Evaluation of Mortality Statistics in Turkey from 2017 to 2022: An Analysis of the Impact of COVID-19

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Abstract

Background: Examining death statistics at regular intervals is highly useful for assessing public health. This study aimed to analyze cause-specific mortality statistics, to ascertain their distribution over the years, and to offer remedial solutions to enhance public health outcomes.

Methods: In this retrospective descriptive study, an analysis was conducted on data sourced from the "Death and Cause of Death Statistics" provided by the Turkish Statistical Institute between 2017 and 2022.

Results: While the crude mortality rate remained stable from 2017 to 2019, a discernible increase in mortality rates has been observed since 2020, attributed to the impact of the pandemic. The crude death rate was the highest in the <5 yr and ≥65 yr age groups. Approximately 70% of the total mortality cases in Turkey were attributed to cardiovascular diseases, cancers, respiratory diseases, and diabetes.

Conclusion: Given the world's rapidly aging population, an increase in deaths related to the four major noncommunicable diseases is foreseen. Therefore, there is an imperative need to enhance efforts aimed at preventing and controlling these diseases.

Keywords: Cause of death; Crude death rate; Excess mortality; Death certificate; Death statistic; COVID-19

Introduction

Death statistics are a key indicator of overall health, playing a crucial role in monitoring healthcare policy effectiveness and guiding necessary adjustments (1,2). The World Health Organization (WHO) and most countries regularly publish these statistics on a national scale at predetermined intervals. It is thus necessary to systematically compile and classify them at regular intervals to monitor their changes over the years and enable meaningful comparisons (1,2).

In Turkey, since 2013, the documentation of each death has been carried out electronically through the "Death Notification System", overseen by the responsible physician. Each document is then reviewed for compliance by the relevant Public Health Directorate and, upon approval, is transmitted to the Turkish Statistical Institute (TURKSTAT) (1,2). The death certificate involves various pertinent information, including but not limited to: demographic data, details regarding the place and time of death, classification as a natural or unnatural death, indication of maternal, infant, or child mortality, and a comprehensive account of the cause of death along with

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any past illnesses that may have contributed to it. The causes of death are coded according to the WHO's "International Statistical Classification of Diseases and Related Health Problems (ICD-10)" (3).

The objectives of this study are as follows: 1) to examine the distribution, changes, and the impact of the pandemic on cause-specific mortality rates in Turkey between 2017 and 2022; 2) to provide a valuable resource for health policymakers and healthcare providers, offering insights into areas requiring improvement; 3) to propose recommendations for the refinement of death certificate issuance processes.

Materials and Methods

Ethical declaration and the data source

TURKSTAT regularly publishes "Death and Cause of Death Statistics" using databases from the Central Population Administration System and the Ministry of Health Death Notification System. Based on the Turkish Statistical Law No. 5429, it is possible to reuse the data obtained from publications or databases within the scope of the Official Statistics Portal without the need for any permission, provided that the source is appropriately acknowledged. In this cross-sectional study, conducted through internet research, specifically the "Death and Cause of Death Statistics," "Population and Housing Census" and "Address-Based Population Registration System Results" data from TURKSTAT between 2017 and 2022, were employed (Website: https://www.tuik.gov.tr Access Date: 27/06/2023). The principles outlined in the Declaration of Helsinki were followed in our study.

As this study is based on internet research, no ethics committee approval was sought or obtained.

Statistical analysis

Data for all years were integrated into a single table using Microsoft Office Excel. Within this table, percentages for causes of death were calculated for each specific year. Additionally, percentages representing the total causes of death between 2017 and 2022, cause-specific death percentages categorized by age groups, and percentages categorized by sex were also calculated. Cause-specific mortality rates per 1000 population were calculated on the basis of years, sex, specific age groups. The OpenEpi application was used to examine whether the differences in the proportions of causes of death among sexes were statistically significant within the total deaths(https://www.openepi.com/Menu/OE_Menu.htm). The number of deaths that occurred over five years due to the specified cause of death, juxtaposed with the total deaths from other causes, was tabulated in a four-cell table for both sexes, and a chi-square test was conducted to evaluate the statistical significance of the observed differences. The *P*-value of <0.001 was considered statistically significant, suggesting that the prevalence of the cause of death either lower or higher in one sex compared to the other.

