ORIGINAL RESEARCH

Mortality patterns in a tribal population in the Dangs district of Gujarat, India: A verbal autopsy-based study

Simran Jha[1], Tapasvi Puwar[2], Bhavna Puwar[3], Shyamsundar Raithatha[1*]

[1]TIDE Trust, Dangs, Gujarat, India
[2]Indian Institute of Public Health, Gandhinagar, Gujarat, India
[3]Community Medicine Department, Smt NHL Municipal Medical College, Ahmedabad, Gujarat, India

 *Corresponding author: ss007.office@gmail.com

ABSTRACT

Introduction: Reliable mortality data is scarce in tribal and rural areas of India, where many deaths occur outside of healthcare facilities. Verbal autopsy is a practical approach for identifying the cause of death in such settings. This study examined the common causes of death across different gender and age groups in a tribal population in Dangs, Gujarat, using verbal autopsies.

Methods: A cross-sectional study was conducted from January to June 2024 using the verbal autopsy approach. Data on all deaths occurring between 1 January 2023 and 31 December 2023 were collected by trained field workers through structured VA interviews conducted in the Gujarati language. Causes of death were determined using ICD-10 coding by two independent, trained physicians. Discrepancies were resolved through reconciliation and adjudication by a third physician.

Results: A total of 303 deaths were analyzed. The mean age at death was significantly lower for males (53 years) than for females (60 years). The leading causes of mortality were senility (15%), alcohol-related deaths (12%), and stroke (11%). Alcohol-related deaths, including alcoholic liver disease, excessive alcohol consumption and withdrawal complications, disproportionately affected males, accounting for 17% of all male deaths. Non-communicable diseases (NCDs), including cardiovascular diseases and stroke, were prevalent among older adults, whereas suicides and alcohol-related deaths were more common among younger and middle-aged males.

Conclusion: This study highlights alcohol abuse, suicide and stroke as significant contributors to mortality in the tribal population of Dangs. The findings emphasize the urgent need for public health measures focusing on reducing alcohol-related harm, promoting mental health, and preventing NCDs. Implementing a community-oriented primary care model could help to address these challenges by providing targeted interventions and reducing preventable deaths, thereby improving overall community health.

Keywords: Mortality, verbal autopsy, tribal, suicide, community, India.

Abstract in Español at the end of the article

INTRODUCTION

The analysis of mortality and morbidity data is of crucial importance in the shaping of public health programmes, since it facilitates the identification of health priorities and guides resource allocation for effective interventions. However, in India, such data are limited, especially in tribal areas. According to the Civil Registration System (CRS), while there has been an improvement in birth registration rates, death registration remains inconsistent, particularly in rural and tribal regions where

a significant number of deaths occur at home without medical oversight. This lacuna in data severely hampers the country's ability to design effective public health interventions and allocate resources where they are most needed [1].

In order to address the identified gap in the existing literature, verbal autopsy (VA) is a method that can be utilised to ascertain the underlying cause of death in cases where formal medical records or death certificates are not available. This is a pragmatic approach to ascer-

taining the cause of death in settings where resources are scarce. The investigative approach involves the conduction of structured interviews with the deceased's family members or close associates, with the objective of eliciting information regarding the exhibited symptoms, the prevailing circumstances, and the sequence of events that culminated in the fatality. Subsequent to the collection of data through interviews, the responsibility falls upon trained health professionals to analyse the data collected in order to ascertain a probable cause of death. This is often achieved by the utilisation of a standardised classification system, such as the International Classification of Diseases (ICD) [2].

The World Health Organisation's (WHO) standardised VA tools are employed internationally. These tools systematically collect detailed information about the deceased, with a particular focus on the symptoms exhibited and the events that led to the individual's demise [3]. Currently, data concerning the cause of death are collected at intervals of between two and three years on a macroscopic level in the country by the Registrar General of India through the medium of verbal autopsy (MINErVA: Mortality in India Established through Verbal Autopsy). While the data are useful at national and state level for policy making, they are not available at the district or block level for designing locally relevant interventions [4].

