


*Original Research***A Five-Year Retrospective Study on Medico-Legal Aspects of Unidentified Decedents Brought to A Tertiary Care Centre in India**Ajith Antony^{1a}  0000-0001-5333-0175, Dr. Sheryl Suares^{2b}, Dr. André Victor Fernandes^{3b}**Abstract**

Dubbed as a disaster in disguise, the death of the unidentified is now a global problem. The present study aims to shed light upon the patterns and trends of unidentified deaths in a state in India while suggesting solutions to “preventable” deaths. During the study period, 8.96% of the bodies brought to the morgue for autopsy were unidentified. Majority were males and belonged to the age group of 41-50 years. Most deaths were natural and preventable, with pulmonary predominance. Chronic alcoholism, poor mental health, and unhygienic living conditions were major risk factors. The importance of DNA fingerprinting in the identification process is stressed. Analysis of monthly and seasonal variation of death shows higher death rates during summer and winter season, but an insignificant monthly correlation. The trends thus generated may prove to be an asset while developing and implementing policies centered on preventing deaths as well as achieving identification of the ‘John’ and ‘Jane Does’ brought to the morgue.

Keywords: identification; homeless persons; natural deaths; unidentified decedents; DNA; pulmonary; mental health

© 2025 Karnataka Medico Legal Society. All rights reserved.

Introduction:

Death of unidentified people is a disaster in disguise¹. The United States had reported a staggering figure of more than 40,000 unidentified human remains that are held in evidence rooms without a closure². Every unidentified decedent brought to the morgue is a true test of the forensic pathologist’s skill and command over the subject, especially if the entire body is unearched, or if skeletonized, not the entire skeletal system is available for assessment. It is their duty to opine on the cause, the manner and the nature of death, for which autopsy findings alone might not suffice.

Vast majority of the unidentified cases comprises of homeless people, especially the mentally challenged who are abandoned by their families³, and are open to both environmental and criminal assault⁴. Their niche plays a dual role of the prey and the perpetrator of crime, with the lack of basic amenities being the main reason cited for their criminal behaviour³. Even in well-developed countries such as the USA, Germany, Canada and Australia, the prevalence of mental disorders have been reported to be more than 80-95% in the homeless population. The nature of illness varies in each country, but the general spectrum of mental disorders in this population can be attributed to depressive illness, psychotic disorders, substance abuse, and schizophrenia among other disorders of affect and personality⁵.

Regardless of multiple studies related to unknown deaths, we still lack data for implementing better policies and ensuring

¹Senior resident, ²Assistant lecturer, ³Professor, Department of Forensic Medicine & Toxicology, ^aJubilee Mission Medical College, East Fort, Thrissur, Kerala, ^bGoa Medical College, Bambolim, Goa.
Correspondence: Dr. Sheryl Suares
Email: suares87sheryl@gmail.com
Contact: +919359723425

Received on 25.02.2025

Accepted on 15.03.2025

the overall benefit of this population. The present study strives to provide a better estimate of the number of annual unidentified deaths brought to a tertiary care centre in Goa, India, and to identify demographic and pathological characteristics associated with the same. Moreover, this study also strives to determine the geographical, seasonal and temporal variability, and to shed light upon the efficiency of the identification system.

Materials and methods:

The present study is a five-year retrospective study conducted from January 2011 to December 2015 at the Department of Forensic Medicine and Toxicology of Goa Medical College (GMC), India. All the unidentified cases that were brought for autopsy to the morgue during this period were included in this study. Details regarding the decedents were obtained from the police inquest reports, autopsy reports and other relevant hospital records. The final data collected was then tabulated and statistically analyzed.

Descriptive analysis was carried out to check for distribution of cases based on age, sex, area, time, season and organ system involved in the natural causes of death. Bar-charts were used to observe the yearly trends in unidentified patients brought to the morgue and pie diagrams to check for frequency of various methods of identification used.

To check for monthly trends, number of cases per month (a quantitative variable) and each month (a qualitative variable) was arranged in a 13-columned matrix, assigning binary numerical values (0 and 1) to months. Regression analysis was performed with cases per month (CPM) as dependent variable and each month as an independent variable. To check for seasonal variation, local climate data was perused to

delineate the months in each season and the cases per season was checked against the individual seasons using the same method.