Results

The crude mortality rate remained stable from 2017 to 2019; however, a notable increase was observed in 2020 and 2021 attributed to the pandemic. In 2022, there was a discernible decline, albeit the rate remained elevated compared to the pre-pandemic period (Fig. 1).

Between 2017 and 2022, the crude death rate was highest in <5 yr and ≥65 yr age groups. During the pandemic period (2020-2022), there was an increase of 0.3-0.5 per 1000 individuals in the crude death rate among the 15–64 age group compared to the year 2019, while the ≥65 age group demonstrated a more substantial increase of 5–8.3 per 1000 individuals. However, no significant change was observed in the <14 age group during the same period (Table 1).
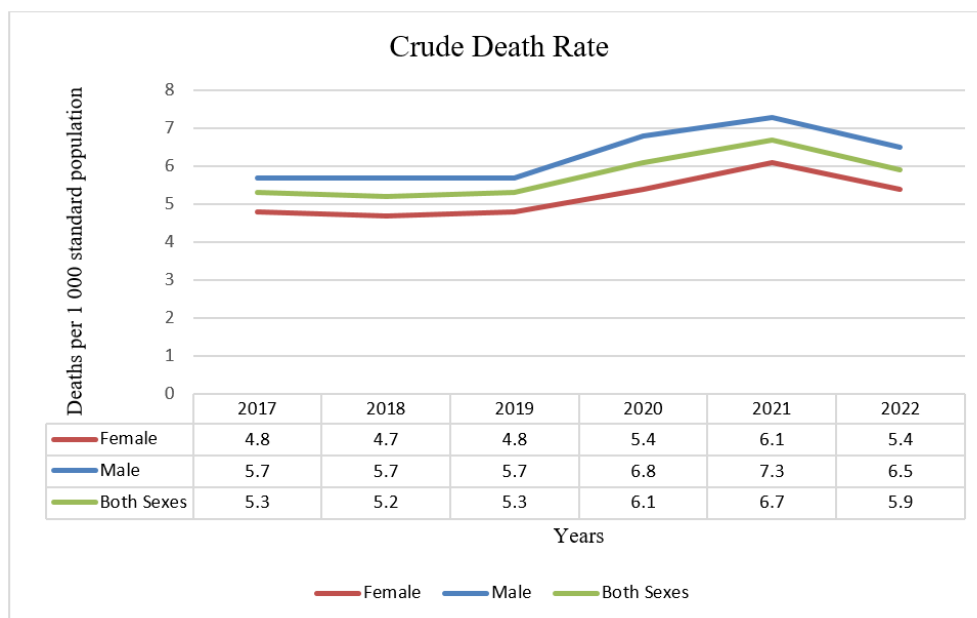
Fig. 1: Change in crude death rates by years

Table 1: Crude death rates (per 1000 population) by specific age groups between 2017 and 2022

Year	Sex	Age Groups(yr)						
		Neonatal	Postneonatal	İnfant	<5 ages	5-14 ages	15-64 ages	≥65 ages
2017								
	Female	5.5	3.3	8.7	10.7	0.4	1.3	38.8
	Male	6.4	3.5	9.9	12	0.5	2.6	48.8
	Both Sexes	6	3.4	9.3	11.3	0.4	1.9	43.2
2018								
	Female	5.5	3.3	8.8	10.7	0.2	1.2	37.9
	Male	6.5	3.3	9.9	12.1	0.2	2.6	47.7
	Both Sexes	6	3.3	9.3	11.4	0.2	1.9	42.2
2019								
	Female	5.3	3.2	8.5	10.5	0.2	1.2	37.2
	Male	6.4	3.6	9.9	12.2	0.2	2.5	47.1
	Both Sexes	5.9	3.4	9.3	11.4	0.2	1.9	41.6
2020								
	Female	5	3	8	10	0.2	1.4	40.1
	Male	6.1	3.3	9.4	11.4	0.2	2.9	55
	Both Sexes	5.6	3.1	8.7	10.7	0.2	2.2	46.6
2021								
	Female	5.5	3.2	8.7	10.6	0.2	1.7	44.3
	Male	6.5	3.4	9.9	12	0.2	3.2	57
	Both Sexes	6	3.3	9.3	11.3	0.2	2.4	49.9
2022								
	Female	5	3.4	8.4	10.2	0.2	1.3	39.4
	Male	6.4	3.6	9.9	12.1	0.2	2.7	50.5
	Both Sexes	5.7	3.5	9.2	11.2	0.2	2.0	44.3

