The accident and emergency department as monitoring centre of human mobility: the Bangladesh experience

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Abstract

Introduction: The Accident and Emergency Departments (A&E-D) are privileged eyewitnesses of the health needs of a population that resides or transits in a given area. Through the experience acquired in Rome’s Umberto 1° Policlinico’s A&E, we report the experience gained the study results of admissions of citizens from Bangladesh are reported.

Materials and Methods: we conducted a retrospective study of patients that attended the A&E-D from 2000 to 2014. We isolated records of patients from Bangladesh, noting age, gender, reason for admission and the final diagnosis.

Results: data analysis showed 16,420 admittances due to of Bangladeshi citizens. With regard to considering the conditions that led Bangladeshi migrants to visit the A&E-D, it was noted that the diagnostic group mainly represented was “Injury and poisoning”, “Symptoms, signs and ill-defined morbid conditions”, “Diseases of the nervous system and sensory organs”, “Factors influencing the state of health and recourse to health services” and “Diseases of the respiratory system”. The group that presented highly interesting characteristics was the one relating to cardiovascular disease and among these, Coronary Syndromes. Its peculiarity lies in the fact that in the 130 cases considered the average age was 42 years +/- 8, much lower than usual in European countries.

Discussion: the results on the types of diseases presented by Bangladeshi patients were discussed, and in particular the genetic causes, environmental interaction and the lifestyles that can justify the precocity of coronary disease in this population, according to studies reported in the literature. The results could have an impact on the organization of health care systems.

KEY WORDS: bangladeshi population, emergency department, human mobility, observatory of health needs.

Introduction

The Accident and Emergency Departments (A&E) are privileged eyewitnesses of the health needs of a population that resides or transits in a given area. People with critical care who cannot find acceptance in other facilities turn to these structures either for temporary reasons (the A&E department is the only medical facility available 24 hours, every day and night, including holidays) and for bureaucratic/administrative reasons (A&E takes care of all those who enter it, even if not provided with any health care). Thanks to the experience gained in the A&E of Rome’s Umberto 1° Policlinico, we noted the presence of many patients of different nationalities; not only that, over the years there seems to be a change in the prevalence of different populations (presumably for political and socio-economic problems of the various countries of origin) and simultaneously, the prevalence of their pathologies that show their peculiarities in relation to those highlighted by the admissions of Italian citizens. For this reason we assessed the characteristics and trends of pathologies regarding admissions of citizens of different nationalities.

We report the experience gained from the study of admissions of citizens from Bangladesh. We selected this population because we were interested by literature describing coronary artery disease (CAD) as a major public health concern and leading cause of mortality in Bangladesh. Bangladeshi people are easily prone to develop early onset CAD, which follows a progressive course and with a serious angiographic outlook. The underlying pathophysiology is little known. Genetic predisposition, high prevalence of metabolic syndrome and conventional risk factors also...
play an important role. Lifestyle related risk factors, such as bad eating habits, excess fats, salt intake and low level of physical activity can play a role in the development of coronary artery disease. Of all the countries of South Asia, Bangladesh has probably the highest rates of cardiovascular disease. Studies involving emigrants abroad noted that, among Asians, Bangladeshis people are more likely to develop CAD and are associated with a higher morbidity and related mortality. Bangladeshi people seem to share a susceptibility to CAD with other populations of South Asia; however the interaction between genetic and environmental factors may underlie the increased risk causing the so-called “ethnic Bangladeshi”. 

CAD's pathogenesis remains unclear. The interaction between genetic and environmental risk factors probably contributes to the pathophysiology of coronary artery disease. “Classic” risk factors such as hypertension, dyslipidemia, diabetes mellitus and smoking undoubtedly play a key role (1). These factors, in various combinations, in a population genetically predisposed, may explain the high prevalence of CAD in Bangladesh.

Materials and Methods

We conducted a retrospective study of patients that attended the Accident and Emergency Department of Rome’s Umberto 1° Policlinico. We examined admissions from January 2000 to December 2014. Each admission is registered by the GIPSE Computer System (a software tool supporting the activities of the Accident and Emergency Departments that collects data that make up the information flows required to the Lazio Region), in which you input the patient’s info, the reason for their admission, the relative priority code and it follows the path of the admitted patient until the outcome: discharge from the A&E, admission as inpatient, transfer to another hospital or death. It ends with the delivery of valid documentation for the purposes of law. It therefore gathers useful information for the assessment of the population’s state of health. We separated patients from Bangladesh from about 2,000,000 admissions recorded during the 14 years of the study, noting age, gender, reason for admission and the final diagnosis, identified according to the international classification of diseases (ICD-9 CM: International Classification of Diseases – 9th revision – Clinical Modification). We compared the prevalence of this information with those of Italians, who represented the vast majority of citizens who, in the period of the study, have turned to the emergency room of our hospital.

