

Trend of deaths due to circulatory system in Erbil City between 2007 to 2011

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Abstract:

Background: Circulatory diseases are one of the leading causes of death in the world which continue to rise despite preventive measures.

Objective: To determine gender, age and cause specific trends of mortality due to circulatory diseases between 2007 and 2011 in Erbil city.

Methods: A review of registered death records from disease of circulatory system was performed at the statistical unit in Directorate of Health in Erbil city. No special codes for the cause of death were available on death certificate. Statistical analysis was done using SPSS version 19

Results: Diseases of circulatory system was responsible for 25.5% of total deaths during the study period. Highest rates were recorded at 2011 with 74 deaths per 100000 population. After 2009, circulatory mortality increased sharply to be the first cause of death till 2011, Stroke, Ischemic heart diseases (IHD), cardiac arrest and heart failure were the main cause of deaths. Most of deaths occur in age group of 65-74 years. Ischemic heart diseases was the main cause of death in male (31.5%) while stroke in female (34.5%) which were statistically significant

Conclusion: Circulatory mortality was the second leading cause of death in Erbil city till the year 2009 where it started to increase to be the first cause till 2011. Future preventive public health strategies for circulatory diseases prevention are mandatory.

Key words: Circulatory diseases, deaths, stroke, Ischemic heart diseases.

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Introduction:

Circulatory diseases are the leading causes of death in the world, which continue to rise despite preventive measures, It was found that out of 17.3 million deaths in 2008, heart attacks were responsible for about 7.3 million and strokes for another 6.2 million deaths, Circulatory diseases are expected to be responsible for 23.3 million deaths in 2030(1). Rates of coronary heart diseases (CHD) had increased by 160% in the Middle East and North Africa region. The biggest CHD mortality comes from high cholesterol and systolic blood pressure levels, but only among men. These differing gender trends can be partly explained by some dietary characteristics, such as fat and salt intakes which were significantly higher in men in the nutritional survey. Rises in total cholesterol and systolic blood pressure levels generally reflect prominent lifestyle changes (2).

Coronary heart diseases are more obvious in low and middle income countries and they constituted about 80% of deaths in these countries and the reason behind that were many such as exposure to risk factors such as smoking and other non-communicable disease which were more in these countries, less access to equitable health services for those affected by CHD and many other causes, therefore people in such countries die from CHD at younger age in comparison to high income countries(3).The epidemiological transition has

been compounded by powerful environmental and behavioral changes; in particular the adoption of new dietary habits , sedentary lifestyles and the stress of urbanization and of working conditions that may lead to increase in major cardiovascular diseases , risk factors and mortality(4). The Eastern mediterrian region has been recognized as a growing hot spot for cardiovascular diseases. Meanwhile, mortality due to non-communicable disease is decreasing in the developed world, This decline is driven largely by improved public health and medical access for a greater proportion of the population (2).

Methods:-

A cross section study during which a review of records due to diseases of circulatory system from statistical unit in Directorate of Health (DOH) in Erbil was conducted. The statistical unit receives monthly reports on deaths from various health settings including the main hospitals and the forensic medicine center which legally issues death certificates that contain information on age, gender and cause of death. Total numbers of deaths during the study period due to circulatory diseases were 3091. The way of entering data is not according to international standards like system of International Classification of Diseases like ICD-10 (5), but according to systems of body classification. Term like cardiac arrest was considered inappropriate as the term describe the end stage of life and not the main cause of death. Erbil city, the capital of Federal Kurdistan Regional Government, is one of the oldest

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living city in the world; it's about 350 km to the north of Baghdad and covering an area of about 60 km². In 2011, Erbil city was inhabited by 1,233,240 people of whom 622,256 were males and 610,984 were females (6).

Statistical analysis was done for outputs using the Statistical Package for Social Sciences (SPSS-Version 19). Two approaches were used for data analysis mainly descriptive and analytic approaches. The descriptive approach used frequencies, percentages, while the analytic approach used Chi-Square (χ^2) test for testing association between variables. P value ≤ 0.05 was considered statistically significant.