Across all years and in both sexes, the most common causes of death were identified as circulatory system diseases, neoplasms (tumours), and respiratory system diseases. In females, deaths due to circulatory system diseases, diseases of the nervous system and sensory organs, endocrine, nutritional, metabolic diseases, and infectious diseases surpassed that of males. On the other hand, in males, deaths due to neoplasms, respiratory system diseases, external injuries and poisonings, as well as COVID-19 exceeded that of females (Table 2).

Table 2: The causes of death, total numbers, and corresponding percentages by sexes between 2017 and 2022

Causes of Death	2017	2018	2019	2020	2021	2022	2017-2022		
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	**Female n, %**	**Male n, %**	**Both n, %**
Diseases of the circulatory system	167,267	161,190	163,014	183,442	189,876	178,501	517,024	526,266	1,043,290
	39.5	37.8	37.3	36.0	33.5	35.4	39.9	33.5	36.4
Neoplasms	81,886	82,288	80,720	79,916	79,290	76,657	172,117	308,640	480,757
	19.3	19.3	18.5	15.7	14.0	15.2	13.3	19.6	16.8
Diseases of the nervous system and the sense organs	20,623	20,661	20,196	20,366	18,576	18,117	66,819	51,719	118,538
	4.9	4.8	4.6	4.0	3.3	3.6	5.2	3.3	4.1
Diseases of the respiratory system	50,224	52,223	57,065	80,284	76,126	68,370	165,778	218,513	384,291
	11.9	12.3	13.1	15.8	13.4	13.5	12.8	13.9	13.4
External causes of injury and poisoning	21,533	19,757	18,293	17,824	18,223	16,867	29,799	82,695	112,494
	5.1	4.6	4.2	3.5	3.2	3.3	2.3	5.3	3.9
Endocrine, nutritional and metabolic diseases	20,219	19,980	19,210	23,401	23,639	22,832	72,251	56,930	129,181
	4.8	4.7	4.4	4.6	4.2	4.5	5.6	3.6	4.5
COVID-19	0	0	0	22,274	65,366	22,025	47,776	61,889	109,665
	0.00	0.00	0.00	4.4	11.5	4.4	3.7	3.9	3.8
Infectious and parasitic diseases	10,248	10,853	12,229	12,799	16,872	18,469	39,702	41,767	81,469
	2.4	2.5	2.8	2.5	3.0	3.7	3.1	2.7	2.8
Others	51,819	59,497	65,897	68,742	78,517	83,001	183,563	224,016	407,579
	12.2	14.0	15.1	13.5	13.9	16.4	14.2	14.3	14.2
Total	423,819	426,449	436,624	509,048	566,485	504,839	1,294,829	1,572,435	2,867,264
	100	100	100	100	100	100	100	100	100

Over the years, a notable decrease has been observed in both the absolute numbers and percentages of deaths attributed to neoplasms, diseases of the nervous system and sensory organs, and external injuries and poisonings. However, a conspicuous rise is apparent in both the absolute numbers and percentages of deaths ascribed to infectious diseases. An increase in death rates related to infectious and parasitic diseases (0.13 in 2017 and 2018, 0.15 in 2019 and 2020, 0.20 in 2021, 0.22 in 2022) was observed, while a decrease was noted in death rates related to neoplasms (from 1.01 to 0.90 per 1000 individuals) and diseases of the nervous system and sense organs (from 0.26 to 0.21 per 1000 individuals). Deaths related to ischemic heart diseases were more prevalent in males, whereas deaths linked to other circulatory system diseases (including hypertension, cerebrovascular diseases, heart failure, etc.) were higher in females. Deaths related to Alzheimer disease were higher in females, whereas deaths attributed to epilepsy were slightly higher in males. Deaths related to tuberculosis were approximately twice as high in males compared to females, while deaths related to HIV infection were approximately five times higher in males than in females (Table 3).

