Analysis of Leading causes of death, total population, by age group in Canada

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Summary of Questions

1. To Identify the mortality rates and the number of deaths according to age groups of the population. To get an overview of what age demographic is most susceptible to death.
2. To Identify the ratio between the sex of population dying and Identify the major causes of death by the type of the disease/other cause?
3. To Identify the top causes of death with respect to male and female population and to identify if there is any trend that is showing in those causes in the past years?

Data Set

The data used for the analysis in the research is extracted from the Statistics Canada website (an open data source) under which I searched for the specific data relating to the leading causes of death, by total population and age group in Canada. The link to the data source is provided below where the original data set as well as meta data for the same would be available, where you can download the data in csv format based on customized selections available on the website.

url: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310039401

Data Description
Status: Active
Frequency: Annual
Record number: 3233
Subjects:

- Births and deaths
- Diseases and health conditions
- Health
- Life expectancy and deaths
- Population and demography

This is an administrative survey that collects demographic and medical (cause of death) information annually from all provincial and territorial vital statistics registries on all deaths in Canada. The 2017 data are considered preliminary due to improvements in methodology and timeliness which shortened the duration of data collection. 2017 death data for Yukon are not available.

This is an administrative survey that collects demographic and medical (cause of death) information annually from all provincial and territorial vital statistics registries on all deaths in Canada. Prior to 2010, some data were also collected on Canadian residents who die in some American states. Starting with the reference year 2010, Canadian residents who die in American states are no longer collected.

The data are used to calculate basic indicators (such as counts and rates) on deaths of residents of Canada. Information from this database is also used in the calculation of statistics, such as cause-specific death rates and life expectancy.[1]

Data release - November 29, 2018; May 30, 2019

Research

The research is done on an open data collected from the Statistics Canada website of the leading causes of death where in the analysis is done to determine various factors leading to death such as the major causes can be diseases, the ratio of sex, identifying the mortality rates over the age group, and identify the major causes of death in males and females & to look for trends , if any, in them which have occurred over the past two decades.

For the Analysis and Data Visualization, I have used Tableau 10 data visualization tool which is a very easy to use and powerful visualization tool. It allowed me to create graphs, charts, maps etc. on the data source and provided tools for analysis such as average, median, standard deviation etc.

1. To Identify the mortality rates and the number of deaths according to age groups of the population. To get an overview of what age demographic is most susceptible to death.

Mortality rate and Number of deaths according to age groups

		Sex	
Characteristics	Age at time of death	Females	Males
Age-specific mortality rate per 100,000 population	Age at time of death, 1 to 14 years	20	68
	Age at time of death, 15 to 24	133	136
	Age at time of death, 25 to 34 years	38	494
	Age at time of death, 35 to 44 years	385	398
	Age at time of death, 45 to 54 years	614	2,305
	Age at time of death, 55 to 64 years	2,814	1,230
	Age at time of death, 65 to 74 years	4,979	1,627
	Age at time of death, 75 to 84 years	9,585	20,412
	Age at time of death, 85 and over	34,845	50,595
Number of deaths	Age at time of death, 1 to 14 years	11,368	14,828
	Age at time of death, 15 to 24	22,652	54,634
	Age at time of death, 25 to 34 years	32,948	71,320
	Age at time of death, 35 to 44 years	73,464	123,566
	Age at time of death, 45 to 54 years	190,756	292,876
	Age at time of death, 55 to 64 years	362,226	564,112
	Age at time of death, 65 to 74 years	617,036	897,236
	Age at time of death, 75 to 84 years	1,161,468	1,291,590
	Age at time of death, 85 and over	1,782,518	1,038,294

Figure 1

Figure 1 shows the mortality rate and number of deaths in accordance to the age group classifications

On analyzing figure 1, we are able to figure out that there is an increase in the mortality rate on the given data as we go up the in age of our subjected population, as we can see that the ratio of deaths compared of the age group of 1 to 14 years of people to that of people who are above 75 years of age is almost 100 times greater for the people aged 75 years or older. From that we can determine that if we need to improve the health care facilities, we need to do it foe the senior citizens in the country and it indicates the low infant death rates meaning that the newborns are healthy, and they are almost disease free.

