https://doi.org/10.15218/ejnm.2024.18 Erbil j. nurs. midwifery, Vol. 7, No. (2), Nov 2024
Original Article

Unveiling the Veil of Mortality: Investigating the Multifaceted Causes and Consequences of Sudden Deaths through Post-Mortem Perspectives in Erbil City

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ABSTRACT

Background and Objective: Percutaneous sudden death is still a great concern to humankind since it still affects a large population across the globe and has many causes and risk factors. This paper looks at the various contributing factors to Sudden Deaths in Erbil, Iraq, focusing on examining gender differences and family predisposition.

Methodology: Using proper and extensive research methods, this research afforded data from fifty different persons of different ages. The assessment comprised sex, age, cause of death, previous co1morbidity, and family anamneses in addition to qualitative and quantitative semesters with relatives and time-sequential analysis of risk factors.

Results: Mores findings show that smoking and alcohol use are influential risks because of their correlation with health risks at a statistical level. As for stress, obesity and poor sleep do not have very sharp relations, while poverty and lack of risk factors are statistically insignificant, which could mean that they are only correlated at all but could be coincidental. Most observable gaps are on gender: unfortunately, male gender is more vulnerable and affected by lifestyle diseases more than their female counterparts. Using the obtained results of the analysis, it becomes possible to state that myocardial infarction and atherosclerosis are quite frequent health issues, which are predominantly observed during the night and related to family tendencies.

Conclusion: The findings of this research also stress on the importance of smoking and gender differences related to sudden death that demand more careful consideration of the public health approaches , including genetic testing, modification in lifestyle and modification of the environment and so on. It demonstrates the relation between the rates of sudden death and myocardial infarction and atherosclerosis at night and the necessity for further study of circadian rhythm. Emphasis is placed on the position of forensic experts to establish the causes of death, especially in Erbil, Iraq pointing towards a systematized procedure towards bringing down sudden death incidences across the globe.

Keywords: Sudden Death; Smoking; Obesity; Gender Risks; Circadian Rhythms.

Received: 05/04/2024 *Accepted: 27/11/2024* *Published: 30/11/2024*

INTRODUCTION

Death incidents always occur throughout the year and affect families as well as people around the globe , causing so much emotional stress, let alone the imbalance of families and communities that are affected. Such deaths not only interfere with the lives of those involved, but they also have consequences for the rest of society. Easy identification of the many factors that are in some way linked to sudden deaths and their impact on people's lives is essential for prevention, improvement of health outcomes and better ways to support those who are bereaved. Fringe events are the sudden and natural cardiac accidents, suicides, and even homicides. Cardiovascular diseases are considered to be the main contenders for increased rates of sudden deaths that cause considerable rates of deaths worldwide [1, 6]. Khan et al.,conducted a study in Saudi Arabia whereby they established the prevalence of SCD and noted that this was alarmingly high; therefore , they called for effective measures to be taken in order to deal with this problem [2]. Besides, the process components, including air pollution, occupational risks, and chemical use, have also been shown to raise the mortality levels [2, 3]. These factors are aggravating of pre-existing diseases and have high potential risks for several population groups. This brings to the issue of sudden deaths, and a variety of socioeconomic factors can greatly influence this condition. Patient-care disparities that emerge from inequalities in the distribution of the healthcare, educational, and resource systems imply that high rates of otherwise avoidable sicknesses result in unanticipated mortality [4, 5]. For instance, the study has shown that it is computed that death due to sudden cardiac arrest is higher amongst the people with lower socioeconomic status, which shows that the social determinants of health should also be targeted. This study endeavours to shed light on the multifactorial factors that surround the phenomenon of deaths in a specific post-mortem examination view. Through the examination of autopsy results, case notes, and forensic investigations ,the research will determine the causes of sudden deaths and the contributing factors that surround them. By way of this more global perspective, we will try to establish a better understanding of other ramifications of sudden deaths on people and their environment. Equally important is getting to know the consequences of sudden deaths, as in these circumstances the mental state and the economic well-being of survivors may be negatively impacted [7, 8]. That can help avoid the deterioration of long-lasting consequences these tragedies trigger and increase the overall community's coping capacity. It is with this view that this study hopes to enrich the existing literature and guide strategies for prevention and mitigation of sudden deaths as key health trends of interest [9 and 10].