Table 3: Total numbers and corresponding percentages of causes of death between 2017 and 2022

Causes of Death	Female n (%)	Male n (%)	*P-value	Both Sexes n (%)
Diseases of the circulatory system	517,024 (100)	526,266 (100)	<0.001	1,043,290 (100)
Hypertensive diseases	60,984 (11.8)	38,430 (7.3)	<0.001	99,414 (9.5)
Ischaemic heart diseases (Angina pectoris, Acute myocardial infarction, Other)	184,384 (35.7)	242,033 (46.0)	<0.001	426,417 (40.9)
Heart failure	85,367 (16.5)	72,418 (13.8)	<0.001	157,785 (15.1)
Cerebrovascular diseases	116,460 (22.5)	99,600 (18.9)	<0.001	216,060 (20.7)
Others	69,829 (13.5)	73,785 (14.0)	<0.001	143,614 (13.8)
Neoplasms	172,117 (100)	301,422 (100)	<0.001	473,539 (100)
Lip, oral cavity, pharynx	1,690 (1.0)	3,341 (1.1)	<0.001	5,031 (1.1)
Oesophagus	1,910 (1.1)	2,763 (0.9)	<0.001	4,673 (1.0)
Stomach	12,744 (7.4)	25,200 (8.4)	<0.001	37,944 (8.0)
Colon	15,096 (8.8)	21,250 (7.1)	<0.001	36,346 (7.7)
Rectum and anus	3,189 (1.9)	5,061 (1.7)	<0.001	8,250 (1.7)
Liver and the intrahepatic bile ducts	6,029 (3.5)	10,936 (3.6)	<0.001	16,965 (3.6)
Pancreas	12,745 (7.4)	17,368 (5.8)	<0.001	30,113 (6.4)
Larynx and trachea/bronchus/lung	22,903 (13.3)	121,142 (40.2)	<0.001	144,045 (30.4)
Breast	25,335 (14.7)	310 (0.1)	<0.001	25,645 (5.4)
Uterus, cervix and ovary	18,942 (11.0)	0 (0.0)	<0.001	18,942 (4.0)
Prostate	0 (0.0)	20,929 (6.9)	<0.001	20,929 (4.4)
Bladder	2,263 (1.3)	11,655 (3.9)	<0.001	13,918 (2.9)
Lymph-/haematopoietic tissue	15,620 (9.1)	21,903 (7.3)	<0.001	37,523 (7.9)
Others	33,651 (19.6)	39,564 (13.13)	<0.001	73,215 (15.5)
Diseases of the nervous system and the sense organs	66819 (100)	51719 (100)	<0.001	118538 (100)
Meningitis	341 (0.5)	449 (0.9)	>0.001	790 (0.7)
Alzheimers disease	49,730 (74.4)	30,437 (58.9)	<0.001	80,167 (67.6)
Multiple sclerosis	471 (0.7)	401 (0.78)	<0.001	872 (0.74)
Epilepsy	3,510 (5.3)	4,107 (7.9)	>0.001	7,617 (6.4)
Others	12,767 (19.1)	16,325 (31.6)	<0.001	29,092 (24.5)
Diseases of the respiratory system	165,778 (100)	218,513 (100)	<0.001	384,291 (100)
Acute upper respiratory infections and influenza	350 (0.2)	398 (0.2)	>0.001	748 (0.2)
Pneumonia	89,441 (54.0)	100,172 (45.8)	<0.001	189,613 (49.3)
Chronic lower respiratory diseases (Chronic obstructive pulmonary disease and bronchiectasis, Asthma)	55,840 (33.7)	94,642 (43.3)	<0.001	150,482 (39.2)
Others	20,147 (12.2)	23,301 (10.7)	<0.001	43,448 (11.3)
External causes of injury and poisoning	29,799 (100)	82,695 (100)	<0.001	112,494 (100)
Accidents	23,084 (77.5)	60,401 (73.0)	<0.001	83,485 (74.2)
Suicide and intentional self-harm	5,038 (16.9)	16,559 (20.0)	<0.001	21,597 (19.2)
Homicide, assault	1,180 (4.0)	5,071 (6.1)	<0.001	6,251 (5.6)
Others	497 (1.7)	664 (0.8)	>0.001	1161 (1.0)

