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RESEARCH ARTICLE

A SURVEY INTO MORTALITY CAUSES IN ADULTS IN THE KINGDOM OF SAUDI ARABIA

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Abstract

Introduction: The main objective of the current study was to analyse the causes of death in different ages, genders, and regions in the kingdom of Saudi Arabia. Also, the research aims to identify the prevalence of important risk factors in deceased people. Additionally, it aims to determine the condition of death for the sample.

Methods: This is an analytical cross-sectional study which was carried out through a survey of 10 questionnaires conducted on relatives of people who passed away in the last five years, in the Kingdom of Saudi Arabia. The study was conducted from June 29th. 2020 to September 30th. 2020. The sample was randomly selected, through the computer.

Results: The authors got responses from 1100 people who fit with the inclusion criteria. The mean age was 64 years. The five leading causes of death were cardiovascular disorders (20%), stroke (10%), cancer (10%), pneumonia (10%), and road traffic accidents (10%). 30% of deceased people had diabetes mellitus, and 40% had obesity. 61.5% of the sample passed away in hospitals. (P-value 0.05). Only 5.5% of people had their relatives known to palliative service.

Interpretation and Conclusions: The current research provided an analysis of the causes of death in the Kingdom of Saudi Arabia from 2015 to 2020. The leading causes of death were cardiovascular disorders, stroke, cancer, pneumonia, and road traffic accidents. The prevalence of diabetes mellitus and obesity were high among deceased people.

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Introduction:

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targets for improvement, such as maternal health, risk factors for both non-communicable diseases (NCDs), and injuries. (1, 2, 3)

Prior research showed a global reduction in child mortality in the last 10 years due to an improved death rate from communicable diseases and malnutrition. However, over the same period, death from NCDs and injuries have increased in all ages. This is related to the changes in income per capita for people, sedentary life, unemployment, eating habits, obesity, pollution, and others. (4, 5, 6, 7, 8)

The global burden of disease (GBD) 2018 provides evidence on the health of the global population. It showed that the prevalence of death from non-communicable diseases (NCDs) was 73% with cardiovascular disorders as being the leading cause of death at 25%, cancer at 16.4%, stroke at 10.9%, and others including chronic obstructive pulmonary disorders, musculoskeletal disorders with disabilities, cirrhosis, kidney disorders, bowel disorders, neurological diseases, and others at 25%.Followed by, communicable diseases including pneumonia, diarrhea, meningitis, HIV, and others at 19%. Then, injuries, with road traffic accidents and self-harm was at 8%. (9, 10)
Globally, over the last 10 years, adult deaths related to NCDs has increased by 7%, and deaths from injuries have increased by 2·3%. While the mortality rate from communicable disorders has decreased by 6%. (10)

For more developed countries, NCDs and cardiovascular disorders are the leading cause of death followed by cancer, stroke, road traffic accidents then suicide. However, for developing countries, communicable diseases remain the leading cause of death. (11, 12)

Saudi Arabia is one of the largest countries in the Middle East. It has a population of more than 35 million and its economy has improved significantly in the last twenty years. Reports showed that people in Saudi Arabia have some specific metabolic, behavioural, and occupational risk factors, including high body mass index (BMI), high fasting plasma glucose concentration, and drug use across all age groups. All of these factors increase the risk of diseases and mortality from NCDs. (13, 14)

The current study's main objective was to analyse the causes of death in different ages, genders, and regions in the kingdom of Saudi Arabia. Also, the research aims to identify the prevalence of important risk factors in deceased people. Additionally, it aims to determine the condition of death for the sample.

Material and Methods:-

Study design:
This is an analytical cross-sectional study that was conducted through a survey that targeted relatives of people who deceased in the last five years in the Kingdom of Saudi Arabia, based on the ministry of health death certificate data.