On the subject of Bangladeshi citizens living in the town of Rome

The emigration from Bangladesh to Italy grew as a form of opportunistic migration. The influx started in the eighties for economic, social and even political reasons. Bangladesh has a population of one hundred and sixty million inhabitants (2015) of which 22% live below the poverty line. The flow of migrants was originally directed to other European countries but began to find that entry checks to Italy were far less strict than to other European countries, and also for subsequent regularization policy promoted by Italy in the second half of the eighties and the nineties. According to Istat legal Bangladeshi citizens in Italy numbered seventy thousand in 2009, reaching one hundred and fifteen thousand in 2015. The community has always been most consistent for the presence of illegal, temporary or permanent immigrants, variously assessed according to sources. Bangladeshi citizens living in Italy are mainly individual immigrants who maintain economic and social relations with the family of origin (Yeoh, Graham, and Boyle, 2002). Immigration procedures are based on a regular influx of migrants accepted by sponsorship, family reunifications or illegal immigrations. Italy is not necessarily the chosen objective for Bangladeshi immigrants, as the final destination is often defined by migration “facilitators” based on evaluations and opportunities at the time. Bangladeshi citizens officially registered in the City of Rome reside primarily in the 1st and 5th districts.

In 2013 over six thousand lived in the 1st district, whereas in the 5th there were just over five thousand six hundred, only difference being that in the 1st district there were only 7% of minors whilst in the 5th there were 33%, indicating that Bangladeshi families who integrated more in the roman area mainly lived in the 5th district. The 1st district shows Bangladeshi residences around the Termini station area, while the 5th district indicates mostly the areas near S.S. Prenestina such as Pigneto and Tor Pignattara, still within the catchment area of the Accident and Emergency Departments of the Umberto 1° Policlinico (2, 3).

Results

Data analysis from 2000 to 2014 showed 1,908,236 admittances in A&E; 16,420 of these were due to Bangladeshi citizens. The numerical trend showed a slight and steady increase from 2000 (116 admissions) to 2014 (2107) with a peak in 2012 when there were 2,775 admissions (Fig. 1). The Bangladeshi population examined in our available data was mainly represented by male migrants. Admissions to A&E made by Bangladeshi men were 12460; those made by Bangladeshi women were 3961; in 19 cases the gender was not specified. Looking at the influx trend over time it was noted that while the male Bangladeshi population increased slowly and constantly, the female Bangladeshi population increased sharply 2010, doubling the number of admissions over the previous year and then continuing to steadily increase (Fig. 2).

The average age of Bangladeshi patients in the years 2000-2014 was 25 years, without fluctuations (2000: 28.5 years; 2014: 26 years).
The admissions by Bangladeshi citizens in the years 2000-2014 at the Accident and Emergency of the Policlinico Umberto I were grouped according to the diagnostic code assigned at the discharge from A&E in the 18 groups of the ICD-9-CM manual (Fig. 3).

With regard to the conditions that led Bangladeshi migrants to visit the A&E department, it was noted that the diagnostic group mainly represented in the period 2000-2014 was group 17 “Injury and poisoning”. The related diagnostic analysis would seem to indicate that the population of foreign migrants that visited the A&E department between 2000 and 2014 did so due to minor injuries (abrasions, fractures, bruises), probably caused by minor accidents at work. Another significant finding within this diagnostic group is the numbers of patients that come in to A&E, but are not present on the premises of the Emergency department when called for the examination. This is largely for minor triage codes, so that they leave because of the long wait before the consultation.

Other diagnostic groups most represented were: group 16 “Symptoms, signs and ill-defined morbid conditions”, group 6 “Diseases of the nervous system and sensory organs”, group 18 “Additional classification of factors influencing the state of health and recourse to health services” and group 8 “Diseases of the respiratory system”.

