

SUDDEN UNEXPECTED DEATH SYNDROME AMONG MIGRANT LABOURERS IN NORTH KERALA- AN AUTOPSY-BASED STUDY

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ABSTRACT

BACKGROUND

Death among migrant labourers without a definite diagnosis even after autopsy and ancillary investigations is a real challenge for health system in Kerala. Most of the deaths were during night, having similar history and autopsy findings. We wanted to assess sudden and unexpected death among the migrant labourers to identify the common findings and risk factors if any.

METHODS

Study included all cases of sudden and unexpected death among the migrant labourers brought for medicolegal autopsy at Department of Forensic Medicine, Govt. Medical College Kozhikode during the period of 5 years (2011 April-2016 March).

RESULTS

42 cases were studied. Most of them (59.5%) were young adults. 31 (73.8%) cases were those of recently migrated labourers (within 0-6 months). 29 (69.0%) cases were without a definite opinion as to cause of death. Among these 29 cases, some common findings were detected. 29 (100%) showed pulmonary oedema, 28 (96.5%) showed froth in the air passages and 27 (93.1%) showed flabbiness of heart.

CONCLUSIONS

Majority of the cases concluded without a post-mortem diagnosis. Risk factors like exhaustive work, recent migration and substance abuse were seen in all cases. Common autopsy findings such as froth in air passages, pulmonary oedema and flabbiness of heart correlated with the characteristic features of 'Sudden Arrhythmic Death Syndrome.

KEYWORDS

Sudden Death, Sudden Arrhythmic Death Syndrome, Migrant Labourers, Pulmonary Oedema and Obscure Autopsy

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BACKGROUND

In the recent years there is a large inflow of migrant labourers to Kerala from different parts of the country especially from states such as West Bengal, Bihar, Uttar Pradesh, Assam, Jharkhand and Orissa. Higher wages for unskilled labour in the state, large opportunities for employment and shortage of local labourers has led to massive influx of migrant labourers to the state. Overcrowded living conditions, poor sanitation facilities, unhygienic living conditions make this population vulnerable to a wide array of unique health issues.

Unfortunately, so many deaths have been reported among this population recently. Most of the deaths were sudden and unexpected in nature and have similarities in the

history such as being found dead or brought dead into the hospital following chest discomfort or breathing difficulty during sleep. Majority of the decedents were young healthy adults without any pre-existing illness. Autopsy often reveals no positive findings except pulmonary oedema and minor pathology in the heart which are not sufficient to cause death in an ordinary course of nature. In these cases, as the histopathological findings often being unremarkable and chemical analysis reported negatively, a definite opinion as to cause of death cannot be ascertained.

'Sudden Unexpected Death Syndrome' can be defined as sudden and unexpected termination of life of an apparently healthy individual due to some natural causes. Emphasis is placed on the unexpected character rather than the suddenness of the death.¹ The terminology of sudden unexpected death syndrome was coined to report sudden unexplained nocturnal death among young apparently healthy adult Laotian, Cambodian, and Vietnamese refugees in USA 1981.² The causes of sudden death in young people vary, about two thirds of the death is due to cardiac abnormality. Ventricular arrhythmias precipitating cardiac arrest are the most common mechanism of sudden death.³ Over the past two decades a large number of inherited arrhythmic syndromes that cause sudden death have been reported. Some are associated with structural heart diseases

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such as hypertrophic cardiomyopathy and arrhythmogenic right ventricular cardiomyopathy. Other do not produce structural heart disease most are due to inherited abnormalities of cardiac ion channels such as long QT syndrome, familial catecholaminergic polymorphic ventricular tachycardia and Brugada syndrome.⁴ Shortness of breath or chest pain may be a sign that the person is at risk of sudden cardiac death.⁵ Unfavourable working conditions, exhaustive works and substance abuse can have an important role in these cases. The demographics of such cases have not been well defined and there is a need for uniform terminology and data collection to make the reporting more accurate and credible. A detailed evaluation and combined assessment of the findings were conducted to find out common aetiology and pathogenesis on these cases. So, the present study aiming to assess sudden and unexpected death among the migrant labourers to identify the common findings and risk factors if any.

