Buerger's disease as an indicator of socioeconomic development in different societies, a cross-sectional descriptive study in the North-East of Iran

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Abstract

Introduction: Nowadays, Buerger's disease (BD) is more common in the developing countries of Asia. Although its prevalence is going to decrease in the developed countries, its decline rate is not in parallel with that for smoking in these countries. Since the number of BD patients reported to MVasRc is increasing annually and its pathogenesis is unknown, the aim of the study was to investigate the smoking habits and socioeconomic status of the patients corresponding with Shionoya's criteria.
Material and methods: Poverty line was the key factor of economic condition. Hygiene, education, professional occupation, long-term unemployment and healthy work were considered as social indices. Patients under the poverty line in addition to weakness in more than two social indices were included in low socioeconomic classification.
Results: From the total of 86 patients who reported to MVasRc during the 22-month study period, 71.6% and > 95% were new cases of BD and in low socioeconomic status respectively. Smoking ranged from 2 to 80 cigarettes/day. The duration of smoking before the onset of BD varied from 2 months to 35 years.
Conclusions: There is a lack of correspondence between BD and decline in the prevalence of smoking in developed countries. Also, duration and smoking habit varied in the studied patients. On the other hand, the strong dependence of BD on low socioeconomic conditions, as revealed in this research, implies that socioeconomic status may be a risk factor for initiation of BD. Moreover, the prevalence of BD might be an indicator of socioeconomic development in different societies.

**Key words:** Buerger's disease, thromboangiitis obliterans, socioeconomic status.

Introduction

Thromboangiitis obliterans (Buerger's disease) is a non-atherosclerotic segmental inflammatory and occlusive vascular disease. It most commonly affects the small and medium-sized arteries, veins, and nerves of the legs and arms, predominantly in young male smokers [1]. Although Buerger's disease (BD) has a worldwide distribution, nowadays it is more prevalent in the Middle East and Far East than in North America and Western Europe [2]. The initiating factor of this disease is still unknown. Some hypotheses such as bacterial infection, immunological processes and genetic factors

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have been suggested for the onset of BD, although they have been neither ruled out nor certainly confirmed [1, 3]. The only hypothesis that has been admissible since Leo Buerger's time is the extremely strong association between tobacco exposure and this disease. However, some investigators believe that nicotine is just a physiological vasoconstrictor, so it should not be the main cause or the initiating one [4]. As a matter of fact, a small number of smokers all around the world eventually develop this disease and it appears mostly in young male smokers from the low socioeconomic sector of the community [1, 4].

There is not a distinct definition of "low socio-economic condition"; generally, "low socioeconomic status" is considered as "poverty". There is no definite meaning of "poverty" either, but an admissible one is "a specific status of life in which the talents of people remain hidden or emerge with delay" [5]. Poverty is usually divided into absolute poverty and relative poverty. Generally, this classification is established according to the monthly income (poverty line). "Absolute poverty" is defined by difficulty in arrangement of basic life expenses such as food and clothing, as a result which life becomes burdensome. In contrast, "relative poverty" is a condition in which the income is just enough to pay for the basic needs. People in this class have to pass their daily lives while having the lowest standard of living while they compare themselves with the better off people in their society [5].

We have noticed that there is an annual increment of new cases of BD reported to Mashhad Vascular Surgery Research Centre (MVasRc), a referral centre in Khorasan province of Iran (Figure 1) [6]. Khorasan is the largest province in Iran and has a population of over 6 million. Therefore, an
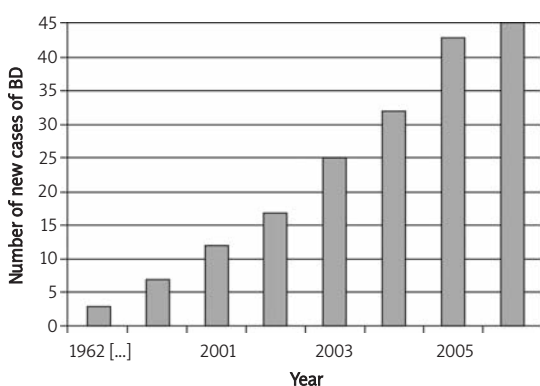
investigating programme has been commenced for various aspects of Buerger's disease; in this paper the smoking habits and socioeconomic status of patients who reported to MVasRc are highlighted.
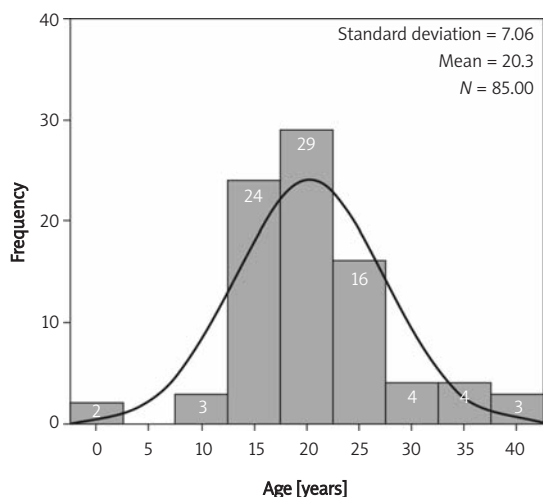
Material and methods