Results:

Out of the 6408 autopsies conducted, the number of unidentified deaths totalled to 574 (8.96%) with a mean of 114.8(SD=15.12) cases per year and 9.56(SD=2.26) cases per month. Highest number of cases ($n=135$) was witnessed in the year 2011 (Figure 1) and lowest in 2013 ($n=102$). As seen in Table 1, the age group belonging to 41-50 years showed the highest number of cases ($n=172$), which is almost similar to the age group of 31-40 ($n=168$). Male sex showed almost absolute predominance (Table 2), comprising of 92.86% of the cases. Figure 2 shows the area wise distribution of cases.

Age group	Number of cases	Percentage
<1 year	3	0.53
1-10	0	0
11-20	0	0
21-30	53	9.24
31-40	168	29.27
41-50	172	29.97
51-60	105	18.3
above 60	52	9.06
N/A	21	3.66
Total	574	100

Table 1: Age distribution of unidentified cases

Sex	No. of cases	Percentage
Male	533	92.86
Female	30	5.23
Undetermined	11	1.92
Total	574	100

Table 2: Sex distribution of unidentified cases

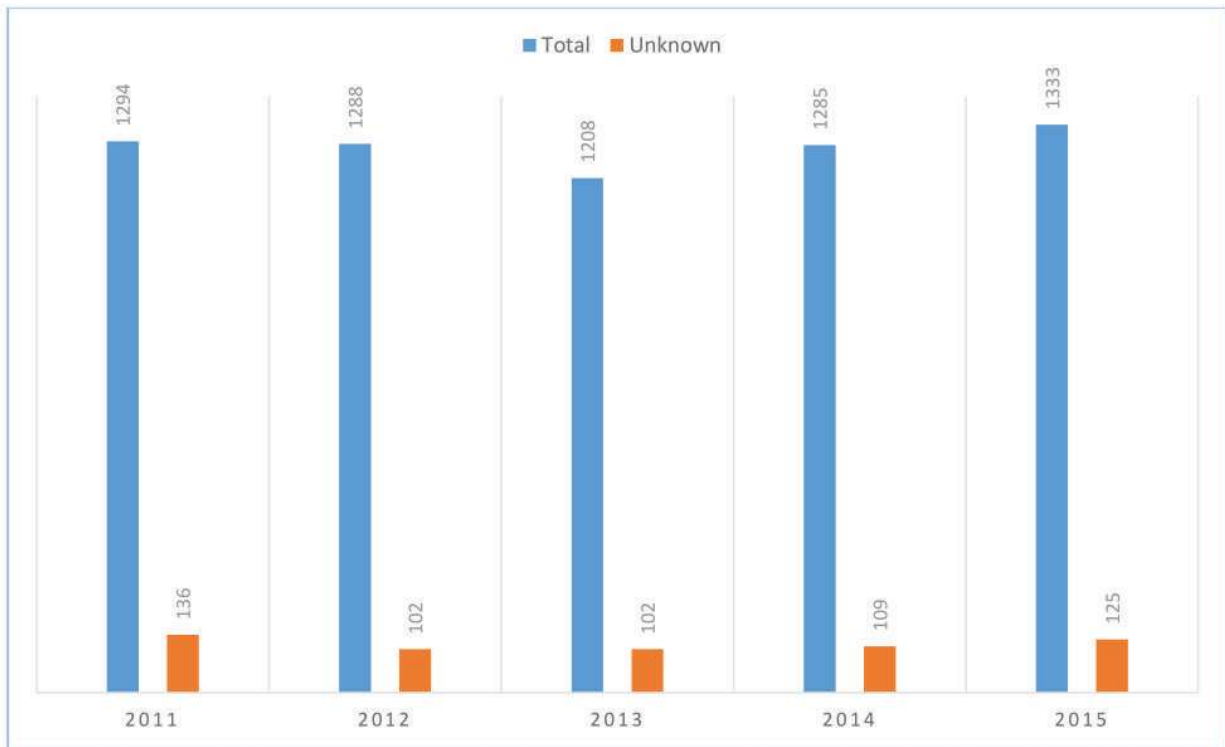


Figure 1: Distribution of unidentified cases. The highest number of cases brought to the morgue was during the year 2015 ($n=1333$), whereas the highest number of unidentified dead bodies brought to the morgue was during the year 2011 ($n=135$)

