



Exploring Community Cause of Death Through Verbal Autopsy Implementation in Bangladesh

Insights from 46 Upazilas, 2023

— Bangladesh, Dhaka, 2024





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Acronyms

Acronym	Full Form
VA	Verbal Autopsy
CDR	Crude Death Rate
NCD	Non-Communicable Disease
GBD	Global Burden of Disease
N/A	Not Available or Not Applicable
HA	Health Assistant
FWA	Family Welfare Assistant
Smart VA	Digital system/process for managing Verbal Autopsy records
BDHS	Bangladesh Demographic and Health Survey
NIPORT	National Institute of Population Research and Training
MOHFW	Ministry of Health and Family Welfare
USAID	United States Agency for International Development
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
HPNSP	Health, Population and Nutrition Sector Program
CRVS	Civil Registration and Vital Statistics
ICD-10	International Classification of Diseases, 10th Revision
SAVVY	Sample Vital Registration with Verbal Autopsy
DHS	Demographic and Health Survey
HDSS	Health and Demographic Surveillance System
TWG	Technical Working Group
CAPI	Computer-Assisted Personal Interviewing
MDD-W	Minimum Dietary Diversity for Women



Glossary

Term	Meaning / Description
Verbal Autopsy	A structured interview with relatives/caregivers of the deceased to determine the probable cause of death, used when no official medical certificate is available.
Upazila	The third-level administrative unit (sub-district) in Bangladesh, comprising several unions and wards, responsible for local health and demographic data collection.
Crude Death Rate	The number of deaths per 1,000 individuals in a given year, providing an overall measure of mortality in a population regardless of age or cause.
Non-Communicable Disease	Chronic diseases that are not transmittable between people, such as cardiovascular diseases, cancers, chronic respiratory diseases (including asthma and COPD), and diabetes.
Global Burden of Disease	An international research initiative that measures the impact of diseases, injuries, and risk factors worldwide through detailed epidemiological analysis.
Health Assistant	Trained frontline health workers in Bangladesh, primarily tasked with monthly household visits, identifying deaths, and assisting in community data capture.
Family Welfare Assistant	Community health workers responsible for routine household visits, approximately every 45 days, gathering family planning, maternal health, and vital event data.
Maternal Death	The death of a woman during pregnancy, childbirth, or within 42 days of the end of pregnancy from any cause related to or aggravated by the pregnancy or its management.
Group I/II/III (GBD Classification)	Categories established by the Global Burden of Disease Study: Group I (communicable, maternal, neonatal, and nutritional diseases), Group II (non-communicable diseases), Group III (injuries).
Crude Deaths	The actual number of reported deaths, not standardized or adjusted by age, population structure, or specific cause.
Smart VA	A digital, tablet- or app-based data collection system used for electronically capturing and managing Verbal Autopsy interviews and records.
Chronic Respiratory Diseases	Long-term respiratory conditions affecting the airways and lungs, such as chronic obstructive pulmonary disease (COPD), emphysema, and asthma.



Community Engagement	The process of actively involving local populations in health programs to build trust, improve participation and accuracy, and foster ownership of outcomes.
Civil Registration and Vital Statistics	The government system for continuous, permanent, compulsory registration of vital events (births, deaths, marriages) that provides key population and health statistics.
Data Collector	Trained personnel responsible for conducting interviews and collecting data for the VA program and other health initiatives.
Ischemic Heart Disease	A medical condition involving reduced blood flow to the heart muscle due to narrowed or blocked coronary arteries, often resulting in angina or heart attacks.
Stroke	A sudden medical event where the blood supply to a part of the brain is interrupted or reduced, causing potential brain damage and physical impairment.
Supervisory Protocol	A defined set of guidelines and processes for monitoring, guiding, and supporting data collectors and field staff to ensure high-quality program implementation.
Neonate	An infant aged 0–28 days. In mortality surveillance, neonatal deaths are separately analyzed due to their specific risk and characteristics.
Ill-Defined/Unusable Cause	Deaths for which the cause could not be determined by verbal autopsy due to insufficient, ambiguous, or contradicting data; flagged for quality improvement activities.
Community Death	Any death that occurs outside of a formal medical or health facility setting, typically in the home or community, and reported through community-based surveillance.



Foreword

The realm of public health is ever evolving, and with it comes the necessity for accurate and comprehensive data to guide effective interventions and policies. In Bangladesh, where a significant proportion of deaths occur outside medical facilities, understanding mortality trends has been a longstanding challenge. The introduction and expansion of verbal autopsy (VA) – a method to ascertain the causes of death in the communities – represents a groundbreaking step in bridging this gap.

Initiated as a pilot in the Kaliganj Upazila of the Gazipur District in 2017, the VA program has grown to encompass 46 Upazilas nationwide. This expansion marks a critical development in our efforts to capture reliable data on causes of death for death that occurred in the absence of medical care. The VA methodology, which involves collecting detailed information from families about the deceased’s symptoms and medical history, provides invaluable insights into mortality patterns that are otherwise hidden.

This annual report of VA from 2023 is particularly noteworthy as data has been captured from across diverse regions and demographics. This report offers a thorough analysis of the data collected, shedding light on the leading causes of death, the demographic distribution, and the challenges faced during VA implementation. It highlights the discrepancies in mortality data between facility and community settings, and provides a detailed breakdown of causes by age, gender, and location.

The findings underscore the prevalence of non-communicable diseases such as ischemic heart disease, stroke, and chronic respiratory conditions, which dominate the mortality statistics among deaths that occur in the community. The report also reveals the impact of factors such as inadequate training, resource constraints, and geographical challenges on data completeness and accuracy.

As we move forward, this report will serve as a vital resource for policymakers, healthcare providers, and researchers. It will guide future interventions, improve resource allocation, and help in crafting targeted health policies. Addressing the limitations identified and leveraging the insights gained will be crucial in enhancing the effectiveness of the VA program and ultimately improving health outcomes across Bangladesh.

The success of this initiative is a testament to the commitment and collaboration of numerous stakeholders, including health officials, data collectors, and the communities involved. Their collective efforts have made this comprehensive report possible, providing a clearer picture of mortality trends and offering a foundation for future improvements in public health surveillance.



We hope this report will catalyze further advancements in health data collection and foster a deeper understanding of the health challenges facing Bangladesh. Together, let us continue to work towards healthier and people centric public health management for all.

Acknowledgement

The Cabinet Division extends heartfelt thanks to all those who supported the development of VA implementation guidelines, Verbal Autopsy standard operating procedures, capacity building training at various levels of the health system as well as the successful implementation of the VA program in Bangladesh. Our heartfelt gratitude also goes to the Bloomberg Philanthropies Data for Health (D4H) Initiative, Vital Strategies, UNICEF, and WHO for their invaluable technical and financial support for their active engagement and contribution.

The Cabinet Division acknowledges the critical contributions of the Management information System (MIS) of the Directorate General of Health Services, and the Office of the Registrar General for their relentless support towards successful implementation of VA. Deputy Commissioners, Civil Surgeons, Deputy Directors Family Planning, Upazila Nirbahi Officers and Upazila Health and family planning Officers of the selected VA districts are deserving of deepest thanks for their precious support and contributions towards introduction of VA within their territorial jurisdiction and continuous implementation of the program.

Finally, the Cabinet Division extends sincere gratitude to all VA interviewers and supervisors for their hard work and family members in the selected VA districts for providing information about the death of a beloved family member.



Executive Summary

The Verbal Autopsy (VA) program has become an essential tool in Bangladesh for understanding and addressing mortality patterns, particularly for deaths that occur outside of medical care. Launched as a pilot in the Kaliganj Upazila of the Gazipur District in 2017 and now expanded to 46 Upazilas, the VA program offers critical insights into the causes of death across diverse communities.

Key Findings for 2023:

- **Expanded Coverage and Data Collection:** In 2023, the VA program significantly increased its coverage, capturing data from a broad spectrum of Upazilas across Bangladesh. This expansion has enhanced the representativeness and reliability of mortality data, contributing to a more comprehensive understanding of public health issues in both urban and rural settings. To achieve the previously determined nationally representative sample of VA, further scale-up to a total of 69 Upazilas is required.
- **Leading Causes of Death:** The analysis of VA data reveals that non-communicable diseases (NCDs) are the predominant causes of death among deaths occurring outside of medical care. Ischemic heart disease, stroke, and chronic respiratory diseases are the leading contributors to mortality. These findings underscore the growing burden of NCDs in Bangladesh and highlight the need for targeted prevention and management strategies.
- **Demographic Insights:** The data shows varying mortality patterns across different demographic groups. There is a notable disparity in the prevalence of certain causes of death by age and gender. For example, ischemic heart disease is more common among older adults, while respiratory conditions are prevalent across a broader age range. Gender disparities also emerge, with specific conditions affecting men and women differently.
- **Challenges and Limitations:** The report identifies several challenges impacting the accuracy and completeness of VA data. These include variations in data collection practices, limited training for field staff, and logistical issues in remote areas. Addressing these challenges is crucial for improving the quality and reliability of future data.



- Recommendations: To enhance the effectiveness of the VA program and address the identified challenges, the report recommends:
 - Strengthening Training Programs: Enhancing the training of data collectors to improve the accuracy and consistency of data collection.
 - Holistic Supervision: Establishing a systematic and routine monitoring and supervisory protocol for supervision from data collection to analysis.
 - Improving Data Management: Implementing robust data management systems to ensure the reliability and completeness of collected data with near real-time monitoring of the electronic data collection.
 - Increasing Community Engagement: Engaging local communities more actively to improve response rates and data quality.
 - Focusing on Non-Communicable Diseases: Developing targeted interventions to address the rising burden of NCDs, including public awareness campaigns and healthcare access improvements.



Chapter 1: Introduction

The collection and analysis of death data are very important for public health and policymaking. It provides essential insights into the leading causes of mortality, which can inform healthcare priorities, resource allocation, and preventive measures. Accurate death data is fundamental for calculating life expectancy and understanding the impact of diseases and injuries on populations.

In Bangladesh, it is estimated that only 20% of all deaths occur in hospitals and remaining 80% occur outside health facilities, either at home or in the community. Based on cause of death data collected in health facilities using medical certification of cause of death (MCCD), it is not possible to know the exact cause of death of this large number of deaths in the communities. The Government of Bangladesh started a routine implementation of VA within the civil registration and vital statistics (CRVS) system in the Kaliganj Upazila of the Gazipur District in 2017 as a pilot to find out the cause of death of people dying at home. After the successful implementation of the program in the Kaliganj Upazila, it was expanded to an additional 13 Upazilas, including at least one Upazila in each Division of Bangladesh. Later, a plan was developed to scale-up the implementation of VA to a total of 69 Upazilas to achieve nationally representative cause-of-death data for death in the communities. By 2023, VA implementation has been scaled up to 46 of the 69 Upazilas.

Objectives of this mortality report based on VA data:

- Analysis and reporting of community deaths based on VA data to see the causes of deaths, disaggregated by relevant attributes.
- Enhance the understanding of the routine application of VA within the CRVS system of Bangladesh, its value and its contribution to knowledge about the mortality and causes of death pattern of the country.
- ≠ Promote use of cause of death information from deaths occurring in the communities to inform public health policy decisions and in the development of effective health intervention programmes to alleviate premature deaths.



Background of VA implementation in Bangladesh:

- Total Population of Bangladesh is 171 million (83.91 million male and 87.09 million female) based on the Sample Vital Registration System (SVRS)¹ report of 2023 from the Bangladesh Bureau of Statistics (BBS)
- As of 2023, the VA implementation covered 46 Upazilas with a total population of approximately 15.69 million (approximately 9.2% of the total population of Bangladesh).
- The national crude death rate of Bangladesh is 6.10 (6.8 for male and 5.5 for female) per 1'000 population based on the SVRS report of 2023 of BBS.
- Based on the estimated population and the crude death rate, approximately 81,559 deaths are estimated for the year 2023 in the 46 VA covered Upazilas.
- Of all the deaths, around 80% (65,243) are community deaths in 2023 in the 46 VA covered Upazilas.
- VA piloting began in the Kaliganj Upazila of the Gazipur District in 2017, making the starting point for the implementation process.
- Scaled up efforts: The program has been scaled up to 46 Upazilas as pf 2023, with plans to expand to cover the remaining Upazilas in the national sample.
- A total of 193 health officials were trained as master trainers to oversee and support the implementation of the VA piloting.
- A total of 2,190 interviewers and supervisors were trained across 54 Upazila including the 46 Upazila that are already implementing as well as 8 which have yet to start implementation.
- From March 2017 to December 2023, a total of 57,191 VA has been completed with 12,834 of those recorded in 2023.
- The Open Data Kit (ODK) server² has been installed at MIS-DGHS to collect, store and manage the VA data.
- The VA Manager Tool (VMan)³ was adopted and adapted in 2023 to provide a comprehensive platform for managing and overseeing VA implementation, ensuring smoother operation and data flow.

¹ Bangladesh Bureau of Statistics (BBS). Bangladesh Sample Vital Statistics (SVRS) 2023 [Internet]. Sample Vital Registration System (SVRS) in Digital Platform Project, Bangladesh Bureau of Statistics; 2024 [cited 2025 Jun 11]. Available from: Available from:

http://203.112.218.101/storage/files/1/Publications/SVRS/SVRS%202023%20Final%20Report_web.pdf.