2. To Identify the ratio between the sex of population dying and Identify the major causes of death by the type of the disease/other cause?

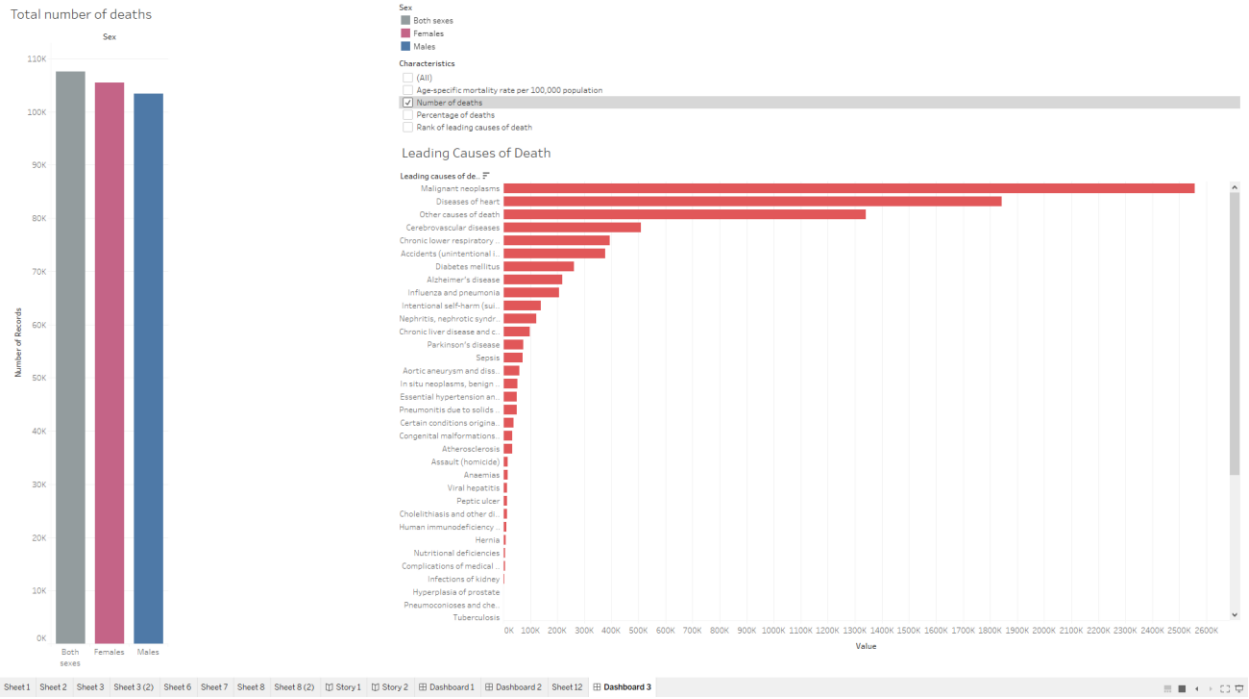

Figure 2

Figure 2 shows the total number of deaths grouped by the sex and the leading causes of deaths irrespective of each classification

The First visualization on the left side of figure 2 i.e. the dashboard of tableau depicts the ratio of deaths by the sex, i.e. it's clear that women have slightly greater number of deaths as compared to men. Which may be a factor in deciding the time at which they would require medical attention, i.e. in figure 1 it can be marked that at the initial age groups women have less mortality rate than men but as we go ahead from the age 55 to 75, we see the trend change and see a significant increase for women and then again after the age of 75 it goes back to the same rate. This shows that there are more deaths for women that men between the age of 55 and 75, and also that in general men have a higher mortality rate.