Study population:
The authors aimed to survey 1600 people all over the country. The sample size was calculated using OpenEpi for cross-sectional studies. The sample was randomly selected, through the computer, among people in Saudi Arabia who had a relative who deceased during the past 5 years**.** For inclusion into the current trial, the deceased person had to be a citizen or a legal resident in the country and passed away in Saudi Arabia from April 1st. 2015 to March 31st. 2020. Also, deceased people should be over 18 years old.

Study period:
The study was conducted from June 29th. 2020 to September 30th. 2020.

Sampling method:
The study was carried out through a survey of 10 questionnaires. Responders were asked to give information about their relative who passed away in the last 5 years; the age, gender, residency region of the deceased person (western, eastern, central, southern, or northern). What was the cause of death?

For those who died from cancer, the responders were required to select the type of cancer (breast, colon, lung, acute leukaemia, other cancer).If the deceased person had diabetes mellitus, obesity, high cholesterol, or hypertension. Whether the relative passed away at the home, hospital, or other places, and in case they deceased in hospitals, how long they stayed in the hospital before their death, if the relative was known to palliative service and the people’s

concept about the most common three causes of death in the country; they were required to select three options from either road traffic accident, cancer, heart attacks, infections, malnutrition.

Study measurements:
The prevalence was defined as the proportion of people with the target disease among all the studied samples. The current study examined the link between mortality and certain patient-related factors including their region, age, gender, and other comorbidities. (15)

The authors classified the causes of death under three headings; NCDs (cardiovascular disorders, neoplasms, stroke, musculoskeletal disorders with disabilities, chronic obstructive pulmonary disease, cirrhosis, kidney disorders, bowel disorders, neurological diseases, and other disorders), injuries including road traffic accidents, self-harm, other injuries, and communicable disease including pneumonia, diarrhoea, meningitis, HIV, and other infections). Further analysis was done to evaluate the four leading causes of death with age, gender, and geographical regions.

Statistical analysis:
Statistical analysis was carried out by Statistical Package for the Social Sciences (SPSS) version 17. Continuous data were presented in terms of mean, median, mode, and 95% Confidence interval (CI). Multivariate analysis with HR using binary logistic regression was performed to investigate the association between the disease leading to death and predefined factors including age, residency region, and gender. Statistical significance was set at a P-value of 0.05 or less.

Ethical statement:
Ethical approval was sought from the biomedical ethical committee of the faculty of medicine, King Faisal University. Informed consent was taken from the participants.

Results:-

One thousand Six- hundred and Fifty people were contacted and the authors got responses from 1100 (67%) people. The following table 1 showed the sample characteristics. (Table 1)
The causes of death are plotted in Table 2. (Table 2)

For patients who died from cancer, 40 (36%) had breast cancer, 35 (32%) had colon cancer, 12 (11%) had lung cancer, and 10 (9 %) had acute leukemia, and 13(12%) passed away from other cancer. (P-value 0.06)

Three hundred and thirty (30%) deceased people had diabetes mellitus, 440 (40%) had obesity, 110 (10%) had hypertension, and 100 (9%) had high cholesterol. Two hundred and fifty (23%) responders had their relative passed away at home, 680 (61.5%) people deceased in hospitals, and 170 (15.5%) people deceased in other places. (P-value 0.05)

Sixty (5.5%) people had their relatives known to palliative service. 770 (70%) people were sick before their death. The main hospital admission time was 6 days (95% CI 2-12 days). Concerning people's concept about the 3 most common causes of death in the country, 770 (70%) of responders selected cardiovascular disorders, cancer, and road traffic accidents as the three commonest causes of death. 220 (20%) responders selected infections among the 3 commonest causes of death. Only 33 (3%) selected malnutrition as a cause of death. (P-value 0.04). Table 3 showed the multivariate analysis of the association between death rate, age, gender, and regional place. (Table 3)

