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Protocol for Handling of COVID-19 Related Deaths

Arbeen Acosta Laurito

MD, DPAMS, FPSMSI, MSHHM
Justiniano R. Borja General Hospital, Cagayan De Oro City, Philippines
Associate Professor, Xavier University-Ateneo De Cagayan, Cagayan De Oro City

Abstract: ***A retrospective and purposive study was conducted to determine the status of implementation of the less than 12-hour protocol of COVID-19 dead bodies from death to disposition or burial. Among the 485 deaths both COVID-19 and non-COVID-19 related deaths for 2020 (Apr-Dec), the majority were adults (43%) and 59% were male. Similarly, 2021 (Jan-May) has the same trend with 44% adults of which 61% were male. In terms of area in the hospital, the majority of deaths were from Severe Acute Respiratory Infection (SARI) ward for 2020 (34.64%) and in 2021 (33.63%). There were 92 deaths swabbed for RT-PCR among the 104 (21.44%) COVID-19 related deaths for 2020 while there were 97 deaths swabbed for RT-PCR among the 101 COVID-19 related deaths for 2021. Regardless of compliant to the 12-hour protocol, the mean time (hours) of stay in the hospital of all swabbed COVID-19 related deaths in 2020 was significantly longer (13 hr and 25 min) compared to 2021 (6 hr and 40 min) (t-test=3.656, SD=1.874, alpha=0.05). Among the swabbed COVID-19 related deaths that stayed <12-hours, there was no significant difference between the mean time of hospital stay from 2020 (5 hr and 49 min) to 2021 (4 hr and 58 min) (t-test=0.437, SD=1.549, alpha=0.05). Also, there was no significant difference between two study periods for swabbed COVID-19 related deaths that stayed more than 12-hours. The mean time for all 2020 deaths (COVID-19 or non-COVID related deaths) was significantly longer (9 hr and 35 min) compared to the deaths where no swabbing was done (5 hr and 50 min) [t-test=8.839, alpha=0.05), but significantly shorter than the 12-hour limit for the WHO protocol for managing the COVID-19 related deaths. The implementation of Cadaver Release Form (CRF) significantly helped in the implementation of the <12-hour protocol for handling the COVID-19 related deaths in the hospital.***

Keywords: Management of the COVID-19 dead bodies, cadaver release form, mean time hospital stay, COVID-19 deaths, 12-hour hour protocol, burial of COVID-19 dead bodies

1. Introduction

Over a year since a cluster of pneumonia cases of unknown etiology was reported in Wuhan City, Hubei Province of China last December 31, 2020[1], we are still facing the pandemic in various waves.

Strategies were varied and reasonable to curb the spread of COVID-19 infection based on worldwide experiences on Coronavirus especially in handling dead bodies[2, 3, 4, 5]. In fact, WHO published the interim guideline in handling the COVID-19 dead bodies[6].

Data supporting the spread of the virus when handling dead bodies are being assessed and still at its early stage[7]. It could either be during postmortem care, handover, performing mortuary services, autopsy, embalming, wake with the relatives, and or transport to the burial or cremation site, among others. The systematic review by Yacoob[8] based on retrieved guidance could be revisited and supported by evidence of published materials on COVID-19 virus. One study from India stated that lungs of COVID-19 dead bodies cannot transmit the virus[9].

Nevertheless, recommendations on the use of personal protective equipment during handling of the COVID-19 dead bodies were emphasized in some medical authorities and published studies[6, 10, 11, 12]. The safety and wellbeing of everyone who tends to handle the bodies should be the priority[13].

The implementation of the less than 12-hours burial as a protocol was supported by several published documents in the Philippines based on the Department of Health[1, 14, 15, 16]. Despite the contrary statement by Go and Docot[18] (2020), the implementation of the protocol observed the dignity of the dead, their culture and religious tradition, and their families were protected throughout. The memorandum was mandated and is in accordance with the Code of Sanitation of the Philippines (P. D. No.856) and the Quarantine Law (R. A. No.9271) [1, 15].

So far, for COVID-19 in-hospital deaths in a level 1 health facility, no data collection being published for the implemented less than 12-hour protocol from death to burial. Thus, this study was conceptualized to have baseline data and as an input in the capability of decision-makers making resilient actions and addressing the current pandemic.