² Get ODK Inc. ODK Central [Internet]. ODK Central. 2025 [cited 2025 Jun 11]. Available from: <https://docs.getodk.org/central-intro/>.

³ VMan3. VMan3 Documentation [Internet]. VMan3 Documentation. 2025 [cited 2025 Jun 11]. Available from: <https://vman3.vatools.net/docs/>



Chapter 2: Methods

2.1 Coverage and Sampling

By the decision of the Bangladesh CRVS Implementation Committee, the sample size for the implementation of VA to obtain nationally representative data was determined to be 69 Upazilas. This sample was identified in collaboration with the Bangladesh Bureau of Statistics (BBS) based on the findings from the Verbal Autopsy Workshop held in Dhaka in 2019 (27-31 October) and stakeholders meeting convened by BBS on 10 September 2020.

Out of the identified nationally representative sample of 69 Upazilas for VA implementation, by 2023, VA implementation was happening in the 46 sampled Upazilas. The characteristics of these Upazilas are shown in Table 1.

Table 1: Estimated number of community deaths and VA completeness in the 46 VA Upazilas in Bangladesh, 2023

Sl No.	Division	District	Upazila	Total Population	CDR	Yearly Estimated Death	Yearly Estimated Community Death	Total Death Regi. (yr. 2023)	Total Smart VA Completed 2023	%
1	Khulna	Khulna	Phultala	95,375	5.81	554	443	751	415	94
2	Chattogram	Chittagong	Anowara	301,530	4.98	1,502	1,201	1353	796	66
3	Chattogram	Cumilla	Laksham	192,299	6.4	1,231	985	1054	608	62
4	Rajshahi	Joypurhat	Khetlal	110,262	6.4	706	565	668	340	60
5	Khulna	Bagerhat	Fakirhat	149,774	6.4	959	767	620	422	55



Sl No.	Division	District	Upazila	Total Population	CDR	Yearly Estimated Death	Yearly Estimated Community Death	Total Death Regi. (yr. 2023)	Total Smart VA Completed 2023	%
6	Barishal	Barishal	Gournadi	208,301	6.84	1,425	1,140	778	559	49
7	Dhaka	Gazipur	Kaliganj	305,135	4.98	1,520	1,216	1017	523	43
8	Dhaka	Gazipur	Kapasia	381,236	4.98	1,899	1,519	1194	652	43
9	Chatto gram	Brahmanbaria	Bancharampur	334,363	5.82	1,946	1,557	1409	486	31
10	Rajshahi	Bogra	Bogra Sadar*	424,981	5.21	1,107	886	1921	261	29
11	Dhaka	Narsingdi	Shibpur	356,951	6.4	2,284	1,828	1217	476	26
12	Rajshahi	Rajshahi	Paba	374,820	6.4	2,399	1,919	1488	480	25
13	Dhaka	Gazipur	Sreepur	689,376	4.98	3,433	2,746	1489	685	25
14	Sylhet	Sylhet	Bishwanath	286,132	5.82	1,665	1,332	920	330	25
15	Dhaka	Gazipur	Kaliakoir	787,061	4.98	3,920	3,136	1174	767	24
16	Dhaka	Narsingdi	Narsingdi Sadar	872,745	6.4	5,586	4,468	2204	1,062	24
17	Dhaka	Gazipur	Sadar	235,294	4.98	1172	937	489	210	22
18	Barishal	Patuakhali	Patuakhali Sadar	333,946	5.81	1,940	1,552	997	340	22
19	Dhaka	Shariatpur	Goshairhat*	176,016	6.8	598	478	382	102	21



Sl No.	Division	District	Upazila	Total Population	CDR	Yearly Estimated Death	Yearly Estimated Community Death	Total Death Regi. (yr. 2023)	Total Smart VA Completed 2023	%
20	Mymensingh	Mymensingh	Trishal	486,598	6.84	3,328	2,663	1642	413	16
21	Dhaka	Narayanganj	Rupganj	701,556	5.82	4,083	3,266	2636	478	15
22	Mymensingh	Mymensingh	Bhaluka	580,184	6.8	3,945	3,156	1423	434	14
23	Chatto gram	Cumilla	Nangalkot	472,276	6.4	3,023	2,418	1103	283	12
24	Khulna	Chudanga	Alamdanga	406,812	6.8	2,766	2,213	1634	242	11
25	Mymensingh	Sherpur	Sherpur Sadar*	497,179	6.84	1,700	1,360	1609	150	11
26	Rangpur	Nilphamari	Kishoreganj	284,471	5.8	1,650	1,320	522	138	10
27	Rajshahi	Naogan	Damorhat	194,141	6.4	1,243	994	1185	102	10
28	Sylhet	MoulviBazar	Kulaura	359,932	5.82	2,095	1,676	318	165	10
29	Dhaka	Manikganj	Singair	328,473	6.4	2,102	1,682	929	162	10
30	Khulna	Chuadanga	Damurhuda	332,530	6.8	2,261	1,809	1254	174	10
31	Chatto gram	Rangamati	Kaptai	59,522	5.8	345	276	266	23	8



Sl No.	Division	District	Upazila	Total Population	CDR	Yearly Estimated Death	Yearly Estimated Community Death	Total Death Regi. (yr. 2023)	Total Smart VA Completed 2023	%
32	Dhaka	Tangail	Dhanbari	202,184	6.3	1,274	1,019	1008	84	8
33	Rangpur	Nilphamari	Domar	282,804	5.8	1,640	1,312	498	91	7
34	Dhaka	Gopalganj	Mukshedpur*	328,420	6.84	1,123	898	553	68	7
35	Dhaka	Kishoreganj	Katiadi*	373,552	4.98	930	744	1428	56	7
36	Dhaka	Dhaka	Dohar	309,685	4.98	1,542	1,234	893	72	6
37	Khulna	Bagerhat	Bagerhat Sadar*	252,383	6.4	808	646	1148	34	5
38	Rangpur	Lalmonirhat	Hatibandha	268,625	5.8	1,558	1,246	413	49	4
39	Sylhet	Habiganj	Nabiganj*	385,000	5.8	1,116	892	1005	36	4
40	Chatto gram	Brahmanbaria	Bijoynagar*	290,356	5.8	842	673	2110	36	3
41	Dhaka	Manikganj	Ghior*	179,112	5.81	520	416	649	7	1
42	Khulna	Kushtia	Mirpur*	440,202	6.4	1,408	1,126	1234	14	1
43	Dhaka	Faridpur	Boyalmaria*	294,728	5.82	858	686	659	7	1
44	Barishal	Bargona	Bargona Sadar*	308,879	5.83	900	720	886	3	0.41



Sl No.	Division	District	Upazila	Total Population	CDR	Yearly Estimated Death	Yearly Estimated Community Death	Total Death Regi. (yr. 2023)	Total Smart VA Completed 2023	%
45	Barishal	Patuakhali	Galachipa	418,436	5.8	2,427	1,942	898	-	0
46	Chatto gram	Bandarban	Ruma	33,096	6.84	226	181	50	-	0
Total				15,686,733		81,559	65,243	49,078	12,835	19.7

*VA implementation in these Upazilas only started in mid-2023 and the relevant figures are therefore for only 6 months.

The analysis of the VA completeness rates across various upazilas in Bangladesh reveals distinct performance categories (Table 1). In the 0-25% completeness rate group, several upazilas, including Ruma (0%), Galachipa (0%), Barguna Sadar (0.41%), Boyalmari (1%), Ghior (1%), and Mirpur (1%), demonstrate significant challenges in data collection, indicating urgent needs for improvement. The 26-50% group shows moderate progress, with upazilas like Shibpur (26%) making efforts, but still requiring enhanced strategies to boost their completion rates. The 51-75% group reflects better performance, highlighted by Fakirhat (55%) and Gournadi (49%), showing a stronger commitment to data collection, yet still leaving considerable room for further improvement. Finally, the 76-100% group showcases the highest achiever, Phultala Upazila (94%), exemplifying effective data collection practices and serving as a model for others. This categorization underscores the varying degrees of performance across regions and highlights the need for targeted interventions to improve overall data completeness in the verbal autopsy program.



2.2 VA Instrument and Field Data Collection

Bangladesh adapted and used the electronic implementation of the shortened Population Health Metrics Research Consortium (PHMRC) SmartVA instrument from the Institute of Health Metrics and Evaluation⁴. The questionnaire was translated into the local language, converted into an XForm format suitable for use by the Open Data Kit (ODK) software, and installed on the locally hosted ODK server and connected to the ODK Collect apps on the mobile tablets of the interviewers.

Using the PHMRC SmartVA questionnaire and ODK, the trained VA interviewers collected information on the deceased's symptoms, signs, and their duration in the period leading to death. The data were then downloaded from the ODK server and analyzed using the SmartVA-Analyze (Tariff 2.0) algorithm.

At the first step, the community health workers (Health Assistant - HA and Family Welfare Assistant - FWA) identify deaths that have occurred and collect death information about the event during their regular home visits or other routine activities. In accordance with their schedule of work, Health Assistants visit each household in their area of responsibilities once a month, while Family Welfare Assistants visit homes approximately every 45 days. Once a death is identified, the HA or FWA fills out the death notification form at the deceased's home. The HA or FWA then submit the form to the union supervisor (e.g. health inspector, assistant health inspector, family planning inspector). The supervisors meet once or twice a month at a community clinic, union health and family welfare centre or union sub-centre. They review the notification form, identify duplicates and then submit the form to the local Union Parishad office (Birth & Death Registrar). The Union Parishad office enters the death information to the BDRIS online system and provides the supervisor with a 17-digit death registration number which also acts as the VA identification number and is subsequently passed on to the respective VA interviewer.

Next, the VA interviewer visits the deceased home to schedule the date and time of the VA interview. This happens after an adequate mourning period, usually between 6 weeks and 3 months after the death, up to a maximum of 1 year, to minimize recall bias. Religious and private occasions are avoided. The interviewer also selects the most appropriate person to provide the information on signs, symptoms and associated illnesses with the death. The

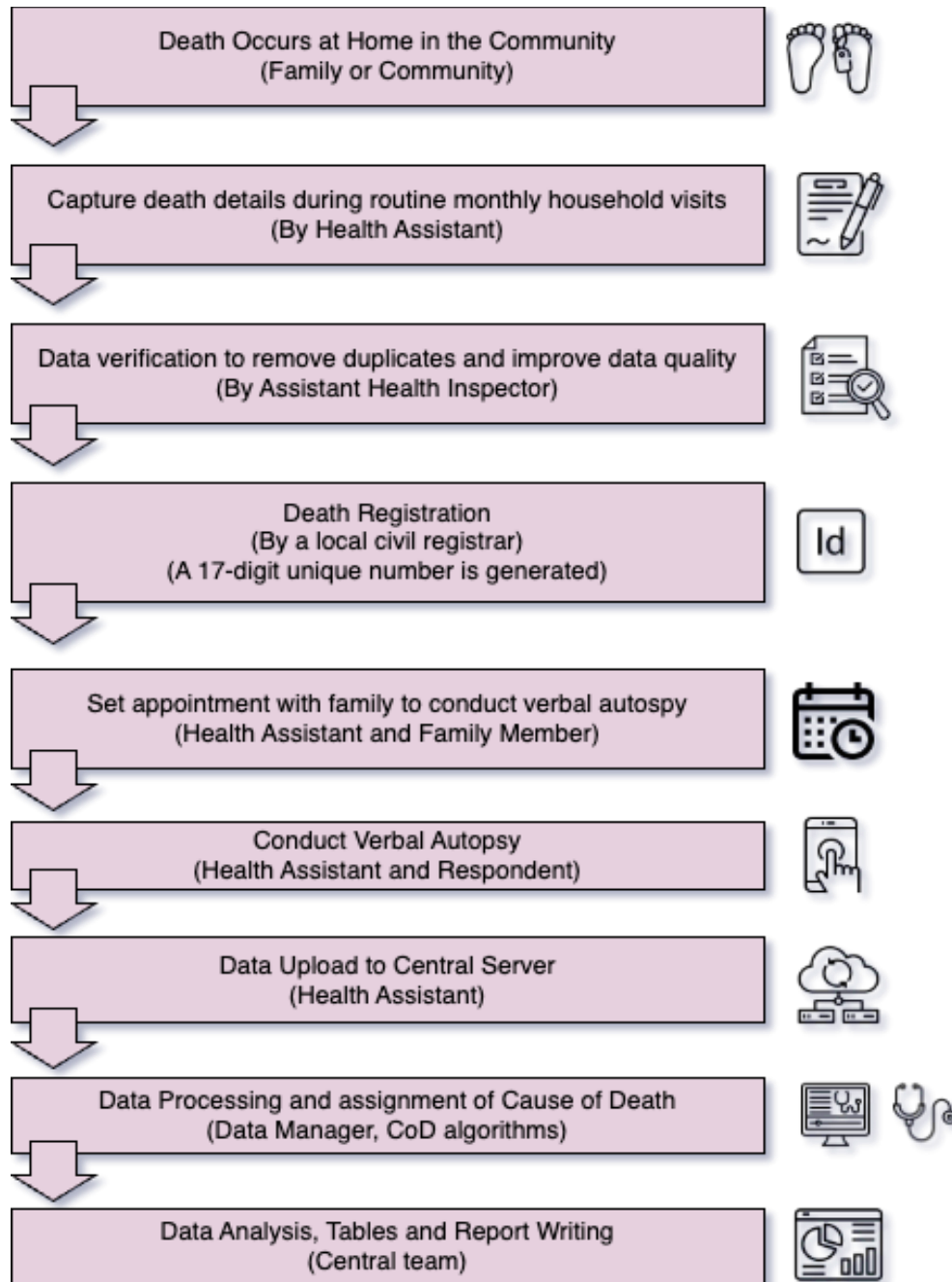
⁴IHME. Verbal autopsy tool | Institute for Health Metrics and Evaluation [Internet]. Verbal autopsy tool. [cited 2025 Apr 14]. Available from: <https://www.healthdata.org/data-tools-practices/verbal-autopsy>.



family is asked to have relevant documents, such as the deceased's national identification card and medical records ready.

