SLJFMSL

SRI LANKA JOURNAL OF FORENSIC MEDICINE, SCIENCE & LAW

Published biannually by the
Department of Forensic Medicine
Faculty of Medicine, University of Peradeniya
Sri Lanka

VOL. 13 No. 2
December 2022
e-ISSN 2465–6089

Sri Lanka Journal of
Forensic Medicine, Science & Law

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Editorial Office:
Department of Forensic Medicine
Faculty of Medicine
University of Peradeniya
Sri Lanka

Websites: **med.pdn.ac.lk**
sljfmsl.sljol.info

Editorial Assistant:
Dr. Kasun Ekanayake

E-mail: **sljfmsl@med.pdn.ac.lk**

Cover Design & Typesetting:
Ms. Vinodani Dharmasena

Tel: **+94 812 388083**

This journal is indexed in DOAJ, IMSEAR & NLM

Sri Lanka Journal of
Forensic Medicine, Science & Law

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Sri Lanka Journal of Forensic Medicine, Science & Law — 2022; 13(2):1-5
DOI: http://doi.org/10.4038/sljfmsl.v13i2.7928

LEADING ARTICLE

Reporting of Systematic Reviews in Medical Journals: Points to Ponder

Perera S
Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka

ABSTRACT

Reliance on recent evidence to answer a clinical question is the key element in Evidence Based Medicine (EBM). The practice of EBM involves identifying the best evidence pertaining to a given situation and integrating it with clinical expertise and patient values in making the best decision with regard to the situation[1]. Finding the best evidence can be a difficult task given the proliferation of information generated by individual studies, which may be of different quality in methodology and context[2]. In such a situation, conducting Systematic Reviews is considered the least biased, most logical and scientific approach to find the best evidence for a given scenario. Credibility of the conclusions of a SR depends on the reliability of its methodology and the quality of reporting the systematic review. Authors of SRs are expected to report a complete, accurate and transparent account of the procedure and results. This article focuses on the issues observed in reporting of SRs in medical journals and aims to provide an account on some aspects to consider when reviewing SR articles. A brief account on the methodology, standards and guidelines of the SR process is presented along with the significance of the technicalities of some important steps that need to be followed. SRs generate new knowledge based on already existing findings, aiming at different types of potential users such as policy makers, healthcare providers, patients and researchers[1]. It is important that reviewers strictly adhere to the guidelines and standards in conducting the review and in reporting their work to produce high quality and reliable SRs.

Keywords: Best evidence; evidence-based medicine; reporting of systematic reviews; systematic reviews; systematic review methodology

Corresponding Author: Perera S
sriyanip88@gmail.com
ORCID iD: https://orcid.org/0000-0002-3713-3304

ARTICLE HISTORY
Received: 23.07.2022 **Received in revised form:** 15.09.2022
Accepted: 15.09.2022 **Available online:** 16.12.2022

INTRODUCTION

The principles of Evidence Based Medicine (EBM) can be used to describe the need for development of Systematic Reviews (SRs) in healthcare. Reliance on current and relevant evidence to answer a clinical question is the key element in EBM. It is a process where the best evidence pertaining to a given situation is identified through a systematic search of literature and integrating it with clinical expertise and patient values in deciding the best course of action[1]. Finding the best evidence can be a difficult task given the rapid influx of information generated by individual studies, as they may be of different quality in methodology and context, biased, misrepresented, misinterpreted, and reaching conflicting conclusions[2]. In such a situation, conducting systematic reviews is considered the best, least biased and most logical and scientific approach to finding the best evidence.

Credibility of the conclusions of a SR depends on the reliability of its methodology. The quality of reporting of a systematic review is important as it reflects the quality of the procedure it followed, which eventually would verify the credibility of its conclusions. Researchers are expected to report a complete, accurate and transparent account of the procedure and the results. This article aims to discuss the quality of reporting of SRs in medical

journals and, to provide an account on some considerations to be made to ensure high quality reporting by authors, editors and peer-reviewers of systematic reviews based on the PRISMA (Preferred Reporting Items for Systematic Reviews & Meta-Analysis) 2020 statement[3].

WHAT ARE SYSTEMATIC REVIEWS?

'Systematic review' is defined as "a synthesis that collates all empirical evidence fitting pre-specified eligibility criteria in order to answer a specific research question"[4]. As such SR is a review of literature pertaining to a clearly formulated question, using a set of **systematic and explicit methods** to first **identify, assess and select all relevant studies** for the review, and then to **collect, analyze and synthesize data** from those **selected studies**, with the aim to **present a valid conclusion**, representing the 'best evidence' that can be drawn from the review, in order to answer the question[5]. Meta-analysis may or may not be used to analyze and combine the results of those studies included in the review during the process of its synthesis[6]. A systematic review may be presented as a narrative synthesis or a combination of a narrative synthesis and a meta-analysis. The final product of a SR is the comprehensive summary of the synthesized evidence from the included studies in the form of a report or a journal article.

The process of conducting SRs adheres to a **strict**, **explicit**, **reproducible, and pre-specified** methodology[2]. The core principles of SR methodology are the scientific rigor, transparency and replicability[7]. Conducting a systematic review is a time-consuming exercise, requiring a carefully thought-out research question, a review protocol (the pre-plan), a wide range of resources and the commitment of a team of reviewers for its successful completion. Systematic reviews are conducted according to a pre-plan which is explicitly documented in the form of a Review Protocol.

The SR procedure involves the following stages for which **technical details are available through guidelines and standards**:

PHASE 1

1. Assess need, assemble team, define research question
2. Define 'study inclusion criteria', create review protocol (Pre- plan)

PHASE 2

3. Conduct Review - Strictly follow the protocol
   - Identify search terms; outline the search strategy
   - Search literature: strive to locate <u>all</u> relevant studies (articles), manage references
   - Screen through relevant articles using the 'study inclusion criteria'; select studies for the review
   - Assess selected studies for quality; identify studies of acceptable quality for inclusion in the review
   - Extract data from included studies
   - Analyze extracted data (qualitative / quantitative)
   - Update the search towards end of review, to locate/include any current studies
   - Synthesize findings of included studies (narrative synthesis and/or Meta-analysis)
   - Discuss; describe results, archive review data, materials

PHASE 3

4. Write report of the review and disseminate findings
5. Update the review as needed (if new research findings are not included SR would be out of date)

Systematic reviews differ from normal reviews in the following aspects, in that SRs

i) adhere to a protocol
ii) locate ALL relevant evidence using a comprehensive search strategy that avoids bias
iii) screen all relevant studies using 'study inclusion criteria'
iv) exclude studies of poor quality and use findings from only the studies of good quality

The reliability of the findings of a SR depends entirely on adherence to the methodology. For example, the literature search is a crucial component of a systematic review as it is the underling process that defines all subsequent steps of the SR procedure. The search process of identifying evidence pertaining to the research question should be reproducible, deploying a thorough and comprehensive search strategy. In addition, the quality (internal and external validity) of included studies determines the reliability of the evidence derived through a systematic review. This necessitates quality appraisal of included studies to select only the studies of acceptable quality for inclusion in the review.

STANDARDS AND GUIDELINES FOR SYSTEMATIC REVIEWS

Various institutes and organizations have collectively established comprehensive guidelines for conducting SRs in healthcare. These guidelines / standards aim to guide the researchers through all stages of the SR process. CRD Guidance (Cochrane Reviews & Dissemination handbook)[2] and IOM (Institute of Medicine) standards[8] are two examples. PRISMA 2020 checklist provides the guidelines for reporting of systematic reviews.

In undertaking a SR, IOM standards recommends a team of researchers with expertise covering each aspect of the SR process; methodology, literature search, data management, subject specialty, and data analysis if a meta-analysis is planned. Reviewers are expected to rigorously adhere to all technicalities in each step of the SR procedure in order to minimize all possible system errors and, also to avoid potential bias[9]. The minimum number of reviewers to be involved, methods for independent evaluation at each phase, resolving disagreements, and tools/techniques to be used etc. are well documented in the guidelines.

Creating a review protocol at the initial stage of the process is vitally important for which guidance is provided through PRISMA-P 2015[10]. The review protocol ensures that the SR is well planned and the methods to be used are documented and it promotes consistent conduct by the review team throughout the SR process. While, PRISMA-P 2015 helps reviewers to create a high quality review protocol, it has potential to improve the conduct of the systematic reviews as well[10]. Review authors are expected to comply with all 17 items specified by PRISMA-P 2015 in creating the protocol. These items are categorized into three sections: administrative information, introduction, and methods. The search strategy is an integral element that should be included in the methods section of the review protocol.

It is recommended that the review protocol is registered in a Protocol Registry: the PROSPERO (International prospective register of systematic reviews) at an early stage of the process. Purpose of prospective registration is to prevent unintended duplication of reviews, reduce bias in the conduct and promote transparency.

IOM standards specifies the methods for literature searching and recommends use of a reference management system software (examples: Mendeley, EndNote) for managing the articles that will be retrieved. The details of the searching process should be documented including databases, citation indexes, grey-literature, and other sources to be searched; methods of hand-searching; cited and citing references of included studies and a line-by-line description of the search strategy with the date of search for each database. The search strategy involves translation of the research question into search concepts using a 'Search-term Harvesting Table', correct choice of Boolean operators, using relevant subject headings, spelling variants and truncation, and translation of the search strategy for each database. Contacting the authors of the relevant studies is recommended in case of any required clarification of data of included studies.

It is essential that guidelines for conduct of literature search and reporting searches, are followed. Guidance for reporting the search process is provided by *PRISMA-S*[11], in the form of a checklist of 16 items, covering all aspects of the search process. It requires reporting of search strategies for all the databases that were searched, copied, and pasted exactly as the searches were run. This ensures the transparency and reproducibility of the systematic review.

CRD guidance and IOM standards specify the norms for the study screening process, including inclusion/exclusion criteria. The Web application Rayyan[12] is a useful software designed to facilitate the screening process of articles in SRs. The study selection process should be documented with details, including the reasons for exclusion of potentially relevant studies. PRISMA- Flow diagram is the standard format for reporting the study selection process.

The most convenient method of assessing quality of included studies is to use validated checklists that are designed for the purpose. Various tools are available for this and there is no single tool that is suitable for use in all reviews. Choice of the checklist should be guided by the study design of the study that is concerned. Following are a few examples of commonly used instruments:

- The Cochrane Collaboration's tool for assessing risk of bias in randomized trials in health sciences[13]
- The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomized studies in meta-analyses[14]
- The Joanna Briggs Institute Critical Appraisal tools for use in JBI Systematic Reviews[15]

- Downs and Black Scale for randomized and non-randomized studies[16]

REPORTING OF SRs IN HEALTH/MEDICAL JOURNALS

Many SRs published as journal articles, represent SRs of high quality. However, it is evident that certain systematic reviews published in journals are questionable in their quality with regard to methodology and reporting. Most of the time reviewers tend to report normal reviews as systematic reviews using the terminology of SRs. In such reporting, some authors have used the expected SR terminology to list the entire PRISMA checklist items claiming to have conducted during the review, but without providing proof for the actual conduct of the listed processes. At a glance such a SR article would be portrayed as a properly conducted SR and thereby mislead the readers. The conclusions presented by such systematic reviews cannot be accepted as reliable evidence for purposes of decision making. Peer-reviewers of such SR articles should be able to identify the missing points in the reporting and to verify if a proper SR has been conducted or not. In the peer-review process, it is important to read through the article carefully to check, if it presents sufficient clues for following the recommended guidelines based on PRISMA 2020 checklist during each step. Paying attention to the following would be useful when reviewing SR articles submitted for health/medical journals:

1. **Submission guidelines (of journals)** for SR articles should include the need to provide (i) annexures of supplementary documents supporting the content reported in the article (ii) the search strategy (iii) review protocol (iv) PRISMA-2020 checklist sheet, (v) PRISMA-Flow diagram for study selection (vi) quality assessment reports etc..
2. **Peer- reviewers** are expected to check on (i) documents in determining the credibility of the reported SR (ii) measures taken to avoid risks of bias and system errors in the process (iii) reproducibility of the search strategy as PRISMA-S guidelines recommend reporting the details of search strategies for all databases (iv) whether methods reported in the article is comparable with what was planned in the protocol. This helps peer-reviewers verify the levels of potential risks of bias if there are any.