During a period of 22 months from August 2003 to June 2005, a descriptive study was conducted using a questionnaire related to the history, clinical features of BD and socioeconomic indices. This questionnaire was filled in based on the information obtained from the individual patients who corresponded with Shionoya's criteria. Shionoya's criteria include 1) history of smoking, 2) onset before the age of 50 years, 3) infrapopliteal arterial occlusive disease, 4) either upper limb involvement or phlebitis migrans, and 5) absence of athero-sclerotic risk factors other than smoking [7].

Owing to the fact that poverty does not only mean "low economy", some indices for the assessment of socioeconomic status in this study were set up regarding: 1) clean and tidy appearance, 2) level of literacy based on the high school diploma as the minimum qualification, 3) having a known professional career, 4) unemployment, longer than 3 months in Iran, 5) good quality job, with respect to the number of hours worked per day and suitable payment, 6) monthly income taking into consideration the fact that in Iran the relative and absolute poverty lines are defined as 300 and 160 US dollars respectively, and finally, 7) the place of living [5, 8].

In this study, poverty line was the index for economic status and the rest of the indices were associated with the social condition; thus, if the patient was below the poverty line, and not eligible for more than two social indices, he or she would be included in the low socioeconomic category.

Additionally, absolute lymphocyte count (ALC) as a non-specific indicator of protein-energy malnutrition [9] was measured for hospitalized patients whose cell blood count (CBC) was known before sympathectomy surgery. In healthy subjects, the absolute lymphocyte count should be above 2,500 per mm^3. Mild lymphopenia is considered to be in the range 1500-2000 per mm^3, and counts below 1,500 are classed as severe lymphopenia [9]. Patients were excluded from the body mass index (BMI) evaluation for biases such as major extremity amputations, atrophic limbs due to ischaemia and severe rest pain that did not allow them to stand up straight or to get on the balance for weight measurement. Also, the patients' places of living were specified on a map of the city.

The study was approved by the ethical committee of Mashhad University of Medical Sciences (MUMS).

Figure 1. New cases of Buerger's disease reported to MVasRc at Emam Reza Hospital from 2000. The data in 1962 are related to the cases reported to the surgery department of Emam Reza Hospital. Between 1962 and 2000 there are no statistical data about this disease
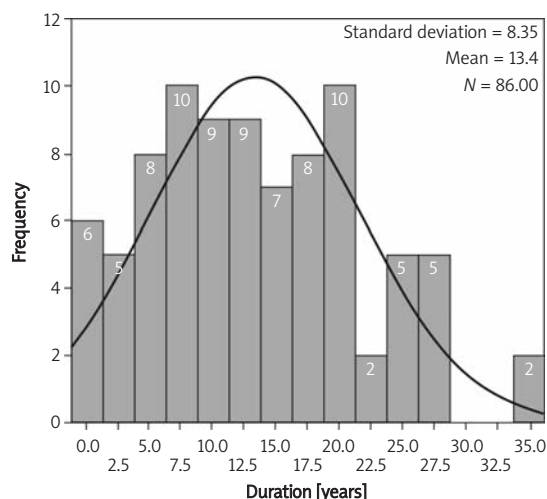
Figure 2. Smoking initiation age in the studied patients (in years). Two of the patients were passive smokers from their childhood

Figure 3. The duration between smoking initiation and the onset of Buerger's disease in studied patients (in years)

Statistical analysis

The questionnaire was designed in Microsoft Access software version 2000 and the entered data were exported to SPSS software version 11.5 and were analysed based on descriptive methods including central and spread parameters.