The Second visualization in the figure 2, displays the leading causes of deaths in Canada irrespective of all the provided classifications in the data, on further analysis the top five reasons come out to be malignant neoplasm, heart diseases, cerebrovascular, lower respiratory diseases and accidents. This signifies that there is a high risk for an individual living in Canada to acquire heart, brain, respiratory disease or cancer, as they list of as the leading causes of death. On a critical note cancer and heart disease taking up most cases of death, so by using this data as a reference it could be used to further improve the health care facilities and increase the number of special hospitals and expertise doctors for the same causes.

In the figure 3, below we have tried to create a same data visualization as we did it for the one above in her we used a tree map to display ranking of the disease as per age group, which generates the same results to figure out the top causes of death for the population.

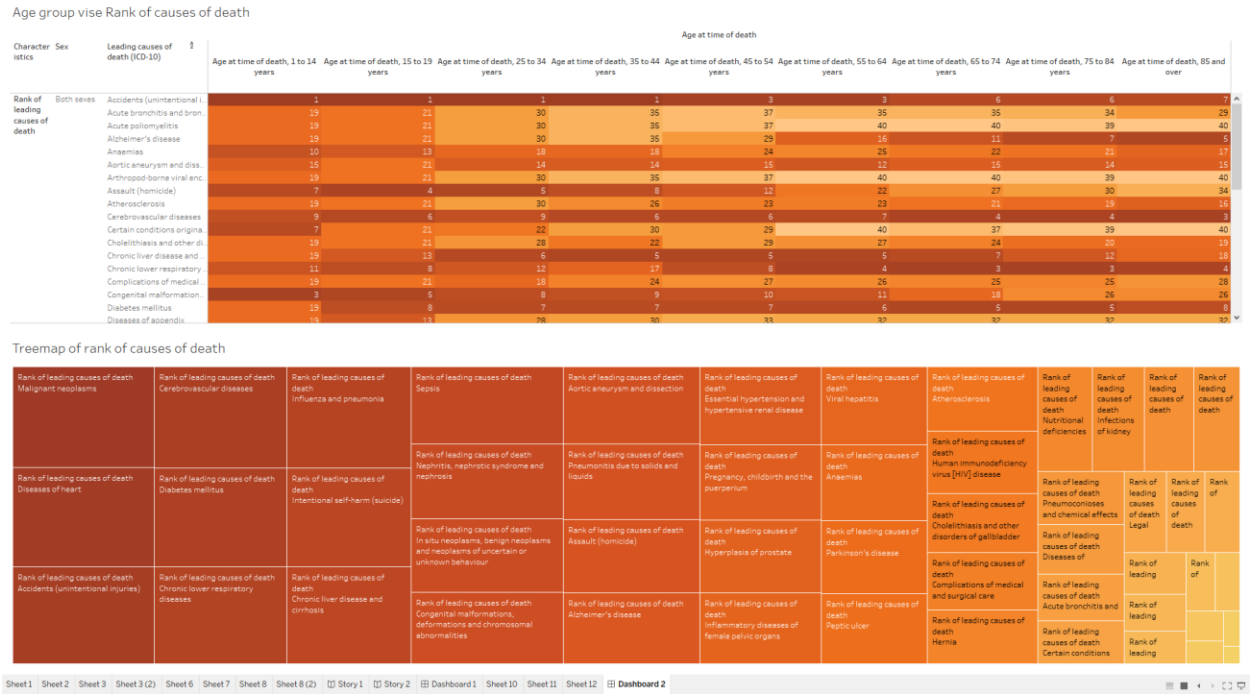

Figure 3

Figure 3 shows the ranks for the causes of deaths grouped by age group and a treemap for ranks

3. To Identify the top causes of death with respect to male and female population and to identify if there is any trend that is showing in those causes in the past years?