CONCLUSION

Significance of the technicalities of each step of the SR process has been well documented. It is not possible to present a comprehensive account on these processes in this article due to its–enormity. Systematic reviews generate new knowledge based on already existing observations and findings that may be of benefit to a wide range of users such as policy makers, healthcare providers, patients and researchers[1]. It is mandatory that such conclusions/findings are adequately justified and without bias. Therefore, researchers should strictly adhere to the guidelines and standards, first in conducting the review, and then in reporting their work, with commitment to uphold desired standards of quality SRs. Such SRs would provide credible accounts on the issues of interest to all relevant stakeholders.

CONFLICTS OF INTEREST

There are no conflicts of interest.

DISCLOSURE

SP is an editorial board member of Sri Lanka Journal of Forensic Medicine, Science & Law. Therefore did not participate in any way in the publication / decision making process of this submission, as per journal policy.

ETHICAL ISSUES

None

SOURCES OF SUPPORT

None

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Sri Lanka Journal of Forensic Medicine, Science & Law — 2022; 13(2):6-13
DOI: http://doi.org/10.4038/sljfmsl.v13i2.7892

RESEARCH ARTICLE

A comparative study of suicidal deaths during the pre-COVID and COVID periods

Tyagi Y[1,2], Meena MS[3], Kumar J[4], Mittal S[1,2], Soni RK[3]*

[1]*Department of Forensic Medicine, Atal Bihari Vajpayee Institute of Medical Sciences, New Delhi, India*
[2]*Dr. Ram Manohar Lohia Hospital, New Delhi, India*
[3]*Department of Forensic Medicine and Toxicology, National Institute of Medical Sciences and Research, NIMS University, Jaipur, India*
[4]Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, India

ABSTRACT

The present study was undertaken to observe the change in the pattern of unnatural deaths, particularly suicidal deaths between non-pandemic periods, i.e., Pre-COVID and a pandemic period, i.e., COVID period at a tertiary care hospital of New Delhi, India. The data was collected from post-mortem reports of autopsies done at Dr. Ram Manohar Lohia Hospital, New Delhi, between 1st April 2019 to 30th September 2019 (pre-COVID period) and 1st April 2020 to 30th September 2020 (COVID period). The data collected were subjected to statistical analysis and presented as numbers, proportions, age, gender, and suicide methods.

Findings suggests a notable change in the pattern of unnatural deaths, apart from an increase in natural deaths, particularly suicidal deaths in the population of New Delhi, India, due to the impact of COVID and nationwide lockdown following the first wave of the COVID pandemic. There was a significant decrease in accidental and homicidal deaths, whereas an 18% increase was observed in suicidal deaths during the COVID period compared to the pre-COVID period. The difference in the number of suicidal deaths out of total unnatural deaths during the pre-COVID and COVID period was found to be significant (P-value <0.0001). As the duration of the lockdown period was being extended, suicidal deaths kept on increasing, with a peak seen during the last months of the COVID period. Both the males and females showed a significant rise in suicidal deaths, and the percentage increase was found to be more among males than females, i.e., 19.1% and 15.8%, respectively. Variations in suicidal death rates were observed in different age groups. In both genders increase in the suicidal deaths was observed in the age group of 30-40 years, while it decreased in 40-50 years of age group.

Keywords: COVID-19; mental health; pandemic; suicide; unnatural deaths

Corresponding Author: Soni RK
ravikanth.soni@gmail.com
ORCID iD: https://orcid.org/0000-0003-4446-7641

ARTICLE HISTORY
Received: 09.03.2022 **Received in revised form:** 21.06.2022
Accepted: 07.07.2022 **Available online:** 16.12.2022

INTRODUCTION

Two waves of the COVID-19 pandemic devastated the world in 2020-21, and the third wave in 2022[1]. The devastation was caused within a short period leading to the death of about six million people worldwide till the end of 2021[2]. Various countries across the world adopted different methods to tackle the rapidly spreading COVID-19 pandemic. Countries closed their borders, restricted international flights, and imposed nationwide lockdowns to tackle this situation[3]. In India, the first case of COVID-19 was reported from the state of Kerala on 30th January 2020[4].

Within the next few months, there were 18 deaths and a 260% weekly increase in the number of cases reported as on 23rd March 2020[5]. Hence, India imposed a sudden strict nationwide lockdown and stopped national and international flights. Railways and roadways were closed significantly from 25th March onwards except for transport services for food, health, and economic matters.

The sudden lockdown resulted in a feeling of confinement and isolation which was further aggravated by the loss of loved ones, and social stigma due to COVID-19. Lockdown also caused loss of jobs, financial insecurity, and an uncertain future for the country's young population. Toddler's and college-going students could not attend schools and colleges, making them anxious and isolated. Females became more vulnerable to domestic violence due to the loss of their jobs or the job of their life partners, which forced them to stay longer at home with no involvement in other activities resulting in more conflicts[6,7]. Older individuals were neglected by the younger generation who showed signs and symptoms of depression due to isolation and confinement in the houses away from friends and society[8]. All this led to a negative psychological impact on the people in the form of mental stress, hopelessness, and panic, which eventually led to fatal outcomes.

Evidence has suggested that previous epidemics such as Influenza (2019) and SARS (2003) were also associated with a rise in deaths by suicide[9-11]. Findings of this study will also be useful in creating awareness among health professionals and public in general about the impact of pandemic and lockdown on suicides.

OBJECTIVE

To compare the pattern of suicidal deaths, (incidence, rate, numbers, percentage, age, gender, methods) in the pandemic (COVID period) and non-pandemic periods (pre-COVID period), at a tertiary care hospital in New Delhi, India.

METHODS

This was an observational comparative study done in the Department of Forensic Medicine, Atal Bihari Vajpayee Institute of Medical Sciences & Dr. Ram Manohar Lohia Hospital, New Delhi, with the objective of understanding the impact of COVID on suicidal deaths in terms of rate, proportions and methods adopted for suicide. The data was collected from the records of post-mortem reports of autopsies done between 1st April 2019 to 30th September 2019 (pre-COVID period) and 1st April 2020 to 30th September 2020 (COVID period). The same period of each year was taken to avoid any bias due to seasonal factors. The cause of death was taken as per the post-mortem reports. All post mortem examinations done during the study period were included while cases in which the cause of death was not ascertained were excluded.

Data was collected from the post mortem reports of autopsies conducted during the study periods using a checklist of variables and analysed using the Excel statistical package. The data is presented in tables, histograms, percentages along with appropriate statistical analysis. A comparison of unnatural deaths between pre-COVID period and COVID period was made using chi-square test. The incidence rate ratio (IRR), i.e., the ratio of incidence of suicidal deaths, was calculated from the ratio of incidence of suicide out of total deaths during the COVID period and the pre-COVID period.

RESULTS

Suicidal deaths vs. total deaths

During the pre-COVID period, 415 deaths were reported, of which 115 (27.71 %) were natural and 300 (72.29 %) were unnatural. During the COVID period, 305 deaths were reported of which 119 (39.02 %) were natural and 186 (60.98 %) were unnatural.

A chi-square test of independence showed that there is a significant association between manner of death during pre-COVID and COVID periods (Table 1).

Table 1: Manner of death during COVID and pre-COVID periods

Manner of death	Pre-COVID period	COVID period	Total	P-value
Natural	115 (27.7 %)	119 (39 %)	234	0.0014*
Unnatural	300 (72.3 %)	186 (61 %)	486	
Total	415 (100 %)	305 (100 %)	720	

*P-value obtained by using Pearson's chi-square test

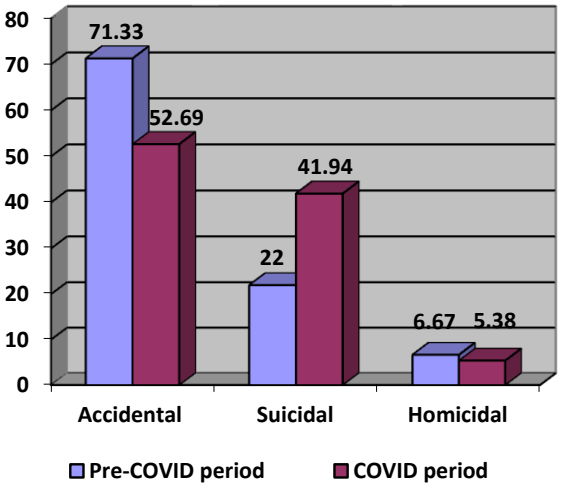

Fig. 1: Unnatural deaths during pre-COVID period and COVID period.

Of the 300 unnatural cases in pre-COVID period, 66 (22%) were suicidal deaths and 234 (78%) were other forms of unnatural deaths (accidental deaths and homicidal deaths). Of the 186 unnatural deaths in the COVID period,78 (42%) were suicidal deaths, 108 (58%) were other forms of unnatural deaths (accidental deaths and homicidal deaths). A chi-square test of independence showed that there is a significant difference between types of unnatural deaths during pre-COVID and COVID periods (Table 2).

Table 2: Comparison of suicidal deaths with other forms of unnatural deaths during COVID and pre-COVID periods

Types of unnatural deaths	Pre-COVID period	COVID period	Total	P-value
Suicidal deaths	66 (22 %)	78 (41.9 %)	144	0.0001*
Other unnatural deaths	234 (78%)	108 (58.1 %)	342	
Total	300 (100 %)	186 (100 %)	486	

*P-value obtained by using Pearson's chi-square test

Monthly variation in suicides

A monthly variation in suicides was also noted during the COVID period. As the lockdown period went on, the number of Suicidal deaths increased, with the highest number of deaths during August and September (Figure 2).

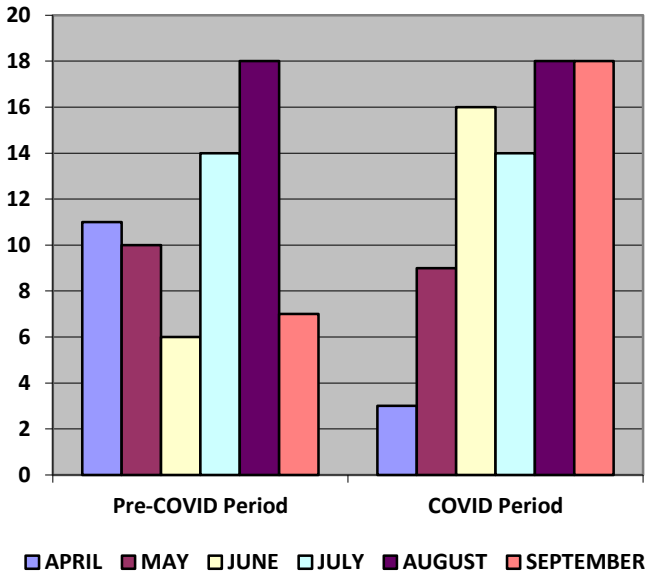

Fig. 2: Distribution of Suicidal deaths month-wise during pre-COVID and COVID periods.

Gender Variation

During the pre-COVID period, there were 66 suicidal deaths, out of which 47 were male, and 19 female, whereas, for the COVID period, there were 78 suicidal deaths out of which 56 were males, and 22 were females. An increase in percentage of suicidal deaths was observed in both the genders with male preponderance.