The district of Dangs, located in the southern region of Gujarat, India, is home to an estimated population of 280,000 individuals, of which 95% belong to tribal communities. According to the Planning Commission, Dangs is one of the most economically distressed districts in India, facing numerous socio-economic challenges such as poverty, seasonal migration, limited healthcare access, and high rates of alcoholism [5]. The aforementioned factors have a dual impact: they serve to exacerbate existing health issues, whilst concurrently contributing to the underreporting of deaths. This, in turn, makes it difficult to capture an accurate picture of mortality patterns in the region. It is imperative to comprehend these patterns in order to formulate targeted health interventions that are tailored to the specific needs of this marginalised population. A couple of studies have been published on the causes of death in tribal communities in Melghat and Gadchiroli in the state of Maharashtra. However, there is a general absence of mortality data for tribal communities in India [6, 7]. To address this discrepancy, this study was conducted in 80 of the 311 villages in the Dangs district, with the aim of examining regional mortality patterns to inform the prioritization of health interventions based on the leading causes of death identified [8].

METHODS

Study design and data collection

This cross-sectional mortality study was conducted between January and June 2024. It captured all deaths that occurred in the 80 villages surrounding Purna Clinic, a primary care facility managed by the non-profit organisation TIDE Trust, between 1 January 2023 and 31 December 2023. The Trust has been involved in activities focusing on improving healthcare access and socioeconomic development in the region for more than 15 years.

The study used a validated, structured VA questionnaire that had previously been used in the Million Death Study across different Indian states [2]. For this study, a Gujarati version of this questionnaire was used [9]. The questionnaire included four forms to gather detailed information on neonatal, child, adult and maternal deaths (Table 1).

Table 1. Different forms used as a part of the survey instrument.

Form	Age group	Description
1	Neonatal deaths (28 days or less)	The form collected information about deaths occurring within the first 28 days of life, focusing on prenatal care, the birth process, and the newborns' immediate post-birth condition.
2	Child deaths (29 days to 14 years)	Designed for children aged 29 days to 14 years, this form gathers data on common childhood illnesses, vaccinations, nutritional status, and any injuries or accidents.
3	Adult deaths (15 years or older)	Used for individuals aged 15 years and older, this form included questions about chronic illnesses, lifestyle factors, occupational hazards, and other health conditions.
4	Maternal deaths (females aged 15-49 years)	Specifically, for women of reproductive age who died during pregnancy, childbirth, or within 42 days of pregnancy termination, this form collected details about antenatal care, delivery complications, and postpartum health.

These forms comprised various sections, including details of the respondent and the deceased (such as personal and socio-demographic information), the deceased's past medical history, a list of cardinal symptoms, and a narrative of the events leading up to the death.

The questionnaire was integrated into the KoboToolbox platform, which enabled data to be collected directly via a mobile application. Community Health Workers (CHWs) associated with the TIDE Trust were responsible for listing deaths. Data collection was conducted by the Trust's field supervisors, who have a minimum of 10 years' education. The field supervisors were responsible for supervising the work of the CHWs. They were familiar with, and comfortable reading, writing and speaking, the local language, Gujarati. They also belonged to the same community and knew the villages well.

A comprehensive two-day training session was organised to familiarise the field supervisors with the interview process. On the first day, they learnt how to complete the form using KoboCollect and how to write detailed narratives of deaths, covering all essential points. On the second day, the supervisors discussed each form question in detail to ensure they understood it. Then, VA interview exercises were conducted under expert supervision. To ensure the quality of the forms, each one was reviewed by a study investigator before being sent for final death coding. If a narrative was unclear, the field supervisor was asked to revise it and extract more details from the family.
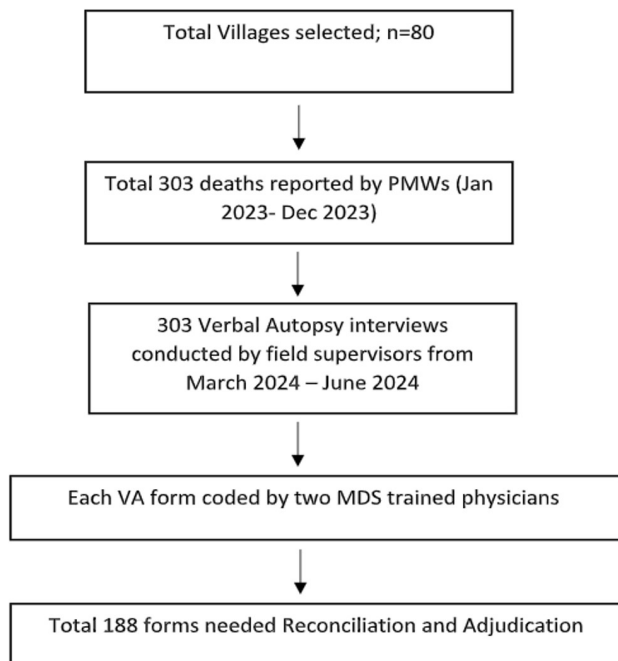