METHODS

1. Study Design, Setting, and Duration (2019-2023): Study Design, Setting, and Duration (2019-2023): 50 cases of sudden deaths in this study were topics of a retrospective cohort that was investigated carefullyby the department of Forensic Medicine at Rezkar Hospital in Erbil, Iraq, for the period of 2019-2023. The selected cases do cover a vast age range from 15 months to 70 years; this would mean that the study obtained a diverse population that would capture all the necessary demography that is relevant to an understanding of the complexity of sudden deaths.2. Strategic Case Selection and Sample Determination: The choice of cases of Sudden Death was conducted with

a high level of rigor and using thorough procedures which included, amongst others, peculiar criteria such as age, gender and overall ascertainable causes of deaths. Thus, the variability of the results is also magnified due to the variation of age of the participants, which, though, diversifies the study findings [11]. This means that sample size restricts some certain interpretation of the outcomes to reduce risks of making wrong conclusions concerning the cause of sudden death.3. Advanced Family History Analysis: A review of each case family history was done separately to undoubtedly link the families' health history with the risk factors and proven causes of sudden death. In this important step, the main purpose was to reveal potential genetic and hereditary causes that could potentially increase the risk of sudden death in Erbil's population [12,13]. Through such relations , the study aims at explaining the heritable risks that may contribute to causes of sudden deaths.4. In-depth Temporal Analysis of Death Circumstances: In-depth Temporal Analysis of Death Circumstances: Conducting a temporally expansive study for each case, pre-mortem and post-mortem information was accrued with the view to demystify the key chronology and socio-environmental circumstances associated with each SLED event. This integrative assessment was attempted to assess specific changes in lifestyle, other health events, and proximate events leading to these sudden deaths [14,15].5. Sophisticated Risk Factor-Cause Correlation Analysis: Sophisticated Risk Factor-Cause Correlation Analysis: The study systematically analysed the connection between the common risk factors, including smoking, alcohol consumption, obesity, poor sleep, stress, and low SES, with the exact types of mortality deaths in the light of the context of Erbil within the years of 2019-2023. This analysis was planned so that it wanted to find statistically significant relations for enhancing the comprehension with regard to these risk factors and the idea of how they are related to sudden death [16].6. Obesity Measurement Technique: Obesity was defined using Body Mass Index (BMI) which remains one of the most valid measures of obesity. BMI was computed by dividing an individual's weight in kilograms by the square of height in meters (BMI = kg/m^2). Participants were categorized according to the World Health Organization's classifications for obesity:, which are classified as as; underweight (BMI<18. 5), normal weight (BMI < 25), overweight (BMI 25-29. 9) and obesity (BMI ≥ 30). Such standardized measurement was possible to apply in order to evaluate the relation between obesity and sudden death in a consistent manner.7. Integrated Quantitative and Qualitative Family Interviews: Besides, the assessment based on the reorganization of 50 medical records, the qualitative interviews with the relatives of the deceased patient were carried out. This approach was developed in an effort to somewhat attempt to obtain a genuine picture of the family relational aspect, consumption patterns and practices involving diet and exercise, and : the inheritable profile, which encompassed the cases of sudden death. The study applied clear and precise phenomenological research methods, the phenomenological research designs derived qualitative data from the study; the data set signifies profound-rooted family perception about sudden-death events [17].8. Dynamic Longitudinal Analysis of Risk Factor Evolution: For examining the trends and shifts of risk factors for sudden deaths from the year 2019 to the year 2023, a big-scale long-term cohort study was done, as several of them are chronic and dynamic in nature and several of them are long-term risk factors associated with sudden deaths With regard to

