RESEARCH ARTICLE

SOCIO-DEMOGRAPHIC AND ETHNIC DIFFERENCES IN PATIENTS OF ACUTE CORONARY SYNDROME WITH OR WITHOUT DIABETES MELLITUS

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ABSTRACT

Introduction: Non-communicable diseases (NCDs) are rapidly becoming major causes of morbidity and mortality worldwide, including the Gulf Cooperation Council (GCC) countries. Although Acute coronary syndrome (ACS) and Diabetes mellitus (DM) are two important non-communicable diseases, the magnitude and the distribution of established as well as emerging risk factors for ACS have not been fully studied in the GCC countries in a large scale epidemiological context.

Objective: The study aims to identify the socio-demographic and ethnic variable sin acute coronary syndrome patients with or without diabetes mellitus admitted to the Department of Cardiology of Gulf Medical College Hospital and Research Center from January 2010 to December 2013.

Methods: The research is a hospital record-based descriptive study conducted at Gulf Medical College Hospital and Research Center, Ajman, UAE. The study population is all patients with acute coronary syndrome admitted to the Department of Cardiology from January 2010 to December 2013.We included all cases of ACS based on diagnosis by a medical officer. Case records with incomplete data were omitted. The data were imported to Statistical Package for the Social Sciences (SPSS) program version 20 for analysis. Chi-square test was performed to test the association between variables. Statistical significance was set at p 0.05.

Results: Out of the 175 ACS patients 75 (43%) were diabetic. ACS with diabetes was found in 63(84%) males while it was observed in 12 (16%) females. Higher proportion of non-Arabs had ACS with diabetes (60%) as compared to Arabs(40%). Patients aged 40-60 years had the highest proportion of ACS with DM [41(54.7%)].

Conclusion: The majority of the ACS patients were aged between 41-59 years, non-diabetic, male and non-Arab and were from South East Asia.

INTRODUCTION

A World Health Organization (WHO) study showed that around 57 million individuals died during2008 due to medical illness worldwide. Furthermore, in approximately7.3 million of these, death was due to IHD and in another 6.2 million due to stroke (WHO, 2011). Countries are affected differentially according to their economic status. Over 80% of CVD deaths occur in the developing countries, with the two genders being equally affected (WHO, 2011). For every 100,000 individuals aged between 30 and 70 years, the occurrence of MI is almost 600 among males and 200 among females. In the United States, acute coronary syndrome is the most common reason for cardiac hospitalization.

However, myocardial infarction is the primary cause of death in both males and females, with nearly 500,000 Americans dying ….. (period) from myocardial infarction (Kumar and Abbas, 2010). In the United Arab Emirates, cardiovascular disease - mainly myocardial infarction - is the principle cause of death, responsible for 28% of total deaths (Staff Reporter, 2006). IHD constitutes serious socio-medical problem in many countries (Alajbegovi *et al.*, 2006), with the incidence of cardiovascular disease (CVD) rising in the developing countries. Yet, there are only a few published studies on the impact of modifiable CVD risk factors of acute coronary syndrome on …. in the GCC countries (Alrouh *et al.*, 2013; Cardiovascular diseases on the increase in Arab states, 2013). Therefore, we decided to conduct a study among patients with acute coronary syndrome admitted to GMC Hospital, Ajman, UAE, and determine its possible association with diabetes mellitus. Hence our objective was to identify the socio-

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demographic and ethnic differences in acute coronary syndrome (ACS) patients with or without Diabetes mellitus.

MATERIALS AND METHODS

The research is a hospital record-based descriptive study conducted at Gulf Medical College Hospital and Research Center, Ajman, UAE. The study population is all patients with acute coronary syndrome admitted to the Department of Cardiology of Gulf Medical College Hospital and Research Center from January 2010 to December 2013.We included all cases, of both genders and any age group, diagnosed by a doctor as having ACS. We excluded case records with incomplete data. The study was conducted from September 2013 till March 2014. The variables to be included in the checklist we used were chosen after reviewing several case records of patients with ACS and published articles from the literature. The checklist had all the variables covered in the study. The independent variables were Diabetes Mellitus, age, gender, ethnicity, WHO region while the dependent variable was the presence of acute coronary syndrome. English language was chosen for the checklist because all the hospital records had been maintained in English. After obtaining approval from the Ethics Committee of Gulf Medical University and permission from Medical Director, GMCHRC, the data collection was started. Confidentiality of the information collected and anonymity of the patients were ensured and the information was used only for research purposes. Permission was taken from the Medical Records Department for reviewing the case records.