Results

According to systems of body classification, the most common cause of deaths in Erbil City in years between 2007 and 2011 was due to accidents which constituted about 29.1% of total deaths followed by circulatory diseases (25.5%) Figure (1). Death rates from circulatory causes started at 2007 with 56 deaths per 100,000 population, followed by gradual sloping to reach its lowest rate at 2009 with 41 deaths per 100,000, then followed by abrupt increase to reach its highest rate at year 2011 with 74 deaths per 100,000 Figure (2). On looking on the trends of all causes of death, circulatory diseases declined from 2007 to 2009 in the 2nd rank, after 2009, increased sharply from the 2nd rank to the 1st rank and remained as the 1st cause of

death until 2011 Figure(3).

Trends of different types of circulatory causes of death showed that stroke decreased from 2007 to 2009 followed by sharp increasing in 2010 then it became flattened. Ischemic heart diseases (IHD) showed gradual decrease from 2007 to 2009 and sharp increase in 2010 then again decreased but not reaching the initial point. Cardiac arrest which was an ill-defined cause of death was low initially in 2007-2009 then in 2010 and 2011 there was a sharp increasing in death to become the 1st cause in 2011. Heart failure also decreased from 2007 to 2009 then followed by increasing in 2010 and 2011 to become the 4th cause of circulatory system deaths in 2011. All other causes of death caused very few numbers of deaths as shown in figure (4). Most of deaths due to circulatory system occurred between 45 and 85 years and above with peaking in the age group 65 to 74 years, this peaking was more obvious for stroke, followed by ischemic heart diseases, heart failure and cardiac arrest. Figure (5). Circulatory causes of deaths were predominated in male than females in all the study period (62.6 versus 51.9/100000 population). Stroke, Cardiac arrest, Heart failure and others causes were more common in female, while IHD were more predominated in males than females. (31.5% versus 24.4%). There was a statistically significant difference between both genders in Stroke for female ($p=0.004$) and IHD for male (<0.001) only as shown in Table (1).