1.1 Statement of the Problem

This study aimed to assess the implementation of the WHO guideline of less than 12-hour burial (or cremation) from the time of death among COVID-19 related deaths. The documentation of the time elements are crucial, thus, the creation of Cadaver Release Form (CRF), approval and implementation. Specifically, it deals with the following:

1) Demographics of the all-hospital deaths from 2020 (April to December 2020) and deaths for 2021 (January to May 2021) in terms of age, sex, and ward distribution.
2) Frequency and percentages of COVID-19 related and non-COVID-19 related deaths, swabbed and non swabbed deaths and the length of hospital stay from the time of death to the release of the dead bodies for burial (or cremation).

1.2 Hypotheses

1) Is the mean time difference between swabbed COVID-19 related deaths that stayed less than 12-hours the same between 2020 and 2021?

2) Is the mean time difference between swabbed COVID-19 related deaths that stayed more than 12-hours the same between 2020 and 2021?
3) Is the mean time difference between swabbed COVID-19 related deaths stayed longer in 2020 than in 2021?
4) Is the mean time of hospital stay among swabbed deaths equal to non-swabbed deaths (2020 and 2021, regardless of <12 or >12 hours) ?
5) Is the mean time of hospital stay among swabbed deaths (2020 and 2021, regardless of <12 or >12 hours) equal to 12 hours?

1.3 Scope and Limitation

The study covers the 435 reported hospital deaths of 2020 (April to December 2020) and 232 deaths for 2021 (January to May 2021), either COVID-19 or non-COVID-19 related deaths. April 2020 was the start of implementation of the approved Cadaver Release Form (CRF). All hospital deaths received by the morgue facility from various wards or units together with the filled up CRF.

Handling of the dead bodies undergoes a process flow, governed by the hospital Management of the Dead Body, and released to the external government agency for free burial and cremation services (City Management of the Dead Body). The less than 12-hour WHO protocol is from death to burial (or cremation). This study collects data from the time of death until the time the dead body is released to the external agency assigned for burial and cremation. Delays observed going to, or during the burial and or cremation process are beyond the scope of the study.

COVID-19 related deaths in the hospital were assessed as COVID-19 suspects based on the WHO and national guidelines upon admission. Swabbing for RT-PCR may be performed before or as a post-mortem procedure within the hospital. But confirmatory results are delayed for more than 24 hours and are performed at the other health facility. Thus, it was not included in the study due to its unavailability within the 12-hour time frame.

Compliance and completeness of the Cadaver Release Form (CRF) were also assessed. Blank or incomplete data entry were categorized as No Data or Incomplete data during the analysis and were excluded.

2. Materials and Methods

2.1 Research Design

This is a retrospective and purposive study utilizing the Cadaver Release Form ([CRF], version 4, 08/13/2020) for review and was conducted in a level-1 public hospital.

2.2 Research Environment

The study was conducted in a level-1, 100-bed capacity, city-owned public hospital, and handling non-COVID-19 cases. In 2020, the facility expanded its services outside the main building with functional Triage, tents for ARI and SARI. COVID-19 suspect and confirmed cases were referred to a tertiary hospital located in the same city. All ER or ward deaths were transferred to the morgue within the hospital facility and waiting for burial or cremation by the City Management of the Dead.

2.3 Sampling Procedure

The study utilizes data retrieved from the created form, Cadaver Release Form, among all hospital deaths from 2020 and 2021. All deaths from the different wards were transferred and logged in the morgue facility together with the CRF form. Purposive sampling was used to evaluate the completeness of the data written in the form and categorized as; 1) COVID-19 related deaths, 2) non-COVID-19 related deaths, and 3) No data (or incomplete data). Among the COVID-19 related deaths, they were sub-categorized into 1) Swab Done, 2) Swab Not Done, and 3) No Data (or incomplete data) (See Figure 1).

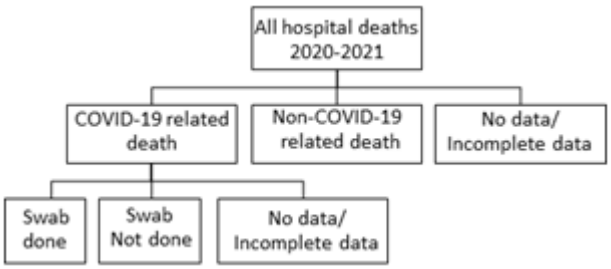

Figure 1: Purposive sampling of the COVID-19 related deaths

2.4 Data Gathering Instruments and Procedure

Data from the approved Cadaver Release Form ([CRF], version 4, 08/13/2020, created by the hospital Management of the Dead Body-COVID-19 were tabulated in a spreadsheet. The form consisted of four (4) parts that were filled up by different staff and areas involved, such as the 1) Nurse-on-duty where the death occurred, 2) endorsement to the morgue facility, 3) released by the Security Guard to the City's Management of the Dead Body for COVID-19, and 4) disinfection team. Each staff and area involved were allowed to have two (2) hours to complete the process to be able to comply with the 12-hour protocol for burial of the COVID19 related deaths. Date and time were written in every data entry. The form underwent several revisions since the start of the pandemic. This study emphasized only the steps numbered 1 to 3 which are within the jurisdiction of the hospital. The actual time for burial or cremation is beyond the scope of the study and is under the City's Management of the Dead Body for COVID-19, as an external agency.

