

### SEX DIFFERENCES IN ACUTE MYOCARDIAL INFARCTION: BIRJAND, EASTERN IRAN

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#### Abstract

The objective of this study was to compare baseline characteristics, risk factors, medical care and mortality of AMI in women and men. We used data from medical charts and administrative records of patients hospitalized with AMI from 1994 to 2003 in Birjand hospitals. Of 918 patients, 71.9% were male and 28.1% were female. The women and men had mean ages of 65.62±10.56 years and 58.98±12.11 years, respectively. The prevalence of hypertension, diabetes mellitus, smoking was 50, 17 and 13.6 percent, respectively, in women and 24.6, 9.8 and 36.3 percent, respectively, in men ( $P<0.05$ ). In-hospital mortality was higher in women but not significant (10.4% versus 8.6%,  $P=0.42$ ). Fasting blood sugar, cholesterol and diastolic blood pressure were significantly higher in women. Mean age and the prevalence of diabetes and hypertension were higher in women with AMI. We recommend that interventional programs be designed to reduce the risk factors of AMI through education, especially in women.

**Keywords:** Acute myocardial infarction, women, medical care, risk factors.

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#### Introduction

Acute myocardial infarction (AMI) is the single most common cause of death in both women and men in large parts of the world.<sup>1</sup> AMI accounts for a great number of deaths in Iran,<sup>2</sup> including the Eastern city of Birjand.<sup>3</sup>

Several studies have shown the incidence of AMI in men to be higher than in women.<sup>4-8</sup> In recent years, the incidence of AMI in women has increased; AMI accounts for more deaths in women than before.<sup>4-6</sup>

Previous studies have suggested differences in the epidemiology of AMI in women. Women, on average, were older than men and had higher prevalence of hypertension (HTN), diabetes mellitus (DM), dyslipidemia, and in-hospital mortality.<sup>7,8</sup> However, in other studies, there is no difference in long-term mortality after myocardial infarction between men and women.<sup>9-11</sup> In the present study, we assessed sex difference in the incidence, risk factors, and mortality of AMI and the use of pharmacological agents in a cross-sectional study of all AMI patients admitted to Birjand hospitals from 1994 to 2003.

This descriptive study was conducted between 1994 and 2003 in the city of Birjand, Eastern Iran. We obtained lists of all patients with AMI hospitalized in Birjand.

The diagnosis of AMI was based on the criteria proposed by Braunwald:<sup>12</sup> dynamic changes of electrocardiography indicating the development of AMI and changes in the activity of cardiac enzymes in blood stream. The medical records of selected patients were abstracted by two trained nurses.

Information was obtained about the patients' age, risk factors, and use of pharmacologic agents. Data analysis was performed with chi-square test and t-test at  $\alpha=0.05$  using SPSS.

From 1994 to 2003, 918 patients were hospitalized with definite AMI in Birjand. 77.9% of the subjects were men with a mean age of 58.9±12.1 years; 28.1% were women with a mean age of 65.6±10.6 years ( $P<0.001$ ). The prevalence of cardiac risk factors in men and women was compared (Table 1).

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Table 2 represents mean levels of fasting blood sugar (FBS), serum lipids and blood pressure in men and women.

Comparisons revealed a statistically significant difference in blood sugar, cholesterol and diastolic blood pressure between the two groups.

The frequency of thrombolytic therapy was significantly lower in women (3.8% in women, 14.2% in men,  $P < 0.001$ ). In-hospital mortality in women was higher than in men (10.4% in women, 8.7% in men,  $P = 0.42$ ).

In our study, 28.1% of patients hospitalized with definite AMI were women; women on average were older than men. The results of other studies are in agreement with our findings.<sup>4-6</sup> The lower prevalence of AMI in women may be due to the protective effect of estrogen.<sup>13</sup> Many studies have shown the prevalence of hypertension and diabetes mellitus to be significantly higher in men; the prevalence of smoking in men has also been reported as being three-time that in women.<sup>11-14</sup>

In our study, in-hospital mortality in women was higher than in men, but not significantly. In the majority of reports, in-hospital mortality of women was higher than that of men.<sup>7,8</sup> However, other studies, for example one in Yazd (2000-2001) found

no difference between in-hospital mortality rates from AMI in men and women.<sup>9-11</sup>

Patient mortality is greatly influenced by medical care. In a recent publication from the Neufeld Cardiac Research Institute,<sup>7</sup> Gotlieb et al. noted women were less likely to be treated with aspirin, beta-blockers, captopril and thrombolytic drugs.

In our study, however, medical management was similar for men and women, except for treatment with thrombolytic drugs.

Thrombolytic drugs were used significantly less in women than men. Several earlier studies have noted that women were less likely to receive thrombolytic drugs due to older age, comorbid conditions and late arrival.<sup>15-17</sup>

Sex differences in management, risk factors and outcome after AMI in Birjand is similar to other parts of the world.

Despite the low prevalence of AMI in women, in-hospital mortality in women was higher, which may be due to older age, more comorbidities (especially DM and HTN), low awareness, late arrival and less frequent use of thrombolytic drugs in women.

We conclude by emphasizing the need for educating the public on healthy lifestyle and treatment-seeking for AMI, especially in women.

**TABLE 1.** Frequency distribution of risk factors in men and women with definite AMI.

Risk factor	Women	Men	P value
Hypertension	129 (50%)	161 (24.4%)	0.001*
Diabetes	44 (17%)	65 (9.8%)	0.002*
Dyslipidemia	49 (19%)	128 (19.4%)	0.88
Cigarette smoking	35 (17.6%)	240 (36.4%)	0.001*
Positive family history	11 (4.3%)	28 (4.2%)	0.99

Total: men=660, Women=258

\*Statistically significant

**TABLE 2.** Comparison of mean levels of FBS, serum lipids and blood pressure in women and men.

Object	Women	Men	P value
FBS (mg/dl)	138.4±75.4	122.2±52.6	0.001*
Cholesterol (mg/dl)	214.7±61.7	199.6±49.5	<0.001*
Triglyceride (mg/dl)	138.8±69.8	138.4±103.7	0.95
Systolic blood pressure (mmHg)	125.3±25.9	121.5±26.1	0.07
Diastolic blood pressure (mmHg)	87.6±15.5	75.6±16.3	0.01*

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