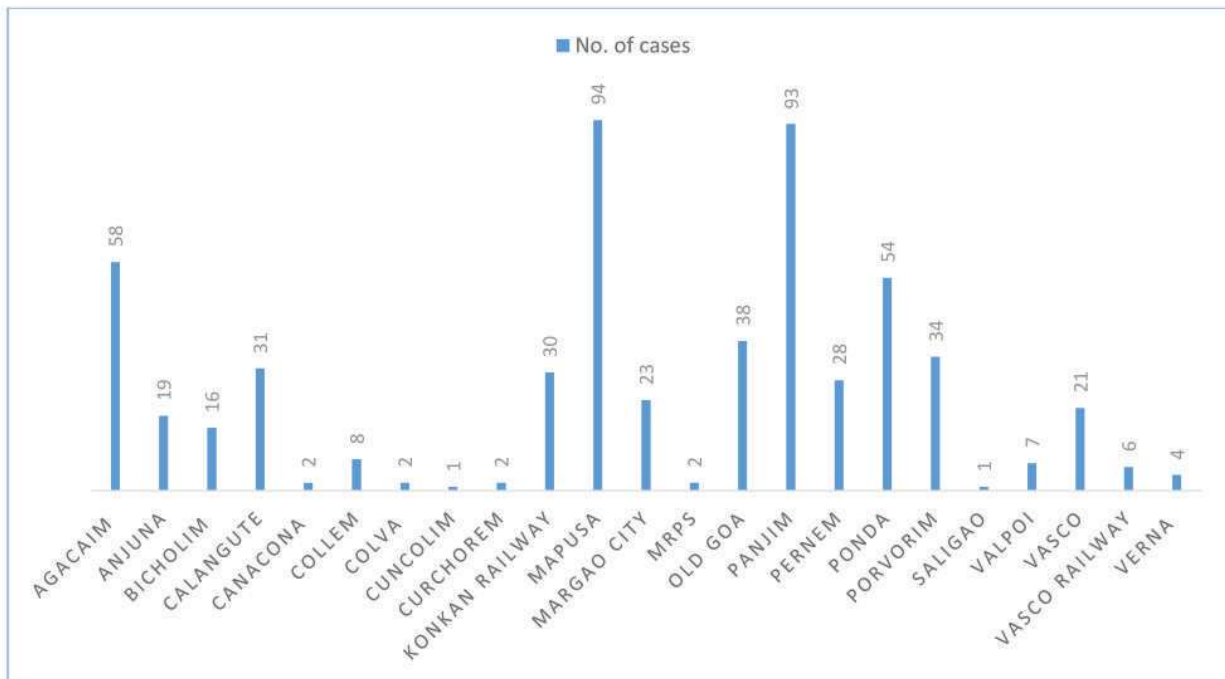


Figure 2: Area-based distribution of unidentified cases. Mapusa ($n=94$) and Panjim ($n=93$) areas had maximum cases whereas Cuncolim and Saligao regions had the least ($n=1$).

Month	No. of unidentified cases					Total	Percentage	Correlation
	2011	2012	2013	2014	2015			
January	12	11	13	11	12	59	10.28	0.3018
February	13	11	8	10	11	53	9.24	0.1396
March	11	8	8	9	15	51	8.89	0.0856
April	10	11	9	9	7	46	8.02	-0.0495
May	12	9	10	12	13	56	9.76	0.2207
June	10	9	7	7	11	44	7.67	-0.1036
July	12	7	6	10	7	42	7.32	-0.1576
August	13	7	9	8	8	45	7.84	-0.0766
September	13	8	8	9	6	44	7.67	-0.1036
October	11	6	8	6	12	43	7.5	-0.1306
November	8	5	7	9	10	39	6.8	-0.2387
December	11	10	9	9	13	52	9.06	0.1126