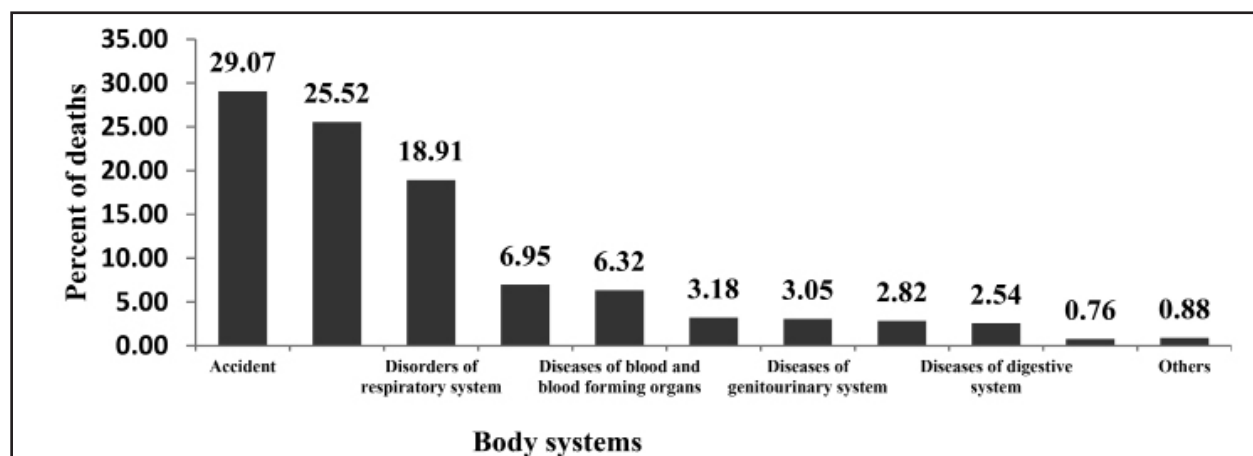


Figure 1: Distribution of deaths according to body systems

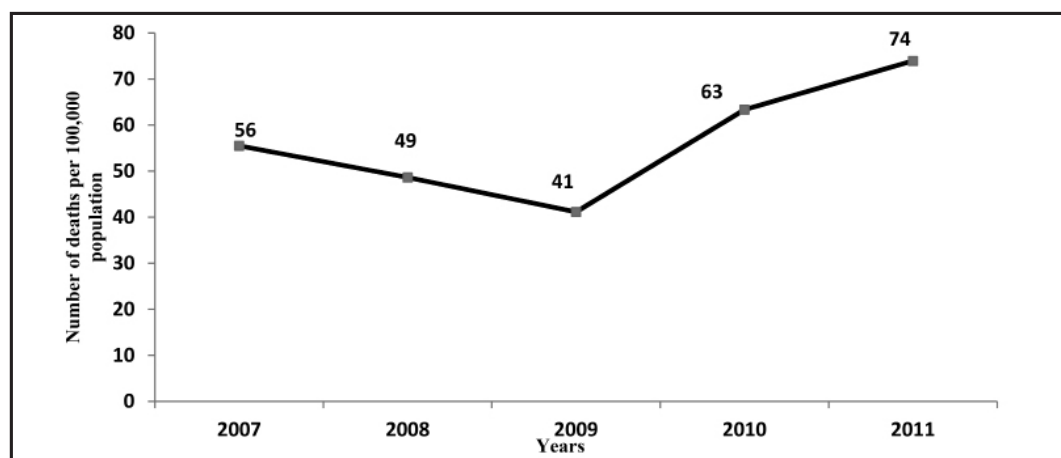


Figure 2: Trend of circulatory system diseases from 2007 to 2011

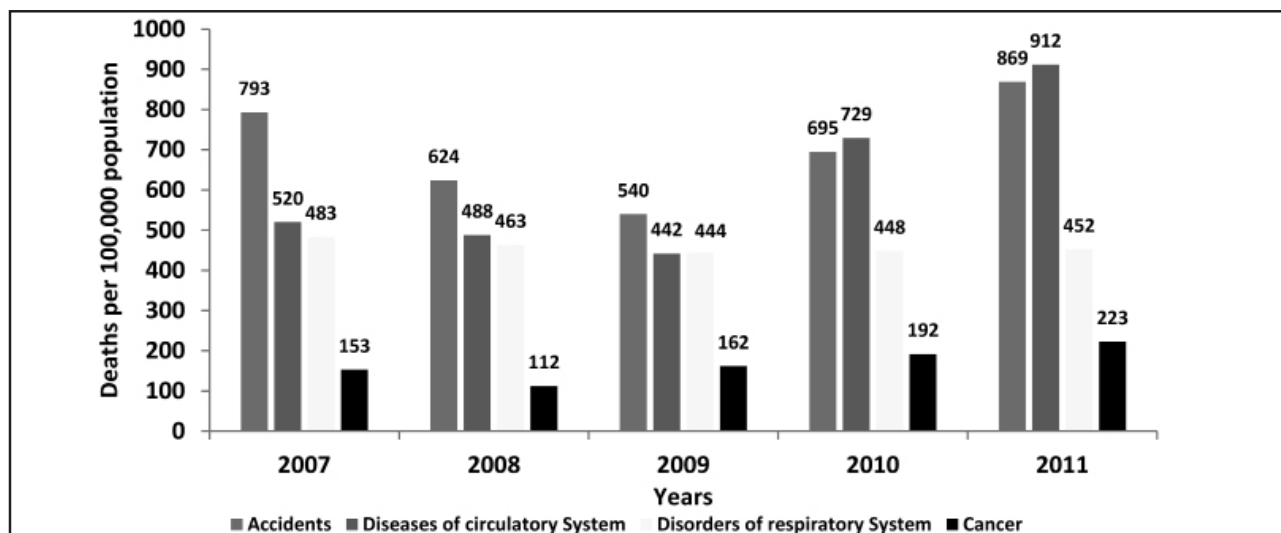


Figure 3: Trends of all causes of death from 2007 to 2011

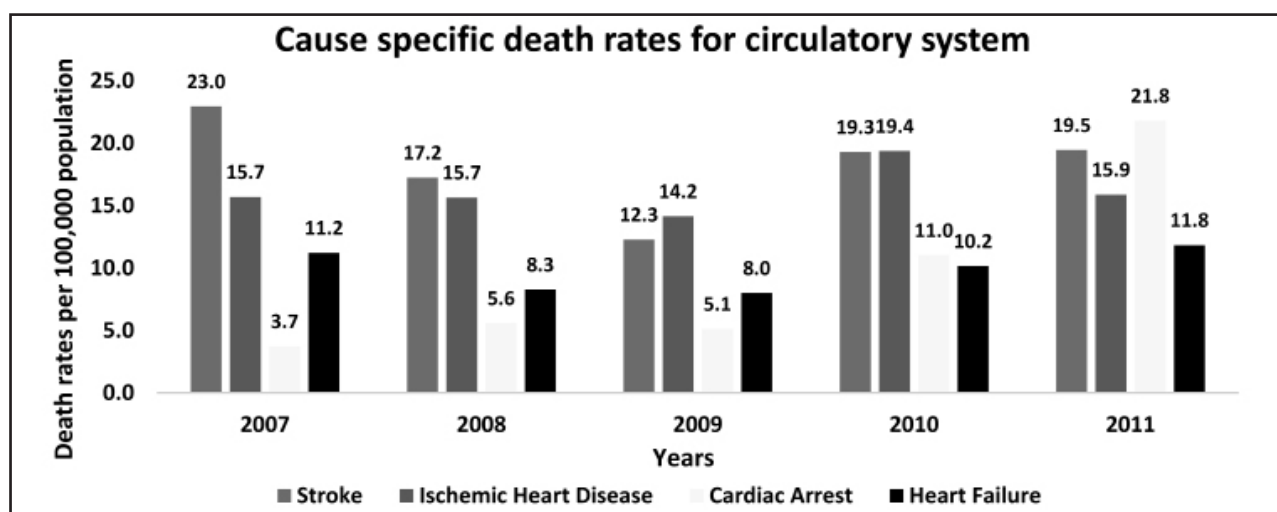


Figure 4: Trends of cause of death for different types of circulatory system

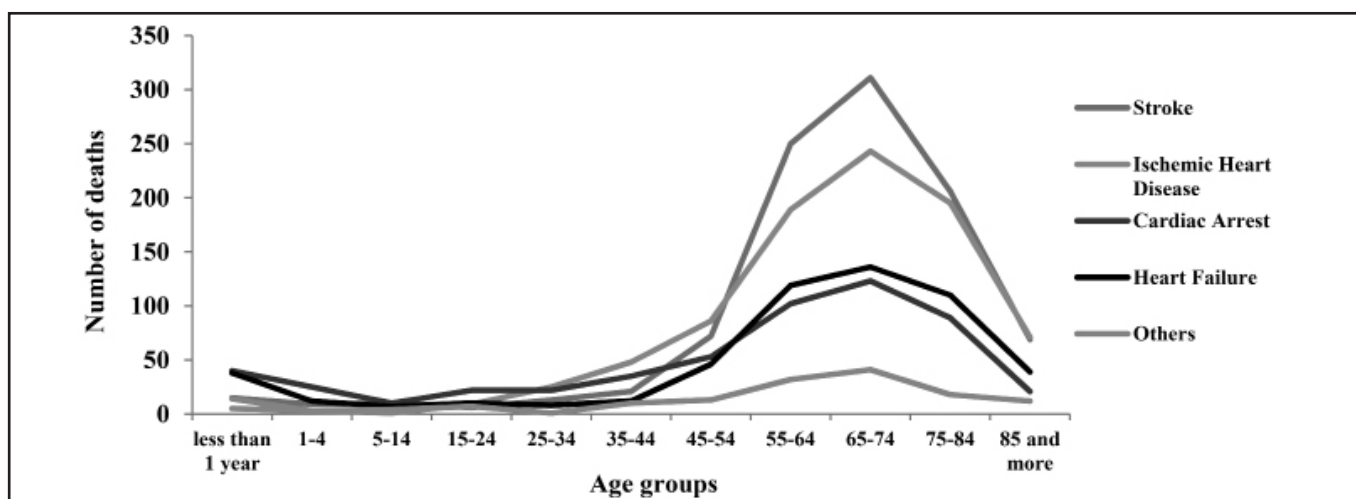


Figure 5: Causes of death for different types of circulatory system by age groups

Table 1: Causes of death for different types of circulatory system by gender

Circulatory causes of death	Male deaths			Female deaths			Total death			
	No.	%	Rate/ 100000 pop	No.	%	Rate/ 100000 pop	No.	%	X ²	P. value
Stroke	505	29.6	18.5	478	34.5	17.9	983	31.8	8.419	<0.0001
Ischemic heart diseases	536	31.5	19.7	339	24.4	12.7	875	28.3	18.536	<0.001
Cardiac arrest	288	16.9	10.6	254	18.3	9.5	542	17.5	1.054	0.305
Heart failure	294	17.3	10.8	243	17.5	9.1	537	17.4	0.038	0.847
Others*	82	4.8	3.0	72	5.3	2.7	154	5.0	0.326	0.5688
Total	1704	100	62.6	1387	100	51.9	3091	100.0		

* Deaths due to arrhythmias, endocarditis, cardiomyopathy.