Male

For the pre-COVID period, Suicidal deaths among males as a percentage of total unnatural deaths (300) were 15.67% and as a percentage of total deaths (415) was 11.32%, whereas for the COVID period, Suicidal deaths among males as a percentage of total unnatural deaths (186) was 30.11%, and as a percentage of total deaths (305) was 18.36%.

Female

For the pre-COVID period, Suicidal deaths among females as a percentage of total unnatural deaths (300) is 6.33%, and as a percentage of total deaths (415) is 4.58%, whereas for the COVID period, Suicidal deaths among females as a percentage of total unnatural deaths (186) was 11.83% and as a percentage of total deaths (305) was 7.21%.

Age Distribution

It was observed that there is a general increase in Suicidal deaths in the COVID period among all age groups except for the age group of 40-50 years (Table 3). When age distribution was tabulated according to sex, it was observed that different age groups were affected differently. There was an increase in suicidal deaths in individuals less than 20 years old, among both the genders, with the earliest suicide reported at age of 16 for males and 13 years for females. In the age group of 20-30 years, there was a decrease in suicidal deaths among males while there was an increase among females. In the age group of 30-40 years, suicidal deaths increased in both the genders. In the age group of 40-50 years, suicidal deaths decreased among both males and females. Above 50 years, suicidal deaths increased among males (Table 3).

Table 3: Suicide during pre-COVID and COVID periods - Age distribution

Age group	Pre-COVID period			COVID period		
	Male	Female	Total	Male	Female	Total
<20 years	3 (6%)	3 (16%)	6 (9%)	4 (7%)	4 (19%)	8 (10%)
20-30 years	18 (38%)	8 (42%)	26 (39%)	17 (30%)	10 (45%)	27 (35%)
30-40 years	7 (15%)	3 (16%)	10 (15%)	12 (21%)	4 (18%)	16 (21%)
40-50 years	13 (28%)	4 (21%)	17 (26%)	11 (20%)	3 (14%)	14 (18%)
50-60 years	4 (9%)	1 (5%)	5 (8%)	9 (16%)	0	9 (12%)
>60 years	2 (4%)	0 (0%)	2 (3%)	3 (5%)	1 (5%)	4 (5%)
Total	**47**	**19**	**66**	**56**	**22**	**78**

Methods of committing suicide

During the pre-COVID period, out of 66 Suicides, 50 (75.76%) were due to hanging, 11 (16.67%) were due to poisoning, 4 (6.06%) were due to thermal deaths, 1 (1.52%) was due to a firearm injury. No deaths were reported due to fall from heights. During the COVID period, of a total of 78 suicidal deaths, 62 (79.49%) were due to hanging, 11 (14.10%) were due to poisoning, 3 (3.85%) were due to fall from heights, 1 (1.28%) was a thermal death, and 1 (1.28%) was due to firearm (Table 4).

Table 4: Methods of committing suicide*

Method of Suicide	Pre-COVID period	COVID period
Hanging	50 (75.8 %)	62 (79.5 %)
Fall from height	0 (0 %)	3 (3.8 %)
Poisoning	11 (16.7 %)	11 (14.1 %)
Thermal Deaths	4 (6.1 %)	1 (1.3 %)
Firearm	1 (1.5 %)	1 (1.3 %)
Total Suicidal deaths	66 (100 %)	78 (100 %)

* Use of statistics on table 4 is difficult as the numbers are too small

DISCUSSION

Various studies have been done to assess the impact of COVID on suicidal deaths throughout the world[6-7, 12-14]. Most of the studies suggested that pandemics not only caused a direct impact on the life of the person, but many indirect impacts keep harming human life for a very long period even after the passing of the pandemic.

In a study done by Calderon-Anyosa et al.[12], it was revealed how lockdown policy impacts unnatural deaths among the Peruvian population. They observed that all the types of unnatural deaths showed an immediate decline, particularly accidental deaths with a reduction of up to 12.22 and 3.55 deaths per million population for males and females, respectively. Suicidal deaths also showed a marginal drop in their study. Similar results were observed in the present study, with total unnatural deaths decreasing by 38%, although in the present study total number of suicidal deaths showed an increase of 18%.

Proportion of suicidal deaths out of total deaths in pre-COVID period is 15.9% and during COVID period is 25.6% This increase in the proportion of suicidal deaths can be attributed to absolute increase in the number of suicidal deaths along with fall in number of accidental and homicidal deaths. As Peru have a GDP per capita more than 3 times that of India, it would have better managed the impacts of pandemic, particularly financial impact. In comparison, India is a developing nation with high income inequality and a large chunk of the

population dependent on daily wages. So, the impact of COVID pandemic was more pronounced in a developing country like India than in any other part of the world.

A study by Sengupta et al.[13] to assess change in the pattern of suicidal deaths during the first month of lockdown (April) in India. As per their findings, suicidal deaths increased by about 34% and 43% during the first month of lockdown compared to the previous two months before lockdown. In contrast, in the present study there is an initial decline followed by subsequent increase in suicidal deaths (Figure 2). Results similar to present study were also observed by Tanaka T et al in their study done in Japan.[7]. The possible explanation for different observations in different studies, especially for suicidal deaths, could be that every study has unique population groups with different social and economic statuses. Also, measures taken by the government to handle the pandemic had a significant impact on the stress and depression level in the different populations and age groups. Suicide is a complex phenomenon with multiple factors involved and responsible for the person to commit suicide. Many review studies have been done to assess the psychological and social impact of COVID-19[15- 32].

Almost all the literature describes the occurrence of depression following financial insecurity, unemployment, loneliness, different types of fear (Fear of contagion, isolation, the burden for the family, etc.), and various kinds of other stresses. Committing suicide after getting tested positive of COVID were noted by various authors. Suicide committed by celebrities and role models also promoted suicidal tendencies, particularly in young persons[33]. Some literature has provided evidence of involvement of the nervous system in case of infection with the novel coronavirus (CoV) leading to neuropsychiatric manifestations[34-35]. Few studies have pointed out the involvement of the Liver and kidney due to COVID-19 infection, which can result in prolonged morbidity and hence financial and physical burden resulting in suicidal tendencies[36].

The monthly study by Ueda et al.[6] in Japan observed a decline in suicidal deaths at the initial months of pandemic followed by exceptionally increased deaths in the later months, particularly among females (IRR-1.695), i.e., approximately 70% increase in suicidal deaths. Similar findings were observed by Tanaka T et al.[7]. The present study also observed higher number of Suicidal deaths in the last two months of the COVID period. Although multiple factors could be involved, one of the possible reasons could be the stress levels that kept increasing as time passed. A study done by Hai-Xin Bo et al.[37] studied the pattern of post-traumatic stress symptoms in clinically stable COVID-19 patients. They found the presence of post-traumatic stress symptoms among more than 96% of the COVID-19 patients before discharge. These findings suggest the negative psychological impact due to COVID, affecting the quality of life and an inclination towards suicidal tendencies.

Most studies supported the findings of an increase in suicide in both the sex with higher suicide observed in females compared to males[15]. However, the present study is consistent with an increase in overall suicidal deaths, but there is slightly more increase in suicidal deaths among males compared to females (Table 3), which is consistent with the study done by Sengupta et al.[13] In every critical situation like COVID pandemic, vulnerable populations like elderly, females and children are at increased risk of getting affected. It has been observed that females suffered from adverse economic conditions and domestic violence due to job loss and financial stress of their male partner due to lockdown.

Ueda et al.[6] found that young females of less than 40 years showed a maximum increase in suicidal deaths in all age groups. Our study noted similar findings with females from 13 years to 40 years showed increased incidences of suicidal deaths in the present study population. Also, males less than 20 years showed a marginal increase in suicidal deaths. As per the periodic labour force survey (PLFS) the unemployment rate among 15 years and above increased to 20.8% for April-June 2020 and 13.2% for July-September 2020 in the urban population.[38] Industrial production declined up to 28% in the initial few months of the pandemic worldwide, with about a 40-60% decrease reported from India[39]. This resulted in a loss of livelihood and financial distress leading to increased suicidal ideation.

The least affected age groups were 40-50 years of age as they were most stable financially and did not face much impact of job loss due to savings and stable family structure. Older age individuals are affected both due to social isolation and disease conditions, leading to increased suicidal deaths in this age group. Most studies supported these findings and suggested measures to curb this issue in older individuals by a selective approach[8,15,40-42].

Hanging was suggested to be the most typical method of suicide[13] which was also found in the

present study. It can be easily understood that hanging is the easily accessible and commonest painless form of death. Falling from height for a similar reason is also an easily accessible method for suicide. Poisoning, thermal deaths, and firearm deaths showed negative association most likely due to painful nature and prolonged hospitalization.

The negative psychological impact of the pandemic as a result of loss of life of loved ones, unemployment, financial distress, fear mongering by media etc. has led to an increase in suicidal deaths. Although our government took a series of steps like Food grain scheme, direct cash transfer, movement restrictions, setting up of infrastructure for diagnosis and management of COVID, etc, we need to do more in improving mental health and enhanced social connectedness for long term mitigation. For this we need to increase the awareness and decrease the taboo regarding mental health issues among general population. This can be achieved by traditional and social media campaigns to promote mental health. Importantly the slogan for COVID prevention should be physical distancing, not social distancing, along with other universal, selective, and indicated measures for suicidal prevention[43-46].

CONCLUSION

COVID-19 was a dual pandemic causing death due to both infection and suicide. The present study provides quantitative data on the increase in suicidal deaths in both genders in different age groups.

RECOMMENDATIONS

1. Develop scientifically sound preventive strategies to mitigate morbidity and mortality associated with suicides.
2. Integrate functions of government bodies, media, social organizations, health care providers, and the public
3. Increase budgetary allocation for health, especially the mental health.
4. Develop further studies to better understand the impact of COVID on suicides in different regions.
5. Include more people under Job Guarantee schemes like MGNREGA which will lead to decreased suicide rate in times of high unemployment.
6. Promote online learning portals like SWAYAM, ATAL ACADEMY, etc to be better prepared for future job requirements.
7. Promote financial literacy in order to take effective and informed financial management decisions.

CONFLICTS OF INTEREST

There are no conflicts of interest.

ETHICAL ISSUES

None. Ethical clearance obtained from Institutional Ethical Committee of Atal Bihari Vajpayee Institute of Medical Sciences and Dr. Ram Manohar Lohia Hospital, New Delhi, India (File No. 494 (30/2021)/ IEC/ABVIMS/RMLH/529)

SOURCES OF FUNDING

None

AUTHOR CONTRIBUTIONS

YT: Project proposal and data collection; **MSM:** Data collection and analysis; **JK:** Drafting project report; **SM:** Data collection and compilation; **RKS:** Writing final project report and proofreading.

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Sri Lanka Journal of Forensic Medicine, Science & Law — 2022; 13(2):14-22
DOI: http://doi.org/10.4038/sljfmsl.v13i2.7900

RESEARCH ARTICLE

Medical ethics during COVID-19 pandemic: An experience with death investigation

Jayasinghe JMYK*, Jayasinghe JAGK, Perera WNS, Paranitharan P.
Department of Forensic Medicine, Faculty of Medicine, University of Kelaniya, Sri Lanka

ABSTRACT

Introduction : Medical ethics is a key element in the practice of medicine. This study highlights the application and conceptualization of those principles in the process of death investigation during the COVID-19 pandemic.

Objective : To identify different ethical principles and their application in death investigation during the COVID-19 pandemic.

Methodology: Autopsy information of 41 deaths from 2020-2021, which were referred for inquest with positive Polymerase Chain Reaction (PCR) test or positive rapid antigen test for COVID-19, was analysed. The death investigation process was conceptualized against the ethical principles; justice (time taken for PCR), autonomy (method of disposal and release of the dead body), beneficence, and non-maleficence (duration of illness, cause of death, Cycle threshold value of PCR etc.).