The interviewer then returns to the deceased's house to conduct a VA interview. The purpose of the visit and the importance of VA are explained, and the interviewer asks for verbal consent before beginning the interview. After receiving consent, the interviewer conducts the VA interview with a VA supervisor accompanying every fifth case and checks the tablet after the interview. Finally, the interviewer sends the completed form to the ODK server.

A total of 13,827 verbal autopsy records were retrieved from the ODK system for deaths that occurred in 2023. During data cleaning, 2,190 records were excluded: 1,900 (14%) due to missing date of death, 244 (2%) due to an unknown date of death, and 46 (0.3%) due to lack of consent for the interview. After cleaning, the final analytical dataset comprised 11,637 records, representing approximately 17.8% of the total expected community deaths in 2023



Ref: This flowchat has been designed using resources from Flaticon.com

Figure 1: Process flow for verbal autopsy field work implementation, automated data collection, analysis and use



2.3 Demographic Characteristics

The distribution of the VA records by type of VA questionnaire and by sex is displayed in Table 2 below, indicating 67.4% (N=7,848) were males and 32.5% (N=3,781) were females. A very small number (2, 1 and 5) were identified as a Third gender, or it was not possible to identify the sex of the deceased at the time of the interview (Don't know) or the interviewee refused to disclose the sex/gender of the deceased (Refused to answer). In total there were 11,629 records with sex specified as female or male. Distribution by age groups, Neonate (0-28 days), Child (29 days to 11 years) and Adult (12 years and above) shows that most deaths from VA interviews were adult deaths (98.4%), and only 1.2% were deaths of children from 1 month old to 11 years of age, and a very small proportion (0.4%) were neonatal deaths.

Table 2: Distribution of VA records by gender and VA questionnaire type (i.e. age group)

Gender	Age Group			Total
	Adult	Child	Neonate	
Male	7,741 (66.5%)	78 (0.7%)	29 (0.2%)	7,848 (67.4%)
Female	3,706 (31.8%)	58 (0.5%)	17 (0.1%)	3,781 (32.5%)
Third gender	2 (0.0%)	(0.0%)	(0.0%)	2 (0.0%)
Don't Know	1 (0.0%)	(0.0%)	(0.0%)	1 (0.0%)
Refused to answer	5 (0.0%)	(0.0%)	(0.0%)	5 (0.0%)
	11,455 (98.4%)	136 (1.2%)	46 (0.4%)	11,637 (100.0%)

Table 3: Distribution of community deaths by broad age groups

Age in Years	N	%
0-4	143	1.2
5-14	69	0.6
15-59	4,707	40.5
60+	6,718	57.7
Total	11,637	100



Table 3 shows distribution of community deaths by broad age categories: 0-4 years, 5-14 years, 15-59 years, and 60+ years. These are age groupings typically associated with the reporting of health intervention programs and in reporting the international indicators. It is unclear why deaths in children below 15 years were very few among all deaths reported.

Death Pyramid

The death population pyramid displays a distinct V-shaped pattern by age (Figure 2). Mortality is slightly elevated among children under five years old, accounting for 0.5% of female deaths and 0.7% of male deaths. However, deaths reported by VA in 2023 remain relatively low across the younger and working-age populations, with gradual increases starting from age 25 onwards. A sharp rise in deaths is observed from age 50 upward, peaking dramatically among the elderly (65+), who account for 14.6% of females and 31.7% of male deaths.

This pattern suggests a low mortality burden among younger age groups (5-49 years) in the dataset analyzed here, with substantially higher mortality concentrated among older adults, particularly senior males. The sharp increase in mortality among the elderly reflects the typical burden of age-related and chronic conditions. The death among males is predominant across most age groups, especially in older ages, may indicate either higher vulnerability of men to chronic diseases or external causes of death compared to women, or the VA system is missing significant number of female deaths, or both.

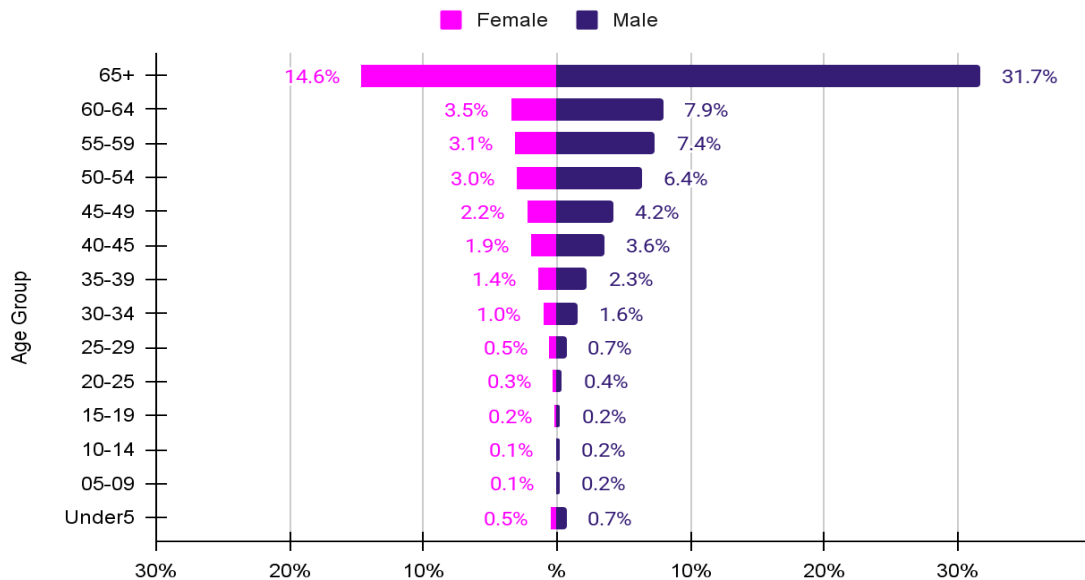


Figure 2: Death population pyramid. N=11,629.

Data Quality Assurance

VA interviewers underwent a comprehensive four-day training focused on standardized data collection procedures. The training covered a detailed review of the VA instrument, clarification of question definitions, and hands-on practice using tablet-based data collection tools. Interviewers were also trained on ethical community engagement, including how to obtain informed consent for death interviews and how to identify the most appropriate respondent. The sessions included mock interviews to reinforce practical skills.

The PHMRC Verbal Autopsy instrument was downloaded and adapted for the local context. The tool includes built-in data quality controls such as input validation for numeric and text fields, pre-defined dropdown options to restrict entries to permitted ranges, and logic-based skip patterns to ensure consistency and relevance throughout the interview. These features helped to maintain high data quality during data entry. Further quality assurance was conducted during data extraction and processing of the cause of death (COD). The data manager filtered the dataset to include only deaths



that occurred in 2023. Additional metadata—such as submission date and time, interviewer identification, and the respondent’s relationship to the deceased—were reviewed and validated to enhance data reliability and completeness.

Overall, data Quality Assessment was conducted in three key steps:

1. Monthly review: A regular check to ensure the data completeness, including a comparison between targeted and calculated completeness levels.
2. Annual assessment: An in-depth evaluation conducted annually to assess the overall data quality.
3. Review workshop: A comprehensive review workshop involving third-party stakeholders, both international and national, to critically assess the data quality.

Assignment of Cause of Death

Assignment of Cause of Death (COD) was done using the SmartVA Analyzer application version 3.0.0⁵. The input parameters were the source VA data from the ODK download, data origin (country) was set to Bangladesh, and specification for HIV and Malaria regions were set to False. Summary output from the SmartVA analyzer indicated 46 rows (records) declined the interview, 249 rows (records) did not have valid age data and could not be analyzed and 3 rows (records) had multiple cases predicted with equal likelihood. The application of the algorithm therefore resulted in 11,637 records with a COD computed.

⁵SmartVA-Analyze [Internet]. Institute for Health Metrics and Evaluation; 2025 [cited 2025 Jun 11]. Available from: <https://github.com/ihmeuw/SmartVA-Analyze>.



Chapter 3: Causes of Death Analysis

Following data cleaning and quality checks, and cause of death assignment using computer algorithms, a total of 11,637 deaths with cause of death information from verbal autopsies were analyzed to produce various tables and graphs to help understand the burden of mortality and the leading causes of deaths in the communities in Bangladesh that did not undergo formal medical certification of cause of death (MCCD) process. Recall that this is the interim analysis involving VA data from the 46 of the 69 national representative sample upazilas (66.7%) in Bangladesh. Therefore, these results should be carefully interpreted and understood with this context in mind.

To better present and understand the leading causes of death in this chapter 3, some specific causes within the same category of cause of death were combined to account their relative significance and contribution in the overall burden of mortality and their causes. For example, all accidents and injury-related specific causes of death were combined into one category named “Injuries & Accidents”, and all specific cancer-related causes of deaths were combined into one cause called “Neoplasms”. However, these combined causes were separated during cause-specific analysis of causes of death in Chapter 4. On a related note, analysis of specific maternal-related causes of death were not possible with the choice and type of the VA instrument and algorithm used.

Prior to conducting detailed cause-specific analyses in subsequent sections of this Chapter 3 and in Chapter 4, the causes of death were analyzed following the Global Burden of Diseases (GBD) broad and major causes (Sections 3.1, 3.2 and 3.3 below)

3.1 Global Burden of Disease (GBD)

Table 4 present causes of death according to GBD groups and major categories. More than two-thirds of all reported community deaths (68.2%) in 2023 were due to non-communicable diseases (GBD Group II), followed by Group III Injuries (3.3%), and deaths due to communicable disease at 2.0%. Significant proportion of deaths were



categorized as unusable (26.5%) causes combining both the undermined and ill-defined causes.

Table 4: Cause of death distribution by broad and major categories. Bangladesh VA 2023

GBD Broad Category	% of Total (N)	GBD Major Category	% of Total
Group I: Communicable	2.0% (N=236)	Infectious	1.2% (N=138)
		Maternal	0.6% (N=67)
		Neonatal	0.3% (N=31)
Group II: Non-Communicable	68.2% (N=7931)	Cancers	4.5% (N=529)
		Other NCD	63.6% (N=7402)
Group III: Injuries	3.3% (N=388)	External Causes	3.3% (N=388)
Unusable (undetermined and ill-defined)	26.5%(N=3082)		
N =	11,637		

3.2 Distribution of GBD broad causes by sex

Table 5 shows similar distribution of causes of death by GBD groups but disaggregated by male and female deaths. The overall pattern remains the same by sex, with deaths due to non-communicable diseases having a higher proportion in both males and females. However, the proportion is much higher among males (70%) than females (64.1%). Deaths due to external causes/injuries is also slightly higher among males (3.6%) than females (2.8%). For deaths due to communicable diseases, females have higher proportion (3.4%) compared to males (1.4%). While the proportions are very high among both sexes, the unusable cause of death seemed to be higher among female deaths (29.6%) compared to male deaths (25.0%)



Table 5: GBD Cause of death by broad and major categories, and by sex. Bangladesh VA 2023

GBD Broad	Gender		
	Male	Female	Other*
Group I: Communicable	1.4% (N=106)	3.4% (N=130)	
Group II: Non-Communicable	70.1% (N=5,502)	64.1% (N=2425)	50% (N=4)
Group III: Injuries	3.6% (N=281)	2.8% (N=107)	
Unusable	25.0% (N=1,959)	29.6% (N=1,119)	50% (N=4)
Grand Total	7848	3781	8

* Other contains Unknown Gender, Don't Know and Refused to Answer responses

3.3 Distribution of major GBD causes of death among males and females

Figure 3 below shows the distribution of major causes of death as classified by GBD. Cancers and other NCDs are leading causes of deaths for both males and females in the non-communicable GBD group. Small proportion of deaths were from infectious, maternal and neonatal conditions in in the GBD communicable group.