this, they were very much involved in documenting the temporal trends of these risk factors and their regression analysis of changes in the predictor on occurrences of sudden death.9. Rigorous Ethical Oversight and Data Privacy: Teaching is highly ethical where matters concerning data privacy are effectively followed from set standards. As to the participants being involved in the research, the high level of ethical research standards and the close concern with participants' privacy was attended to by ensuring participants' identities were kept anonymous where they or their families' medical information and experiences were identified. For this purpose, permission was sought and obtained from the relevant institutional review boards, hence improving the ethical intention of the proposed research.10. CONTRAST, Analysis with Advanced Statistics using SPSS 29. The analysis of this study used the Statistical Package for Social Sciences (SPSS) at the 29 and more version. The study used complex statistics to compare all complexities and consistencies within data sets. This involved the use of chi-square tests, logistic regression models, and survival analysis as the means of evaluating and confirming the strength of the relationship between the risk factors, family history dispositions, and incidences of sudden deaths. 11. Expert Consultations for Validation and Insight: The Consultation with the Experts for the Confirmation and Information When: The study also included focus group discussions with a panel of medical and forensic physicians from Rezkar Hospital with the aim of getting more views on the various complex factors that lead to sudden deaths. Use of consultation in engaging news and journal articles was useful in these consultations because it was contributing to a study, which was statistically coherent and clinically relevant.12. Adaptive Feedback Mechanism for Continuous Refinement: The adaptive feedback mechanism to make constant improvements: The feedback process was used throughout the study to determine the strengths and weaknesses of the process while it was ongoing from the feedback of various parents, doctors, community workers, and especially families with such children. This dynamic approach assisted in maintaining a certain level of the study's relevance to the emerging new developments and, thus, enhanced the study's efficiency in handling a phenomenon of sudden deaths in Erbil.

RESULTS

Table 1 demonstrates the cross-tabulation of some of the risk factors and their outcomes as concerning a specific health outcome. This is done through the help of frequencies, percentages, and the results of the Chi-Square test. Thus, smoking and alcohol consumption levels are found to be the most significant risk factors that are present in this study as evidenced by their low p-values. These risk variables are considered to be the most prominent global risk variables most linked to the risk. The confidence of the links between obesity and stress is less than that of the smoking and alcohol intake, even if the p-values of the latter two components are slightly higher. However, there is strong evidence that levels of stress are related to obesity. Traditional standards for statistical significance ($p < 0.05$) are not met by such variables as insufficient sleep, poverty, and the absence of other documented risk factors. Thus, it remains unclear whether there are any links with the health resultthey could only be due to chance, as this implies. The p-values by the stars are aligned such that it will be easily appreciated by the reader when high or low significance levels are achieved. A better rating means more cases that speak against the H0 and we recall that H0 states that no relationship exists.

Table 1: Distribution Lifestyle Risk Factors and Sudden Death in Erbil

Risk Factor	Frequency (n)	Percentage (%)	Chi-Square Test (P-value)
Smoking	22	(44)	0.002 HS
Alcohol Consumption	12	(24)	0.015 S
Obesity	7	(14)	0.050 S
Poor Sleep	6	(12)	0.080 NS
Stress	8	(16)	0.037 S
Poverty	3	(6)	0.110 NS
No Identified Risk Factor	10	(20)	0.200 NS

The data in table 2 give an idea of these disparities and reveal fairly large gender differences in the mortality rates from many of these causes. As it can be seen in this table, the discrepancies are real in that they reflect information generated from the data. That is evidenced by the following variances. This is due to various causes, including smoking, alcohol consumption, atherosclerosis, myocardial infarction, renal failure and other reasons that have not been well elucidated. A statistically significant difference is a key figure that speaks about such differences. A p-value below 0. 05 denotes statistical significance. Based on the results above, it is quite reasonable to assume that men are more vulnerable to various kinds of risk than women. This is due to the fact that men have a higher risk of smoking-related mortality, and disease of atherosclerosis and myocardial infarction in addition to alcohol intake, as compared to the female gender. Furthermore, male consumers have been found to consume the alcohol more than the females.

One would also want to note that renal failure is, apparently, more frequent in females, which contrasts with the general tendency observed. This is an important area to shed light on. There may be gender disparities in mortality that have not been explored; however, the presence of deaths that resulted from unspecified causes confirms such a possibility. Still, it is possible to assume that there are latent differences in mortality rate between males and females. Such accumulation of data offers insights into the disparities in mortality in different diseases according to gender as well as the contributed effects of certain individual lifestyles on the overall health status. Thus, it can be stated that it is specific therapies and more research that are required to address the issues mentioned above. This is because of this event, the annual Latin Grammy Awards were held to celebrate artists of Latin American origin.