Results : Most deaths (36.59%) were between 71-80 years, with a male-female proportion of 51:48. Majority were home deaths (63.41%), while deaths of non-vaccinated people (80.49%) were predominant. PCR was done in <24 hours after death in 36.59% and within 24-48 hours in 58.54%. Comorbidities were present in 78.05%. Among the 75.61% of cases with a Cycle threshold (Ct) value of less than 30, in 83.87%, the primary cause of death was related to COVID-19 infection while the duration of illness was >3 weeks in 12.9% and 2-3 weeks in 3.23%. About 17.07% cases had a Ct value of more than 30, with COVID-19 infection being a contributory cause of death in 57.14%, while all cases had a duration of illness of <2 weeks.

Conclusion: Justice has prevailed in this cohort. The PCR report influences the autonomy in claiming and releasing the bodies to the relatives. A higher Ct value may suggest less infectivity, which may be considered when releasing the body after excluding lung changes in an autopsy. Therefore, more research is needed regarding Ct values and the infectivity of dead bodies.

Keywords: *Death investigation; ethical dilemmas; medical ethics*

Corresponding Author: Jayasinghe JMYK
yomalkajayasinghe@gmail.com
ORCID iD: https://orcid.org/0000-0002-4147-5067

ARTICLE HISTORY
Received: 07.06.2022 **Received in revised form:** 25.10.2022
Accepted: 28.10.2022 **Available online:** 16.12.2022

INTRODUCTION

Ethics is a set of standards that helps to lay the foundation for correct behaviour, which enables a person to understand and choose what is right in accordance with human, cultural, and social values[1]. Medical or clinical ethics is the use of these standards to guide medical care, treatment, and professional conduct[1]. When medical professionals encounter ethical dilemmas with no easy solutions, careful ethical analysis is useful for making decisions. These dilemmas need to be approached using ethical principles, consisting of (1) respect for patient autonomy; (2) beneficence; (3) non-

maleficence; and (4) justice. Respect for patient autonomy means that each individual patient has the right to determine which medical interventions they will accept or refuse, and the decision is made with an understanding of the circumstances and consequences of the decision, with intention, and without undue external influences. Beneficence refers to the duty of medical professionals to act in the best interests of their patients. Non-maleficence refers to the requirement to avoid harming patients. The principle of justice has two components: equity and distributive justice. Equity means the absence of disparities in the quality of medical care given to persons with like medical conditions and circumstances regardless of other nonmedical factors such as wealth and social standing. Distributive justice means that there is a moral obligation to distribute the limited resources fairly among patients[2]. Usually, ethics require a higher standard of behaviour than the law; as one can act within the law, and yet the action could be unethical[2,3].

Judicial Medical Officers assist to conduct death investigations and certify the cause and manner of unnatural and unexplained deaths such as homicides, suicides, unintentional injuries, drug-related deaths, and other deaths that are sudden or unexpected. The role of the Judicial medical officers is to decide the scope and course of a death investigation, which includes examining the body, determining whether to perform a full autopsy, and ordering other necessary investigations. Apart from the value in the field of Forensic Medicine, death investigation is emerging as a critically important tool in evaluating the quality of health care and the nation's response to pandemic situations and bioterrorism[4].

The COVID-19 pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) turned into a public health emergency of global concern causing extensive morbidity and mortality. This pandemic resulted in unprecedented challenges to governments worldwide due to the transmissibility of the virus and the scale of its impact on morbidity and mortality, healthcare systems, economies, and societies[5].

SARS-CoV-2 continues to spread, and deaths continue. The mode of transmission of the virus is thought to be largely by inhalation of infected respiratory droplets. Most patients with COVID-19 have a mild disease course. However, some develop severe disease with high mortality, which is often associated with older age, the presence of comorbidities, and immunosuppression[6-8].

The COVID-19 diagnosis is by clinical, laboratory, and radiological features. The main diagnostic tool is real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) using respiratory samples[9]. The rRT-PCR uses a fluorescence signal, which increases proportionally to the amount of amplified nucleic acid enabling accurate quantification of RNA in the sample. The cycle threshold (Ct) value; the number of cycles at which fluorescence of the PCR product is detectable over and above the background signal, is used in PCR assays to consider the COVID-19 positivity as the Ct value is thought to be inversely proportional to the viral load[10].

The COVID-19 pandemic has worsened health and social inequities with a greater impact on vulnerable and disadvantaged populations[11]. Because of the rapid spread of infection, health systems in many countries have been overwhelmed. This challenge has led health care systems to consider healthcare rationing due to scarce resources and crisis capacity[12,13].

The death investigation process has also been affected by the COVID-19 pandemic. With the increased number of deaths associated with COVID-19 infection, the medico-legal death investigation system was overburdened[7,14]. Especially in Sri Lanka, during the initial phase of the pandemic, a circular was released to conduct mandatory inquests and/or postmortem examinations on all the deaths that occurred in lockdown or high-risk areas and during the period of quarantine[15]. The whole death investigation process (from history taking to postmortem examination) changed due to the pandemic[16]. Consequently, various ethical dilemmas arose within the medico-legal death investigation system during this period.

OBJECTIVE

To identify how the principles of medical ethics (autonomy, justice, non-maleficence, and beneficence) are applied and conceptualized in the process of death investigation during the COVID-19 pandemic.

METHODS

This descriptive cross-sectional study. Autopsy information of 41 deaths brought for inquests to the Judicial Medical Office of the Colombo North Teaching Hospital, Ragama, Sri Lanka from December 2020 to October 2021, with positive rapid antigen tests (RAT) or Polymerase Chain Reaction (PCR) tests for COVID-19 was included for analysis in

this study. The COVID-19 positive deaths involving unidentified individuals were excluded.

The post-mortem reports of these 41 deaths were used to extract data. After removing the personal identifiers, socio-demographic details like age, gender, and profession, and information such as duration of illness, vaccination history, place of death, time of performance of PCR, and Ct values were collected. Further, details regarding the postmortem investigations such as type of death, method of acquisition of clinical history, available documentation of clinical history, type of autopsy conducted, cause of death, and method of conveying the information to the relatives were collected.

In order to conceptualize the application of ethical principles in death investigation, the following details were considered.

- *Justice:* Time interval between the arrival of the body at the mortuary and performance of PCR.
- *Non-maleficence* and *Beneficence*: Type of autopsy, duration of illness before death, cause of death, Ct value of the PCR test, release of body to relatives.
- *Autonomy:* Method of disposal of dead body, method used to convey information to relatives, release of dead body to relatives.

For the purpose of analysis, the cases were divided into three groups according to the Ct values of the PCR tests: Ct values less than 30, Ct values more than 30, and Ct value unknown.

Extracted data were analysed using the statistical package SPSS version 25. These data of the death investigation process of 41 deaths were used to conceptualize the ethical principles: justice, autonomy, beneficence, and non-maleficence.

RESULTS

Socio-demographic details

A total of 41 deaths were analysed. The results of the socio-demographic details like age, gender, and other information such as comorbidities, duration of illness, vaccination history, and place of death are presented.

- *Age and gender*

Most COVID-19 positive deaths have occurred in the age groups between 71-80 years (36.6%, n=15), and 61-70 years (22%, n=9). It was infrequently seen in ages between 30-50 years (n=5). None of the deaths were aged below 30 years. A less gender disproportion was seen among the cases, where males and females were almost equally distributed (male:51.2%, n=21; female:48.8%, n=20).

- *Comorbidities*

A significant number of people had comorbidities (78.05%) such as Diabetes Mellitus (39.02%), hypertension (26.8%), heart disease (12.2%), chronic kidney disease (9.8%), and malignancy (9.76%) as single or combination of diseases. Diabetes Mellitus, hypertension, heart diseases, and malignancy each were present as single comorbidities among 7 (17.1%), 1 (2.4%), 1 (2.4%), and 2 (4.9%) cases respectively, and in combination with other diseases among 9 (22.0%), 10 (24.4%), 4 (9.8%), and 2 (4.9%) cases respectively. The other comorbidities present were, cerebrovascular accidents (n=3; 7.3%), chronic live cell disease (n=1; 2.4%), Systemic Lupus Erythematosus (n=1; 2.4%), Myelofibrosis (n=1; 2.4%), respiratory diseases (e.g.: Tuberculosis, asthma) (n=3; 7.3%), and psychiatric illnesses (e.g.: Schizophrenia, depression) (n=3; 7.3%).

- *Place of death*

Deaths most commonly occurred at home (n=26, 63.41%). This was followed by hospital (n=10, 24.4%), and other places (n=5, 12.2%) such as on the way to the hospital.

- *Vaccination history*

Among the 41 deaths, a majority were non-vaccinated (n=33, 80.49%), 9.76% had received only one dose and 4 had received the 2nd dose (A two dose vaccination programme was available during that period).

Justice

To conceptualize the application of justice in death investigation, the time interval between the arrival of the body at the mortuary and performance of PCR was considered to identify any breech of equity among the cases.

- *Performance of PCR and Ct value*

After arrival at the mortuary, PCR test was done on the dead bodies in less than 24 hours, within 24-48 hours, and in more than 72 hours after death in 15 (36.59%), 24 (58.54%), and 1 (2.44%) case respectively. In only one case Rapid Antigen Test (RAT) has been performed to check for positivity. About half of the cases, the Ct value was between 11-20 (n=22, 53.7%), while 2.4% (n=1), 19.5% (n=8), and 17% (n=7) had Ct values between 1-10, 11-20, and 31-40 respectively. The remaining two deaths, which underwent PCR tests and became positive, didn't have Ct values.

Non-maleficence and beneficence

Non-maleficence and beneficence were applied in death investigation by considering the type of the autopsy, cause of death, duration of illness before death, Ct value of the PCR test of the dead body, and the release of the body to the relatives.

- *Type of autopsy:*

Due to the COVID-19 positivity in the dead bodies, the process of postmortem examination was changed during this period, where the main method of conducting the autopsy was a verbal autopsy. The verbal autopsy only was conducted in 65.85% of cases and 9.76% underwent verbal autopsy together with an external examination. In 21.95% a partial autopsy and external examination were performed. A full autopsy was conducted in only one case (Table 1).

Table 1: Type of autopsies conducted

Type of autopsy	Frequency (Percentage)
Verbal autopsy only	27 (65.8%)
Both verbal autopsy and external examination	4 (9.75%)
Both partial autopsy and external examination	9 (21.95%)
Both complete autopsy and external examination	1 (2.4%)
Total	**41**

- *Cause of death and duration of illness:*

Death directly due to COVID-19 infection was the cause of death in 63.4% of cases, while death was contributed by COVID-19 infection in 26.8%. There were 9.75% of deaths in which the COVID-19 positivity was found as an incidental finding. In 70.7% (n=29) of cases, the duration of the disease was less than two weeks, and among those cases, the majority (21.96%) had the illness for only 4-5 days before the death. There was only one case that had the illness for 2-3 weeks, and about 17.1% had suffered from the disease for more than three weeks before the death (Table 2).

- *Ct value of PCR test vs duration of illness, cause of death, comorbidities*

Studies have shown that PCR assays use 30 as the cut-off for Ct value to consider a patient positive[16,17]. In this study, there were 75.6%, 17.07%, and 7.31% of cases with Ct values less than 30, more than 30, and unknown values respectively. Within the Ct value less than 30 group, 83.87% were deaths directly due to COVID-19 infection, 9.67% of deaths had COVID-19 infection as a contributory cause and 6.45% had COVID-19 infection as an incidental finding. In this group, the illness duration was less than two weeks in 67.74%, between 2-3 weeks in 3.23%, and more than 3 weeks in 12.9% of cases. The group with a Ct value of more than 30 had COVID-19 infection being a contributory cause of death in 57.14%, while all had less than 2 weeks of illness duration (Table 2).