Aims and Objectives

1. To assess all sudden and unexpected death cases among the migrant labourers during the period of 5 years.
2. To identify the common findings.
3. To classify the cases according to the opinion furnished in the post-mortem reports.
4. To evaluate the frequent findings to find out aetiology and risk factors.

METHODS

Study included all cases of sudden and unexpected death among the migrant labourers brought for medico legal autopsy at Department of Forensic Medicine, Govt. Medical College Kozhikode during the period of 5 years (2011 April-2016 March). Information gathered from police, family members, cohabitants and co-workers. Data collected from-

- A. Inquest reports.
- B. Autopsy reports.
- C. Histopathology reports.
- D. Chemical analysis reports.

Exclusion Criteria

1. Presence of injuries other than minor limb injuries
2. At the end of autopsy, if it concluded as a case of unnatural death.

Observations were recorded in the proforma. Statistical analysis was conducted after classifying the findings and opinion as to cause of death.

RESULTS

Number of Cases

42 cases were studied. During 2011-2012 period only 3 cases were reported, but during 2012-2013 period 9 cases, 2013-2014 period 9 cases, 2014-2015 period 7 cases and 2015-2016 period 14 cases were reported. All of them were male.

Year	No. of Cases	Percentage
2011-2012	3	7.1
2012-2013	9	21.4
2013- 2014	9	21.4
2014-2015	7	16.7
2015-2016	14	33.7
total	42	100

Table 1. Number of Cases

Age

25 (59.5%) cases belongs to 20-29-year age group, 9 (21.4%) cases 30-39-year age, 6 (14.3%) cases 40-49-year age and 2 (4.8%) cases more than 50 years.

Age	Frequency	Percentage
20-29	25	59.5
30-39	9	21.4
40-49	6	14.3
50-59	2	4.8
Total	42	100

Table 2. Age

State

20 cases (47.6%) were migrants from West Bengal, 8 (19%) were from Assam, 6 (14.3%) were from Bihar, 4 (9.5%) were from Jharkhand, 2 (4.8%) were from Orissa and 2 (4.8%) were from Uttar Pradesh.

Period of Migration

31 (73.8%) cases were recently migrated (within 0-6 months), 3 (7.1%) cases were within 7-12 months period of emigration and 8 (19%) cases were more than one year of emigration.

Period of Migration	Frequency	Percentage
0-6 months	31	73.8
7-12 months	3	7.1
More than 1 yr.	8	19
Total	42	100

Table 3. Period of Migration

History as Per Inquest

25 (59.5%) cases were found dead during sleep and 17 (40.5%) cases were brought dead to hospital with history of chest discomfort.

History	Frequency	Percent
Found dead during sleep	25	59.5
Brought dead to hospital	17	40.5
Total	42	100.0

Table 4. History as Per Inquest

Occupation

15 (35.7%) persons were engaged with hotel work, 20 (47.6%) persons with construction work and 7 (16.7%) persons with other works.

Occupation	Frequency	Percentage
Hotel work	15	35.7
Construction work	20	47.6
others	7	16.7
total	42	100

Table 5. Occupation

Substance Abuse

3 (7.1%) persons were having a habit of chewing or smoking tobacco. 18 (42.9%) persons were having usage of tobacco along with consumption of alcohol. 2 (4.8%) persons were IV drug abusers, 19 (45.2%) persons with multiple sort of substance abuse and none of them were free of substance abuse.

Sub. Abuse	Frequency	Percentage
Tobacco alone	3	7.1
Tobacco + alcohol	18	42.9
Iv drug	2	4.8
Mixed	19	45.2
Nothing	0	0
Total	42	100

Table 6. Substance abuse

Opinion as to Cause of Death

Out of the 42 autopsies 29 (69.0%) cases were without a definite opinion as to cause of death, one death was due to cardiomyopathy, 10 deaths were due to coronary artery disease, one case showed coronary artery bridging and one death was due to other causes.