Table 2. Prevalence and Statistical Significance of Various Causes of Death by Gender

Cause of Death	Prevalence among Males (%)	Prevalence among Females (%)	P-value
Smoking	(44)	(22)	<0.05*
Atherosclerosis	(36.11)	(14.29)	<0.05*
Myocardial Infarction (MI)	(27.78)	(7.14)	<0.05*
Alcohol Consumption	(24)	(12)	<0.05*
Renal Failure	(11.11)	(21.43)	<0.05*
Unknown Causes	(11.11)	(21.43)	<0.05*

Table 3 shows a description of the frequency of different health conditions in the population that was sampled. Among the many causes of heart disease, the results show that atherosclerosis accounts for 46% of all cases and myocardial infarction for 28%. With p-values of 0.045 for myocardial infarction and 0.030 for atherosclerosis, respectively, the statistical analysis shows that both conditions are significantly correlated with the sample population. In comparison, 10% of cases are due to renal failure, and 16% are from other reasons; these are far less common. There is no statistically significant correlation with the sample population for renal failure and other causes, with p-values of 0.150 and 0.200, respectively. Evidence from this study indicates that while heart attacks and atherosclerosis are major problems for this population, renal failure and other variables do not play a major role in these problems.

Table 3. Distribution and Statistical Significance of Sudden Death Causes

Cause	Number of Cases	Proportion of Total	Significance Level
Myocardial Infarction (MI)	14	(28)	0.045 S
Atherosclerosis	23	(46)	0.030 S
Renal Failure	5	(10)	0.150 NS
Other Causes	8	(16)	0.200 NS
Total	**50**	**(100)**	

The following table 4 offers some ideas of the timing of unexpected fatalities, which can be associated with a number of factors concerning the time of their occurrence. Attacks of acute myocardial infarction are given special causation along with the diseases like atherosclerosis and renal failure and many more. Atherosclerosis and myocardial infarction also have an interesting pattern; while both manifestations are more frequent during the night and in the morning, besides, they have variable data during the day. Both of these are other unsuspected causes of death which are associated with atherosclerosis. Since, in view of the assessments madeby comparing the coefficients obtained and the sensitivity of the tests performed, the p-value turned out to be less than 0. 05, it is possible to consider the assessment of a potential relationship between the events listed above and certain times of the day. At the same time, the unforeseen mortalities that are connected with renal failure as well as other causes also do not show highly defined temporal trends, and incidents are distributed throughout numerous time frames. Furthermore, the significance of these alignments is not even near, being 0.10 and 0. 25 respectively, in the comparable populations. In aggregate, the results of the research have shown the necessity to conduct further scientific investigation of the timing characteristics of deaths related to renal failure and other diseases. Moreover, the findings made it possible to state that attention should be paid to temporal factors, which might help explain the instances of sudden death due to myocardial infarction and atherosclerosis.

Table 4: Temporal Distribution of Sudden Deaths by Cause : In sample with Overall Statistical Significance

Cause of Sudden Death	Morning (6AM-12PM) (n)	Afternoon (12PM-6PM) (n)	Evening (6PM-9PM) (n)	Night (9PM-6AM) (n)	Unknown (n)	Overall p-value
Myocardial Infarction (MI)	3	3	2	6	0	< 0.05 S
Atherosclerosis	6	7	3	7	0	< 0.05 S
Renal Failure	3	1	1	0	0	0.10 NS
Other Causes	4	2	2	3	1	0.25 NS

Table 5 also suggests that causes of SCD have heritable disposition since they are inclined to be transmitted down the generations. The statistics indicate that there are a number of family predisposition cases with regard to atherosclerosis and MI – eight cases of MI and ten cases of atherosclerosis, respectively. These diseases run in the families based on the information presented in these data and p-values of 0 which are less than the levels of significance. 035 and 0. 050, respectively.

It is less in the case of family predisposition, where there are 4 cases of renal failure and 6 cases for other reasons. A relatively weaker genetic linkage is suggested by the other associated p-values of 0. 200 and 0. 200 and 150 for these situations, respectively, as shown in the table below. These observations also illustrate how family medical histories are crucial in identifying the root of autopsied sudden deaths, including myocardial infarction and atherosclerosis.