Table 3: Continued …

Endocrine, nutritional and metabolic diseases	72,251 (100)	56,930 (100)	<0.001	129,181 (100)
Diabetes mellitus	54,617 (75.6)	42,680 (75.0)	<0.001	97,297 (75.3)
Others	17,634 (24.4)	14,250 (25.0)	<0.001	31,884 (24.7)
Infectious and parasitic diseases	39,702 (100)	41,767 (100)	<0.001	81,469 (100)
Diarhoea and gastenteritis of presumed infectious origin	725 (1.8)	579 (1.4)	<0.001	1,304 (1.6)
Tuberculosis	741 (1.9)	1,486 (3.6)	<0.001	2,227 (2.7)
Meningococcal infection	35 (0.1)	37 (0.1)	>0.001	72 (0.1)
Septicaemia	34,857 (87.8)	35,283 (84.5)	<0.001	70,140 (86.1)
HIV disease	117 (0.29)	567 (1.4)	<0.001	684 (0.8)
Viral hepatitis	894 (2.3)	1,218 (2.9)	>0.001	2,112 (2.6)
Others	2,333 (5.9)	2,597 (6.2)	>0.001	4,930 (6.1)

* The *P*<0.001 was considered for the significance of the cause of death by sex for 2017-2022

Between 2020 and 2022, it was found that 0.2% of total deaths attributed to COVID-19 infection occurred in the 0-14 ages group, 27.2% in the 15–64 age group, and 72.6% in the >65 age group. Furthermore, 95.9% of all COVID-19-related deaths occurred in individuals aged 45 yr and older (Table 4).

Table 4: Total numbers and corresponding percentages of causes of death by age groups between 2017 and 2022.

Causes of Death	Age Groups(yr)								
	0-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+
	N %	N %	N %	N %	N %	N %	N %	N %	N %
Diseases of the circulatory system	2,932 3.0	2,288 6.6	4,397 10.4	16,384 21.8	49,487 29.6	119,490 31.5	212,540 34.6	327,938 40.7	307,827 47.2
Neoplasms	3,560 3.7	3,208 9.3	5,876 13.8	17,477 23.3	47,841 28.7	111,508 29.4	143,597 23.4	107,790 13.4	39,900 6.1
Diseases of the respiratory system	3,717 3.9	1,487 4.3	1,803 4.2	4,123 5.5	12,336 7.4	39,977 10.6	85,367 13.9	131,187 16.3	104,292 16.0
Diseases of the nervous system and the sense organs	5,463 5.7	2,764 8.0	1,749 4.1	2,146 2.9	3,074 1.8	5,543 1.5	13,121 2.1	37,255 4.6	47,423 7.3
Endocrine, nutritional and metabolic diseases	1,998 2.1	440 1.3	510 1.2	1,464 2.0	5,521 3.3	16,505 4.4	31,231 5.1	40,718 5.1	30,794 4.7
External causes of injury and poisoning	6,568 6.8	15,312 44.1	16,118 37.9	14,930 19.9	13,694 8.2	13,324 3.5	11,336 1.8	11,231 1.4	9,940 1.5
COVID-19	167 0.2	324 0.9	1,099 2.6	2,872 3.8	7,308 4.4	18,245 4.8	29,047 4.7	31,223 3.9	19,380 3.0
Others and unknown	71,938 74.7	8,875 25.6	10,943 25.8	15,682 20.9	27,721 16.6	54,384 14.4	88,589 14.4	118,729 14.7	92,194 14.2
Total	96,343 100	34,698 100	42,495 100	75,078 100	166,982 100	378,976 100	614,828 100	806,071 100	651,750 100