The patients' hospital numbers were recorded from the coronary care unit (CCU) register. The computer database of patient records were viewed and the information required to achieve the objectives were extracted and entered in the checklist forms. The case records of all patients with ACS who had reported to the Cardiology Department between January 2010 and December 2013 were abstracted. The data were fed into Excel spreadsheets directly. After obtaining the data from the records, each option ticked was coded. Then the coded data were imported to Statistical Package for the Social Sciences (SPSS) version 20 for analysis. The results were subsequently presented as frequency tables, figures or texts. Chi-square test was performed to test the association between variables. The statistical significance was set at p 0.05.

RESULTS

175 patients with ACS had reported to the Department of Cardiology from January 2010 till December 2013.

Table 1 shows the socio-demographic characteristics of the patients with Acute Coronary Syndrome (N=175). The age was categorized into three groups: less than or equal to 40 years, between 41 and 59 years, and greater than or equal to 60 years. It was observed that of the total 175, one-fourth of the cases were in the age group 40 years, two-fourths between 41 and 59 years and one fourth 60 years. Among all the age categories male patients were more than female patients. For the patients in the age group less than or equal to 40 years, the majority were males. Among the patients who were between 41 and 59 years of age, about 90% were males. Among patients in the age group greater than or equal to 60 years, the majority were males and about 15% were female patients. The mean age of the total participants was 49.9 ± 11.19 year, with that of the male patients being 49.5±11.25 years and females53.8±10.16 years. The majority of the patients were male, with over than 50% in the age group between 41 and 59 years followed by almost greater than 25% in the age group less than or equal to 40 years and around 22% in the age group greater than 60 years. The total number of females was 20 cases the majority (50.0%) of whom were in the age group between 41 and 59 years followed by 35.0% in the age group greater than or equal to 60 years and 15.0%) were below or equal to 40 years of age.

As Table 1 shows our data had been collected during the period 2010 till 2013. Among patients admitted in 2010, the maximum number was male with only 6.7% being female. The corresponding figures for 2011 were >85%males and<15% females. The number of cases in both genders decreased significantly in 2012, the number of males being 42 and females six. In 2013 more than three-fourths were males As for the ethnicity of the ACS patients, we classified them into groups based on whether they were Arabornon-Arab and considering the WHO regions of origin (Middle East / Africa / Europe and South East Asia). There was a preponderance of malepatients among the Arabs. A similar preponderance was observed among the non-Arabs as well, with 91.0% males and 9.0% females reporting with ACS. Among the patients of Middle East/Africa/Europe origin it was found that there were 56 males and 10 females. Among patients originating from South East Asia regions over 90% were male. In total, there were more cases of non-Arab men compared to cases of Arab men. The number of cases of Arab and non-Arab females was equal. The frequency of ACS in males from South East Asia was higher than that from Middle East/Africa /Europe. Table 2 gives the comparison of ACS patients with and those without Diabetes mellitus based on socio-demographic characteristics.

Table. 1 Socio-demographic characteristics of the participants (N=175)

Variables	Groups	Gender			
		Male		Female	
		No.	%	No.	%
Age group in years	40 years	41	93.2	3	6.8
	41-59 years	80	88.9	10	11.1
	60 years	34	82.9	7	17.1
Age	Mean ± SD	49.5±11.25		53.8±10.16	
Years	2010	42	93.3	3	6.7
	2011	50	86.2	8	13.8
	2012	42	87.5	6	12.5
	2013	21	87.5	3	12.5
Ethnicity	Arabs	54	84.4	10	15.6
	Non-Arabs	101	91.0	10	9.0
WHO regions	Middle East/Africa/Europe	56	84.8	10	15.2
	South East Asia	99	90.8	10	9.2

Table 2. Comparison of ACS patients with or without Diabetes mellitus by Socio-demographic characteristics (N=175)

Variables	Groups	ACS with DM		ACS without DM		P value
		No.	%	No.	%	
Age group in years	40 years	7	15.9	37	84.1	p<.001
	40-60 years	41	45.6	49	54.4	
	60 years	27	65.9	14	34.1	
Age in years	(Mean ±SD)					p<0.001
		55.2±9.99		46±10.44		
Gender	Male	63	40.6	92	59.4	NS
	Female	12	60.0	8	40.0	
Ethnicity	Arabs	30	46.9	34	53.1	NS
	Non-Arabs	45	40.5	66	59.5	
WHO regions	Middle East, Africa and Europe	30	45.5	36	54.5	NS
	South East Asia	45	41.3	64	58.7	

We divided the sample into three age groups, 40 years, 40-60 years and 60 years. In the group 40 years, there were 15.9% ACS patients with DM and 84.1% without DM; in the group 40-60 years there were 45.6% ACS patients with DM and 54.4% without DM and in the group 60 years two-thirds the ACS patients had DM and one-third (34.1%) did not. The highest frequency (>50.0%) of ACS with DM was in the age group between 40-60 years and the lowest (less than 10%) in the age group of 40 years. The highest frequency of ACS without DM was also in the same age group (40-60 years) with about 50.0% and the lowest (approximately 15.0%) was in the age group 60 years. The majority (>90%) of male patients were non-diabetic, while the majority of female patients (60%) were diabetic.