Opinion	Frequency	Percentage
Cardiomyopathy	1	2.4
No opinion	29	69.0
CAD	10	23.8
Bridging	1	2.4
Other	1	2.4
Total	42	100

Table 7. Opinion as to Cause of Death

Post Mortem Findings

Out of 29 autopsies in which there was no definite opinion, 29 (100%) showed pulmonary oedema, 28 (96.5%) showed froth in air passages and 27 (93.1%) showed flabbiness of heart.

Pm Findings	Frequency	Percentage
Froth in air passages	28	96.5
Pul. oedema	29	100
Pul. congestion	4	13.7
Flabbiness of heart	27	93.1
Coronary bridging	1	3.4
Coronary occlusion	0	0

Table 8. Post Mortem Findings

DISCUSSION

Sudden unexpected death syndrome has been documented as early as 1915 among young men in Manila and in 1959 in Japan where it was in another name "Bangungut."⁶ But this syndrome was documented only after South East Asian refugees died suddenly and unexpectedly in a mysterious manner in USA. The entity of sudden unexpected death syndrome in Forensic pathology needs further exploration more over the mere purpose of excluding the unnatural factors by autopsy. Clinical advances with modern investigation techniques such as immunohistochemistry and molecular genetics can contribute much to this for determining exact cause of death. The epidemiology of sudden death in the absence of ischaemic heart disease is not extensively studied because autopsies are not routinely performed in many cases and an assumption is often made

that coronary artery disease was the cause of death. The study of Behr et al put forth a post-mortem diagnosis of Sudden Adult Death Syndrome (SADS), a unique subset of sudden death in these types of cases. With current data and increasing recognition of arrhythmogenic syndromes they now suggest that SADS should be replaced by Sudden Arrhythmic Death Syndrome, recognising that youngsters also being affected and emphasising the mechanism of arrhythmia.⁷ Many of the sudden death cases of cardiac arrhythmia due to localised cardiac pathology such as coronary artery spasm or bridging as well as due to systemic effects of intoxication are concluded as obscure or negative autopsy even after histopathological and toxicological studies. Even though the autopsy findings such as flabbiness of heart, blood clots in the heart chambers, pulmonary oedema and congestion can substantiate the opinion, reliability of the same is often questionable.

This study is an attempt to evaluate such cases by using the data from history, autopsy findings and ancillary investigations such as histopathology and chemical analysis. As such cases are frequently brought to medicolegal autopsy at department of Forensic Medicine, Govt. Medical College Kozhikode being among migrant labourers, that particular population is considered for the study. Findings of the study enlighten the seriousness of the scenario. There is a progressive increase in the number of cases per annum from 2011 to 2016. During 2011-2012 period only 3 cases were reported. But for the next 2 years there were 9 cases per annum. 7 cases were reported during 2014-2015. But there was a dangerous hike of 14 cases during 2015-2016. Though the population of the migrant labourers also increased during this period, it alone can't account for the alarming hike of the sudden dismissal of the energetic youth from migrant population. It was observed that all the decedents were male, as most of them are living without family the strength of the female population is negligible in this group. Consider the age of the decedents 25 out of 42 (59.5%) were among 20-29 age group and none of them had a significant illness in the past history. Maximum number of migrants were from West Bengal.

73.8% of the deaths were among recent migrants i.e. within 6 months period of migration. Abrupt change in the living conditions, detachment from the family and unaccustomed heavy working conditions might have accentuated the scenario. They were engaged as construction workers, casual labourers and hotel workers etc. In Kerala there is a predominating trend in allocating more difficult and laborious work to them.⁸ 83.3% of them were engaged as construction workers and hotel workers.