Table 3: Monthly distribution of unidentified deaths and its correlation to each month over the span of five years

Season	2011		2012		2013		2014		2015		Avg. death rate (n/m)
	n	n/m	n	n/m	n	n/m	n	n/m	n	n/m	
Summer	33	11	28	9.33	27	10	30	10	35	11.7	10.2
Monsoon	59	11.8	37	7.4	38	8	40	8	44	8.8	8.72
Winter	44	11	37	9.25	37	9.25	39	9.75	46	11.5	10.15
Summer: March-May, Monsoon: June-October, Winter: November-February.											

Table 4: Seasonal distribution of unidentified cases (n) and cases per month (n/m) over a period of five years

In the monthly distribution of deaths (Table 3), January showed the highest number of cases (10.27%) and November had least (6.8%). Regression analysis performed on monthly data revealed $R=0.53$ and $R^2=0.28$ but was statistically insignificant (P -value=0.093). When arranged according to seasonal data (Table 4), summer showed the highest death rate (mean=10.2 CPM), comparable to winter (mean=10.15 CPM), whereas monsoon had the least with 8.72 CPM. Regression analysis revealed a good correlation, with $R=0.72$, $R^2=0.52$, and the same was statistically significant (P -value=0.037).

At least 42.86% comprised of natural deaths, with maximum of pulmonary pathologies (59.35%) and a minimum of renal pathologies (0.41%) causing the

deaths (Table 5). Among methods of identification used (Figure 3), visual methods (62%) proved to be the most useful followed by DNA fingerprinting (31%).

Discussion:

Death of the unidentified is dubbed as “nation’s silent mass disaster” in the United States², with 9.7 per 10 million people and a declining trend⁶, and the state of affairs is not too different in India. The poor and homeless people contribute most to this niche, with higher rates of mortality and morbidities^{1,7}. A study conducted in Ireland shows that homeless people suffer from more morbid conditions than their counterparts in general population⁸. The age adjusted annual mortality rate was 3.5

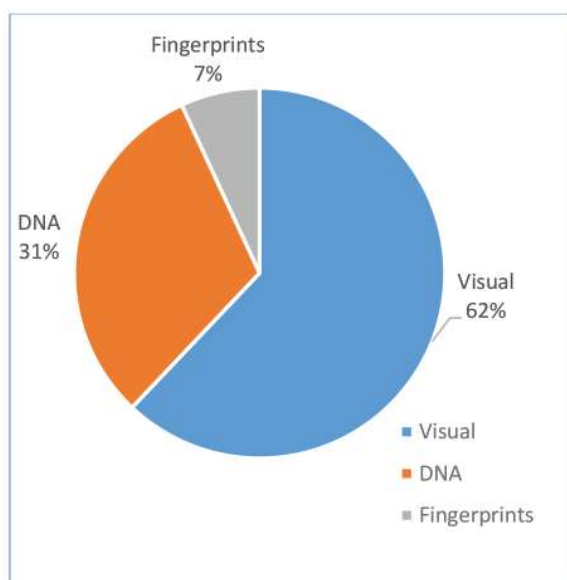


Figure 3: Methods of Identification. Visual method of identification by photographs proved to be the most efficient in the current setting ($n=18$), not due to the inherent effectiveness of this method, but due to the limitations of DNA analysis in the current scenario. DNA, however, proved to be the second-best method available ($n=9$).

System	No. of Cases	Percentage
CNS	15	6.1
Cardiac	15	6.1
Lung	146	59.35
Renal	1	0.41
Liver	14	5.7
GIT	6	2.44
Unspecified	49	19.92
Total	246	100

Table 5: Distribution of natural causes of death in relation to body systems

niche, with higher rates of mortality and times higher among the homeless people of Philadelphia, with similar statistics in Boston and Georgia⁹⁻¹¹. Though we could not ascertain the exact numbers, majority of cases from the present study did belong to the homeless population and were beggars.

The total number of unidentified comprised of about 8.96% ($n=574$) of the total autopsies conducted ($n=6408$). The yearly distribution of the number of unidentified cases, when compared with the total number of autopsies conducted, does not show any particular trend as such (Figure 1).