Table 2: Ct values vs duration of illness and cause of death

	CT Value <30	CT Value >30	Unknown	Total
Total Frequency	**31 (75.6%)**	**7 (17.07%)**	**3 (7.31%)**	**41**
Duration of Illness				
Less than 1 day	1 (3.2%)	3 (42.9%)	1 (33.3%)	5 (12.2%)
2-3 days	4 (12.9%)	2 (28.6%)	0	6 (14.6%)
4-5 days	8 (25.8%)	2 (28.6%)	0	10 (24.4%)
6-7 days	2 (6.5%)	0	0	2 (4.9%)
1-2 weeks	6 (19.4%)	0	0	6 (14.6%)
2-3 weeks	1 (3.2%)	0	0	1 (2.4%)
>3 weeks	5 (16.1%)	0	2 (66.7%)	7 (17.1%)
Not Known	4 (12.9%)	0	0	4 (9.8%)
Cause of death				
Death due to COVID-19 infection	26 (83.9%)	2 (28.6%)	2 (66.7%)	30 (73.2%)
Death contributed by COVID-19 infection	3 (9.7%)	4 (57.1%)	0	7 (17.1%)
COVID-19 infection was an incidental finding	2 (6.5%)	1 (14.3%)	1 (33.3%)	4 (9.8%)

Numerous studies have shown that the presence of comorbidities increases the severity of the disease[8]. In our study, 7 cases (17.1%) didn't have any comorbidities and in 3 people (7.3%) presence of comorbidities was not known. More than two comorbidities were present in 39.0% (n=16), and among these, 3 (18.8%) and 4 (25.5%) cases died in less than 1 day and within 2-3 days respectively since the diagnosis. The Ct value showed values less

than 30 in 10 (62.6%) and more than 30 in 6 (37.4%) cases. Patients with only one comorbidity were 36.6% (n=15), of which 86.6% (n=13) had Ct values less than 30 with a majority (n=7; 46.7%) having 4-5 days of duration of illness.

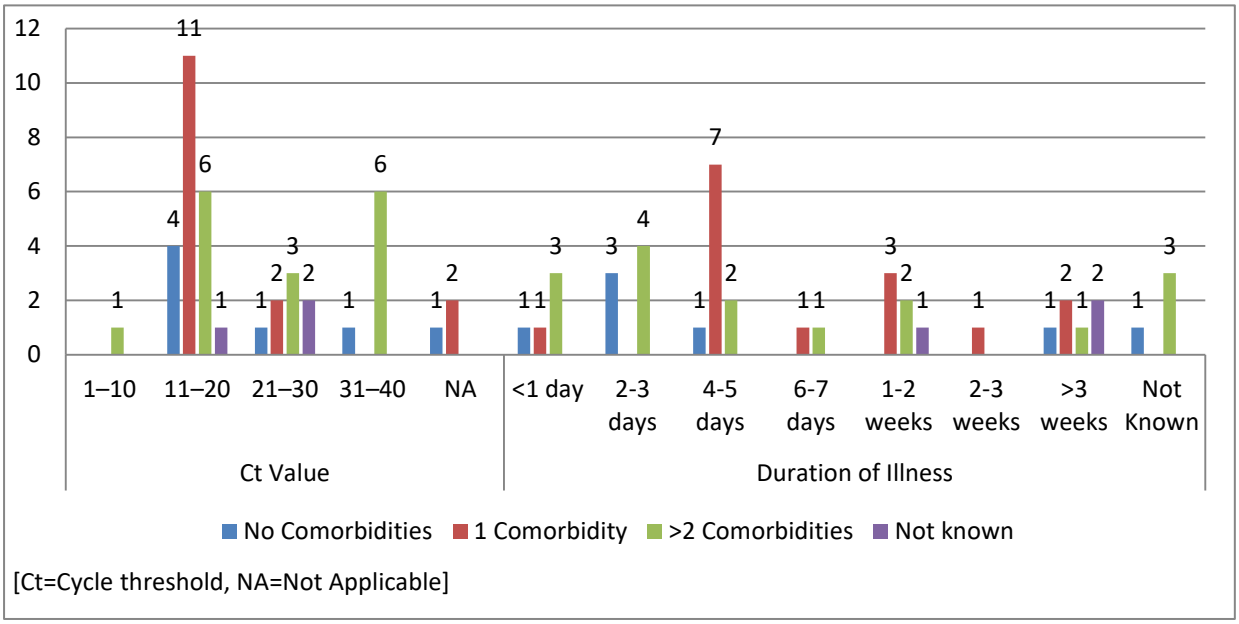

Fig. 1: Number of comorbidities vs Ct value and duration of illness

Among the Ct value less than 30 group (n=31; 75.6%), the commonest comorbidity was Diabetes Mellitus (n=10; 32.3%) as a single (n=7) or in combination (n=3) with other diseases such as hypertension, ischaemic heart diseases, malignancy, CKD etc. Most people with only Diabetes Mellitus had a duration of illness of 4-5 days (n=3; 30.0%) while when it was in combination, all had a duration of illness of 2-3 days. Only 4 people had a duration of illness for more than three weeks and among these, two (6.5%) had malignancy and ischaemic heart disease (Fig. 2).

Among the Ct value less than 30 group (n=7; 17.1%), three (42.9%) patients have had Diabetes Mellitus and hypertension together as comorbidities. All patients had a duration of illness of fewer than 5 days, while three patients (42.9%) died on the first day after the diagnosis, who had comorbidities such as Diabetes Mellitus, hypertension, end-stage renal disease, and Malignancy in combination (Fig. 3).

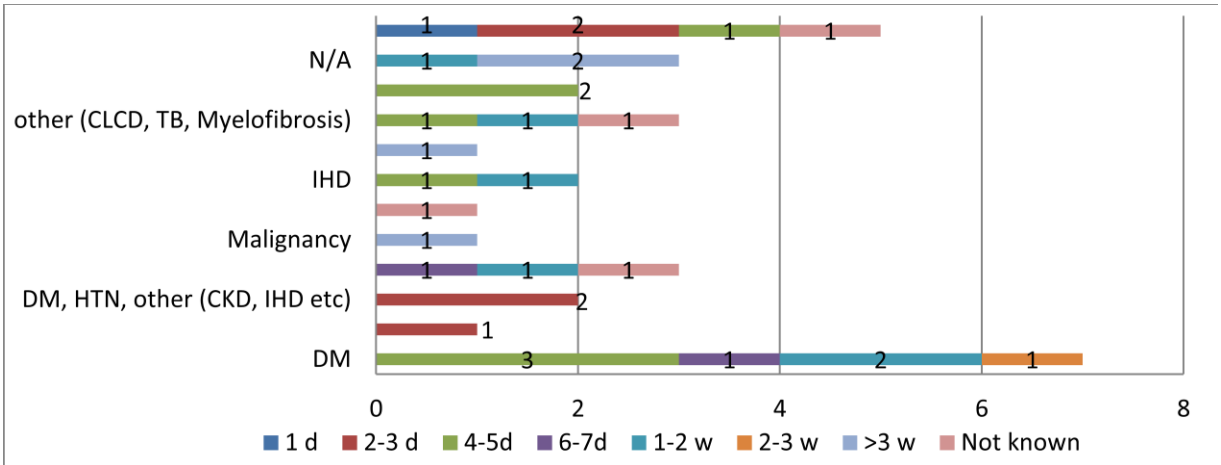

Fig. 2: Ct value <30 versus comorbidities and duration of illness
[Ct=Cycle threshold; N/A=Not known; CLCD=Chronic Liver Cell Disease; IHD=Ischaemic heart disease; HTN=Hypertension; CVA=Cerebrovascular accidents; CKD=Chronic kidney diseases; DM=Diabetes]

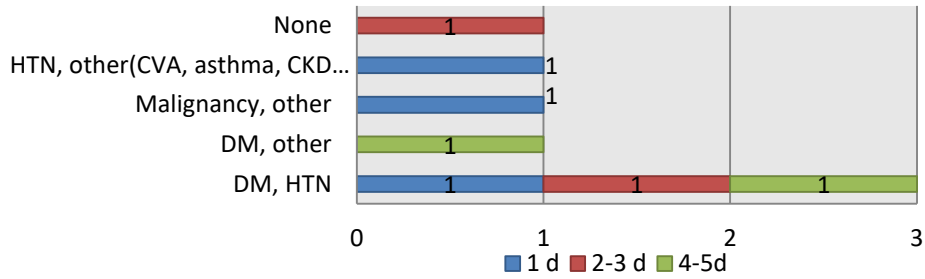

Fig. 3: Ct value >30 versus comorbidities and duration of illness
[Ct=Cycle threshold, HTN=Hypertension; CVA=Cerebrovascular accidents; CKD=Chronic kidney diseases; DM=Diabetes Mellitus]

Autonomy

Conceptualization of application of autonomy in death investigation was considered with the factors such as method of disposal of the dead body, the method used to convey information to the relatives, and the release of the dead body to the relatives. When considering the method used to convey information about the autopsy to the relatives, 53.7% (n=22) were done over the telephone since the close relatives of the deceased were quarantined, while 43.9% (n=18) were via face-to-face communication. The dead was disposed with the assistance of the Medical Office of Health as a mandatory requirement as cremation in 92.7% (n=38), while burial was done in only one case. None of the bodies were directly released to their relatives.

DISCUSSION

Ethics is one of the vital components of health and medical care in general. Medical ethics, in which clinical ethics is also included, is the application of ethical theories, principles, rules, and guidelines in clinical situations in medicine[2]. The primary goal of the application of clinical ethics is to provide the best possible care for the patient while maintaining the integrity and accountability of the treatment providers[2,19]. However, when dealing with various clinical situations, issues arise frequently, which may progress to ethical dilemmas. Possible resolutions of these dilemmas may carry both benefits and tribulations requiring careful ethical analysis of the situation[2]. The COVID-19 pandemic caused serious and distinct medical ethical issues and dilemmas in clinical practice, due to overwhelmed health systems in the countries, subsequent worsening of the health and social inequities, and health care rationing due to scarce resources and crisis capacity[11-13].

Similar to clinical practice, the medico-legal death investigation system also is subjected to ethical dilemmas, which became profound during the COVID-19 pandemic. Challenges have been raised when dealing with the dead bodies of the deceased who have been suspected or confirmed cases of COVID-19 as it imposes a series of precautions that must be taken to stop the spread of the virus among health workers, relatives of the deceased and the community. Adhering to the ethical principles; justice, autonomy, non-maleficence and beneficence, was put to test during this pandemic and in the medico-legal death investigation.

During the past couple of years, due to the COVID-19 pandemic, Judicial Medical Officers were assigned a duty to perform risk assessments in every postmortem examination for the safety of the workers[7]. In Sri Lanka, this risk assessment included the performance of rt-PCR in the dead bodies to exclude the infection. In the medico-legal context, one of the ethical principles; justice, could be applied during the performance of risk assessment in postmortem examinations, where the rt-PCR is performed on every deceased person brought to the mortuary. Justice means treating patients in a fair way[2]. The rt-PCR facilities were available in limited quantity and the time taken to perform the PCR testing may influence the time period the body was kept at the mortuary without releasing it. This affects the justice for the deceased and the relatives. In the current study, it was observed that the mandatory PCR testing of the dead bodies before post-mortem examination has been conducted in all the bodies received to the mortuary suggesting absence of discrimination. About 95.1% of the cases were tested within 48 hours after their

arrival at the mortuary. Therefore, most of the cases had received the same quality and equity during the distribution of post-mortem service, allowing justice to prevail in this cohort.