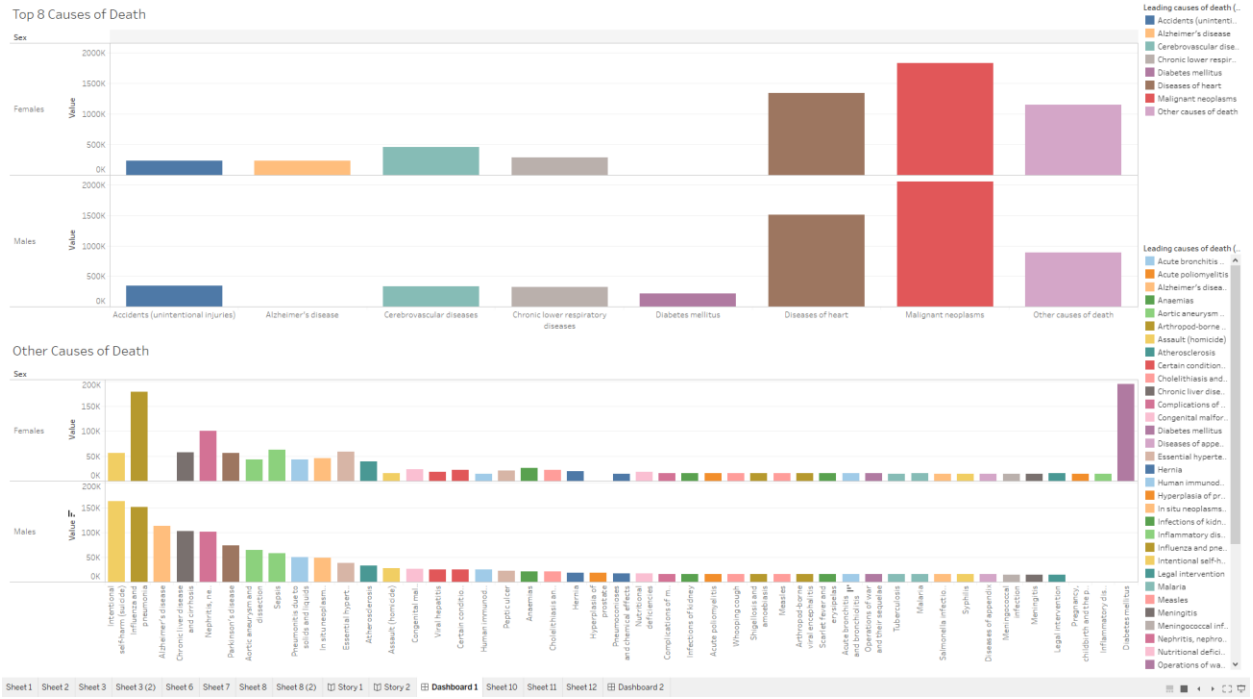

Figure 4

Figure 4 shows the Top 8 causes of deaths (greater than 200,000 cases) and the other minor causes of death in comparison to the former, both grouped by the sex of population

From the first visualization in the figure 4, we can conclude that apart from the top 5 causes of death that remain the same for both the sexes i.e. malignant neoplasms, accidents, heart, cerebrovascular and lower respiratory disease but the other causes show a major variation pertaining to the population sex i.e. males have a higher tendency to acquire diabetes mellitus and females to have Alzheimer's disease. This information can help us understand the diversity in the disease profile for each of the population sex portfolio.

The second graph doesn't provide us with much detail or a strong indication that either of the sexes are more likely to acquire a specific disease. In general, it just describes the causes of death for the particular sex.