Age has been observed to have a relation to the unidentified death. As the age progresses the risk of contracting diseases increases, and so does the propensity for unnatural causes of death such as suicide, owing to the decline in physical and mental performance¹². Moreover, the elderly population is an easy prey for the infectious diseases. It is also believed that the age group between 25-50 years is the most mobile in terms of social, economic or any other reason. Majority of the cases in the present study ($n=172$; 29.97%) fell in the age group of 41-50 years (Table 1), which resonates with a study conducted in Istanbul (27.95%)¹³. This is further supported by the observations made by multiple Indian studies^{7,12,14}.

Male predominance ranging from 80-90% have been observed in various international studies^{4,6,13}. Similar studies conducted in India ranged showed 69-87% of male deaths^{1,7,15}. Another South Indian study showed similar results, with male preponderance in adults and female predominance in infants¹⁶, the latter being attributed to the societal attitude towards the girl child, which has a skewed perception towards the female gender as a "burden" to the family¹⁷. The present study too, shows a significant proportion of males (92.8%) among the unidentified decedents (Table 2), which is in accordance with Indian as well as international studies. However, only one female was present among the unidentified infant deaths ($n=3$), contrasting the South Indian study.

Furthermore, the average Indian family is patriarchal, with males as breadwinners. The likelihood of a lower socioeconomic class female to venture off far away from

home in search of financial or career prospects is less. Goa being a rapidly developing state and an international tourist destination attracts immigrant men for labor. The fact that most of these unidentified decedents were brought from Mapusa and Panjim areas support this (Figure 2), since the former is a booming tourist destination with a plethora of beaches and resorts, and the latter is the capital of the state.

Chronic consumption of alcohol seems to be yet another important risk factor in the death of unknown. About one-third of the total deaths in Russia are claimed to be alcohol-related in some manner¹⁸. In the present study too, majority of homeless people and beggars had a history of chronic alcoholism, with autopsy revealing alcohol-related liver diseases in about 14% of cases. *Feni*, the romanticized local alcoholic beverage of Goa, is available at prices comparable to a bottle of mineral water. Cheap and ready availability of the same could be one reason why the homeless folk tend to flock towards alcoholism in Goa.

Local climate causing hypothermia and hyperthermia also contribute to the death of the unknown individuals. Attempts have been made to correlate the seasonal variation to the death in unknown persons, though its congruency stands in the shadow of debate. A Russian study emphasizes on the direct relationship between the extreme cold weather and number of deaths among the unidentified¹⁹. However, 53% of deaths occurred during summer months in Philadelphia¹⁰, whereas in Istanbul¹³ maximum deaths occurred during the winters. Studies conducted in Northern India point to an increase in unknown deaths during the July-September period, where 'monsoon' season is at its peak in that region¹⁵.

In the present study, these deaths are concentrated towards the months of January, May and February (Table 3). Both summers and winters had an almost equivalent death rate (Table 4). Hence, the

extremes of temperature do hold a certain degree of complicity in the deaths of homeless and the beggars in Goa. Winters also promote acute respiratory infections like influenza and pneumonia, which when untreated translates to high lethality. There was no statistically significant correlation observed on monthly death rates, however, there was a good correlation observed among seasonal data ($R=0.72$, $R^2=0.52$, $P\text{-value}<0.05$) thereby proving that a seasonal trend exists within the dataset.

Another plausible explanation for climatic influence given in the literature so far is the seasonal variation of tuberculosis, which tend to spike towards the spring and summer seasons²⁰. India takes the lead in the incidence of tuberculosis (TB) as well as Multidrug-resistant TB on a global level²¹. In the current study, although pulmonary pathologies happen to be the predominant cause of death (Table 5), death due to documented tuberculosis was a relatively less in number, comprising of 5.7% of all natural deaths ($n=246$) and 2.44% of total unidentified deaths ($n=574$). The importance of natural causes of death among the unknown is remarkable. At least 42.86% of the total autopsied cases comes under the bracket of natural diseases in the present study, which is consistent with various national and international studies^{7,15,22-24}, which leans towards pulmonary pathologies. Inarguably, the unhygienic conditions in which the homeless and the destitute live, forms a breeding ground to various pathogens that result in pulmonary diseases. Chronic illnesses or morbid diseases (e.g., cancer, diabetes, etc.) accounted for lesser deaths among the unidentified decedents, although with the caveat that the homeless population probably do not live long enough to contract the same.

