 (1)	8 (4)	189
Saudi Arabia	2 (33)	4 (67)	0 (0)	3 (50)	1 (17)	0 (0)	0 (0)	2 (33)	6
Serbia	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1

Table 1. Continued

Countries	Gender		Age <sup>a</sup>					Total (%)	
	Male (%)	Female (%)	Undefined gender (%)	21–45 age (%)	46–65 age (%)	66–75 age (%)	>75 age (%)		Undefined age (%)
Singapore	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	1
South Africa	0 (0)	4 (2)	236 (98)	2 (1)	2 (1)	0 (0)	0 (0)	236 (98)	240
Spain	4 (50)	3 (38)	1 (12)	0 (0)	7 (88)	0 (0)	0 (0)	1 (12)	8
Sweden	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1
Thailand	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	1
Turkey	1 (17)	5 (83)	0 (0)	4 (67)	0 (0)	0 (0)	0 (0)	2 (33)	6
UK	32 (31)	66 (65)	4 (4)	17 (17)	48 (47)	11 (11)	2 (2)	24 (23)	102
Ukraine	0 (0)	5 (100)	0 (0)	0 (0)	3 (60)	0 (0)	0 (0)	2 (40)	5
United Arab Emirates	2 (40)	3 (60)	0 (0)	3 (60)	1 (20)	0 (0)	0 (0)	1 (20)	5
USA	113 (31)	249 (68)	1 (1)	53 (15)	197 (54)	42 (12)	11 (3)	60 (16)	363
Venezuela	2 (29)	5 (71)	0 (0)	1 (14)	2 (29)	0 (0)	0 (0)	4 (57)	7
Total	259 (17)	686 (45)	573 (38)	178 (12)	491 (32)	81 (5)	16 (1)	752 (50)	1518

<sup>a</sup>Median age: 56 (20–97).

Table 2. Distribution of nurse deaths due to COVID-19, by type of nurses (n = 1518), as of September 2020

	n (%)	Defined age	General age med (min–max)
Undefined	561 (37)	–	–
Defined	957 (63)	755	55 (20–97)
Nurse manager	6 (1)	5	64 (40–70)
Registered nurse	680 (71)	512	56 (20–97)
Nurse practitioner	223 (23)	197	55 (21–80)
Nurse technician <sup>a</sup>	41 (4)	35	49 (27–66)
Midwife	7 (1)	6	60 (30–68)
Total	1518 (%100)	755	56 (20–97)

<sup>a</sup>Nursing assistants and practical nurses were included in the nurse technician group.

Table 3. Nurse deaths due to COVID-19, by department of nursing (n = 1518), as of September 2020

	n (%)
Undefined	1365 (90)
Defined	153 (10)
Mental health	42 (28)
Intensive care Unit (ICU)	34 (22)
Perioperative nurse (OR)	25 (16)
Emergency room (ER)	17 (11)
Paediatric nurse	7 (5)
Labour and delivery	7 (4)
School nurse	7 (4)
Nephrology	4 (2)
Travelling nurse	3 (2)
Haematology	2 (1)
Dermatology	1 (1)
Dental nurse	1 (1)
Otorhinolaryngology (ENT)	1 (1)
Urology	1 (1)
Geriatric	1 (1)
Total	1518 (100)

reasons for the differences in the number of deaths between countries. For some countries, most of the deaths are due to the lack of systematic surveillance systems [7], for others, the lack of PPE [6], inadequate screening of COVID-19, countries’ pandemic onset times, the peak of COVID-19 infection, measures taken by governments and social behaviour of nations [8].

During the pandemic, nurses experienced heavy workloads, long-term fatigue, risk of infection and death. Strategies such as flexible shift work schedules, training on the appropriate use of PPE and psychological support could be provided to nurses. ICN recently reported that it recommends the support of mental health services to

nurses [9]. Also, prevention strategies such as telehealth services can be considered in the delivery of healthcare. Telecommunication technologies allow nurses to work remotely, minimizing the risk of exposure, and improving morale [10].

In summary, strategies could be created to improve the motivation of nurses. It is noteworthy that mental health nurses constitute the majority of those who died in nursing departments, which could be addressed in future studies. The use of telehealth services may be considered by minimizing the risk of exposure to COVID-19. Our research will be a valuable tool and serve as a basis for future studies to provide a comprehensive flow of information.

## Funding

None declared.

## Acknowledgements

None declared.

## Competing interests

None declared.

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