Discussion

In Turkey, based on population projections, the anticipated ratio of the elderly (aged 65 yr and older) population ratio is expected to reach 12.9% in 2030, and 16.3% in 2040 (4). In comparison, the elderly population rate for the European Union was reported as 21.1% in 2022 (5). While the crude death rate in 2019, reflecting the pre-pandemic period, was 5.3 per 1000 individu-

als, during the pandemic period it reached 6.1 in 2020 and 6.7 in 2021 respectively. With the impact of the pandemic largely diminished, the crude death rate declined to 5.9 per 1000 people in 2022. However, in the post-pandemic period, a marginal increase in the crude death rate was observed in comparison to the pre-pandemic period (Fig. 1). Similarly, in the European Union countries, the crude death rate reached 11.8 per thousand in 2021, marking a 0.2 increase from 2020 and a 1.2 increase from 2019 (6). The higher proportion of the elderly population in European Union countries may be identified as one of the main reasons for the crude death rate being higher than that of Turkey. Moreover, the main reason for the increasing crude death rate over the years could be attributed to the increase in the ageing population.

On the other hand, between 2020 and 2022, more deaths were reported in all countries, attributed to both direct and indirect effects of COVID-19 (7, 8). In Turkey, the COVID-19-specific mortality rate was calculated as 0.3 per 1000 individuals in 2020, 0.8 in 2021, and 0.3 in 2022. Data show that a rapid increase (from 0.69 to 0.96 per 1000 individuals) in 2020, 0.90 in 2021 and 0.80 in 2022, in the mortality rate due to respiratory system diseases occurred with the onset of the pandemic. Nearly half of the deaths due to respiratory system diseases were attributed to pneumonia. Therefore, we believe that a part of the increase in the respiratory system diseases-specific death rates in 2020 and 2021, may be due to COVID-19 recorded as pneumonia. Considering all the reasons mentioned above, one can suggest that apart from deaths directly attributed to COVID-19, the majority of excess deaths in 2020 (0.5 per thousand), 2021 (0.6 per thousand), and 2022 (0.3 per thousand) were related to COVID-19, with a portion stemming from the indirect effects of the pandemic. Additionally, another segment of these excess deaths might be attributed to the natural annual fluctuations in the crude death rate.

This study has demonstrated that mortality rates were higher in age groups <5 and ≥65 compared to other age groups (Table 1). In early life, mor-

tality patterns are predominantly shaped by factors such as complications of preterm birth, congenital anomalies, birth asphyxia, birth trauma, sudden infant death syndrome, acute respiratory tract infections, neonatal sepsis, meningitis, and accidents (9). On the other hand, in the later stages of life, mortality trends are intricately related to the aging process and the emergence of chronic diseases.

During the pandemic period, there was a discernible increase in the crude mortality rate in the 15–64 age group, with an increase ranging from 0.3 to 0.5 per thousand compared to the year 2019. Furthermore, in the 65 and older age groups, there was a more substantial increase ranging from 5 to 8.3 per thousand. However, no statistically significant change was observed in the under-14 age group, as outlined in (Table 1). The heightened fatality due to COVID-19 infection in individuals with comorbidities (10) is considered a plausible reason for the significant increase in the crude mortality rate in the 65 and older age group, which represents the most common age group with comorbidities.

According to the findings of our study, the predominant causes of death in Turkey were identified as cardiovascular diseases, cancers, and respiratory system diseases, respectively. Remarkably, this pattern is similar to the prevailing trends observed in many European and other countries worldwide (7). In European countries, the death rate due to ischemic heart disease, a cardiovascular disease, was higher in females than in men (11). In Turkey, on the contrary, the death rate due to ischemic heart disease is more commonly found in men (Table 3). Regarding deaths related to circulatory system diseases, it was observed that the cause-specific mortality rate exhibited a slight decrease from 2017 to 2020, but started to increase again from 2020 onwards, with a subsequent decline in 2022. The reasons for the surge in cardiovascular diseases during the pandemic period may be attributed to the disruption of health services, lacks of routine controls for individuals with cardiovascular diseases, delayed detection of new diagnoses, and worsening of exist-

ing diseases due to behavioural changes caused by pandemic restrictions.