Among the Arabs there were 46.9% ACS cases with DM and 53.1% cases without DM; among the non-Arabs there were 45 ACS cases (40.5%) with DM and 66 cases (59.5%) without DM. Considering the WHO classification of geographical regions, there were 45.5% cases of Middle East origin having ACS with DM and 54.5% without DM, and 41.3% cases from Africa and Europe had ACS with DM and 58.7% without DM.

DISCUSSION

The present study determined the socio-demographic and ethnic differences among acute coronary syndrome patients with and those without diabetes mellitus. Among the 175 patients diagnosed at GMCHRC during the period 2010 to 2013, less than half were found to have diabetes mellitus. We observed that among the total number of patients diagnosed with acute coronary syndrome there were almost eight times more males than females. This finding is similar to the results of studies conducted in Newcastle, New South Wales and Australia (Chun *et al*., 1997) and in the UK (Mulnier *et al*., 2008). It is reported that estrogens are linked to increased levels of bad cholesterol (LDL-cholesterol) and low levels of good cholesterol (HDL-cholesterol) in men (Tomaszewsk 2013). Considering the risk of Diabetes mellitus in ACS, our findings [75 (42.8%) Diabetic patients and 100(58.2%) non-diabetic patients] are comparable to those reported in a study from University of Sri Jayewardenepura, Sri Lanka (Marasinghe and Indrakumar). In the current study the majority of the diabetics were males, which is in line with the results of a study conducted in Iran that showed that almost three fourths

(73.5%) were males (Lotfi *et al*., 2010). It is noteworthy that almost two-thirds of the female patients in the study were diabetic. This result supports the position that women are more prone than men to have Diabetes. The same observation had been mentioned in a research published in Journal of American medical association (Donahoe *et al*., 2007). The ages were sub divided into the following groups in the study: young adults <40 years, old adults 41-59 years and elderly people >60 years. We found that 44 patients (41 males and 3 females) fell in the category of young adults), 90 patients (80 males and 10 females) in the old adults group and 41 (34 males and 7 females) patients in the elderly category. The maximum number of patients was in the category of old adults, amounting to 51.4% of all cases. Many researches have stated, "the risk of getting ACS increases with age" (Grogan, 2013). Correspondingly, by applying the Chi-square test for the data in our study, we observed an association between age and ACS (P<001).

This result matches what has been published in the National Heart, Lung and Blood institute's website, that the risk increases for men after 45 years of age and for women after 55 years of age (National Heart and Lung, 2013). Regarding the male predominance in the young age group the finding was similar to that reported in a research published18. In the study quoted here, there were 710 men and 305 women with a median age of 49 years for both genders18. In our study the Mean age (in years) with SD was 49.9 ± 11.19 for both genders. The MONICA (Monitoring of Trends and Determinants in Cardiovascular Disease) Augsburg cohort study reported similar results; with a male predominance in the incidence of diabetes in patients aged 35 to 74 years (Meisinger and Thorand 2002). This observation is true in our study as well when the three categories are combined: out of the 75 diabetic patients with ACS 63 were males. In contrast to these findings a study done for Sex Differences in Acute Coronary Syndrome reported that women were more likely than men to have diabetes (Khan and Daskalopoulou 2013). This was explained in their study by the fact that women have a higher risk for diabetes and other risk factors associated with ACS like hypertension and depression. It is interesting to note how ethnic variations may play a role in the events associated with acute coronary syndrome. This study has shown that subjects from South East Asia have a higher risk of ACS, than those from the Middle East/Africa/Europe. Approximately two thirds

of the patients were in the South East Asia group and one third in the Middle East/Africa/Europe group. A study that has been conducted in Qatar to ascertain the presence of ACS in 14,593 patients from South Asia and Middle East showed that more than 50% were South Asians and the others were Middle Eastern (Ahmed *et al.*, 2013). Thus, both studies support the position that South Asians have a higher incidence of ACS than the Middle Easterners. In addition, recent studies have suggested that the atherosclerotic events and diabetes in South Asians are due to different factors such as the rate of metabolic syndromes, abdominal obesity and genetic susceptibility (Gupta and Briste 2006). A major limitation in our study was the small sample size that made it difficult to find significant relationships between the variables, as statistical tests usually require a larger sample size to ensure a representative distribution of the condition under study in the population.