Figure 1. Flow-chart describing the data collection and coding process.

Each completed VA form was reviewed individually by two VA-trained physicians, who used the ICD-10 coding system to determine the cause of death. In cases of discrepancy, the same physicians undertook a 'reconciliation' process to reach an agreement on the cause of death. If agreement could not be reached, a third physician carried out an 'adjudication' process (Figure 1). The collected data were analysed using IBM Statistics SPSS 27 and Microsoft Excel Office 2019.

Analysis

Frequencies and percentages were calculated for categorical variables such as age group, gender, education, occupation and cause of death. Means and standard deviations were computed for continuous variables, including age at death. An independent samples t-test was used to compare the mean age at death between males and females. The distribution of causes of death was examined further across different age and gender categories to identify high-burden groups.

Ethics

Ethical approval for the study was provided by the Institutional Ethical Committee of the Indian Institute of Public Health, Gandhinagar (reference no. TRC/2023-24/21-82; approval date: 26/03/2024). Informed consent was obtained from all respondents prior to their participation.
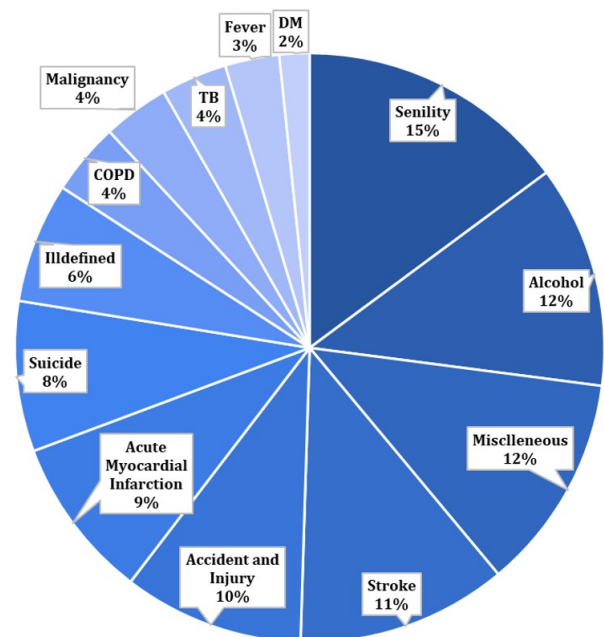

Figure 2. Pie chart showing the proportion of deaths due to different causes in the study population.

RESULTS

A total of 303 deaths were reported during the study period, of which 196 were male and 107 were female. Most of the deceased belonged to the above-60s (51.2%) and 20–59 (40.3%) age groups. The mean age at death was 55 years, with males having a significantly lower age (53 years, SD 22.71) than females (60 years, SD 20.61). The majority of the population was illiterate (212; 70%), practised Hinduism (274; 90.4%), lived in kaccha houses (250; 82.5%), and came from below the poverty line (BPL)

households (289; 95.3%). Housing type was classified as *kaccha* (temporary structures made of mud, bamboo or thatch) or *pakka* (permanent structures built with brick or cement) according to local definitions. The most common occupation among the sample population was agricultural work (185 individuals, or 61%). Only 29.3% of individuals held an *Ayushman* card (a health insurance scheme run by the Government of India) [10] (Table 2). Questions related to addiction were also included in the survey. It was observed that 50.7% of individuals aged 18 years and over reported regular alcohol consumption, while 51.4% reported regular tobacco chewing.

Table 2. Sociodemographic background of the study population.