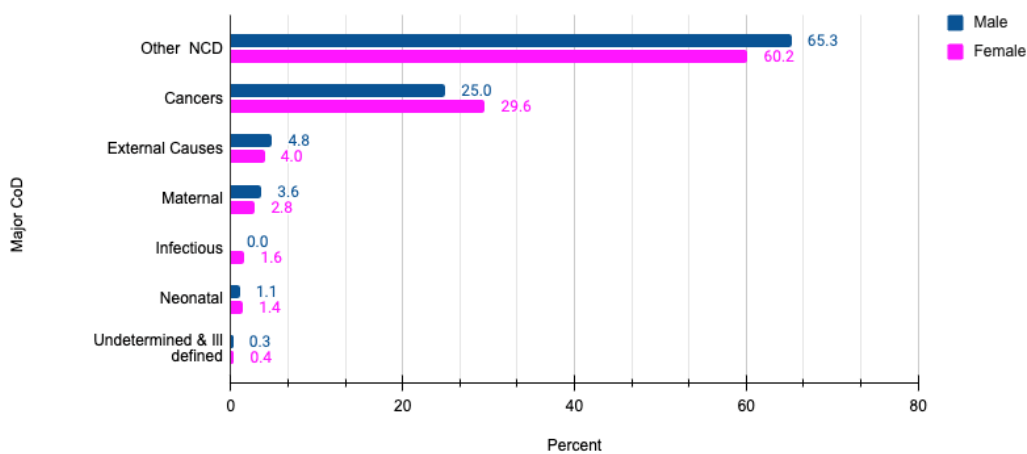


Figure 3: GBD major causes of death by sex, Bangladesh VA 2023



3.4: Leading Causes of Community Deaths

From this section to the end of chapter 3, the leading causes of death are presented for all deaths, then disaggregated by sex, and by age, and by sex and age specifically for adult deaths.

Figure 4 shows the contribution of specific causes of death to the mortality burden of community deaths in Bangladesh in 2023. The top five leading causes of death are all from non-communicable causes of death, with ischaemic heart disease having largest impact on deaths (28.5%), followed by stroke and Chronic Obstructive Pulmonary diseases (COPD), at 11.6% and 11.3%, respectively. Causes of death could not be determined using the algorithm for about a quarter (26.4%) of all reported community deaths in 2023. This is alarming,

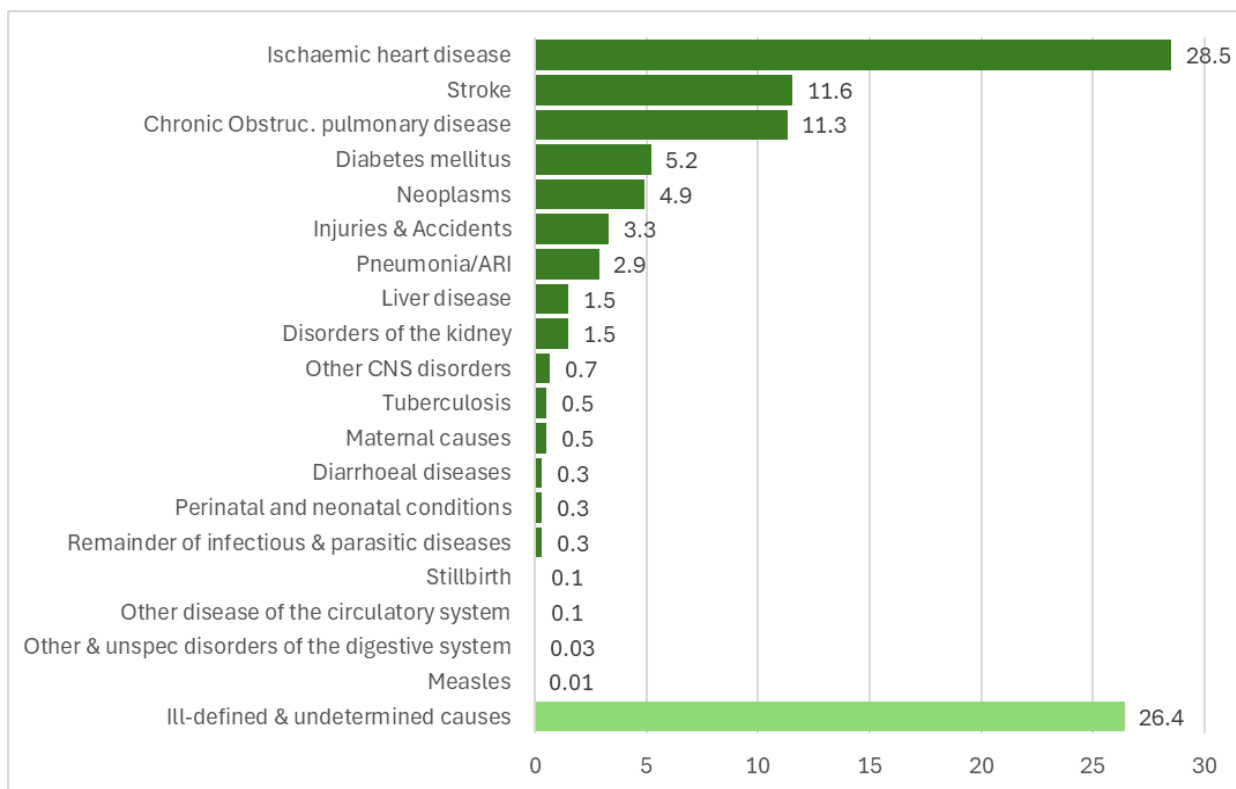


Figure 4: Community causes of death, all ages and sex. Bangladesh, 2023 (N = 11,637)



3.4a: Causes of death among females, all ages. Bangladesh 2023

It is important to analyze causes of death by age and sex to identifying disparities and understand specific diseases and factors that contribute to differences in mortality and their causes by age and sex to adequately guide decisions for effective public health interventions aimed at reducing preventable deaths.

Figure 5 presents the leading causes of death among females in 2023. Ischaemic heart disease was the predominant cause, accounting for 25.1% of all female deaths. This was followed by stroke (11.2%), chronic obstructive pulmonary disease (COPD) (10.2%), diabetes mellitus (5.9%), and neoplasms (4.4%). Notably, maternal causes contributed to 1.6% of all female deaths, underscoring the importance of targeted maternal health interventions. Further analysis of maternal mortality is detailed in Chapter 4, focusing on women of childbearing age. Pneumonia and acute respiratory infections (ARI) were responsible for 3.7% of deaths, while injuries and accidents contributed to 2.8%. The cause of death could not be determined for 29.5% of female deaths, a gap that highlights the need for improved diagnostic and reporting systems.

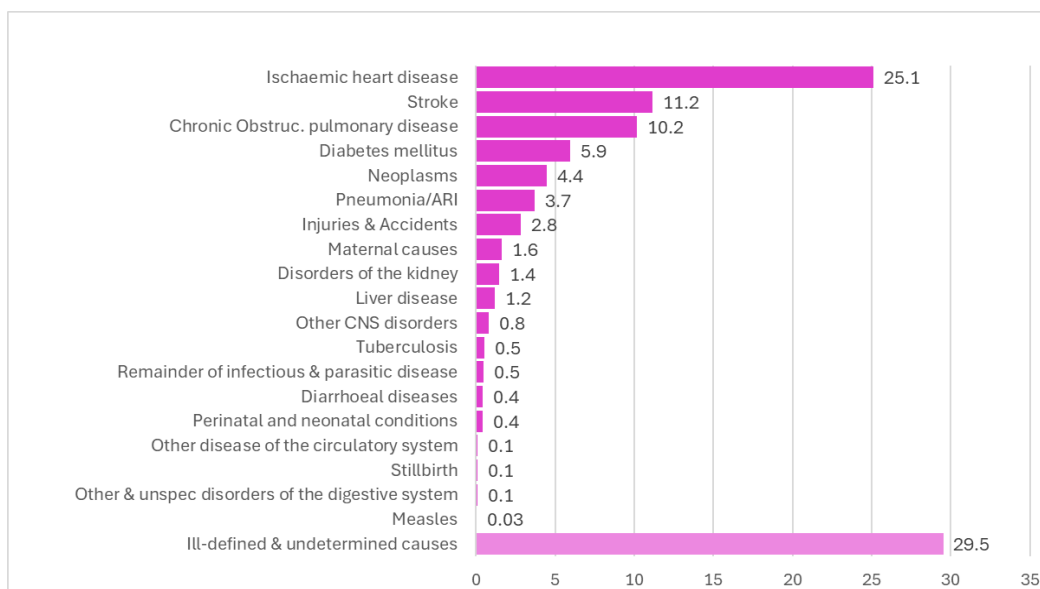


Figure 5: Community causes of death among females, all ages. Bangladesh, 2023 (N = 3,781)



3.4a: Causes of death among males, all ages. Bangladesh 2023

Similarly, Figure 6 outlines the leading causes of death among males of all ages in 2023 (7,848 deaths). Ischaemic heart disease was also the leading cause, but with a notably higher contribution—30.2%—compared to 25.1% in females. COPD (11.9%) and stroke (11.7%) followed, reversing the order seen in females. Neoplasms and diabetes mellitus contributed 5.2% and 4.9%, respectively. Injuries and accidents were higher among males (3.6%) than females (2.8%)—both in proportion and ordinal rank—placing them sixth among males but only seventh among females. This indicates a gender disparity in exposure to physical trauma and possibly occupational risks. Furthermore, pneumonia/ARI accounted for 2.5% of male deaths, slightly lower than in females. Overall, males exhibited a higher proportion of deaths due to both non-communicable diseases and external causes such as injuries. This pattern underscores the need for gender-responsive health policies that address both chronic diseases and injury prevention, particularly in the male population.

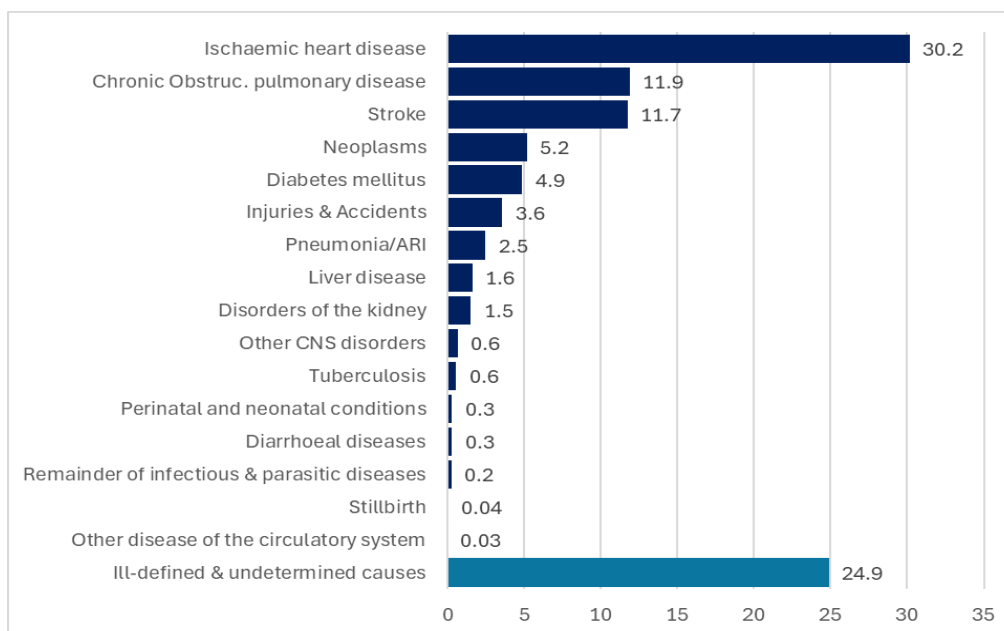


Figure 6: Community causes of death among males, all ages. Bangladesh, 2023 (N = 7,848)



3.5: Causes of death among children aged <5 years, Bangladesh, 2023

Bangladesh has achieved significant reduction in under-five mortality in more recent years⁶[6]. The 2023 VA data analyzed did not have large sample of deaths among children under 5 years. Only 1.2% of all 2023 reported deaths with completed VA interviews in the 46 upazilas were children aged under-five years. Figure 7 present causes of death in this age group. Major causes of under-5 death are perinatal and neonatal conditions including birth asphyxia (25.9%), acute respiratory infections including pneumonia (18.2%), and injuries and accidents at 16.1%. Notably, cause of death could not be determined for about 16.8% of deaths of children under-five years.

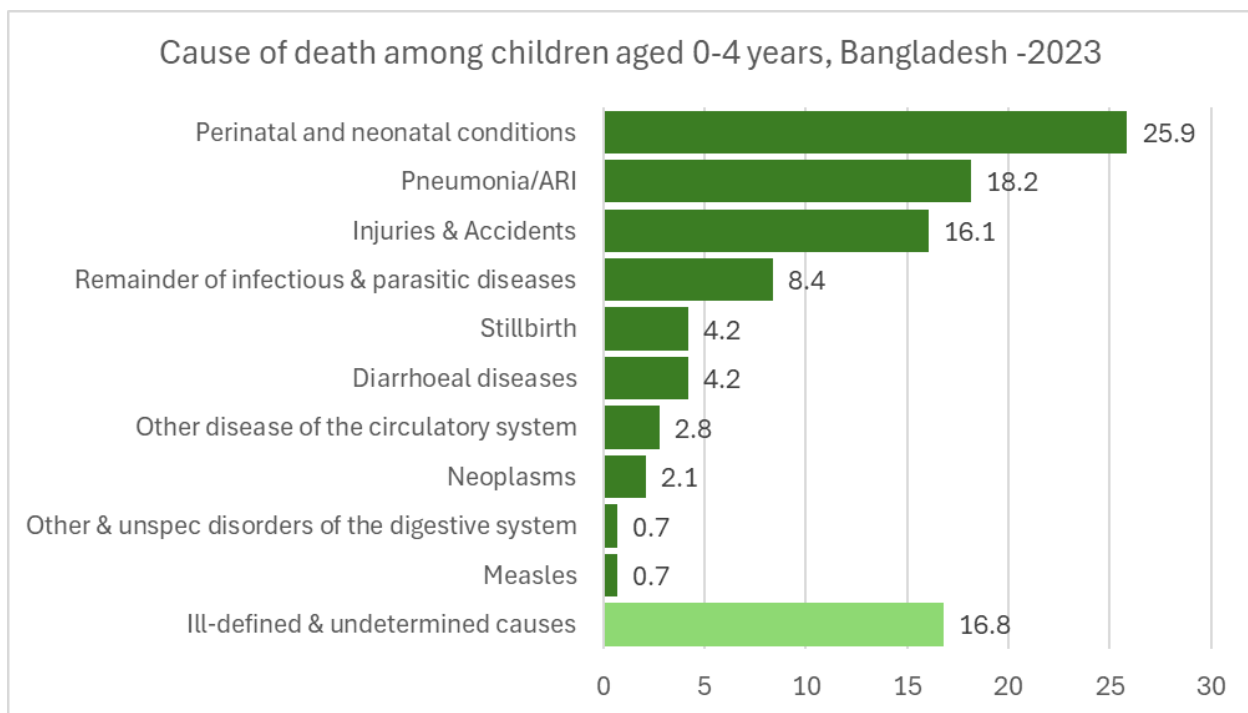


Figure 7: Community causes of death among children aged 0-4 years. Bangladesh, 2023 (N = 143)

⁶Naznin S, Uddin MJ, Ahmad I, et al. Analyzing and forecasting under-5 mortality trends in Bangladesh using machine learning techniques. PLOS ONE. 2025;20(2):e0317715.