Table 5: The Family Link: Exploring Familial Predisposition

Cause of Sudden Death	Familial Predisposition Reported (n)	Familial Predisposition Not Reported (n)	Unable to Ascertain (n)	P-value
Myocardial Infarction (MI)	8	5	1	0.035 S
Atherosclerosis	10	12	1	0.050 S
Renal Failure	2	3	0	0.200 NS
Other	4	3	1	0.150 NS

Discussion

The holistic synthesis of the results from the latest study with the previous studies offers spectacular understanding of the multifaceted connection between the risky behavioral and genetic factors and other large health determinants of sudden death. Smoking is still a well-documented risk factor which was present in 44% of cases of deaths recorded as sudden (p=0. 002); again, observations corroborate evidence given in smoking-related morbidity and mortality in the Framingham Heart Study [18]. This continuous situation clearly indicates that there is a need to eradicate the prevalence of smoking, as its association with sudden cardiac events has already been well documented. In addition, there are gender differences as well, where males are found to be more vulnerable to diseases associated with alcohol x

and substance smoking. This means there is a gender-specific vulnerability that requires gendered health interventions; and therefore gender should be recognized as a vital contributor to health differences. Further, the rise in the number of deaths, particularly during the night, by myocardial infarction and atherosclerosis also draws the need to further understand the circadian effects. Eckart et al. (2011) observed these temporal patterns in the same way and further stressed these patterns while discussing the effective planning of preventive measures [20].Obesity is one of the key factors that amplify gender-specific consequences of risk factors of sudden death. The current study yielded significant correlations with atherosclerosis and myocardial infarction similar to the observation made by Christensen et al. 2009,who recommended integrated intercession since both biological, behavioral, and socioeconomic factors influence the two diseases [21]. Renal failure and other chronic diseases causing SCD are multifactorial, which poses a problem to the application of current risk assessment tools. This complexity requires a holistic multi-disciplinary public health approach that goes a step further than the elimination of risky behaviours, diet and genetic testing and environmental management [22].The discussion of this paper brings into light the need to promote multidimensional approaches to public health as recommended by WHO in 2017. More so, such initiatives need to be underpinned by gender differences, time and genetic factors. Such a strategy offers hope on minimizing the risk factor associated with sudden death as a result of its multiple causes on the international level. Furthermore, this form of evaluation acknowledges the relevance of the economic disparities, emotional issues, and poor heritage information on family medical systems in responding to sudden fatalities [23,24].One of the features of this discourse is the role of forensic experts, which is not mentioned often, especially in such places as Erbil in Iraq. They are indispensable to finding solutions to the workflow that connects medical tests with precise determinations of the cause of death. There is a need to enhance the roles of such experts within the health system since they help in offering important information about mortality trends in order to aid health policies.

CONCLUSION

The effects of one's mode of living, one's blood, and one's health on death in a sudden are described in detail. Preventing smoking is one of the important areas in the world's public health services because the hazard factor has been around for quite some time now. This requirement is supported by the most fundamental research, including the Framingham Heart Study, as evidence that smoking poses a major threat to the cardiovascular systems and a high threat to unknown death. Men's health treatments are very appropriate in mitigating the high incidence of smoking and alcohol-related diseases in the male community Thus, there is a need to do research on circadian rhythms because atherosclerosis and myocardial infarction fatalities are on the increase at night. In preventive measures, timing is very essential. Obesity in particular makes it even harder to establish resolution because the factors that contribute to the rate of sudden death depend on gender. In particular, biological, behavioral, and social models should be taken into consideration during treatment of the condition. A proper reaction is required in this case, as the primary cause of death is multifactorial. This approach challenges the prevailing epidemiological power-based risk

assessment paradigms while setting a stake into environmental, behavioural, and even genetic approaches that are inherent in holistic health interventions. In an address released in 2017, WHO made several general recommendations on why these conclusions should be integrated into the practice of health. Significant additional reductions in the rate of ‘‘out of nowhere’’ deaths require a more comprehensive strategy that targets sex, time and genetics. Going by this technique, there could be a minimal number of deaths that were not expected to occur, and the health care system could be personalized to suit patients’ needs. Talented forensic professionals are in demand, and this is especially.in Erbil – Iraq, where they identify why a person dies. The common one is the total disconnection of medical examination to the cause of death diagnosis. Health ecosystems to be recognized and assisted is much better cognizance. This is why a comprehensive postmortem approach that is more than what a common protocol calls for is required for the purposes of postmortem observations in the event of an assigned death. Environmental treatments, behavioural changes, and genetic tests demand better information on gender differences, time and genetic characteristics. Worldwide BESD mortality could be lowered due to an interprofessional approach, improved sunders, and SES by employing forensic learning. The complexity of the interaction of sudden death factors may be better controlled with this informed approach, thus enhancing the intervention and prevention efforts.

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