Further trial analysis showed that; among people, 18 to 30 years of age, the four leading causes of death were road traffic accidents at 15%, cardiovascular disorders at 14%, musculoskeletal disorders at 12%, and stroke at 10%. Among people, 31 to 50 years of age, the four leading causes of death were cardiovascular disorders at 19%, stroke at 12%, road traffic accidents at 12%, and cancer at 9%. Among people, 51 to 65 years of age, the four leading causes of death were cardiovascular disorders at 21%, cancer at 12%, stroke at 11%, and road traffic accidents at 11%. Among people over 65 years of age, the four leading causes of death were cardiovascular disorders at 16%, pneumonia at 14%, cancer at 10%, and stroke at 7%. (P-value 0.05)
For men, the four leading causes of death were cardiovascular disorders at 21%, stroke at 10%, cancer at 10%, and road traffic accidents at 9%. For women, the four leading causes of death were cardiovascular disorders at 19%, cancer at 11%, stroke at 10%, and road traffic accidents at 10%. (P-value 0.06)

For people resident in the Western and Central regions, the four leading causes of death were cardiovascular disorders at 20%, cancer at 11%, stroke at 10%, and road traffic accidents at 11%. For people resident in other regions, the four leading causes of death were cardiovascular disorders at 20%, cancer at 10%, stroke at 10%, and road traffic accidents at 10%. (P-value 0.06)

Discussions:-

The current study's main objective was to analyse the causes of death in different ages, genders, and regions in the kingdom of Saudi Arabia. The authors believe that the health of people is very essential to be maintained at a high standard and identifying the cause of death could help to achieve the ultimate goal of medicine which is to decrease mortality rates among people. Saudi Arabia has a diverse ethnic population, other than Saudi citizens, it has Egyptians, Syrians, Yemini, Philippines, Indians, Pakistanis, and people from Western countries. There are some risk factors for diseases including obesity, diabetes, sedentary life. Also, serum vitamin D level is low among 40% of the Saudi population. Knowing the prevalence of the disease and identifying the risk group could help physicians in selecting patients who benefit from an additional diagnostic test and prioritise patients who require additional care. (13, 14)

The current study is a cross-sectional study that was based on interviewing relatives of deceased people over a 3-month period. The sample was selected by the computer from governmental data for people who deceased in the last 5 years in the country. The authors decided to conduct a cross-sectional survey. A cross-sectional survey provides the best way to identify a disease and its risk factors in a predefined population. (15, 16)

Based on the global burden of disease (GBD) classification, the authors classified the causes of death under three headings; NCDs (cardiovascular disorders, neoplasms, stroke, chronic pulmonary airway disorders, cirrhosis, kidney disorders, bowel disorders, neurological diseases, and other disorders), injuries including road traffic accidents, self-harm, and others, and communicable diseases including pneumonia, diarrhea, meningitis, HIV, and other infections). (13)

Prior research was conducted in this active area. The study of Tyrovolas et al., 2020, which was based on the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, showed that, from 2010 to 2017, there was a decline in mortality in Saudi Arabia. cardiovascular diseases were the commonest cause of death, musculoskeletal disorders with disabilities were the second leading cause of death. Cancer was the third commonest cause, and, neurological disorders were the fourth cause of death. Road traffic injuries were the fifth-ranked cause of death. Also, the study of Murray et al.,2020, which was a statistical analysis in 204 countries and its input data were extracted from censuses, surveys, statistics, disease registries, health service use, disease notifications, and others, showed that, in Saudi Arabia, the mean life expectancy for males was 75.3 years and 79.4 years for females in 2019. The most common cause of death was cardiovascular disorders at 23%. This was followed by road traffic accidents at 20%, then stroke at 16.9%. Additionally, the study of Memish et al., 2014, which was based on Global Burden of Disease 2010 (GBD), showed that the main cause of death was cardiovascular disease, accounting for 16.04% of total mortality, musculoskeletal disorders with disabilities were the second cause of death. Road traffic injuries were the third leading cause of death, accounting for 11.75% followed by cancer. Furthermore, the study of Ansary et al., 2014, which was a cross-sectional study that evaluated death certificates, and carried out in a single institute in Riyadh, Saudi Arabia, during 2008, showed that, The mean age of death was 63.9 years. The most common cause of death was cancer at 7.3%, followed by cardiovascular disorders at 4.9%. Accidents including road traffic accidents were the third leading cause of death at 4% and accidents were more common in the younger age groups and among men. Moreover, the research of Alhabib et al., 2020, in which 2047 randomly selected participants were recruited from 25 urban and rural communities from the Central region of Saudi Arabia who was only Saudi nationals. The study followed them over a period of 4.5 years. The authors observed that cardiovascular disorders were the main cause of death and the prevalence was similar in urban and rural regions. Diabetes was the second leading cause and cancer was the third common cause of death. (13, 17, 18, 19, 20)