3.6: Causes of death among children aged 5-14 years, Bangladesh, 2023

There were very few deaths (n=69) among children aged 5-14 years reported to have died in the communities in 2023 and VA interview conducted. This age group represents only 0.6% of all deaths with a VA in 2023 in the 46 Upazilas. Figure 8 represents leading causes of death in children in this age group. Deaths due to accidents and injuries contributes significantly (23.2%) to mortality in children aged 5-14 years. Drowning and road traffic accidents contribute to 75% of all external causes of death in children in this age group. Pneumonia, diarrhoeal diseases and cancer are also among the top five leading causes of death in children aged 5-14 year-contributing to 11.6%, 7.3%, and 4.4%, respectively. Ill-defined causes of death were high in this age group (30.4%).

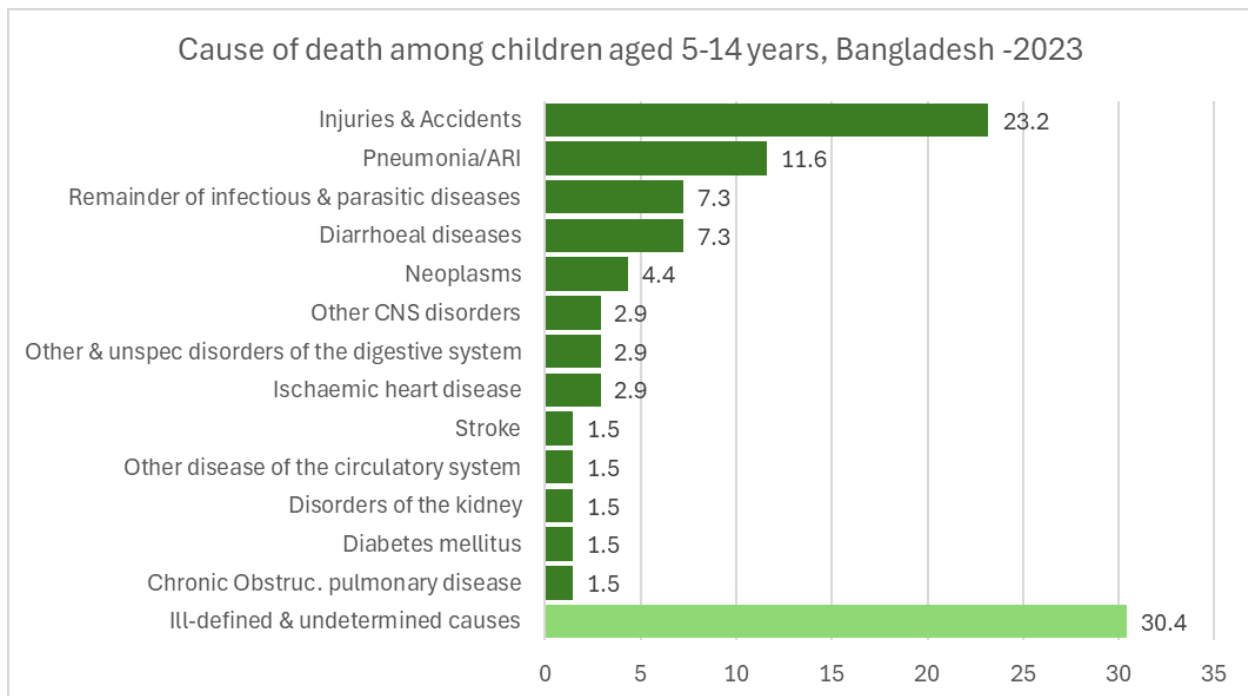


Figure 8: Community causes of death among children aged 5-14 years. Bangladesh, 2023 (N = 69)



3.7: Causes of death among adults aged 15-59 years, Bangladesh 2023

Figure 9 presents the leading causes of death among adults aged 15 to 59 years (representing 4,707 deaths). Ischaemic heart disease is the most prominent cause, accounting for 30.5% of all deaths in this age group. This is followed by stroke (10.9%), COPD (6.9%), and neoplasms (6.2%). Both diabetes mellitus and injuries and accidents each contributed equally, responsible for 4.9% of adult deaths. Notably, ill-defined and undetermined causes comprised a substantial 25.6% of all deaths, highlighting a significant gap in diagnostic reporting and the need for strengthening of the VA system.

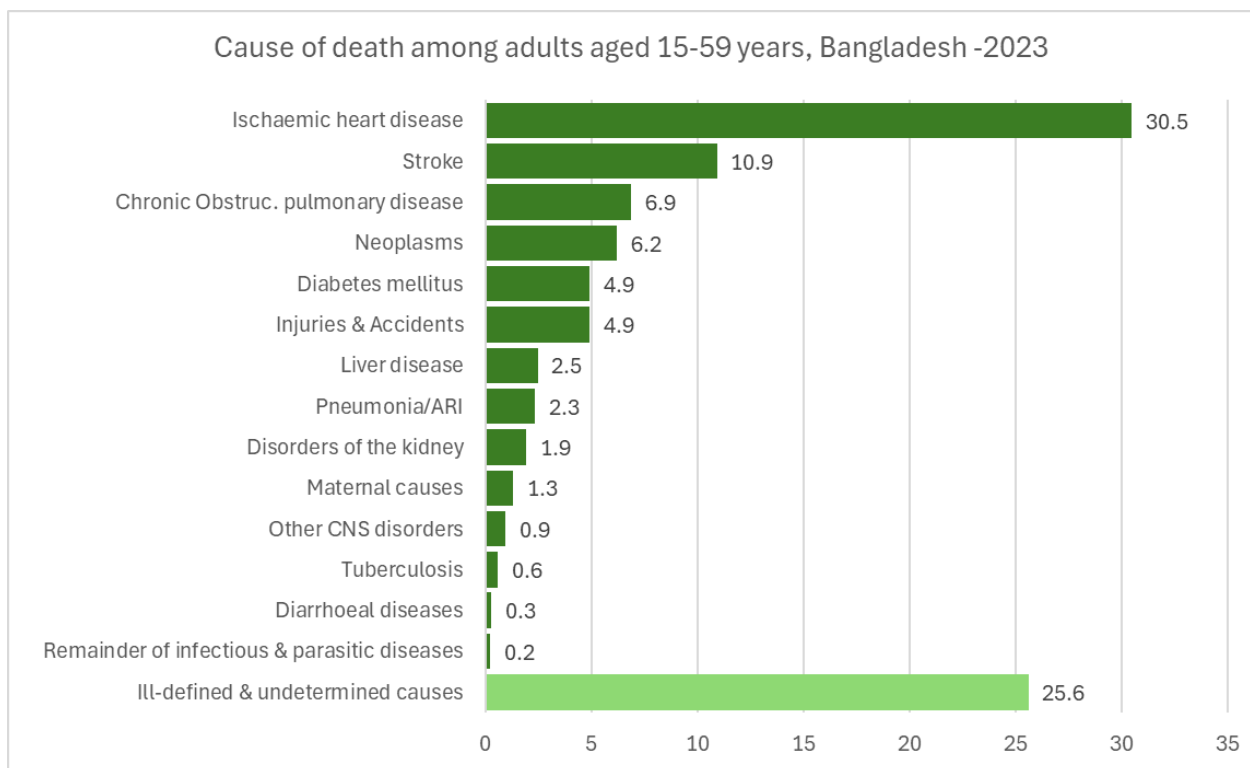


Figure 9: Community causes of death among adults aged 15-59 years. Bangladesh, 2023 (N = 4,707)



3.7a: Causes of death among adult males aged 15-59 years. Bangladesh 2023

Causes of death among adult’s males aged 15-59 years (3,108 deaths) indicates that Ischaemic heart disease was the leading cause of death among males aged 15-59 years in 2023 accounting for 33% of deaths, followed by Stroke (11.3%), COPD (7.3%), neoplasm (6.1%) and injuries and accidents (5.3%). A complete distribution of causes of death in males in this group is shown in Figure 10 below.

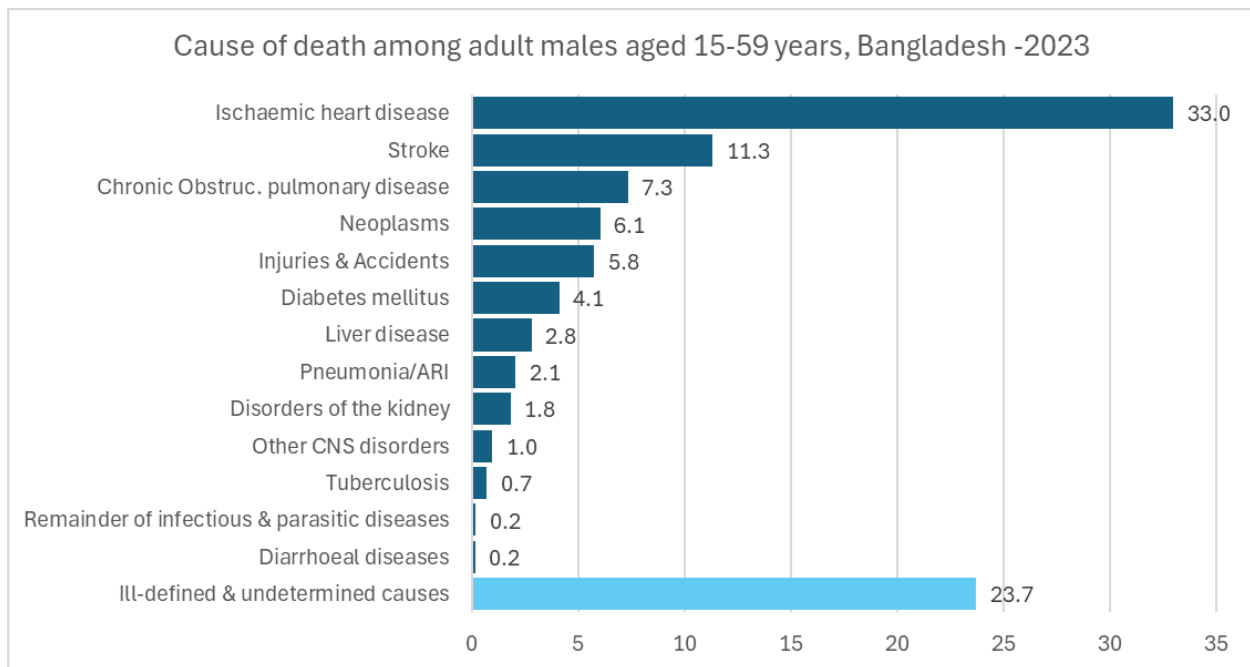


Figure 10: Community causes of death among males aged 15-59 years. Bangladesh, 2023 (N = 3,108)

3.7b: Causes of death among adult females aged 15-59 years, Bangladesh 2023

Figure 11 illustrates the leading causes of death among adult females aged 15 to 59 years (1,596 deaths). Ischaemic heart disease was the leading cause, responsible for 25.6% of deaths in this group. This was followed by stroke (10.2%), with neoplasms and diabetes mellitus each contributing 6.5%, and COPD accounting for 6.0%. Maternal causes were responsible for 3.8% of deaths, reflecting ongoing risks associated with reproductive health. Injuries and accidents accounted for 3.3%, while pneumonia and ARI contributed 2.9%. A significant 29.3% of deaths were attributed to ill-defined and



undetermined causes, highlighting a critical need for improved quality of data collection and