Discussion:

Circulatory deaths was the second most common cause of death in Erbil city during the study period which constitute about 25.5% of total deaths which is lower than that reported in Aleppo- Syria in 2007 which showed that 45.0% of overall mortality reported in the past five year of the study were due to circulatory causes (7). Stroke constituted most of death in current study and was the first cause of death and this was inconsistent to that of global leading cause of death in which ischemic heart diseases was the first cause of death according to the report of WHO of global burden of diseases(8) This is inconsistent with the study of Basra which showed cardiovascular system cause of death as the 1st cause in 2007 (9). and inconsistent with the study done in Saudi Arabia in 2008 which showed malignant neoplasm as the 1st leading cause of death (10).

The result of this study was inconsistent with the report of Australian Bureau of Statistics of 2010 which showed that the cardiovascular system death was the first leading cause of death followed by cancer deaths (11). In a study done in Viet Nam in 2009, stroke was the leading cause of death in both genders, other prominent causes of deaths were cancers and HIV infection in males and cardiovascular diseases, pneumonia and diabetes in females (12). These findings were inconsistent with the current study which showed accidents as the first leading cause of death followed by circulatory cause of death, although there were some similarities in the causes but the difference was in ranking. A study in Thailand 2010 (13) revealed that among males stroke was the first cause of death which constituted 9.4%, and IHD (6.4). In females stroke was again the first cause of death (11.3%) and IHD (7.4%), in contrast to the present study which showed that in males IHD was the first cause of death (31.5%), while in females stroke was the first cause of death with (34.5%) of circulatory system cause of death. The most significant trend in circulatory system causes of death was "cardiac arrest" which is an ill-defined cause of death and indicates that the direct cause of death was not registered showed low rate in 2007, then increased gradually, but after 2009, there had been an abrupt increase in

death rate until 2011 to become the 1st cause of death. On other hand, IHD and heart failure showed increase in death rates after 2009, except for stroke which decreased in 2011. There is no specific explanation for trends of different types of circulatory system cause of death as there were many overlapping between them, but in general there was increasing in circulatory cause of death after 2009 which may be due to western life style adoption, eating unhealthy diet, physical inactivity, smoking and alcoholism. The male dominance over female deaths is more prominent in ischemic heart disease (P<0.001) which is in line with a cohort study done in Lebanon in 2001. On other hand, the study of Lebanon showed female predominance in stroke (14). Also a study in Syria showed higher mortality for males due to heart diseases and higher mortality in females for stroke which is consistent with the current study for IHD and stroke (7). In Australia, circulatory cause of death were responsible for about 31.7% of total deaths in 2010 with median age of 85 years, female deaths constitute about 52.5%, and IHD and stroke together were responsible for 72.3% of deaths due to circulatory system deaths (11). In Erbil city in the current study circulatory causes of death were responsible for 25.5% of deaths and with male to female ratio of 1.39:1 which was inconsistent with that of Australia which showed female predominance, IHD and stroke in Erbil city were responsible for about 60% of deaths due to circulatory diseases. In a study done in Syria about coronary heart diseases between 1996 and 2006, The mortality rate had increased by about 64%, which was attributed to increase in circulatory risk factors as a result of urbanization and changing in lifestyle. This Syrian study showed female predominance which was inconsistent with current study. Most of deaths in 2006 in Syrian study were in the age group 65-74(15), which was in line with current study. In USA, 49.9% of deaths in 2008 were caused by CHD (16). Heart failure was responsible for 7% of circulatory deaths in USA while in Erbil city it was 17.4 % in study period. Stroke in USA was responsible for 16.5% of circulatory deaths while in Erbil city it was responsible for 31.8% of death. Circulatory mortality increased with age in USA while in Erbil city it was more concentrated in the age group 65-75 years. The younger

mortality due to circulatory diseases in current study comparing with Australia and USA may be due to unhealthy diet, physical inactivity, obesity, DM and dyslipidemia together with aging, genetic factors promote atherosclerotic changes, which started early in life in childhood and adolescent and manifest itself as heart attack and stroke in early late stages of life (17). In a study done in the West Bank in Palestine on pattern of mortality, circulatory system was the main cause of death in the years between 1999 to 2003 (18), which constituted about 45%, also the ranking of further classification of circulatory deaths were hypertension, acute myocardial infarction, chronic IHD, heart failure and cerebrovascular diseases respectively, while in the current study the ranking of circulatory cause of death were stroke, IHD, cardiac arrest and heart failure. In the same study males were similar to females in death in contrast to current study in which males predominates over females.