The current study revealed a lot of interesting findings which will add to our current knowledge and experience. The mean age of the sample was 64 years old. The mean age of males was 64 compared to 66 for women. The study of Ansary et al., 2014 agreed with our current results. However, the study of Murray et al., 2020, showed that the mean life expectancy in males of 75.3 years and 79.4 years for females. Probably the difference is related to the sample in both trials. While the current trial sample was from people who actually deceased, the trial of Murray et al., 2020

was based on statistical analysis from surveyors. Also, the trial of Murray et al., 2020 focused on mortality in 2019, while the current work was for people who deceased over the last 5 years. (17, 19)

The leading causes of mortality in our trial were cardiovascular diseases at 20%, followed by stroke, cancer, road traffic accidents, and pneumonia at 10% for each. The study of Murray et al.,2020, showed a higher rate of road traffic accidents in the country. Again, the trial of Murray et al., 2020 looked at 2019 rates only. The rate of road traffic accidents was slightly higher in the study of Memish et al., 2014, this could be related to an increased awareness of people towards this potentially preventable problem. The authors believe that further work is required to decrease the risk factors for road traffic accidents in the country and increase driver's awareness. Also, the study of Mansuir et al., 2015 agreed with the current advice. (18, 20, 21)

Cancer remains an increasing and challenging problem. Breast and colon cancers were the leading causes of cancer mortality in our series. Also, the current study showed that 30% of deceased people had diabetes mellitus and 40% had obesity.The study of Salehidoost et al. 2020, showed similar rates of Diabetes mellitus. To the knowledge of the authors, this was the first trial that examined the association between obesity and mortality. Further trials are required to confirm our findings. (22)

Additionally, the current trial evaluated conditions related to death. To the knowledge of the authors, this was the only trial that evaluated these conditions on a wide scale. It was observed that 61.5% of deaths occurred in hospitals, while only 5.5% of people were linked to palliative service.The study of Nordström et al., 2015, which was conducted in a more developed country; Sweden, showed different results and recommended that hospital stay should be minimized in late days and the role of palliative medicine should be encouraged. This finding should change people's and physician's awareness towards avoiding hospitals for terminally ill people in their last days and encouraging palliative team input with hospice admissions if necessary. (23)

The study has some limitations related to the sample size. Further trials with a larger sample are required to confirm our results. Also, the current trial did not look at changing trends, as this study focused on mortality in the last 5 years. Further trials are required to look at a longer time interval to show changing trends over time.

Interpretation and Conclusions:-

The current research provided an analysis of the causes of death in the Kingdom of Saudi Arabia from 2015 to 2020. The mean age of the sample was 64 years. The leading causes of death were cardiovascular disorders, stroke, cancer, pneumonia, and road traffic accidents. The prevalence of diabetes mellitus and obesity were high among deceased people. It is important to improve the awareness of people towards the role of palliative medicine, and road safety measures.

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Conflict of interests:

All authors disclose that they did not have any financial and personal relationships with other people or organizations that could inappropriately influence (bias) the work.

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