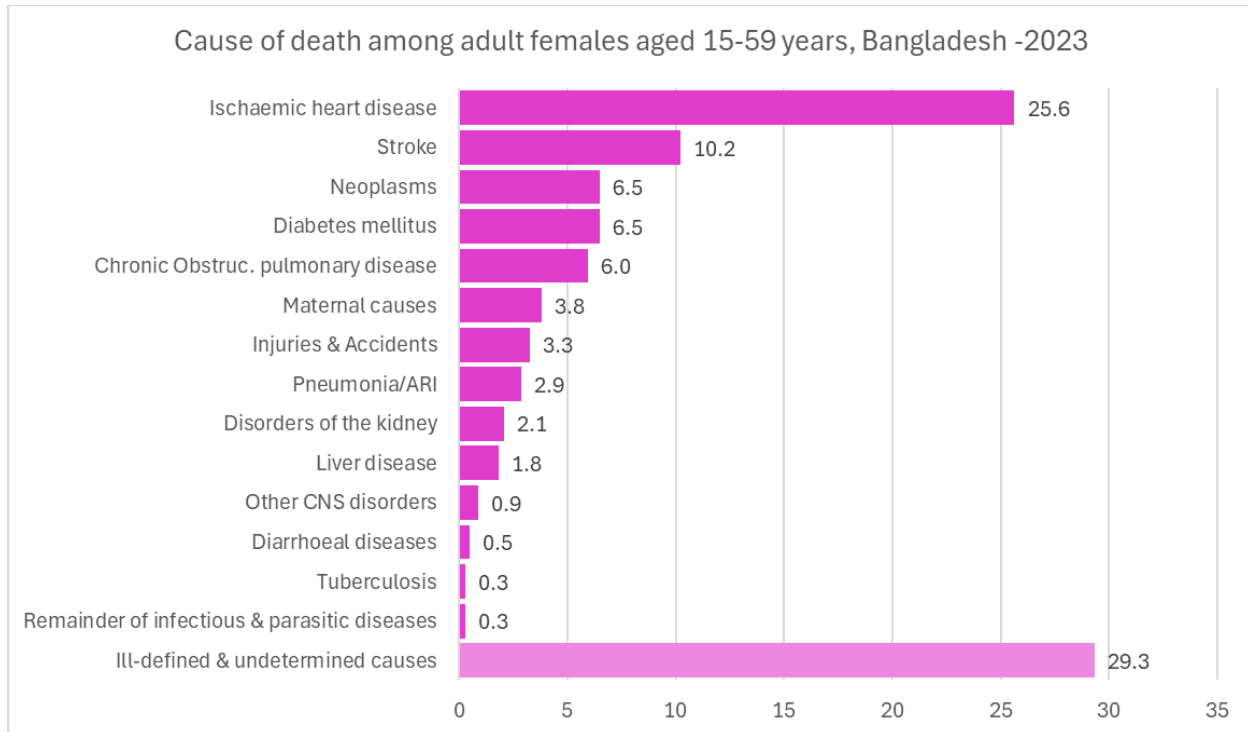


Figure 11: Community causes of death among females aged 15-59 years. Bangladesh, 2023 (N =1,596)

3.8: Causes of death among elderly aged 60+ years

Figure 12 presents the distribution of causes of death among the senior population in 2023 (6,718 deaths). Ischaemic heart disease was the leading cause, responsible for 28% of all deaths in this age group. This was followed by COPD at 14.8% and stroke at 12.3%, underscoring the significant burden of non-communicable diseases among older adults. Other notable causes included diabetes mellitus (5.6%), neoplasms (4.1%), and pneumonia/ ARI at 2.8%. Injuries and accidents contributed to 1.8% of deaths. Additional causes included kidney disorders (1.2%), liver disease (0.9%), and both tuberculosis (TB) and other non-communicable diseases (NCDs), each accounting for 0.5%. Importantly, 27.2% of deaths were classified as ill-defined or of undetermined cause, indicating a substantial gap in diagnostic accuracy and the need for improved mortality data systems in this age group.

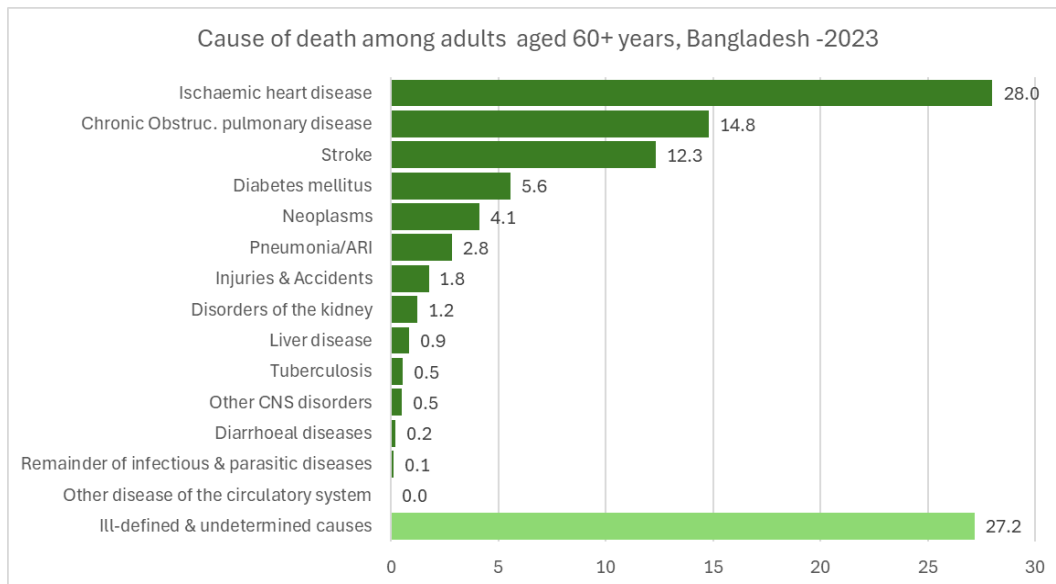


Figure 12: Community causes of death among the elderly aged 60+ years. Bangladesh, 2023 (N = 6,718)

3.8a: Causes of death among adult males aged 60+ yrs

Figure 13 presents the leading causes of death among senior adult males aged 60 years and above (4,609 deaths). Ischaemic heart disease was the foremost cause, accounting for 29.1% of deaths, followed by COPD at 15.3% and stroke at 12.3%. Diabetes mellitus contributed to 5.5% of deaths, while neoplasms and pneumonia/ARI accounted for 4.6% and 2.5%, respectively. A significant 25.8% of deaths were categorized as ill-defined or undetermined.

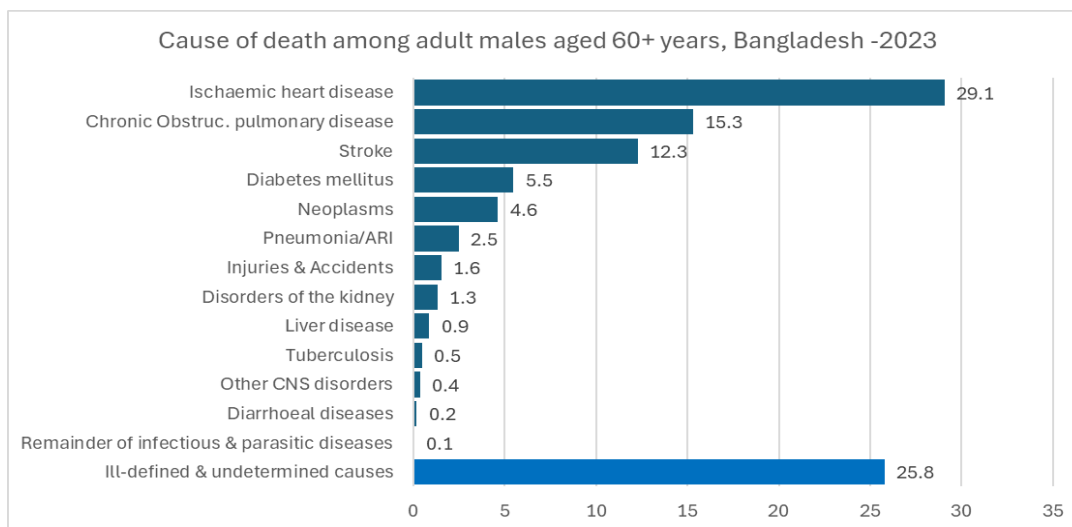


Figure 13: Community causes of death among males aged 60+ years. Bangladesh, 2023 (N = 4,609)



3.8b: Causes of death among adult females aged 60+ yrs

As shown in Figure 14, the leading cause of death among senior adult females (2,104 deaths) was also ischaemic heart disease, though at a slightly lower rate than males—25.7%. This was followed by COPD (12.7%) and stroke (12.3%). Diabetes mellitus accounted for 5.7% of deaths, pneumonia/ARI for 3.6%, and neoplasms for 3.0%. Injuries and accidents contributed to 2.2% of deaths in this group. Notably, 30.1% of female deaths were recorded as ill-defined or of undetermined cause—an even higher proportion than observed among males—highlighting an urgent need for improved diagnostic clarity, particularly in elderly women.

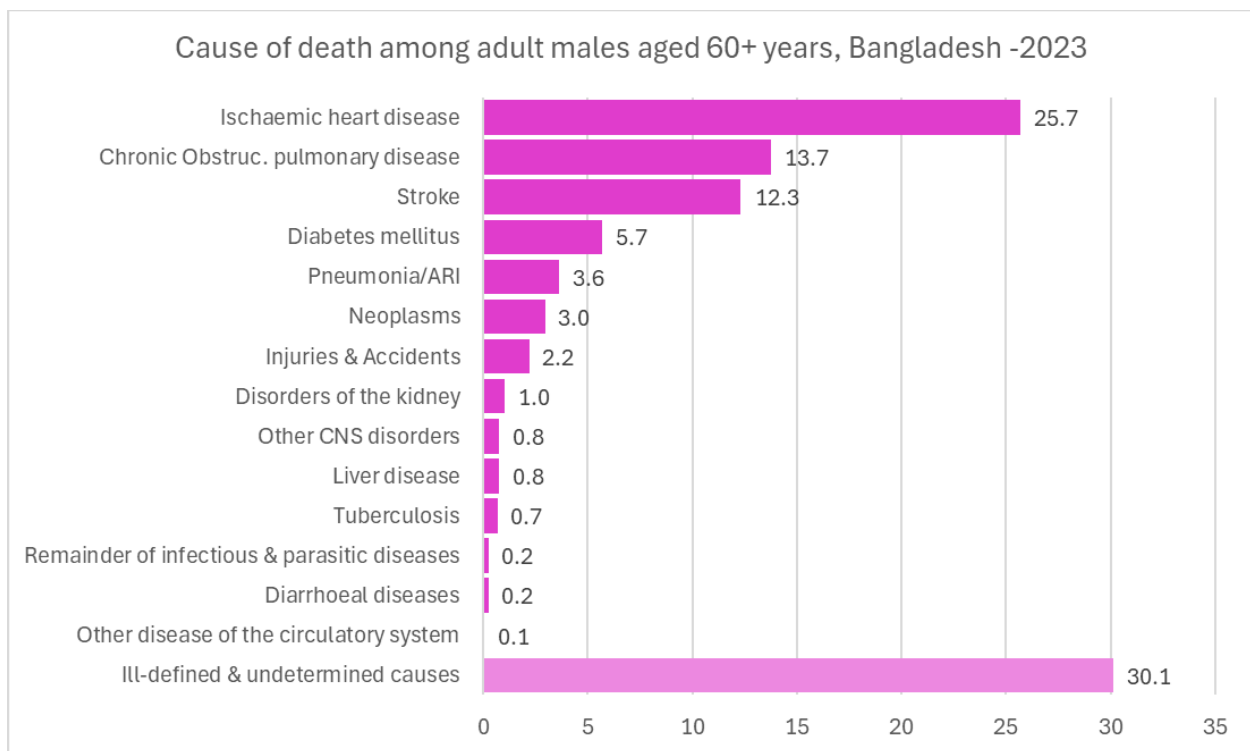


Figure 14: Community causes of death among females aged 60+ years. Bangladesh, 2023 (N = 2,104)



Chapter 4: Deaths from Specific Causes

In this Chapter 4, causes of death due to selected diseases and circumstances that are of public health importance are presented. These include deaths due to external causes, neoplasms and maternal deaths.

4.1: Deaths due to External causes

The WHO defines external causes of death as deaths due to external forces and circumstances, such as accidents, injuries, and violence, as well as certain complications of medical and surgical care. In Bangladesh, external causes of death primarily encompass deaths resulting from accidents, injuries, and violence, including unintentional events like traffic accidents and intentional acts like suicide and homicide. These deaths are significant contributors to the overall burden of mortality, particularly in younger populations.

Figure 15 presents specific causes of accidents and injuries among males and females (387 deaths overall). Among external causes of deaths, deaths due to transport accidents are leading causes of death among males, accounting for 55.5% of all male deaths due to external causes, and among females, accounting for 31.8% of all female deaths due to external causes. More males are dying from external causes and injuries compared to females. Death due to falls is the second leading cause of death among males and females, with females dying more from falls compared to males (29% of female deaths compared to 17.1% of male deaths due to falls for those dying from external causes). It is also important to note that data suggests more females are dying from intentional self-harm than males; the difference is two-folds (13.1% among females and 6.1% among males).