Contrastingly, a study conducted in Chandigarh showed craniocerebral damage to be the most common cause of death¹². Only 12.7% of the deaths resulted from craniocerebral damage in the current study.

A North Indian study showed accident as most common manner of deaths⁷ whereas a French study revealed suicide to be the major cause of death²⁵. In both these studies, natural causes stand third, which was a contradiction to the present study.

About half of the unnatural deaths in our study could be attributed to accidental manner, which concurs the other North Indian studies^{7,15}. Homicides, if confirmed, pertained mainly to ligature strangulation followed by stab wounds, contrasting with international studies wherein firearm injuries formed the majority²⁵. Stringent laws and regulations that surround the licensing and use of firearms in India prevents high rate of firearm deaths.

Many of the unidentified deaths turns into cold cases that remain unsolved due to various reasons. Out of the total unidentified people ($n=574$) in the present study, only 29 cases were identified post-autopsy, which accounts 5.32% of total deaths. About 95% of the cases are still unidentified, or if identified, they were not brought to notification of the department. Among the methods used for identification, visual means proved to be the most efficient in our study (Figure 3), with 62% of the identified cases belonging to this method. About 31% of the identified cases made use of DNA analysis. Fingerprint analysis (7%) was the least used method.

A major chunk of the study population involved homeless people, mostly beggars and the destitute. Since their personal, past, and family history are virtually impossible to obtain in a practical sense, this study relies heavily upon the information furnished by the investigating officer. Hence, the accuracy of data relies upon the credibility of the information thus obtained. Furthermore, this study was conducted in the GMC, North Goa, which receives relatively lesser number of cases from the South Goa district. Hence, the epidemiological parameters cannot be generalized to the entire state or country.

Conclusion

The present study highlights the burden of deaths among the unidentified people brought to GMC morgue. Majority of these deaths were natural and preventable, belonging to the homeless class with a male preponderance, occurring during summer and winter seasons with a strong seasonal trend. It is pertinent to note that the homeless population is a part of the country too, and adequate measures need to be implemented to ensure the provision of bare minimum amenities like food, clothing and shelter.

Public health intervention strategies along with provision of temporary shelters and emergency kits during unfavorable weather conditions are efficient, yet exhaustive methods to bring down the preventable deaths. Promotion of mental health needs to be stressed, not only in the homeless, but also in families with a mentally challenged patient. Care should be taken to remove any social and economic barriers by providing opportunities for work and rehabilitation.

Solving the case of an unidentified decedent should be less reliant on “breakthroughs” and sheer luck, requiring a paradigm shift towards scientific methods. As of now, DNA fingerprinting is utilized as a tool of the last resort, and bringing DNA analysis to the forefront is crucial. This also staves off the use of certain mutilating, if not barbaric, procedures like the preservation of finger pulps for retaining the prints, a practice that is still prevalent in certain Indian institutions²².

Suggestions include training of medical, and law officers, creating DNA databases and formation of an index system for reference, encouraging DNA sample collection from the decedents and supplying of DNA sampling kits. There is also an obvious shortage of data regarding the magnitude of this “silent disaster,” which necessitates the promotion of further studies in this field.

Conflicts of interest/Competing

interests: None to declare.

Funding: The authors did not receive support from any organization for the submitted work.

Ethical permission: Obtained from Institutional Ethics Committee.