2.5 Statistical Instrument

The research data were processed using SPSS Statistics (v.28.0) analytical statistics such as comparing means using independent sample T-test. While descriptive statistics used were frequency, percentage and mean. Data presentations were done with tables and figures.

3. Results and Discussion

Based on Table 1, there were 485 deaths in all cases for 2020 (April to December 2020) while 232 deaths for 2021 (January to May 2021). Table 1 showed that the majority of the 2020 deaths were adults (43%) and senior citizens (42%). For 2021, the trend was consistent with the majority of deaths were from the adult age of 19-59 years old (44%) followed by the senior citizens (40%).

There were more males than females in both study periods, 2020 (59%) and 2021 (61%). Meanwhile there were only 40% for females in 2020 while 39% for 2021 (Table 1).

Table 1: Demographics of all hospital deaths from 2020 to 2021

Demographics			2020		2021	
			Frequency	Percentage	Frequency	Percentage
Age	Pediatric	0-18 yr	68	14.02%	35	15.09%
	Adult	19-59 yr	209	43.09%	102	43.97%
	Senior citizens	>60 yr	204	42.06%	92	39.66%
	No entry		4	0.82%	3	1.29%
Total			**485**		**232**	
Sex	Male		287	59.18%	141	60.78%
	Female		195	40.21%	90	38.79%
	No entry		3	0.62%	1	0.43%
Total			485		232	

Based on Table 2, 2020 deaths were from SARI ward (34.64%) followed by ARI ward, and Internal Medicine wards. These three wards catered to the adult population which was highly vulnerable at the start of COVID-19 pandemic. Among 232 deaths in 2021, the majority were from SARI ward (33.62%) followed by ARI ward and Internal Medicine ward. The same trend was seen when comparing the two study periods.

Table 2: Frequency and percentages of all deaths and ward distribution

	2020		2021	
Area	Frequency	Percentage	Frequency	Percentage
ARI* Ward	150	30.93	63	27.16
SARI** Ward	168	34.64	78	33.62
Internal Medicine Ward	45	9.28	28	12.07
No entry	35	7.22	19	8.19
Tuberculosis Pavillion	22	4.54	9	3.88
Other wards***	65	13.4	35	15.09
TOTAL	485		232	

Note:
*= Acute Respiratory Infection ward
**= Severe Acute Respiratory Infection ward
***= consisted of wards from Pedia, Surgery, Obstetrics, Gynecology, CCU, Main Emergency Room, OB-Gyne ARI/SARI, Infirmary Wards

Referring to Figure 1, Table 3 showed the frequency and percentages of the classifications of deaths related to COVID-19. For 2020, there 104 (21.44%) COVID-19 related deaths, while majority of deaths were non COVID-19 related deaths, 357 (73.61%). Moreover, for 2021, there were 101 (43.53%) COVID-19 related deaths while 127 or 54.74% were non-COVID-19 related deaths. The same trend was observed for both study periods. There were incompletely filled up forms but much lower comparing 2020 deaths (24) with 4 deaths for 2021. A total of 92 COVID-19 related deaths in 2020 were swabbed for RT-PCR compared to 97 swabbed in 2021.

Table 3: Frequency and percentages of COVID-19 related and non-COVID-19 related deaths in 2020 and 2021 (2020 n=485; 2021 n=232)

COVID-19 Status	2020		2021	
	Frequency	Percentage	Frequency	Percentage
A. COVID-19 related deaths	104	21.44	101	43.53
Swab	92	88.46	97	96.04
No Swab	10	9.61	1	0.99
No data	2	1.92	3	2.97
B. Non-COVID-19	357	73.61	127	54.74
C. No Data	24	4.95	4	1.72
Total	**485**		**232**	

Among the swabbed COVID-19 related deaths from Table 4, the mean time from time of death to release from the hospital facility (for burial or cremation by the external agency) was longer in 2020 (13 hours and 25 minutes) compared to 2021 with 6 hours and 40 minutes (Table 4). Meanwhile, there were 78 (80.41%) swabbed deaths in 2021 compared to 2020 with only 59 (64.13%) swabbed deaths. Table 4 also presented that swabbed COVID-19 related deaths which stayed more than 12 hours in the hospital facility were comparable percentages between 2020 (15.22%) and 2021 (15.46%).