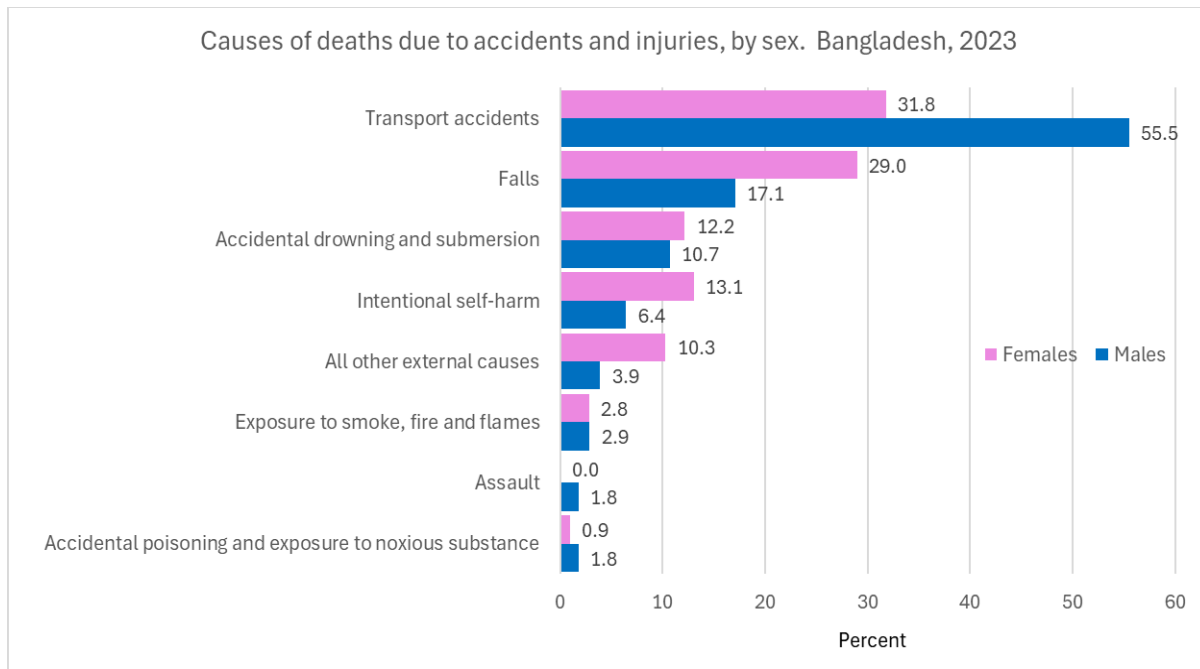


Figure 15: Specific causes of death due to external causes and injuries among males (N = 281) and females (N = 107). Bangladesh, 2023

4.2: Deaths due to Neoplasms

Deaths due to neoplasms are increasingly becoming prevalent in Bangladesh. It is estimated that over 150,000 deaths due to cancers occur annually, contributing to about 10% of all annual deaths⁷. In year 2023, Bangladesh saw a significant number of cancer cases, with prostate, lung, mouth-oropharynx, and stomach cancers being the most prevalent in men, and breast and cervical cancers being most prevalent in women.

Figure 16 show types of cancers for all community deaths due to neoplasms (574 deaths). Surprisingly, among all death doe to neoplasms (combined data for both sexes), prostate cancer is the leading cause of death contributing to one-third of all deaths due to neoplasms. The second leading cause of death is lung cancer at 22.7%, followed by esophageal cancer (11,2%) and cervical cancer at 9.2%.

⁷Reza S, Dewan SMR, Islam MS, et al. Response of Bangladesh to the World Health Organization call to eliminate cervical cancer as a public health issue: An observational report. Health Sci Rep. 2024;7(6):e2178.

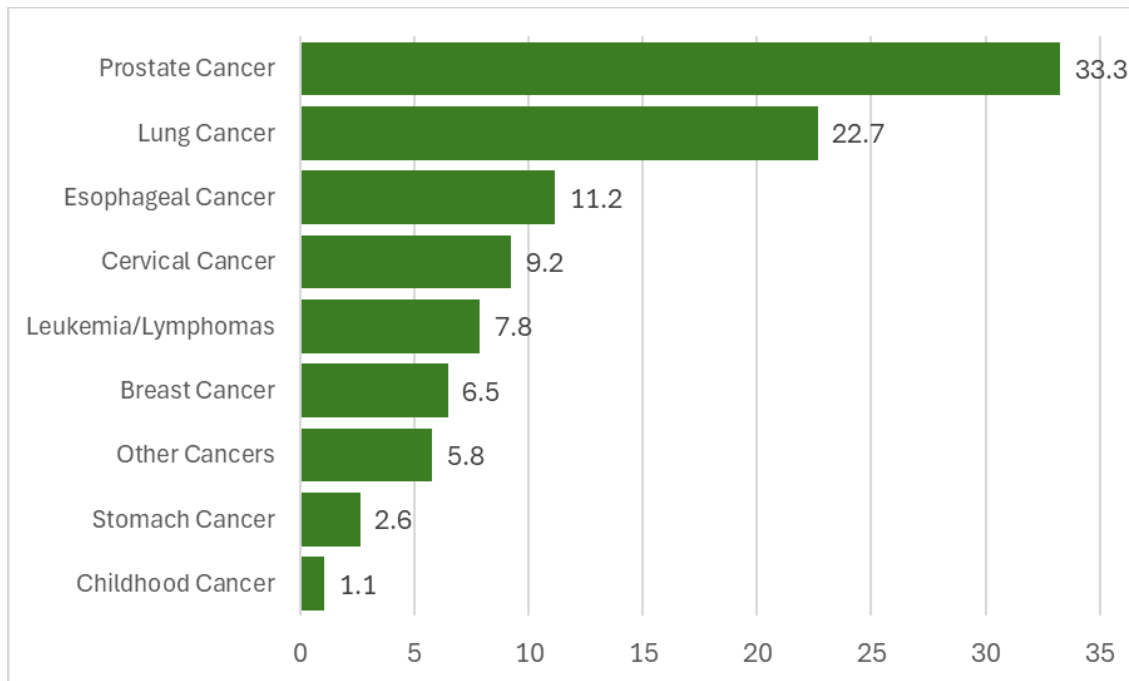


Figure 16: Type/Site of cancer for deaths due to Neoplasms, all ages and both sexes. Bangladesh, 2023

When disaggregated by sex of the deceased (Figure 17), the difference between males and females is striking among cancers that may occur in both males and females. Lung cancer deaths are about four times higher among males (29.3%) compared to females (6.6%). The big difference could be contributed to long term smoking among males. Contribution of stomach cancer deaths among females who died from cancers is higher (4.8%) compared to males who died from stomach cancer (1.7% of all cancer deaths among males)

Among males who died from neoplasms, prostate cancer is the leading cause of cancer deaths (47.0%), followed by lung cancer (29.3%) and esophageal cancer (10.8%). Among female deaths due to neoplasms, cervical cancer is the leading cause of death (31.6%), followed by breast cancer (22.0%) and esophageal cancer (11.9%)

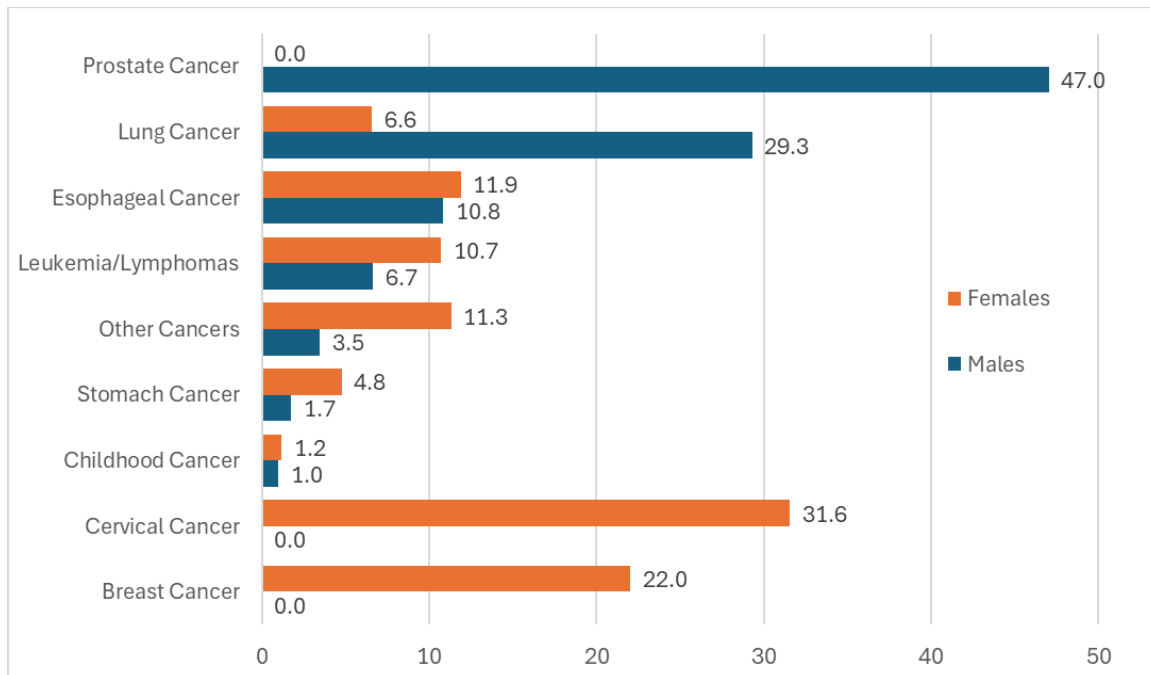


Figure 17: Type/Site of cancer for deaths due to Neoplasms, by males (N=406) and females (N=168). Bangladesh, 2023

It is worth noting that 41.2% of all adult male deaths (aged 15+ years) were smokers and only 4.6% of all adult females were smokers when they were alive. Long term smoking is considered as one of the major risk factors for developing lung cancer. Given that lung cancer was the second largest cause of death among adult males 15+ years, we further explored the relationship between smoking and death due to lung cancer out of all male deaths due to any type of neoplasms using Chi-Square method. Table 6 presents findings from this analysis.

Table 6: Relationship between smoking and dying from lung cancer among adult males.

Smoking	Lung Cancer		Total
	No	Yes	
No	217	10	227
Yes	70	109	179
Total	287	119	406

*Pearson chi2(1) = 154.1336, Pr < 0.0001



There was evidence of strong relationship between smoking and dying from lung cancer among adult males – where males who smoked were very likely to die from lung cancer compared to those who did not smoke.

4.3: Maternal deaths

Maternal mortality in Bangladesh has significantly declined in the last five years but continues to remain a public health concern as pregnant women still die each year from preventable causes related to pregnancy and childbirth⁸. The verbal autopsy data collected did not permit analysis of specific causes of maternal deaths. However, we analyzed the causes of death in women of child-bearing age (15-49 years) to assess the burden of maternal mortality among women in this age range. A total of 61 deaths among women of childbearing age were due to maternal-related causes.

Table 7: Age distribution of maternal deaths in Bangladesh, 2023

Age	N	%
15-19	1	1.6
20-24	5	8.2
25-29	12	19.7
30-34	12	19.7
35-39	15	24.6
40-44	9	14.8
45-49	7	11.5
Total (15-49)	61	100.0

The age distribution of women who died due to maternal cause is presented in Table 7. About 9.8% of maternal deaths occurred among young women below age 25 years.

⁸Chowdhury ME, Ahmed A, Kalim N, et al. Causes of Maternal Mortality Decline in Matlab, Bangladesh. *Journal of Health, Population and Nutrition*. 2009;27(2):108–123



Approximately 78.8% of women in childbearing age who died due to maternal causes were between ages 25 and 44 years.

Figure 18 presents the leading causes of death in women aged between 15 and 49 years. At 6.9%, maternal mortality is among the top five leading causes of death in women of childbearing age, after ischaemic heart disease and stroke.

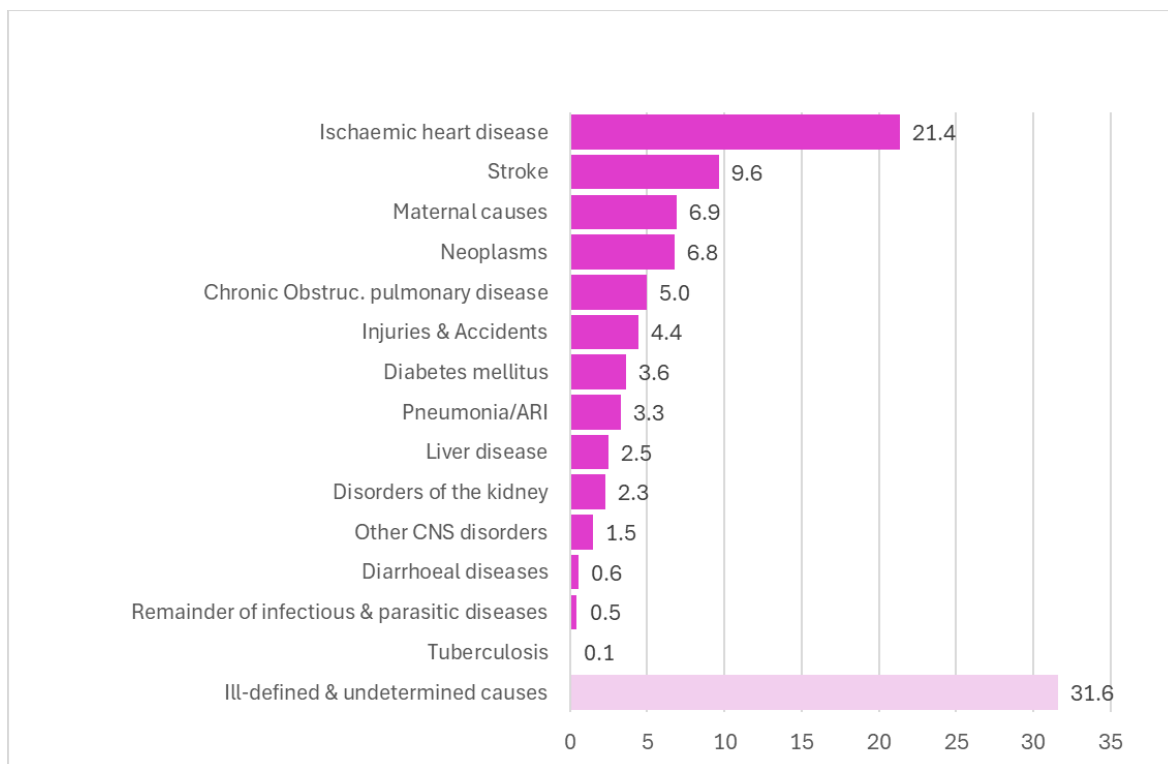


Figure 18: Causes of death among women of childbearing age (15 - 49 years, (N=61) in Bangladesh, 2023



Chapter 5: Treatment and Health Seeking Behavior

The VA instrument used in Bangladesh included some questions aimed at seeking information whether any form of treatment was sought or received by the deceased person during his or her illness in the period leading to death, and for those who received treatment, which health care facilities did they go to for medical care, in addition to receiving care at home.