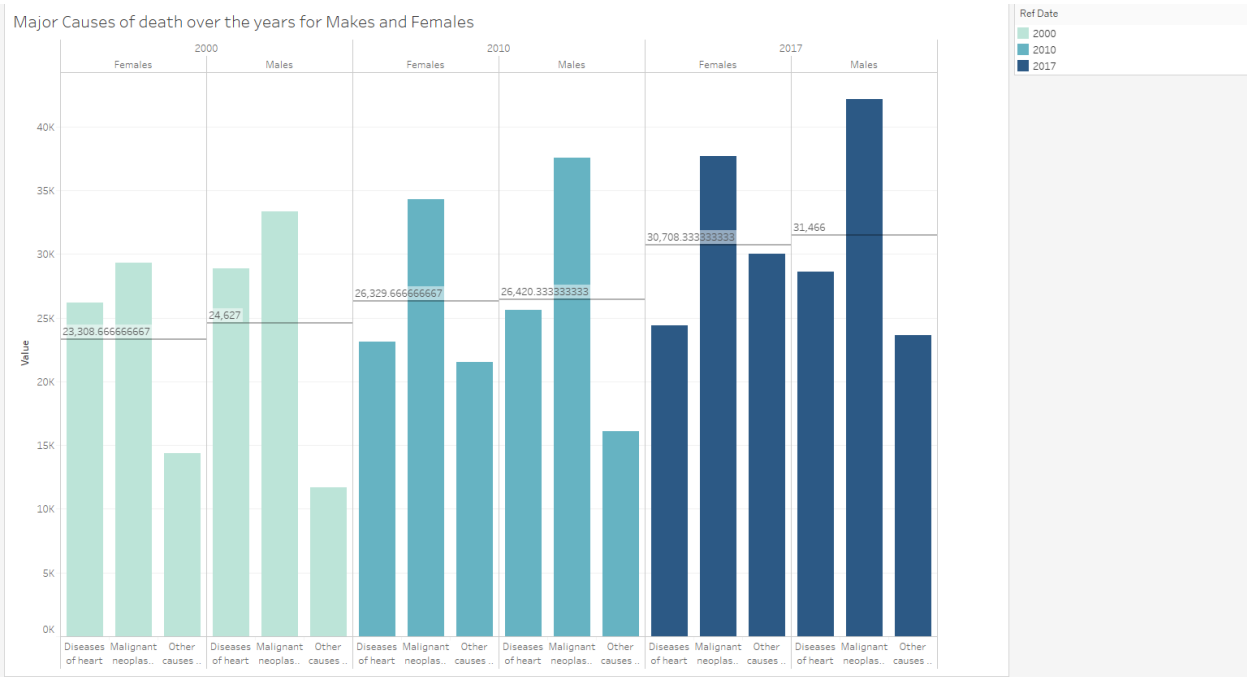

Figure 5

Figure 5 shows the major causes of deaths grouped by sex of population for the years 2000, 2010 and 2017

In continuation with the current question, the visualization In figure 5 describes the scenario of the major causes of deaths over 17 years, starting from the year 2000, for both the sexes to figure out if there is a pattern in the major cause whether it continues to follow same trend of there is a change in the pattern.

Using the analysis pane, we have also drawn an average line which calculates the average value for each year, sex and collection of causes of death.

For the year 2000, we can see the 1st major cause is malignant neoplasm and 2nd cause is heart disease for both the sexes and are well above the average, but in the year 2010 we can observe that the no. of deaths caused by malignant neoplasm has increased in contrast to a decline in no. of deaths by heart diseases making it fall under the average value. Following a similar trend, In the year 2017 the 1st major cause of death for both sexes remain malignant neoplasm and heart disease again showing an increase with the increasing no. of records, but the first 2 causes are still more prominent for males than for females as in the year 2017 deaths by other causes is more than the deaths by heart disease for females, which

marks a change in pattern and may continue to vary in the future. Using this information, we can also create predictions for the same.

Conclusion

In conclusion to the questions, relevant research done and from the analysis of the data under observation I have made a few conclusions, which are as follows, that there is an almost linear increase in the mortality rate for the Canadian population as we go down the age group irrespective of their sex, Second major conclusion would be the major causes of death in Canada which in general are Cancer, Heart Disease, Brain disease, Accidents, and Respiratory disease. This information can be vital for the improvement of medical facilities for the same and also can be a source to spread more awareness to be safe and informed for the causes. There is other conclusion which are female demographic is more susceptible to Alzheimer's than males and Diabetes Mellitus prevalent in males more than females. As this isn't an in-depth research the following findings are possible and there can be many more vital conclusions which can be drawn, or we can generate predictions by performing a detailed research on a wider data source.

References

1. Statistics Canada, Vital Statistics - Death Database(CVSD), 2019
http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3233