Seemingly, cancer stands as the second leading cause of death, following cardiovascular diseases, both in the world and in Turkey (11). The most common types of cancer leading to death are lung cancer (18%), liver cancer (8.3%), stomach cancer (7.7%), and breast cancer (6.9%), respectively (12). Likewise, our study identified respiratory system malignancies as the leading cause of death due to cancer. On the other hand, while liver cancer ranks as the second most fatal cancer worldwide, it assumes the sixth position in Turkey (Table 3). Respiratory system malignancies resulted in approximately 5.3 times more deaths in men than in women, while bladder malignancies led to approximately 5.2 times more deaths in men than in women. On the other hand, breast malignancies caused approximately 82 times more deaths in women than in men (Table 3). Our findings have revealed that the cancer-specific death rate moderately decreased over the years, and this decrease may be associated with the implementation of cancer screenings conducted, facilitating early detection, and contributing to improved outcomes. Additionally, advancements in treatment protocols may have played a role in this decrease

There has been a decrease in deaths due to circulatory system diseases and cancers worldwide, while deaths related to chronic respiratory tract diseases have continued to increase. It is plausible to attribute this increase primarily to the rise in chronic obstructive pulmonary disease (13). In our study, a moderate decrease in cancer-specific mortality rate was observed, while a mild decrease was observed in cardiovascular diseases-specific mortality rate until the onset of the pandemic. However, concerning respiratory system diseases, there was a moderate increase in cause-specific mortality rate before the pandemic, followed by a more pronounced increase during the pandemic period.

Approximately 3.7 million people in Turkey were unaware of their diabetes status, with the proportion of undiagnosed diabetes cases reaching approximately 41.8% in 2021 (14). According to the data obtained from our study, diabetes-related deaths accounted for 3.4% of the total deaths recorded between 2017 and 2022. It is crucial to ensure the detection of individuals unaware of their condition through screening tests, facilitating early treatment and a reduction in long-term mortality.

In this respect, the WHO has identified cardiovascular diseases, cancers, respiratory diseases, and diabetes as four major noncommunicable disease groups that require advancements in prevention and control in the 21st century (7). Notably, between 2017 and 2022, 70% of the total deaths in Turkey were attributed to these aforementioned four major noncommunicable diseases (Table 1).

Strengths and limitations

The present study holds significance in demonstrating the diseases that Turkey has made progress in preventing in recent years, while also pinpointing areas where more focus is required to prevent specific causes of death. On the other hand, the reliability of death certificates raises questions and constitute a primary limitation of this study. Up to now, a wide range of inaccuracies regarding the coding of death certificates have been reported worldwide, with connections to multiple factors, including sociodemographic development and deficiencies in physician training. Inaccurate data concerning the underlying cause of death remains a prevalent issue in numerous healthcare settings, especially in developing countries (15). This study was conducted within the outlined limitations, and its findings should be assessed within the context of these limitations.

Conclusion

From 2020 to 2022, Turkey experienced a significant rise in deaths and crude mortality rates, largely due to the widespread impact of the COVID-19 pandemic. The complex dynamics reveal both the direct effects of COVID-19 and

indirect consequences that contributed to increased mortality rates. The interpretation of death statistics, which previously faced doubts and criticisms regarding the adequacy of data quality, has encountered heightened challenges with the advent of the 2020 pandemic. Despite all these challenges, death statistics continue to maintain their value in monitoring public health. Recognizing the value of death statistics, there emerges a pressing need to address the challenges associated with data quality. A strategic approach involves prioritizing training on the issuance of death certificates within medical education, aiming to equip future healthcare professionals with the required skills for accurate documentation. Moreover, enhancing the competency of presently practicing physicians through targeted in-service training initiatives becomes major in maintaining and enhancing the standard of death certificate issuance. Additionally, bolstering the oversight mechanisms for death certificates, particularly through rigorous inspections conducted by Public Health Directorates, serves as a proactive measure to elevate the quality and reliability of death statistics. These concerted efforts contribute to fortifying the foundation of death statistics, ensuring their enduring significance and efficacy in the effective monitoring of public health.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgements

Conflict of interest

The authors declare that there is no conflict of interests.

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