From all 11,637 deaths with a VA in 2023, the VA respondents for only 3,326 (28.6%) deceased persons reported that some form of treatment was sought and received outside home care during illness that led to death. Among all male deaths, 28.4% received some form of treatment during illness that led to death, whereas the proportion for female deaths was 28.9%.

Figure 19 shows place of health care where treatment was sought by the deceased during illness prior to death. It is important to note that individuals who died may have visited more than one place of care during the period leading to death, and therefore, the proportions do not add up to 100%. Rather, it is the number of individuals who accessed the place and type of care and services at some point at those places during their illnesses before death--out of those who reported to have sought health care services outside home. More than half (59.3%) of deceased persons sought medical care at government hospitals at some point during illness before death. About 40% sought medical care at private hospitals. Approximately 13% of deceased individuals sought health care from either private physician, pharmacies, drug seller stores or markets during their illness before death.

A small proportion of individuals either sought homeopathy therapy, went to traditional healers, or to community-based practitioners associated with the health system, or



other care providers. About 1.7% of the deceased persons family members did not know or refused to mention the places visited to seek medical care during the illness of the deceased before death.

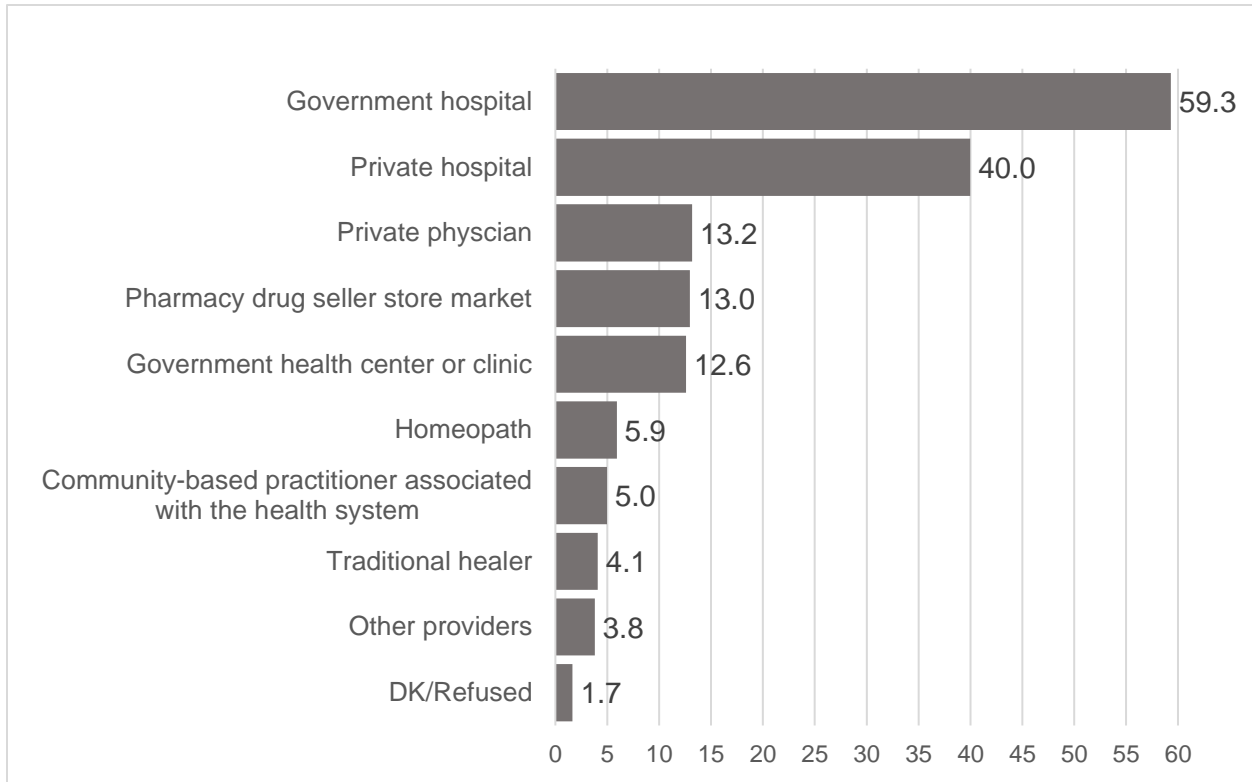


Figure 19: Place of treatment in the period leading to death. Bangladesh VA 2023



Chapter 6: Discussions, Recommendations and Conclusions

The collection and analysis of mortality data is critical for understanding the leading causes of death and guiding public health priorities, resource allocation, and the development of targeted prevention strategies. This report presents key findings, challenges, and recommendations from the 2023 Verbal Autopsy (VA) implementation in Bangladesh, covering 46 Upazilas with an estimated population of 15.69 million—approximately 9.2% of the country’s total population. Based on population estimates and crude death rates, around 81,559 deaths were expected, with approximately 80% (65,243) occurring in community settings.

The analysis reveals notable differences in mortality patterns based on age and sex. The findings suggests that older adults have a higher prevalence of ischemic heart disease, while respiratory conditions affect a broader age range. Gender disparities, in particular low numbers of female deaths compared to male deaths with a VA across all ages, highlighting the need to improve registration and VA data collection of death among females and the need for tailored health interventions. The leading causes of death in the communities in Bangladesh are predominantly non-communicable diseases including ischemic heart disease, stroke, and chronic respiratory diseases and neoplasms. The findings underscore the urgent need for targeted public health interventions and prevention strategies for NCDs.

Causes of death could not be determined for a significant proportion of deaths across different ages and sex - to the levels not recommended by the World Health Organization’s VA standards. We could not establish the reasons for this high proportion of undetermined causes from the dataset. Other remedial procedures should be put in place to investigate and address this high number of deaths with ill-defined and undetermined causes. Large proportion of ill-defined causes across different age groups and by sex highlights the need for better training, close follow up of field implementation, frequency data quality checks to significantly minimize the



proportion of undetermined causes and improve the overall accuracy of mortality data. It is worth noting that WHO recommends use of the Standard WHO VA instrument for VA implementation at national scale for reasons including the fact that the WHO standard tools have been validated in many settings, supports electronic data capture, and there is a wide network of support in terms of resources and technical expertise.

Lessons Learned

VA has shown promising results in determining causes of death for deaths occurring in the communities without medical certification of cause of death. One of the learnings from VA implementation in Bangladesh is the feasibility of having health assistants (HAs) conducting VA interviews in the households. This set up will ensure institutionalization and sustainability of VA implementation linked to CRVS system. However, conducting routine VA that is linked to CRVS requires the death to be registered in the civil registration system, and an ID must be generated. This dependency on timely death registration poses an obstacle when that process is delayed. While the 2023 VA data analysis included 46 of the 69 upazilas that were sampled for national representation, it is crucial time to continue scaling up of VA implementation in the remaining upazilas to reach national representation and to ensure coverage and reliability of mortality data and cause of death data, despite observed challenges in some regions, particularly in the remote areas when it comes to data collection and supervision. For the reasons mentioned above, it is however recommended that VA data collection is transitioned to the WHO questionnaire (specifically, the 2022 WHO VA Instrument).

Challenges in VA field implementation including inadequate training for VA interviewers and supervisors, coupled with logistical issues especially in remote areas, and inconsistencies in data collection process contributed to the low levels of overall data quality received from the field. This resulted into very high levels of ill-defined causes of death. Addressing these issues is crucial for improving the quality and accuracy of



VA data for use in public health decision making process. Effective trainings and periodic refresher trainings of both VA interviewers and supervisors is vital.

Variability in the completeness of VA data across different upazilas was observed. Some upazilas have relatively high completeness rates, while others are struggling with very low levels of completeness rates. It is important to establish good practices to ensure that VA coverage and completeness are improved. This will require routine monitoring from the central level as well as improved field-level supervision. Strengthening data collection processes and ensuring consistent application of protocols are essential for reliable data. More awareness campaigns and engaging communities can lead to improved response rates and VA data quality. Building trust and understanding of the local context is critical for successful VA implementation.

As noted earlier, remote and hard-to-reach areas pose significant challenges for VA data collection. Addressing these geographical barriers through better resource allocation and logistics planning can enhance data coverage and completeness.

The use of IT technology including using ODK Central and the VA Manager (VMan) software are critical for efficient data collection, data management and monitoring and evaluation processes. There needs to be a strong IT support to ensure smooth functionality of these innovative IT solutions.

General recommendations for VA implementation at national scale in Bangladesh.

Bangladesh has developed a suite of e-learning courses⁹ on Verbal Autopsy (VA) through the Directorate General of Health Services (DGHS), covering key topics such as VA introduction, registration, and procedures for different age groups, including neonates, children, and adults. These courses, available via the DGHS portal, aim to build capacity among health workers in accurately conducting and documenting verbal autopsies, although the instructional videos are primarily in the local language.

⁹E-learning courses⁹ on Verbal Autopsy (VA) through the Directorate General of Health Services (DGHS): <https://old.dghs.gov.bd/index.php/en/home/5464>



- **Conduct Regular Refresher Trainings:** Provide consistent training to health assistants to enhance their skills and ensure the effective execution of verbal autopsies.
- **Adopt a Multi-Sectoral Approach:** Strengthen collaboration among ministries to link local death registration processes with community health worker activities for seamless VA implementation.
- Consider conducting Physician review of verbal autopsy (PCVA) to confirm the findings from SmartVA algorithms particularly on deaths due to non-communicable diseases being so high, and also to investigate why so many VAs have unusable cause of death
- **Implement Data Quality Monitoring and Supervision:** Ensure regular supervision by health managers at all levels to maintain high standards of VA data quality and quantity. This also applies to routine data quality checks for VA data coming in from field sites.
- **Support to data collectors:** Allocate resources to support VA interviewers in reaching remote and underserved areas to conduct VA interviews on a timely basis.
- **Enhance Central Monitoring and Supervision:** Strengthen central oversight mechanisms to ensure VA completeness and improve data accuracy across all regions.
- **Plan for transition to WHO VA instruments:** Develop and implement a strategy to transition from the PHMRC VA short form to the WHO VA 2022, including a pilot phase to test the new instrument. The goal is to complete the transition as soon as possible within the next few months.
- **Conduct Regular Mortality Committee Meetings:** Organize regular Upazila Hospital Mortality Committee meetings to review progress and address implementation challenges.
- **Foster Collaboration for Routine Mortality Surveillance:** Continue to strengthen collaboration and communication between the Cabinet Division, DGHS/MIS, BBS, and other key stakeholders for routine mortality surveillance using Verbal Autopsy methods integrated with the national CRVS system.



Conclusion

The findings and insights from the 46 upazilas implementing VA for understanding community causes of death emphasize the need for continuous improvement in data collection practices, data analysis, and use to inform evidence-based decisions and development of targeted health interventions. Equally important, the VA data analysis from these 46 upazilas has identified some challenges and gaps in the current implementation of VA processes and recommends some considerations for addressing these challenges to enhance the program's overall effectiveness, including the need to minimize the gender gap by increasing female death notification and registration.

The VA program in Bangladesh, as evident in this report of 2023 data, underscores the critical role of comprehensive and accurate mortality data in shaping effective public health interventions. The program's expansion to cover a wider range of upazilas has significantly enhanced the scope of data collection, revealing important trends in causes of death and highlighting persistent challenges.

Key findings include the dominance of NCDs as leading causes of mortality, disparities based on age, gender, and geographical location, and the ongoing issues related to data completeness and quality. The variability in data coverage and the high percentage of undetermined causes of death signal the need for improved supervision, training, better logistical planning, and more robust community engagement.

Addressing these challenges is essential for refining the VA methodology and ensuring that the data collected is both reliable and actionable. By focusing on improving data collection processes, enhancing training programs, and leveraging technology effectively, the program can provide more accurate insights into mortality patterns and inform targeted public health strategies.

Ultimately, the lessons learned from 2023 VA implementation highlight the need for continued commitment to refining data collection practices and addressing gender disparities to better understand and tackle the evolving health challenges in Bangladesh.



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