Conclusion:

Circulatory mortality was the second leading cause of death in Erbil city during study period, but from 2009, it starts to increase to be the first cause till 2011. Future preventive public health strategies for circulatory diseases prevention are mandatory.

Authors' Contributions:

Dr. Haitham Issa: research writing interpretation, and comparing with other studies in discussion in addition to reference writing.

Dr. Aso Zangana: Data collection and analysis.

References:

- 1- Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS medicine* 2006; 3(11): 442.
- 2- Saidi O, Mansour NB, O'Flaherty M, Capewell S, Critchley JA, Romdhane HB (2013). Analyzing Recent Coronary Heart Disease Mortality Trends in Tunisia between 1997 and 2009. *PloS one* 2013; 8(5): e63202.
- 3- WHO. Cardiovascular diseases. Geneva; 2013: WHO. www.who.int/mediacentre/factsheets/fs317/en/index.html#.
- 4- Al-Hadiithi T, Shabila N, Al-Tawil N, Othman S. Demographic transition and potential for development: the case of Iraqi Kurdistan. *East Mediterr Health J.* 2010;16(10):1098-102
- 5- WHO. International Classification of Diseases and Related Health problems (ICD-10th revision). Geneva: WHO; 2013. <http://www.who.int/classifications/icd/en/index.html>.
- 6- KRSO. Erbil population. Erbil, Iraq: KRSO, Ministry of Planning; 2013.
- 7- Maziak W, Raslam S, Mzayek F, Ward KD, Eissenberg T, Keil U. Cardiovascular health among adults in Syria: a model from developing countries. *Ann Epidemiol* 2007; 17(9): 713-20.
- 8- Mathers C, Fat DM, Boerma J. The global burden of disease: 2004 update. Geneva: WHO; 2008
- 9- Sadek H, Ajeel N. Age-standardized mortality rates by cause in Basra, Iraq: 1978 and 2007. *East Mediterr Health J* 2012; 18(10).
- 10- Ansary LA, Esmaeil SA, Adi YA. Causes of death certification of adults: an exploratory cross-sectional study at a university hospital in Riyadh, Saudi Arabia. *Ann Saudi Med* 2012; 32(6): 615-22.
- 11- Australian Bureau of Statistics. Causes of Death. Australia: Australian Bureau of Statistics. 2012
- 12- Hoa NP, Rao C, Hoy DG, Hinh ND, Chuc NTK, Ngo DA. Mortality measures from sample-based surveillance: evidence of the epidemiological transition in Viet Nam. *Bull World Health Organ* 2012; 90(10): 764-72
- 13- Rao C, Porapakkham Y, Pattaraarchachai J, Polprasert W, Swampunyalert N, Lopez AD. Verifying causes of death in Thailand: rationale and methods for empirical investigation. *Population Health Metrics* 2010; 8(1): 11.
- 14- Sibai AM, Fletcher A, Hills M, Campbell O. Non-communicable disease mortality rates using the verbal autopsy in a cohort of middle aged and older populations in Beirut during wartime, 1983-93. *J Epidemiol Community Health* 2001; 55(4): 271-6.
- 15- Raslam S, AL Ali R, Maziak W, Mzayek F, Fouad F, O'Flaherty M, Capewell S. Explaining the increase in coronary heart disease mortality in Syria between 1996 and 2006. *BMC Public Health* 2012; 12(1): 754.
- 16- National Institutes of Health. Morbidity & Mortality, Chart Book on Cardiovascular, Lung And Blood Diseases. USA: National institutes of health. 2012
- 17- Mendis S, Puska P, Norrving B. Global atlas on cardiovascular disease prevention and control. Geneva 2011: WHO.
- 18- Abu-Rmeileh NM, Hussein A, Giacaman R, Abu-Arqoub O, Hamad M. Peer Reviewed: Mortality Patterns in the West Bank, Palestinian Territories, 1999-2003. *Prev Chronic Dis* 2008; 5(4). www.cdc.gov/pcd/issues/2008/oct/07_0184.htm.