Table 4: Swabbing status and the Mean hours of stay in the hospital of the COVID-19 related deaths from 2020 (n=92) and 2021 (n=97). (Alpha=0.05)

SWABBING STATUS (COVID-19 Related Deaths)	2020		2021		Standard Deviation	T-test
	Frequency	Percentage	Frequency	Percentage		
A. No swab	10		1			
B. No data	2		3			
C. Swabbed	92		97			
Mean	**13:25**		**06:40**		**1.874**	**3.656**

<12 hrs	59	64.13	78	80.41		
Mean	**05:49**		**04:58**		**1.549**	**0.437**
>12 hrs	14	15.22	15	15.46		
Mean	**22:01**		**16:05**		**3.207**	**1.314**

This study emphasized that COVID-19 related deaths were properly disposed through burial or cremation by the external government agency with or without the RT-PCR results due to variable limitations. Since all deaths swabbed were initially classified as COVID-19 Suspects during admission, therefore, swabbing status was utilized rather than using the official RT-PCR results.

Comparing the two study periods among the swabbed COVID-19 related deaths that were compliant with the less than 12-hours dead body disposal. This study answered the first hypothesis that there was no significant difference between the two means from 2020 (5 hours and 49 minutes) to 2021 (4 hours and 58 minutes) (t-test=0.437, SD=1.549, alpha=0.05).

COVID-19 related deaths that were not compliant with the less than 12-hours protocol from 2020 showed no significant difference compared to 2021 (t-test=1.314, SD=3.207, alpha=0.05). On this second hypothesis, several reasons were identified during the course of improving the form, ranges from 1) communication gaps, 2) reorganization of committee members, 3) hesitancy of dead body disposal despite no RT-PCR results on hand, 4) refusal for cremation (not culturally practice), 5) travel to other cities or municipalities, 6) capability of the city's management of the Dead Bodies for COVID-19, and 7) national and local policies and guidelines, among others.

Comparing the mean number of hours of stay in the hospital, COVID-19 related deaths in 2020 significantly stayed longer for 13 hours and 25 minutes compared to 2021 with a mean hospital stay of 6 hours and 40 minutes (t-test=3.656, SD=1.874, alpha=0.05). Therefore, the mean time of hospital stay of COVID-19 related deaths in 2020 was improved with the utilization of the hospital approved Cadaver Release Form which underwent several revisions (Table 4).

Consolidated COVID-19 related deaths both for 2020 and 2021 were analyzed if the implementation of the Cadaver Release Form has an impact in handling the dead bodies within the less than 12-hours WHO guideline as shown in Table 5.

Table 5: Analysis on consolidated COVID-19 and non-COVID-19 related deaths for 2020 and 2021

	Status of swabbing	
2020 and 2021 Deaths	Swabbed	Swab not done
Frequency	165	436
Mean time (hours)	09:35	05:50
Standard deviation	0.222	1.432
T-test (9: 35 vs 5: 50)	8.839	
T-test (9: 35 vs 12hr)	-17.0199	

This study tried to evaluate the compliance on the less than 12-hour protocol for hospital stay among all swabbed dead bodies or among those categorized as COVID-19 related deaths (suspect or confirmed) for both 2020 and 2021.

Table 5 showed that the mean COVID-19 related death stay of 9 hours and 35 minutes was significantly longer than the dead bodies where no swabbing was done (5 hours and 50 minutes) [t-test=8.839, alpha=0.05) but significantly shorter than the 12-hour limit for the WHO protocol for managing the COVID-19 related deaths.

This study proved the usefulness of the recently drafted Cadaver Release Form to determine the needs for improvement for the human resource, implementation of the process flow, the identification of choke points of the process flow, collaboration with other neighboring municipalities and cities, and collection of good quality data entry for policy-making decision makers. Moreover, the current study presented an improved handling and disposition of COVID-19 related deaths (suspect, probable or confirmed) in the hospital. The process flow was implemented in every area to adhere to the WHO protocol of less than 12-hour disposal of COVID-19 related dead bodies either for burial or cremation process.

Therefore, with the surge of COVID-19 related deaths and the limited standardized RT-PCR machines in the locality, health facilities can still adhere and be compliant to the disposal of the dead bodies of COVID-19 related deaths in less than 12-hours.

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