Conclusion

We observed that 75 (43%) patients were diabetic. ACS with diabetes was more among males than in females. Non-Arab individuals appeared to have a higher incidence of ACS with diabetes than Arabs, and patients aged 40-60 years formed the highest proportion of ACS patients with DM. We recommend future researches be conducted to obtain more generalizable results, the health professionals and practitioners be trained to focus on the risk factors during the assessment of ACS cases, and awareness programs be conducted among the high risk groups.

REFERENCES

Acute myocardial infarction, [homepage on the Internet]. 2011 [cited 2013 Jul 18]. Available from: http://www.patient.co.uk/doctor/acute-myocardial-infarction.

Ahmed E, Gehani EE, El-menyar A, Ali W, Al Binali H, Singh R. 2013. Ethnicity and acute coronary syndrome: insights from a 20-year registry from the Middle East. *European Heart J* 34(1):3125.

Alajbegovi S, Metelko Z, Alajbegovi Z, Mehmedika-sulji E, Resi H. 2006. Prevalence and Significance of diabetes in patients with acute myocardial infarction. Diabetologia Croatica, 35(4).

Alrouh H, Ismail A, Cheema S. Demographic and health indicators in Gulf Cooperation Council nations with an emphasis on Qatar, *Journal of Local and Global Health Perspectives* 2013:3http://dx.doi.org/10.5339/jlghp.2013.3

Cardiovascular diseases on the increase in Arab states. Nature middle east [database on the Internet]. 20 March 2012 [cited 2013 Nov 13].; 36 Available from: http://www.nature.com/nmiddleeast/2012/120320/full/nmiddleeast.2012.36.html

Chun BY, Dobson AJ, Heller RF. 1997. The Impact of Diabetes on Survival Among Patients With First Myocardial Infarction. Diabetes care, 20 (5), Diabetes care, 20(5)

Donahoe M, Stewart GC, Mccabe CH. 2007. Diabetes and Mortality Following Acute Coronary Syndromes. JAMA: *Journal of the American Medical Association.*

Grogan M. 2013 . Acute coronary syndrome, Mayo clinic [homepage on the Internet]. Available from: http://www.mayoclinic.com/health/acute-coronarysyndrome/DS01061/DSECTION=risk-factors.

Gupta M, Brister S, Verma S. 2006. Is South Asian ethnicity an independent cardiovascular risk factor? *The Canadian J of Cardiology*, 22(3):193-197.

Khan NA, Daskalopoulou SS, Karp I. 2013. Sex Differences in Acute Coronary Syndrome Symptom Presentation in Young Patients. JAMA: *Journal of the American Medical Association Internal Medicine.*

Kumar V and Abbas Robbins and Cotran. 2013. Pathologic Basis of Disease. 8th ed. Philadelphia: Saunders Elsevier.

Lotfi MH, Sadar SM, Mahdea S. 2010. Coronary Artery Disease Risk Factors in Urban Areas of Yazd City, Iran. *Asia-Pacific Journal of Public Health* [homepage on the Internet]. 3 August [cited 2013 Nov 26].;23(4) Available from: http://www.sagepublications.com.

Marasinghe MG, Indrakumar J. Glycaemic status on admission in patients with Acute Coronary Syndrome. *Sri-Lanka journal of critical care.*

Meisinger C, Thorand B, Schneider A. 2002. Sex Differences in Risk Factors for Incident Type 2 Diabetes Mellitus. The MONICA Augsburg Cohort Study, JAMA: *Journal of the American Medical Association.*

Mulnier HE, Seaman HE, Raleigh VS. 2008. Risk of myocardial infarction in men and women with type 2diabetes in the UK: a cohort study using the General Practice Research Database. Springer-Verlag 26 June.

National Heart, Lung, and Blood Institute M. What is angina? [homepage on the Internet]. No date [cited 2013 Dec 11]. Available from: http://www.nhlbi.nih.gov/health/health-topics/topics/angina/printall-index.html

Staff Reporter, Heart disease leading cause of deaths in UAE. KhaleejTimes 2006 Dec 15.

Tomaszewsk M. Why Men Are More Prone To Heart Disease: New Research Led By University Of Leicester. Atherosclerosis [homepage on the Internet]. 2008 [cited 2013 Dec 14]. Available from: http://www.medicalnewstoday.com/releases/119844.php

World Health Organization. Global atlas on cardiovascular disease prevention and control. [homepage on the Internet]. 2011 [cited 2013 Jul 20]. Available from: http://www.who.int/cardiovascular_diseases/publications/atlas_cvd/en/.

World Health Organization. Global status report on noncommunicable diseases 2010. [homepage on the Internet]. 2011 [cited 2013 Jul 20]. Available from: http://www.who.int/nmh/publications/ncd_report2010/en/.

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