All the deaths were during night in between 12 midnight to 6 am. 59.5% of them were found dead during sleep. Similar incident was reported in Singapore among Thai migrant labourers in 1993.⁹ 40.5% of cases were brought dead to hospital following history of chest discomfort and breathing difficulty in the early hours of morning.

Substance abuse is a very common habit among this population. Rapid mobility and relative instability of living and working conditions leads to high level of stress that

increases the use of tobacco products and various other substance among the migrant labourers. Most of them use a wide variety of smokeless tobacco since it does not cause any hindrance during work. Majority use bang/ganja, injecting drugs, toddy, foreign liquors or any forms of alcohol and combination of various abusing substances. There is a habit of in taking these substances before going to sleep to get deep sleep and refreshment on the next day. It is well studied and many of the authors reported that these substances are notorious to produce arrhythmia and death during sleep due to sympathetic activation which leads to varying degree of tachycardia, vasoconstriction, unpredictable blood pressure effects and arrhythmias. Coma and pulmonary oedema may be produced by over dosage with large number of narcotic agents.¹⁰ The pathogenesis of drug induced pulmonary oedema remains unclear, however various hypothesis have been advanced. Hypersensitivity and anaphylaxis to the injected material have been suggested as etiological factors. 'Narcotic lungs' noted at autopsy were oedematous with a whitish froth filling the air passages.¹¹ Tobacco stains on teeth seen in more than 90% of cases. Chewed tobacco seen in situ in the buccal cavity in between lips and gums in some cases. In one of the cases, syringe with needle seen in situ in the cubical fossa as pierced the vein. But the chemical analysis report was negative in all cases. Combination of the risk factors such as exhaustive work, recent migration and substance abuse were well correlated with sudden deaths.

Evaluation of autopsy findings revealed combination of characteristic features of sudden arrhythmic death syndrome invariably present in all cases in which autopsy reported as inconclusive. Froth seen in air passages was profuse whitish lathery in character, pulmonary oedema was intensive as 'narcotic lung' and flabbiness of heart was evident. These three features were common in all cases for which autopsy failed to ascertain a definite opinion as to cause of death. Combination of pulmonary oedema and congestion without flabbiness of heart and froth in air passages seen in all cases of coronary artery occlusion (23.8% cases) in which a definite opinion of coronary artery disease as to cause of death could be ascertained with histopathology support. One case was cardiomyopathy and another one was spontaneous subarachnoid haemorrhage. Bridging of coronary artery seen in 1 case. In 29 out of 42 cases (69%) a definite opinion could not be ascertained. As the chemical analysis report were negative for all cases, considering the risk factors such as exhaustive work, recent migration and substance abuse which are common in cases of inconclusive opinion and autopsy findings such as froth in air passages, pulmonary oedema and flabbiness of heart can suggest sudden arrhythmic death syndrome as cause of death.

The main limitation of the study is the unavailability of family history. A large number of inherited arrhythmogenic syndromes are having the same features as those seen in the study. Only histopathological examination and chemical analysis were conducted as ancillary investigations. If

immunohistochemistry and genetic study were conducted the results would have been better.

CONCLUSIONS

The study was conducted in the background of increasing frequency of unexplained deaths among migrant labourers of North Kerala recently. Majority of the cases concluded without a post-mortem diagnosis. However, many common findings were revealed by the study on these cases. Majority of the deaths were among 20-29 years age group. All deaths were during night after going to sleep. Risk factors like exhaustive work, recent migration and substance abuse were seen in all cases. Common autopsy findings such as froth in air passages, pulmonary oedema and flabbiness of heart correlated with the characteristic features of 'Sudden Arrhythmic Death Syndrome'. From the results of this study it can be recommended that there should be a registration system for the migrant labourers. Facility to get immediate health care, health education and actions to stop substance abuse are also recommended. Modern investigations such as immunohistochemistry and genetic studies should be used to make the opinion accurate. Uniform pattern and terminology shall be practiced on reporting such cases.

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