Characteristics	Frequency
Level of education	
Illiterate	212 (70%)
Literate (but never went to school)	12 (4%)
Less than 8 years of schooling	41 (13.5%)
More than 8 years of schooling	31 (10.2%)
Graduation and above	7 (2.3%)
Religion	
Hindu	274 (90.4%)
Christian	28 (9.3%)
Muslim	1 (0.3%)
House type	
Kaccha house	250 (82.5%)
Pakka house	53 (17.5%)
BPL	
Yes	289 (95.3%)
No	14 (4.7%)
Occupation	
Agricultural worker	185 (61%)
Unemployed	41 (13.5%)
Non-agricultural wage worker	26 (8.6%)
Farmer	23 (7.6%)
Housewife	7 (2.3%)
Student	7 (2.3%)
Business	6 (2%)
Migratory labourers	4 (1.3%)
Salaried worker	3 (1%)
Others	1 (0.3%)
Ayushman card	
Yes	89 (29.3%)
No	224 (73.9%)

The most frequent cause of death in the total sample was senility (15%), followed by alcohol-related deaths (12%) and stroke (11%). Among males, the three most common causes of death were alcohol (17%), stroke (11%), and suicide (11%), whereas among females they were senility (23%), stroke (13%), and accidents (9%).

It was observed that causes of death linked to mental health issues (alcoholism and suicide) placed a disproportionately higher burden on males, whereas senility was more prevalent among females. Stroke and accident injuries were distributed similarly among males and females (see Figure 2 and Table 3). Given the high number of deaths due to suicide and alcohol-related causes, further analysis was conducted to understand the demographic and age-related patterns (Table 4).

Table 3. Common causes of death (COD) in total and by gender.

S.No	COD	Frequency
Total		
1	Senility	45 (15%)
2	Alcohol Related Deaths	37 (12%)
3	Stroke	35 (11%)
4	Accident & Injury	30 (10%)
5	Acute Myocardial Infarction	27 (9%)
Males		
1	Alcohol Related Deaths	34 (17%)
2	Stroke	21 (11%)
3	Suicide	21 (11%)
4	Acute Myocardial Infarction	20 (10%)
5	Accident and Injury	20 (10%)
Females		
1	Senility	24 (22%)
2	Stroke	14 (13%)
3	Accident & Injury	10 (9%)
4	Acute Myocardial Infarction	7 (7%)
5	COPD	5 (5%)

As shown in Table 5, alcohol was responsible for one-fifth of all deaths in the 15-59 age group. Of these alcohol-related deaths, 54% were associated with binge drinking, 37% were due to alcoholic liver disease and 9% were due to alcohol withdrawal. Alcohol may also have contributed to other deaths (e.g. suicides and road traffic accidents), as 51% of the study population reported consuming alcohol. Suicide (18%) was the second most common cause of death in this age group, with a disproportionately higher number of male suicides. Accidents and injuries were the third most common cause of death in the total sample (15%), and the most common cause of death among females (19%). Among the elderly (over 60 years), senility, stroke and acute myocardial infarction (AMI) were the three most common causes of death in both sexes.

DISCUSSION

Our study revealed that senility and alcohol-related deaths were the most common causes of death. Alcohol-related deaths were more prevalent among males, while

senility was more prevalent among females. The mean age of death differed by seven years between the sexes. Alcohol-related causes accounted for 12% of all deaths, making them the leading cause of mortality among men. According to the 2016 Global Burden of Disease (GBD) study, alcohol use contributed to 12.2% of male deaths globally in the 15–49 age group. Our study's breakdown of alcohol-related deaths, including alcoholic liver disease, excessive alcohol consumption, and withdrawal complications, illustrates alcohol abuse's multifaceted impact. In contrast, the Melghat study reported that alcohol-related deaths (alcohol intoxication and alcoholic liver disease) accounted for around 3% of all deaths. Studies have consistently highlighted high levels of alcohol consumption among tribal populations, often in association with cultural practices [11]. However, shifting consumption patterns have also been noted, exacerbating the problem of mortality [12]. These include an earlier age of initiation, an increased quantity of consumption, and changes in the type of alcohol consumed. This growing burden is accompanied by adverse social determinants of health in tribal communities, such as poor access to healthcare, poverty, malnutrition, illiteracy and harmful cultural practices, which contribute to higher mortality rates.