Non-maleficence is to do no harm and beneficence means to act in the best interests of the patients, professional staff, and the community[20]. The infectivity status of a COVID-19 infected body poses serious implications for these two ethical principles. Studies have reported that the dead bodies of the SARS-CoV-2 infected persons should be considered potentially infective, where the infectivity is dependent on the time interval between initial disease symptoms and the occurrence of death, virus strain, and viral load[21,22]. Thus, in this study, the conceptualization of the ethical principles; non-maleficence and beneficence in application of death investigation was done by considering the infectivity of the dead bodies. The duration of the infection prior to death is one of the decisive factors for the infectivity status[22]. According to studies, the peak of the SARS-CoV 2 viral load occurs around symptom onset persisting for about 10 days and declines within one to three weeks[5,9]. In this study, the duration of illness was taken from the day of diagnosis of COVID-19 infection by PCR or RAT tests until the death. The duration of illness prior to death in 70.7% of cases was less than 2 weeks and in 17.1% of cases more than 3 weeks. Hence, if the duration of illness was considered, the cases, in which the COVID-19 was diagnosed more than 3 weeks later, could be less infectious. Cell culture studies have reported a correlation between the viral load and the infectivity, where the samples from bodies with a Ct value less than 30 resulted in positive cell culture, whilst at a Ct value of more than 34, culture was negative[22]. In 50 % of cases, viral infection was detected in samples with a Ct value of approximately 29.5[22]. A decrease in the viral load has been shown over time during the disease phase as well. Studies have shown that the probability of culturing the virus declines to 8% in samples with a Ct value of more than 35 and to 6%, 10 days after the onset of symptoms[9]. In the current study, contrasting observations were made, where cases with a Ct value of more than 30 had a duration of illness less than two weeks, while the Ct value of less than 30 group had 67.7% with less than two weeks and 12.9% with more than three weeks. Thus, it is with caution that the Ct value and the duration of the illness should be assessed when the infectivity of a COVID-19-infected dead body is considered, as these can influence the principles of non-maleficence and beneficence with regard to relatives, professionals, and the community.

During initial periods of the pandemic, there was reluctance to perform autopsies considering the difficulty in assessing the risk of infection posed by bodies, severe shortages of personal protective equipment (PPE), and a lack of biosafety-approved mortuary facilities[7,21]. In Sri Lanka, during this period, all the deaths that occurred in a lockdown or high-risk areas and during the period of quarantine underwent mandatory inquests and/or postmortem examinations, where post-mortem investigation methods which were different to the routine process were applied; such as no examination, external examinations, verbal autopsy or partial autopsy.[15,16]. In the current study, verbal autopsy alone was done in 65.9% of cases, external examination and partial autopsy in 22% and a full autopsy was performed in one case.

Funeral procedures of potentially infected bodies imposed particular concerns on the authorities regarding safety of the individual and the community, where adherence on non-maleficence and beneficence were considered in a difficult decision-making process. Open casket burials, ritual washing, and embalming of the deceased, which are common in some cultures and religions were not permitted in many countries, and in some countries, the preferred method for disposal was cremation by electrical or CNG (Compressed natural gas)-run crematoria[21,23]. Similarly, in Sri Lanka, during the initial period, the government issued a circular restricting the release of the COVID-19 infected bodies to relatives and the burial of the bodies, leading to mandatory cremation.[16]. Accordingly, in this study, it was observed that 92.7% of the bodies were disposed of by means of cremation, and only one body had undergone burial due to acceptable reasons. Further, in the current study sample, none of the bodies were released to the relatives to be taken home to conduct the funeral procedures as they wished limiting autonomy of the individuals.

Restrictions placed by authorities on visiting and release of dead bodies to their relatives, burial procedures, and funeral procedures, was to safeguard the community from the possible infectiousness of the COVID-19 infected bodies, adhering to the ethical principles of non-maleficence and beneficence. However, it often conflicts with the ethical principle of autonomy of the patient and the relatives, as they also have the freedom, to decide for themselves, and receive the body of their loved one. Thus, one of the ethical dilemmas in this situation is to balance respect for individual freedom and right, in this context the relatives' autonomy, and liberty with the responsibility of authorities to provide their citizens with some degree of

protection, which amounts to non-maleficence and beneficence[24].

In the course of time, the release of a body to relatives was allowed in Sri Lanka, even with a positive PCR test, based on the duration of illness from the initial diagnosis[25]. This was allowed during the evolution of the death investigation process in a pandemic situation considering the less infective status of the human body with prolonged illness and to address the concerns of the relatives of the deceased, under strict health guidelines. Considering the observations made by the current study, even with more than 3 weeks of illness, the Ct value could be less than 30 indicating a high viral load, posing an uncertainty in the infectiousness of the dead body. However, the most recent guidelines allow the PCR positive bodies to be cremated or buried at a place of choice by the relatives under strict health guidelines allowing autonomy, beneficence, and non-maleficence to fairly prevail within the community[26].

The application of ethical principles in death investigation is a formidable challenge during pandemic situations. Health authorities in any country take a lead to formulate guidelines considering the best interest of their citizens in disposing of the dead. Multidisciplinary teamwork, sharing of experiences among each other in managing the dead, and validating the investigative procedures are some of the recommendations the authors would like to propose for the future.

In this study, only the experience of investigators at one medico-legal unit is used limiting the generalization of the results. The Ct values of the PCR tests may show differences based on the sampling technique, transportation, investigative procedure, and equipment, and the Ct values which were more than 30 were not cross-checked in all cases with lung findings to confirm or exclude pneumonic changes.

CONCLUSION

Justice has prevailed in the study sample with regard to PCR testing of dead bodies. Contrasting observations concerning infectivity were made in majority, influencing the non-maleficence and beneficence. The Ct values of more than 30 were not supported with longer than 3 weeks of duration of illness, while some cases had cause of death relating to COVID-19 infection with less than 30 Ct value and longer than 3 weeks of illness duration. Thus, the ethical principles of non-maleficence, beneficence and autonomy with regard to receiving of the bodies by relatives was practiced with caution. Consequently, multiple factors need to be addressed to satisfy the ethical principles in death investigation during pandemic states.

CONFLICT OF INTEREST

There are no conflicts of interest.

ETHICAL ISSUES

The postmortem reports considered were of cases investigated by the authors of this study and data was extracted and analysed by trained assistants. The data of individuals especially concerning identity was never recorded or stored at any stage of this study.

SOURCES OF SUPPORT

None

AUTHOR CONTRIBUTIONS

JMYKJ: Acquisition and analysis of work, interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; **JAGKJ:** Acquisition and analysis of work, interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; **WNSP:** Conception or designing of the work, acquisition of work, interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; **PP:** Conception or designing of the work, acquisition of work, interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published.

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Sri Lanka Journal of Forensic Medicine, Science & Law — 2022; 13(2):23-27
DOI: http://doi.org/10.4038/sljfmsl.v13i2.7908

CASE REPORT

Homicide over the superstition of practising black magic: A case report

Singh R*, Pramod K
Department of Forensic Medicine, Guru Gobind Singh Medical College, Faridkot, Punjab, India

ABSTRACT

Introduction: Killing of people practicing or suspected of practicing black magic which is also known as "witch-hunting" is not uncommon in India. People believe that any tragedy or misfortune that may befall them like, damaged crops, epidemics, sudden and unexplained deaths of children is the work of evil 'witches'. We report a case where a person was murdered due to the belief that he was practicing black magic or witchcraft.

Case report: A dead body of a 60-year-old male was brought by the police for autopsy to a tertiary care center. It was alleged that he was assaulted by a sharp weapon. The alleged assailant was the neighbor of the deceased who believed that the deceased used black magic to cause the death of his four year old child a few months before. Autopsy revealed multiple incised wounds mainly on the back of the head, with compound fracture of occipital bone leading to intracranial and intracerebral bleeding.

Conclusion: This case illustrates a homicide caused by superstition as a motive. Multiple sharp blows to the head, proves adequate intention and knowledge by the accused to kill. As this kind of belief or superstition about black magic is more prevalent in less educated persons, the need arises to raise awareness about witchcraft and other superstitious activities. We propose that it can be included as a subject in schools to change the beliefs of society on superstition and related activities.

Keywords: *Delusions; homicide; magic; superstitions; witch*

Corresponding Author: Singh
Rravdeepsingh011@gmail.com
ORCID iD: https://orcid.org/0000-0001-5437-2107

ARTICLE HISTORY
Received: 07.08.2022 **Received in revised form:** 31.10.2022
Accepted: 22.11.2022 **Available online:** 16.12.2022

INTRODUCTION

Witchcraft is a religious practice of using black magic or sorcery in which evil souls are called upon by carrying out some rituals sanctioned by religious scriptures. It is the practice and belief in magical abilities. The one who practices witchcraft is called a witch or wizard. Different regions of the world have different beliefs and practices which are specific to these regions[1]. The modern world has eliminated many of the dangers faced by previous generations, but basic human concerns about health, relationships and wealth remain. The origin of superstition can be ignorance and illiteracy when reality is replaced by false beliefs[2].

There is common conviction that sickness and other tragic events are related to witchcraft. As a result, persons who are identified as being responsible for such activity are at risk of being murdered. These practices and beliefs are mostly prevalent in rural areas where poor financial conditions lead to strained human relations, and where most illnesses cannot be explained[3]. Many individuals are inclined to to believe that any catastrophe or incident that may befall them like, damaged crops, epidemics, sudden and the unexplained death of children are due the work of a 'witch'. The killing of people practicing or suspected of using black magic is known as witch-hunting. The targets of witch-hunting are mostly

middle-aged widows, elderly women, single women, or sometimes lonely women who are left behind due to the death of men. Witch-hunting in India is not so uncommon[1].

Although India is a fast-growing economy, Most of the population is still poor, and Indians, whether educated or not, often rely on superstition to cure illness, find love, and rationalize disasters. Those who are accused of being "dayans" or witches in India can be tortured, raped, murdered or burned alive. Victims are often single elderly women, but can also be men or children[4].

We hereby present a case in which a person was murdered in the belief that he is practicing black magic or witchcraft.

CASE REPORT

A body of a 60 year old male was brought by police for autopsy to a tertiary care center. It was alleged that deceased was physically assaulted by sharp weapons. As per the police inquest papers and history given by the relatives of the deceased the accused was the neighbour of the deceased. It was divulged that he believed that the deceased used witchcraft and black magic that caused illness of his four year old child who died after a few months. Acting on this belief, he was filled with rage which led him to murder of the victim a few days later. The incident took place in broad day light in a busy market where a heavy sharp weapon 'Gandasa' (Fig 1) was used for the assault.

Fig. 1: The "Gandasa"

The 'Gandasa' is an instrument which has a heavy weight metal blade with a sharp edge and wooden handle which is used in the cultivation of crops. Following the assault the accused and his accompanying friend fled from the scene. The victim was taken to a nearby hospital by bystanders, where he was declared dead in admission. Police was informed and the case was registered under section 302 of Indian penal code.

Autopsy revealed a, moderately built and moderately nourished male, wearing a full sleeved shirt, formal pants and underwear. Both pants and shirt were blood and mud stained. An old deformity of the left lower limb was present. On external examination it was observed that the main focus of the assailant was on the upper body parts mainly head and face. There were multiple deep incised wounds over back of head with tailing (Fig 2). The left ear pinna was cut (Fig 3).

Fig. 2: Back of head, showing multiple incised wounds (white arrows), tailing in different directions and crisscrossing of wounds

Fig. 3: Lateral view of head, showing cut injury to left pinna and haemorrhage from ear canal.