Results

During the period from August 2003 to June 2005, a total of 90 patients diagnosed with BD reported to MVasRc; 86 corresponded with Shionoya's criteria and were included in the list of patients, 61 (71.6%) were new cases of BD, 2 of them were females and only 1 had a positive family history (his father). From the total cases, 90.6% were below the relative poverty line (with an average of 280 US dollars monthly income) and 5.8% were below the absolute poverty line (with an average of 100 US dollars monthly income). All the patients had poor oral and dental hygiene but the appearances of 87.2% were acceptable. Only 4% of the patients had a high school diploma, one of them had a bachelor degree, 21% were illiterate and the rest had the ability to read and write to high school standard. 27.6% had a known profession, while the rest had temporary jobs such as simple labourers (27.9%), peasants (18.6%), taxi drivers (10.8%), hawkers (11.6%) and 3.5% were totally unemployed. Sadly, 2 of the patients were street beggars by revealing their disability. For 60% of them, the wages were not adequate for the number of hours worked per day and almost all of them had no free or leisure time. About 53% had been unemployed more than 3 months and 76% were made redundant at the time of reporting for their claudication or severe rest pain. Moreover, 43% of patients lived in the Mashhad city slum; the remainder stayed in towns or villages in the province. Lymphopenia was observed as a factor of malnutrition in 31 hospitalized patients by measuring the ALC; among these cases, 29% and 22% had severe and mild lymphopenia respectively.

About 45% of the patients had experienced a minor amputation and about 25% had a major amputation during the study.

From the total number of subjects, 66% had started smoking before the age of 20 (half of them before 15), and the lowest age of smoking was 10 (Figure 2). Cigarette smoking had a range of 2-80 cigarettes/day with an average of 22 cigarettes/day. The duration of cigarette smoking, before the onset of BD, ranged from 2 months to 35 years (Figure 3). Of patients, 94% were active smokers, 3.4% were passive smokers and the rest consumed chewing tobacco; 86% had simultaneous opium addiction. Of these patients, 24% had become addicted because of their rest pain or the depression and discomfort after amputation.

Discussion

According to our indices of socioeconomic status, 95.4% of the patients were in the low category, and their economic condition had worsened due to the disabling characteristics of this disease. Clearly, low socioeconomic status was a considerable risk factor for their tendency toward smoking and opium addiction; for instance, only 27% of the patients had a known profession or a long-term career, while absence of professional identity is a risk factor for tobacco and opium addiction [10]. Long time of working for a higher monthly income, hard and heavy jobs with inappropriate nourishment are other risk factors for smoking and in particular drug abuse, because in these patients smoking and drug addiction are the main sources of energy and the cause of making them float in their inaccessible dreams [11].

During the study the author noticed that for numerous subjects, the first manifestation of this disease had occurred following a considerable stress such as losing a family member (8 patients), divorce (3 patients), or bankruptcy (4 patients). This aspect was not considered in the primary questionnaire and only the last 19 patients were asked about it.

Furthermore, the prevalence of this disease has declined in the developed countries, such as in North America, Western Europe and Japan. The decline in prevalence of BD in these countries could be related to the decrease of smoking prevalence and more precise diagnostic criteria. However, during the last decades from 1980 to 2000 – which the diagnostic criteria established more definitely – the decreases in the prevalence of smoking and the prevalence of BD were not parallel. For instance, in the United States, the prevalence of Buerger's disease declined from 104 to 12 per 100 000 [1]. However, during this time, the prevalence of young male current smokers had been increased from 42 300 to 50 300 per 100 000 [12]. Moreover, in Japan, the new cases of this disease reported to Nagoya University Hospital, from 1985 to 1996, showed a 3-fold decline [13]. However, the smoking prevalence had declined around 15% in that time [14]. According to the World Health Organization (WHO) in 2003, 47.7% of adult men and 11.5% of women above the age of 20 were regarded as smokers in Japan [15].

Recently, since 1990 in northern Thailand more people aged 20-50 years have been employed in industry, and as a result their living standard and sanitary condition have improved. Also, a decrease in the number of patients with BD was noticed [16].

The reports of high BD in developing countries such as India, Bangladesh, Turkey or north-east Iran (according to our study) is probably due to the rise in consumption of tobacco (3.4% per year). However, the prevalence of smoking in some developing countries, such as Iran, is still the same as or lower than many Western European countries (about 25% of adult men and 2.5% of adult women smoke in Iran, according to the report of 2005) [17-21].

There are no clear statistics about the status of poverty in Iran. Although, based on news media in Iran, the state of people in absolute poverty improved from 2003 to 2005, during the same period the condition of people in relative poverty worsened [22].

In conclusion, it can be concluded that: 1) the annual increment in the number of BD patients reporting to MVasRc, with 2) only one patient having a positive family history, 3) the variation of time and the level of tobacco consumption in studied patients, and 4) the strong relationship between this disease and low socioeconomic status in the study implies "socioeconomic status" as a controllable risk factor for the initiation of this disease. This could even contribute to the diagnostic criteria of the disease; and a better prognosis may be accomplished by improving the socioeconomic situation of the patients, at least by improving their nutritional status.

As a final suggestion, for the strong relationship between Buerger's disease, tobacco consumption and socioeconomic status, the prevalence of this disease might be an indicator of socioeconomic development in different societies.

Acknowledgments

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