Table 4. Profile for deaths due to suicide and alcohol-related deaths.

	Alcohol related deaths	Suicide related deaths
Total deaths (n, % of total deaths)	37 (12)	25 (8)
Sex (n, %)		
Males	34 (92)	21 (84)
Females	3 (8)	4 (16)
Age (n, %)		
10- 20 years	0	6 (24)
21- 30 years	1 (2.7)	6 (24)
31-40 years	8 (21.6)	8 (32)
41- 50 years	7 (18.9)	3 (12)
51- 60 years	10 (27.1)	1 (4)
≥61 years	11 (29.7)	1 (4)
Main modes (n, %)		
Over-drinking	20 (54)	
Liver disease	14 (38)	
Hanging		20 (80)
Drowning		2 (8)

Stroke emerged as a significant cause of death, accounting for 11% of all fatalities. This finding is consistent with a study conducted in Gadchiroli, a tribal district in eastern Maharashtra, between 2011 and 2013. In this study, stroke accounted for 14.3% of deaths, making it the most common cause of death in the population.

These parallels demonstrate the growing impact of non-communicable diseases on mortality patterns in rural and tribal areas of India, with stroke emerging as a significant health burden. This emphasises the urgent need for public health interventions that prioritise the prevention, early detection, and effective management of non-communicable diseases (NCDs), particularly hypertension and other cardiovascular diseases. However, a study conducted in the Melghat region of Maharashtra, which also used VA, reported that infectious diseases were the leading cause of death (59.2%) among the economically productive age group (16–60 years). This discrepancy may be attributed to regional differences in socioeconomic conditions, healthcare access, and the stage of the epidemiological transition.

Suicide was another major cause of death, particularly among working-age men (22%), highlighting a serious mental health crisis in this community. Our findings are consistent with a report published in The Lancet Regional Health – Southeast Asia, which revealed a significant increase in suicide mortality among males of various ages in India between 2014 and 2021 (from 38.8% to 54.7%). The increase was most pronounced among men aged 18–59, whose suicide rates were approximately 2.5 times higher than those of women. The highest burden was observed among daily wage earners, the unemployed and individuals facing socioeconomic stressors (such as poverty, migration for work, marital conflicts, broken families and high alcohol consumption rates). However, as a systematic review has highlighted, community-based data on suicide and suicidal behaviour among India's tribal populations remains extremely scarce, with only a small number of studies reporting such outcomes [13, 16].

Methodological considerations

A key strength of this study was the use of a validated verbal autopsy tool, which allowed for the collection of comprehensive data even in the absence of formal medical records. Furthermore, the involvement of trained local field workers ensured accurate reporting and fostered trust within the community.

However, this study has certain limitations. VA relies on respondents' memory, which can result in recall bias and inaccurate symptom reporting. Furthermore, conditions such as stroke and acute myocardial infarction share overlapping symptoms, which makes attributing the cause of death more difficult. Additionally, as the study was conducted in 80 villages in the Dangs district, the findings may not be directly generalisable to other rural or tribal populations.

Conclusion

This study sheds light on the mortality patterns of the tribal population in Dangs, highlighting the significant impact of preventable deaths due to alcohol consumption, suicide, and non-communicable diseases. These findings highlight significant gaps in behavioural risk management, mental health support and the early de-

tection of chronic illnesses. A feasible and effective way to reduce premature mortality and improve health outcomes in this underserved population is to strengthen primary care through a Community-Oriented Primary Care (COPC) approach supported by robust mortality surveillance.

Table 5. Common causes of deaths by age group.