Deep incised wound extending to the bone was present over the outer aspect of left elbow joint (Fig. 4) and another incised wound was seen on the front of left wrist joint (Fig. 5)

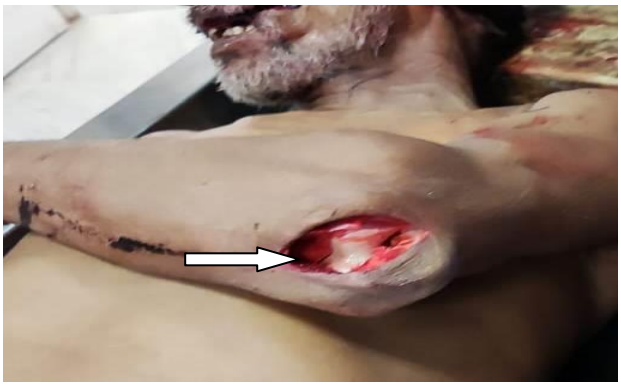

Fig. 4: Posterior and outer aspect of left elbow joint, showing deep incised wound involving underlying bones.

Fig. 5: Anterior aspect of left wrist joint, showing deep slash cut, exposing bones (defense injury)

It was determined that all injuries were caused by a sharp blade of a heavy weapon. The head was the main target of violence and had received multiple slash cut injuries which were found to be overlapping each other and tailing in different directions. On dissection, the multiple fractures of the occipital bone were noted. Dura matter was intact and bulging, which on removal showed diffuse subdural and subarachnoid hemorrhage over left parietooccipital region. Petrous part of left temporal bone, left elbow and left wrist joint were exposed. On Internal examination visceral organs were pale and within the normal range in weight. The stomach contained about 100 ml of clear fluid with no peculiar odor. Multiple head injuries had resulted in death.

DISCUSSION

Lack of education is considered to be one of the main reasons of superstitions[5]. In India, however, educated people have also adhered to beliefs that could be considered superstitions[6]. These superstitious beliefs can range from harmless practices to ward off the evil eye to serious issues like burning of so called witches[7]. A person, especially of the female gender, may be considered a witch who acquires some supernatural power. It is assumed that black magic or witchcraft is used for evil and selfish purposes and to perform superstitious practices to destroy someone physically or mentally. Today, despite human civilizations having progressed this far, some societies are riddled in ignorance and superstition. There has been change in the pattern of attacks on so called witches, where previously women were targeted. However, in recent years the attacks are focused on entire families, even if only one member is accused[1].

The belief of witchcraft took a violent turn into witch-hunting. Witch-hunting had been prevalent even in early modern Europe and colonial America. The worst was seen in Salem witch trials in United States and Suffolk trials of Europe during the fifteenth to eighteenth Centuries, when many women were put to death. The practice of witch-hunting is prevalent in India from ancient times and innumerable women have been killed. Caste and the Brahmanical patriarchal mindset of society are considered to be the cause of the phenomenon of witch-hunting in India[8]. The three-stage process of witch-hunting involves accusation, declaration, and persecution. Accusation involves 'accusing women of harm that occurred, such as the death of any person, child or animal, any disease in the village, natural disaster, or crop loss'. The woman is declared as a "witch" and persecuted[9].

Throughout history "witches" have been executed by hanging, drowning and burning. Even today many persons around the globe are accused of "witchcraft" and persecuted with both genders being at risk[10]. Those who are identified as "witches" are therefore at risk of being murdered. It is mostly seen in poverty stricken rural areas where many bodily illnesses remain unexplained. Illiteracy is a key issue that is related to witchcraft and killing of "witches"[11].

The data published by the national crime bureau of India, revealed 29,272 cases of murders during the year of 2021 in India where the most common motive was 'disputes' (n=9,765, 33.3%) followed by 'personal vendetta or enmity' (n=3782, 12.9%). Disputes included land disputes, family dispute, petty disputes etc. However, only in 0.23% of cases the motive was an allegation of black magic or witchcraft[12]. On the contrary in a study done by Das

Gupta et al. in 1983 reported revenge as the main reason for homicide[13]. Although there is an increased trend of using firearms[14] in homicides earlier studies have shown that blunt and sharp weapons are more common for inflicting fatal injuries to head. Blunt weapon being the commonest weapon of choice[15]. In the case presented the back of the head was the main target. The assailant belonged to a poor socioeconomic background and came from a rural area where superstitions are more prevalent. He had a suspicion that his neighbor was using black magic to harm his child. The suspicion was confirmed the day his child died. Over time his superstitious beliefs led him to openly blame his neighbour for causing the death of his child. The father of the child used a heavy sharp weapon to assault the victim. The attack mutilated the head and face of the victim who sustained multiple incised wounds. The deformed limb of the victim made it difficult for him to escape and call for help. The assailant did not show any remorse when apprehended by the police and affirmed that he needed to take revenge for performing black magic. Delusions in the assailant were of the persecutory type which decreased inhibitions in order to perform horrendous criminal acts[11].

The apex court of India has recommended that in cases of offences carrying capital punishment material regarding psychiatric and psychological evaluation of the accused should be preferably collected beforehand. This type of psychological evaluation will provide a baseline, to evaluate the progress of the accused towards reformation, achieved amid imprisonment time and this will also help to establish proximity (in terms of timeline) by studying the accused person's frame of mind (or mental illness, if any). Besides this, the top court also recommended that trial courts should in a time-bound manner, collect additional information pertaining to the accused, which includes age, early and present family background, type and level of education, socioeconomic background, criminal antecedents, income and the kind of employment and other factors such as the history of unstable social behavior, or mental or psychological ailments. This information should mandatorily be available to the trial court.[16]

The psychological evaluation in this case is unfortunately not available as police failed to get the same done. The reason for this could be lack of knowledge on the part of the investigating officer.

CONCLUSION

Superstition is an irrational belief on an object, action and circumstances which is due to false interpretations of natural events. As this kind of belief or superstition about black magic is more prevalent in less educated and backward classes, there is need to raise awareness about superstitious behaviours. It may be prudent to include it as a subject in schools to change the perceptions and beliefs of society. "Witch-hunting" is a gross violation of human rights, which affects livelihoods, property, personal security, social dignity, and the right to life of victims and families. The intention of such malicious acts being delusions should not be overlooked by police and the psychological evaluation of such persons is an important aspect when investigating such crimes.

CONFLICTS OF INTEREST

There are no conflicts of interest.

ETHICAL ISSUES

None

SOURCES OF SUPPORT

None

AUTHOR CONTRIBUTIONS

RS: Drafting of the manuscript, supervision and finalizing; **KP:** Editing manuscript and reporting autopsy findings.

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Sri Lanka Journal of Forensic Medicine, Science & Law — 2022; 13(2):28-30
DOI: http://doi.org/10.4038/sljfmsl.v13i2.7902

POINT OF VIEW

'Artificial Wombs' replacing medical termination of pregnancy and rights: A point of view

Rathnayake AP*
Faculty of Law, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

ABSTRACT

One of the emerging scientific ventures in the world is the development of artificial gestation of human beings and the Artificial Womb Technology (AWT). This technology supports women who are unable to bear natural pregnancy to procreate. This process has been praised by scientists in view of its contribution to the reproductive process and its purview to act as an alternative to medical termination of pregnancy. The emerging technology has its own pros and cons. The first argument against the Artificial Womb is the fact that, it collides with the reproductive autonomy of women. The positivity of such a venture is signified only in the instances where it is used as a choice but not as a compulsory alternative to a reproductive health right of termination of pregnancy. The substitution of Artificial Womb as a substitute for the termination of pregnancy causes serious predicaments to women in countries with highly restrictive abortion laws where they are compelled to end up with a forced pregnancy. The Author has discussed international and domestic legal frameworks. As the concluding perspective, the author has recognized the fact that, women are entitled to the right of physical integrity, autonomous decision making and unique rights relating to pregnancy namely right not to procreate with the right to genetic privacy. If a technology compels a woman to continue a physical condition which she does not want to continue, that amounts to 'involuntary servitude' and a derogation of international human rights law.

Keywords: Artificial Womb; human rights; involuntary servitude; reproductive autonomy; termination of pregnancy

Corresponding Author: Rathnayake AP
ayodhya.rathnayake@kdu.ac.lk
ORCID iD: https://orcid.org/0000-0003-3674-7280

ARTICLE HISTORY
Received: 10.07.2022 **Received in revised form:** 19.09.2022
Accepted: 09.10.2022 **Available online:** 16.12.2022

INTRODUCTION

The artificial gestation of humans has been developing as a newest scientific venture in the world[1]. In the context of the advanced medical technologies, the scholars argue that artificial wombs are advantageous to women with damaged wombs which are unable to conceive and carry fetuses. Such women are deprived of the capability of bearing children[1]. In addition to this, the artificial womb is considered as enabling the preterm babies to exist by acting as an incubator[1]. In the eyes of advancing scientific word, the artificial womb becomes imperative, due to the fact that, such a technology improves the reproductive success. This contention on the part of proponents to the artificial wombs is criticized by opponents stating that, technology diminishes the value of the woman.

ARTIFICIAL WOMB TECHNOLOGY AND THE WOMEN

Reproduction being a natural and a unique instinct of the women is replaced by the machines. The invent of artificial wombs becomes a positive influence on women only in instances where it becomes an empowering choice [1-2]. However, the technology is developed as a mode which facilitates the *ex utero* gestation of the fetus. The proponents'

argument in favour of the technology is that, it alleviates the burden of women is negated by the view of the opponents that it amounts to forced pregnancy[3]. The acceptance of Artificial Womb Technology (AWT) by the countries with less restrictive abortion laws will be different when compared to the countries with highly restrictive abortion laws. In the former instance, an artificial womb demarcates a liberal approach whereas in latter instances, the women will be overburdened with a forced pregnancy either naturally or artificially. The scholars argue on the fact that, artificial wombs have the power of challenging the defences of abortion based on the arguments on protecting bodily autonomy[5]. This stands to an instance where the arguments are based on the contention that, pregnant woman could have transferred the fetus to an artificial womb instead of choosing termination[5].

PERSPECTIVE IN LIGHT OF INTERNATIONAL LAW

13th Amendment to the Constitution of United States of America (USA), signifies the unconstitutionality of the involuntary servitude. The concept of 'Involuntary Servitude' is a component of international human rights and it is considered an instance where the personal service of one man is disposed of or coerced for another's benefit. Article 8 of the International Covenant on Civil and Political Rights (ICCPR) stand on the abolition of slavery and emphatically states that, no one is forced to produce labour. If a woman is compelled to continue an unwanted pregnancy, that clearly amounts to involuntary servitude. Thus, if the Artificial Womb Technology (AWT) is used an instrument to force women to continue unwanted pregnancy, that amounts to violation of the international human rights law. Further, the development of human ectogenesis is labelled as a process with different implications for clinical practice as well[6]. This is owing to the fact that; it imposes risk on the fetus and exerts pressure on pregnant women to undergo experimental or invasive procedures[6].

THE BUNDLE OF WOMEN RIGHTS

In the notion of pro-life proponents, fetus is entitled to the inalienable right to life. Pro- choice proponents emphasize on the bodily autonomy & physical integrity of the women. Further, the power of taking autonomous decisions is recognized as an imperative facet of the right to privacy[1]. However, right to terminate pregnancy has different facets of rights entitled to by women namely right not to be a mother, right not to create a child and the right to genetic privacy[3-4].

Right not to be a mother specifically stands for the protection of physical and emotional interests affected during the pregnancy[4]. In addition to this, the interests which will be affected by giving birth to a child and personal intimacy are protected by the right not to be a mother. Right not to create a child has a scientific ground in depth. There are instances where women reluctant to procreate and reproduce with her own genetic materials. In such an instance, the forced procreation causes in emotional harm. Right not to create a child predominantly re-emphasizes the right to genetic privacy [3-4]. When taken as a whole, Reproductive Rights of a woman are considered as newest personal non property rights of the fourth generation. This clearly shows that, the reproductive rights are closer to the inalienable right to life, dignity and personal integrity[7].