References:

1. Chattopadhyay S, Shee B, Sukul B. Unidentified bodies in autopsy – A disaster in disguise. *Egyptian Journal of Forensic Sciences* 2013; 3: 112–115.
2. Ritter N. Missing Persons and Unidentified Remains: The Nation's Silent Mass Disaster. *National Institute of Justice Journal* 2007; 2–7.
3. Roy L, Crocker AG, Nicholls TL, et al. Criminal behavior and victimization among homeless individuals with severe mental illness: A systematic review. *Psychiatric Services* 2014; 65: 739–750.
4. Büyük Y, Üzün I, Eke M, et al. Homeless deaths in Istanbul, Turkey. *Journal of Forensic and Legal Medicine* 2008; 15: 318–321.
5. Martens WH. A review of physical and mental health in homeless persons. *Public health reviews* 2001; 29: 13–33.
6. Paulozzi LJ, Cox CS, Williams DD, et al. John and Jane Doe: The epidemiology of unidentified decedents. *Journal of Forensic Sciences* 2008; 53: 922–927.
7. Kumar S, Verma AK, Ali W, et al. Homeless and unclaimed persons' deaths in north India (Jan 2008–Nov 2012): A retrospective study. *Medicine, Science and the Law* 2015; 55: 11–15.
8. Gelberg L, Linn LS. Assessing the Physical Health of Homeless Adults. *JAMA* 1989; 262: 1973–1979.
9. Hwang SW, Orav EJ, O'Connell JJ, et al. Causes of death in homeless adults in Boston. *Annals of Internal Medicine* 1997; 126: 625–628.
10. Hibbs JR, Benner L, Klugman L, et al. Mortality in a Cohort of Homeless Adults in Philadelphia. *New England Journal of Medicine* 1994; 331: 304–309.
11. Hanzlick R, Smith GP. Identification of the unidentified deceased: Turnaround times, methods, and demographics in Fulton County, Georgia. *American Journal of Forensic Medicine and Pathology* 2006; 27: 79–84.
12. Kumar A, Harish D, Chavali K, et al. Patterns of Cause of Death in Unknown Dead Bodies A Three Year Study in a Tertiary Care Hospital. *Journal of Indian Academy of Forensic Medicine & Toxicology* 2012; 34: 304–308.
13. Altun G, Yilmaz A, Azmak D. Deaths among homeless people in Istanbul. *Forensic Science International* 1999; 99: 143–147.
14. Kumar A, Dasari H, Singh A. Cause of Death in “John Doe & Jane Doe”: A 5 year review. *Journal of clinical and diagnostic research : JCDR* 2014; 8: IE01–IE04.
15. Kumar A, Lalwani S, Behera C, et al. Deaths of homeless unclaimed persons in south delhi (2001-2005): a retrospective review. *Medicine, Science and the Law* 2009; 49: 46–50.
16. Job C. Determination of cause of death in decomposed bodies-A regional study . *Journal of Indian Academy of Forensic Medicine* 2009; 31: 11–17.
17. Ansari S. “Born to Die”. Female infanticide and Feticide: An Analysis of India.
18. Nemtsov A v. Alcohol-related human losses in Russia in the 1980s and 1990s. *Addiction* 2002; 97: 1413–1425.
19. Andreev E, Pridemore W, Shkolnikov V, et al. An investigation of the growing number of deaths of unidentified people in Russia. *The European Journal of Public Health*, 18(3), 252-257.

- European journal of public health* 2008; 18: 252–257.
20. Fares A. Seasonality of Tuberculosis. *Journal of global infectious diseases* 2011; 3: 46–55.
21. World Health Organisation. Tuberculosis, <https://www.who.int/news-room/fact-sheets/detail/tuberculosis> (2020, accessed May 3, 2021).
22. Wankhede NM, Parchake MB, Pathak H, et al. Study of demographic profile of unidentified dead bodies in central Mumbai region. *Scholars Journal of Applied Medical Sciences (SJAM)* 2017; 5: 57–61.
23. Ohsaka T, Sakai Y, Kuroda K, et al. [A survey of deaths of homeless people in Osaka City]. *Nihon Koshu Eisei Zasshi* 2003; 50: 686–689.
24. Snyder LD, Eisner MD. Obstructive lung disease among the urban homeless. *Chest* 2004; 125: 1719–1725.
25. Cavard S, Alvarez JC, de Mazancourt P, et al. Forensic and police identification of “X” bodies. A 6-years French experience. *Forensic Science International* 2011; 204: 139–143.