	Age 15-59 years		
S. No	*Overall (n= 133)*	*Male (n= 91)*	*Female (n= 42)*
1	Alcohol-related deaths – 25 (19%)	Alcohol-related deaths – 23 (25%)	Accidents and Injury – 8 (19%)
2	Suicide – 24 (18%)	Suicide – 20 (22%)	Suicides – 4 (9.5%)
3	Accidents and Injuries – 20 (15%)	Accidents and Injuries – 12 (13%)	Tuberculosis – 3 (7%)
4	Acute MI– 9 (6.7%)	Acute MI – 6 (6.5%)	Acute MI – 3 (7%)
5	TB- 8 (6%)	TB – 5 (5.5%)	Malignancy- 2 (4.7%)
	Age 60 years and above		
S. No	*Overall (n= 155)*	*Male (n= 92)*	*Female (n= 63)*
1	Senility – 45 (29%)	Senility – 18 (20%)	Senility – 27 (43%)
2	Stroke – 32 (20%)	Stroke – 18 (20%)	Stroke – 14 (22%)
3	Acute MI – 18 (12%)	Alcohol use – 12 (13%)	Acute MI – 4 (6%)
4	Alcohol use – 12 (8%)	Acute MI – 14 (15%)	COPD – 4 (6%)
5	COPD – 10 (6.5%)	COPD – 6 (7%)	Malignancy- 2 (3%)

The findings of this study point to several priority areas for public health action in the region. First, given the high contribution of alcohol-related deaths, there is a need to strengthen community-based harm reduction strategies. These efforts should include brief counselling interventions integrated into routine primary care visits, improved referral pathways to available de-addiction services, and active engagement of local community leaders and groups to raise awareness about harmful drinking patterns and their health consequences.

Second, the substantial burden of suicide underscores the importance of strengthening mental health services and suicide prevention efforts. Mental health care should be progressively integrated into existing primary healthcare structures, with frontline health workers trained to conduct basic mental health screening and provide initial counselling. In parallel, youth-focused awareness activities delivered through schools and Panchayats can play an important role in promoting mental well-being. A comprehensive public health approach to suicide prevention is essential, one that addresses social and economic stressors alongside the provision of mental health care [14,15].

Third, the early detection and management of non-communicable diseases should be improved, particularly for conditions such as hypertension and diabetes. Expanding village-level screening, implementing protocol-based management for individuals at high risk, and increasing community awareness of stroke symptoms are critical steps to reduce preventable morbidity and mortality.

In addition, strengthening mortality surveillance is necessary to support evidence-informed planning. Establishing a community-based demographic and health surveillance system would allow for periodic tracking of causes of death and trends over time, thereby improving the responsiveness of health interventions.

Finally, further research is warranted to deepen understanding of the leading causes of mortality identified in this study, including stroke, alcohol use, suicide, and accidents. Future studies should also explore gender-specific determinants of mortality and assess the impact of community-oriented primary care interventions on health outcomes.

DECLARATIONS

AI utilization
AI was only used for language editing.

Competing interests
The authors report no conflicts of interest.

Funding
None.

ORCIDs
Simran Jha ⬤ 0009-0004-9189-662X
Tapasvi Puwar ⬤ 0000-0002-4994-0306
Bhavna Puwar ⬤ 0000-0002-5029-5711
Shyamsundar Raithatha ⬤ 0000-0002-5617-5737

ABSTRACT IN SPANISH

Patrones de mortalidad en una población tribal del distrito de Dangs, Gujarat, India: un estudio basado en autopsias verbales

Introducción: Los datos fiables sobre mortalidad son escasos en las zonas tribales y rurales de la India, donde muchas muertes ocurren fuera de los establecimientos de salud. La autopsia verbal es un enfoque práctico para identificar la causa de muerte en estos contextos. Este estudio examinó las causas más frecuentes de muerte en distintos grupos de edad y por sexo en una población tribal del distrito de Dangs, Gujarat, utilizando autopsias verbales.

Métodos: Se llevó a cabo un estudio transversal entre enero y junio de 2024 mediante el enfoque de autopsia verbal. Los datos sobre todas las muertes ocurridas entre el 1 de enero de 2023 y el 31 de diciembre de 2023 fueron recopilados por personal de campo capacitado a través de entrevistas estructuradas de autopsia verbal realizadas en idioma guyaratí. Las causas de muerte se determinaron utilizando la codificación CIE-10 por dos médicos capacitados e independientes. Las discrepancias se resolvieron mediante conciliación y adjudicación por un tercer médico.