THE CONCLUDING PERSPECTIVE

The use of AWT in the countries with restrictive abortion laws must not be considered as an alternative to the pregnancy. The reason is that, such a technology imposes an additional burden on the women to bear a pregnancy which she is not willing or bound to continue. It amounts to the violation of rights entitled to by women whereas such rights are unique. The physical integrity of the woman includes her autonomy and the bodily independence. Reproductive rights resemble an individual's entitlement to control own reproduction. The right not to be a mother, right to genetic privacy are prominent among the unique rights. Thus, the use of AWT as an assisted technology, not as an alternative does not violate the international law.

CONFLICTS OF INTEREST

There are no conflicts of interest.

ETHICAL ISSUES

None.

SOURCES OF FUNDING

None

AUTHOR CONTRIBUTIONS

APR: Conception and design of the work, acquisition, analysis, and interpretation of data for the work and drafting the work or revising it critically for important intellectual content.

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Sri Lanka Journal of Forensic Medicine, Science & Law — 2022; 13(2):31-34
DOI: http://doi.org/10.4038/sljfmsl.v13i2.7901

CONTENTIOUS ISSUES

Beneficence on unborn patients treated in wombs vs. autonomy of pregnant women: A legal standpoint

Rathnayake AP
Faculty of Law, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

ABSTRACT

The 21st century marked increased emphasis on fetal rights which has resulted in the development of advanced medical procedures such as fetal surgery. Fetal surgery has been considered as a starting point of the maternal – fetal conflict owing to the fact that it involves two patients; the fetus and mother. Recognition of fetal patients has caused controversies in the field of law when determining issues pertaining to medical negligence and pre- birth injury. Legal scholars argue on the fact of imposing medical malpractice liability on physicians when fetal patients are injured during surgery. In addition, the "glorification" of the fetus while considering the termination of pregnancy as a secondary option is disputed by feminists. The reason is that, the termination of pregnancy signifies bodily independence of women and autonomy. The author, in this article has adapted a qualitative approach of methodology with a normative and content analysis. The author has discussed primary and secondary sources of law including foreign domestic legislations namely the Abortion Act 1967 (amended by the Human Fertilization and Embryology Act 1990) in the United Kingdom, The Offences against Persons Act 1861 and The Infant Life Preservation Act 1929. The central focus of the article is on the United Kingdom as an illustrative jurisdiction. The basic focus of this article is directed to study whether there is a conflict of rights between fetal patients and pregnant women in the face of the law of tort, medical law and ethics and to suggest the incorporation of the 'Two-Patient Model' to balance conflicting interests while discussing the Chervenak and McCullough's ethical framework.

Keywords: *Fetal patients; jurisdiction; medical negligence; pregnant women; pre-birth injury*

Corresponding Author: Rathnayake AP
ayodhya.rathnayake@kdu.ac.lk
ORCID iD: https://orcid.org/0000-0003-3674-7280

ARTICLE HISTORY
Received: 24.06.2022 **Received in revised form:** 16.10.2022
Accepted: 04.12.2022 **Available online:** 16.12.2022

INTRODUCTION

The developments in modern medicine marked a significant recognition of fetal rights. The recognition of fetal rights with the disciplines of fetal medicine & antenatal imaging have supported the concept of fetal intervention or fetal surgery[1]. The invent of the procedures of fetal surgery has labelled both the mother and fetus as patients[1]. The concept of the fetal patient has resulted in the maternal- fetal conflict[2]. The evolution of fetal rights commenced from the criminalization of abortion and the institution of litigation related to the tort of medical negligence on pre-birth injury[3]. Identification of fetal personhood and the independence of the fetus was the foundation for the conflict in existence[4]. Accordingly, the protection of rights of one entity would cause diminishing or undermining of the rights of the other entity. This study specifically focusses on the evolution of fetal rights with the development of medical interventions, resulting in the maternal & fetal conflict. The discussion throughout the article particularly focusses on the conflict existing between fetal and maternal rights resulting in infringement on self- rule or autonomy of the pregnant woman.

The methodology adopted in the study is qualitative in nature and predominantly takes the form of a normative study. Thus, it is a literature review with analysis of primary and secondary sources of law. The primary sources of law mainly represent domestic legal instruments while the secondary sources of law are texts, publications and legal dictionaries. In addition to the use of secondary legal sources, the study addresses the topic in reference to a specific jurisdiction. The author's focus is directed to the jurisdiction of United Kingdom (UK). The focus on the position in UK clearly depicts the evolution of fetal rights and legislative developments.

DISCUSSION

As specified previously, the term 'fetus' has been subjected to a lengthy process of evolution with a simultaneous development of rights. At the commencement the fetus was glorified amidst religious views. The status of the fetus was improved and its importance was further emphasized with advancements in medicine and technology[1]. Criminalization of termination of pregnancy resulted in abortion being considered as a conduct which contravenes the criminal law. However, due to increasing protests from feminists, abortion is considered as a procedure which shall be exercised as a life preserving option in the light of women's rights. In Sri Lanka, the termination of pregnancy is allowed to save the life of the pregnant woman, on medically established grounds and the law on abortion is rigid[5]. Restrictive abortion laws results in the glorification of the status of the fetus whereas in jurisdictions with non- restrictive abortion laws there is conflict with fetal interests. Fetal intervention as a step forward from the termination of pregnancy has emerged as a tremendous advancement in medical treatment. Fetal intervention is primarily governed by medical negligence frameworks[11].

However, taboos have been imposed by the law of tort which recognized cases related to medical negligence which was subsequently extended for the benefit of the fetus in instances of pre- birth injury[3]. The field of fetal interventions have clinical significance. Interventions are performed considering the fetus as an organ of the mother[11]. Treatment of the fetus grants patienthood to the fetus thereby resulting in the award of independent rights of personhood. If interventions have a negative impact on the mother this gives rise to the maternal - fetal conflict. This simply implies the fact that, granting of patienthood to the fetus has the very effect of placing undue burden on the mother to act in a selfless way and to live for the unborn child.

Fetal intervention sometimes take the form of in utero treatment. In case of fetal surgery, the lower abdomen of the pregnant mother is incised in order to gain access to the fetus[6]. The procedure resembles the caesarean operation but the at the end of fetal surgery, the woman will be still pregnant. This poses the question of physical integrity of the pregnant woman while considering the fetus as a being interconnected to the body of the mother. In Texas, USA a fetus was subjected to a surgery to cure a tumor in as early as 2016[3]. This was done at the Texas Children's Fetal Center to treat spina bifida[16].

As in most jurisdictions world-wide, the status of the fetus is not optimistic. It was axiomatic in the context of English Law that, no legal personhood can be attributed to the fetus until birth[7]. The Offences against Persons Act 1861 specified that, abortion & termination of pregnancy is a crime which was subject to prosecution[8]. Subsequent to this, the Infant Life Preservation Act 1929 identified that, it is a crime to kill or destroy a child who is capable of being born alive[9]. The 'child 'as denoted in this Act does not indicate a child who is capable of surviving independently of the mother. The Abortion Act 1967 (amended by the Human Fertilization and Embryology Act 1990) was enacted with the purpose of formalizing lawful abortions in UK[10]. In the context of United Kingdom, the fetal intervention is governed by the frameworks of medical negligence. Awarding the fetus patienthood has clearly evaded the concern on psychological matters pertain to the pregnant woman. The opponents to prenatal therapy insist, higher emphasis on fetal intervention has a compulsive effect on the pregnant woman to consider the fetus as a born baby[11]. This is marked as a point where the maternal autonomy is considered diminutive. Such a stance clearly depicts the foundation of the maternal – fetal conflict. The diminution of maternal autonomy does amount to the contravention of women's rights. The British Medical Association (BMA) has further recognized fetal pain, where it specifically held that, the fetus can feel pain after 24 weeks of gestation[12]. This was proven by medical evidence where it was revealed that, in certain stages of gestation, the fetuses respond to stimuli. The perception of fetal pain before viability results in creating tension in the context of medical practice and medical ethics namely beneficence and non- maleficence[13].

The current developments show that, fetal surgery has become a valuable mode of treatment where the imposition of taboos would deprive the fetus from the benefits and positive fetal outcomes. Thus, it is seen as indirectly affecting the familial & psychosocial aspects of the pregnant woman. However, it can otherwise be argued that, bearing child has a societal & psychological burden on the pregnant woman.

In the context of fetal surgery related conceptualizations, two models have been identified namely the one-patient model and two-patient model[14]. In the one-patient model, it considers the mother as the sole patient. The fetus is considered fully dependent on the mother for survival and development. In this context, the pregnant woman's decision and consent are prioritized. In the two-patient model, the fetus is recognized as a separate entity entitled to clinical interests different from those of the mother[14]. The autonomous choices of the pregnant woman are disregarded in the context of the two-patient model and the model is criticized for jeopardizing the interests of the pregnant woman.

There is a doubt as to what extent fetal surgery affects the laws governing the maternal and fetal relationship. The imputation of patienthood to a fetus resembles the conferring of personhood to the fetus[15]. This demarcates an instance where two individual right holders occupy the same human body. The fetal personhood brings forth an idea of turning women into 'ambulatory wombs'[15]. However, the performance of a surgery to a fetus necessitates the consent of the pregnant woman.

Two-patient model involves in balancing interests. This model identifies the pregnant woman and fetus as two separate patients whose interests may conflict. This necessitates the doctors to balance the obligations towards each. In Chervenak & McCullough's ethical framework, it is explained that a human being becomes a patient, when it is presented to the physician for medical care and when there exist clinical benefits over clinical harms[14]. In this context, the recognition of fetus as a patient is dependent on the very competence of the physician to provide treatment and the choice of the pregnant woman to present it for medical care[14]. The particular model provides the autonomy for women to decide the patienthood of the fetus. Simultaneously, it confers dependent moral status to the fetus[14].

CONCLUSION

Advent of the 21st century marked a significant rise in fetal rights. The advancements of medical technology introduced fetal interventions for the benefit of the fetus. Among the improvements in the disciplines of fetal medicine, fetal physiology & ultra sound technology, the fetus has been identified as an entity with different sensory perceptions who has the capacity to respond stimuli. Fetal surgery is one of such interventions, which facilitates the treatment of the fetus within the womb. Treating the fetus awards the patienthood, which signifies traits of legal personhood. This marks the beginning of the maternal- fetal conflict. Scholars argue that, treating the fetal patient within the womb itself contravenes the physical integrity of the mother and development of assisted reproductive technologies manifestly negates the rights of women. Medical treatment is developed and extended beyond the established standards. The innovations in the context of fetal medicine and surgery should be encouraged and they necessitate the development of institutional ethical guidelines before practice. Two-patient model which considers both pregnant woman and fetus as patients balances the interests of both. There, the pregnant woman confers dependent moral status to the fetus by taking over the autonomous decision making power to present the latter for medical care. This process establishes the fact that, doctors owe an obligation of beneficence to the fetus and an obligation of autonomy and beneficence to the pregnant woman.

CONFLICTS OF INTEREST

There are no conflicts of interest.

ETHICAL ISSUES

None.

SOURCES OF FUNDING

None.

AUTHOR CONTRIBUTIONS

APR: Conception and design of the work, acquisition, analysis, and interpretation of data for the work and drafting the work or revising it critically for important intellectual content.

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Journal article

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Conference paper

Patrias K. Computer - compatible writing and editing. Paper presented at: Interacting with the digital environment. 46th Annual Meeting of the Council of Science Editors; 2003 May 3-6; Pittsburgh, PA.

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Faculty of Medicine, University of Peradeniya,
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