Resultados: Se analizaron un total de 303 muertes. La edad media al fallecimiento fue significativamente menor en los hombres (53 años) que en las mujeres (60 años). Las principales causas de mortalidad fueron la senilidad (15 %), las muertes relacionadas con el alcohol (12 %) y el accidente cerebrovascular (11 %). Las muertes relacionadas con el alcohol, incluidas la enfermedad hepática alcohólica, el consumo excesivo de alcohol y las complicaciones por abstinencia, afectaron de manera desproporcionada a los hombres, representando el 17 % de todas las muertes masculinas. Las enfermedades no transmisibles (ENT), incluidas las enfermedades cardiovasculares y el accidente cerebrovascular, fueron prevalentes entre los adultos mayores, mientras que los suicidios y las muertes relacionadas con el alcohol fueron más comunes entre hombres jóvenes y de mediana edad.

Conclusión: Este estudio destaca el abuso de alcohol, el suicidio y el accidente cerebrovascular como contribuyentes importantes a la mortalidad en la población tribal de Dangs. Los hallazgos subrayan la necesidad urgente de medidas de salud pública centradas en la reducción del daño relacionado con el alcohol, la promoción de la salud mental y la prevención de las ENT. La implementación de un modelo de atención primaria orientado a la comunidad podría ayudar a abordar estos desafíos mediante intervenciones específicas y la reducción de muertes evitables, mejorando así la salud general de la comunidad.

Palabras clave: Mortalidad, autopsia verbal, tribal, suicidio, comunidad, India.

REFERENCES

[1] Registrar General of India. Vital statistics of India based on the civil registration system 2019. New Delhi: Office of the Registrar General & Census Commissioner, India; 2019.

[2] Jha P, Gajalakshmi V, Gupta PC, Kumar R, Suraweera W, Bhatia P, et al. Prospective study of one million deaths in India: rationale, design, and validation results. PLoS Med. 2006;3(2):e18.

[3] World Health Organization. WHO verbal autopsy standards: 2016 edition. Geneva: WHO; 2016.

[4] MINErVA Network India. Mortality in India established through verbal autopsies. Cause of Death India; 2024. Available from: https://causeofdeathindia.com/.

[5] Office of the Registrar General & Census Commissioner, India. Census of India 2011: primary census abstract for scheduled tribes. New Delhi: Ministry of Home Affairs, Government of India; 2011. Available from:

https://censusindia.gov.in/.

[6] Kalkonde YV, Deshmukh MD, Sahane V, Puthran J, Kakarmath S, Agavane V, et al. Stroke is the leading cause of death in rural Gadchiroli, India: a prospective community-based study. Stroke. 2015;46(7):1764–1768.

[7] Satav AR, Satav KA, Kelkar AS, Sahasrabhojaney VS, Dani VS, Raje DV, et al. Verbal autopsy to assess causes of mortality among the economically productive age group in the tribal region of Melghat, central India. Indian J Med Res. 2023;158(3):217–254.

[8] District Dang, Government of Gujarat. Village and panchayats – Dang District. Dang: Government of Gujarat; updated 2025 Nov 14. Available from: https://dangs.nic.in/village-panchayats/.

[9] Singh US, Bogam RR, Mavli AH. Assessing the mortality patterns in rural villages of Gujarat state of India through a field-based study using a verbal autopsy tool. Natl J Community Med. 2023;14(8):2899.

[10] National Health Authority. Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY). New Delhi: Government of India. Available from: https://pmjay.gov.in/.

[11] Rose A, Minz S, Manohari GP, George K, Arun R, Vinodh A. Community perspectives on alcohol use among a tribal population in rural southern India. Natl Med J India. 2015;28(3):117–121.

[12] Griswold MG, Fullman N, Hawley C, Arian N, Zimsen SRM, Tymeson HD, et al. Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet. 2018;392(10152):1015–1035.

[13] Yadav S, Arokiasamy P, Yadav K, Ram U, Jha P. Changing pattern of suicide deaths in India. Lancet Reg Health Southeast Asia. 2023;16:100265.

[14] Mann JJ, Michel CA, Auerbach RP. Improving suicide prevention through evidence-based strategies. Am J Psychiatry. 2021;178(7):611–624.

[15] Kallivayalil RA. A public health approach to suicide prevention in India. Indian J Psychol Med. 2022;44(5):421–424.

[16] Verma P, Sahoo KC, Mahapatra P, Kaur H, Pati S. Community-based studies on mental health issues among tribal populations in India: a systematic review. Indian J Med Res. 2023;156(2):291.