Group 16 “Symptoms, signs and ill-defined morbid conditions” maintains a constant prevalence in time that reaches an average percentage value of 18%. Most represented diagnostic categories in 2000-2003 were chest pain and abdominal pain; from the year 2004 onwards abdominal pain and fever predominated. This diagnostic group includes a range of clinical symptoms which are not always possible to match to a precise diagnosis and that did not have a sense of urgency.
Within group 6 “Diseases of the nervous system and sensory organs” the pathologies most represented were conjunctivitis and ear infections. From 2001 to 2002 this diagnostic group increased consistently, with a prevalence that went from 1.30 to 16.94%; in 2006 reached a peak figure of 21% and then stood on a constant average percent, until 2014, equal to 12%. The number of admissions in A&E related to diagnostic group 18 “Additional classification of the factors affecting health status and use of health services” rises sharply in 2009, reaching its peak in 2012 with 1051 admissions (number more than quadrupled compared to the previous year), readjusting on a lower setting in 2013-2014. In 2012 A&E admissions by Bangladeshi nationals reaches its peak and it’s revealed as the only year in which a diagnostic group different from the Injury and Poisoning one was larger. Within this group the diagnostic code most represented was that of Medical-Legal examinations: these are investigations of presumed age. This type of check is requested by law enforcement agencies for kids of non Italian nationality without documentation, in order to prove their legal age and to define the admission path or the clandestivity status in the hosting EU country. Within group 8, “Diseases of the respiratory system”, the most represented pathologies are pharyngitis and tonsillitis; over time the trend appears constant and the group is considerable since 2000. Observing the distribution over time by prevalence of the less represented diagnostic groups, a substantially steady trend can be noted; group 11 stands out, “Complications related to pregnancy, childbirth and the postnatal period”, which increases abruptly, rising from 3 admissions in 2009 to 109 admissions in 2010, an increase which then remains constant and continuous for 2 years. It is interesting to note that 2010 is the year in which the number of admissions by the female population doubles its number of admissions to the A&E (Fig. 2).

Comparing the diagnostic groups’ prevalence between Italian and Bangladeshi citizens, the latter shows a higher prevalence in the “Diseases of the respiratory system”, “Complications related to pregnancy, childbirth and the postnatal period”, “Symptoms; signs and ill-defined morbid conditions” and the “Additional classification of factors influencing the state of health and recourse to health services” groups (Medical-Legal examinations to prove legal age, monitoring of straightforward pregnancies) (Tab. 1).

Focus on ischemic heart disease

Having considered existing data in literature regarding the early onset of coronary heart disease in the population of Bangladesh, in this retrospective observational study we analyzed the prevalence of ischemic heart disease and risk factors associated with it among citizens of Bangladesh who have turned to the Accident and Emergency Department and between 2000-2014. The recruitment criteria in our study were: Bangladeshi nationality and a diagnostic code at discharge related to the chest pain. 452 A&E case files were thus selected. The subsequent criteria for inclusion chosen by us were: diagnosis of acute coronary syndrome in place at the time of admission to A&E and / or a history of ischemic heart disease and / or admission to a unit for cardiovascular disease; or CCU or CHEST PAIN Unit. 130 patients’ diagnostic codes were selected, whose average age was of 42 years +/- 8; minimum age 20 years, maximum 71. Diagnostic codes related to “ischemic heart disease” (Ref. 410-414) were 35 including 12 positive anamnesis of prior ischemic heart disease; the average age was of 42 years. Amongst the diagnostic codes relating to “other dis-
Table 1 - Numerical breakdown of A&E admissions made by Italian nationals and those of Bangladeshi nationality, between 2000 and 2014, divided into diagnostic groups (Manual ICD-9CM).

<table>
<thead>
<tr>
<th>GROUP</th>
<th>ITALY</th>
<th>BANGLADESH</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP 1</td>
<td>(1.82%)</td>
<td>(1.84%)**</td>
</tr>
<tr>
<td>GROUP 2</td>
<td>(1.39%)</td>
<td>(0.25%)</td>
</tr>
<tr>
<td>GROUP 3</td>
<td>(0.39%)</td>
<td>(0.35%)</td>
</tr>
<tr>
<td>GROUP 4</td>
<td>(0.65%)</td>
<td>(0.19%)</td>
</tr>
<tr>
<td>GROUP 5</td>
<td>(1.07%)</td>
<td>(0.25%)</td>
</tr>
<tr>
<td>GROUP 6</td>
<td>(18.93%)</td>
<td>(13.78%)</td>
</tr>
<tr>
<td>GROUP 7</td>
<td>(3.98%)</td>
<td>(1.18%)</td>
</tr>
<tr>
<td>GROUP 8</td>
<td>(6.69%)</td>
<td>(9.5%)</td>
</tr>
<tr>
<td>GROUP 9</td>
<td>(3.31%)</td>
<td>(3.7%)</td>
</tr>
<tr>
<td>GROUP 10</td>
<td>(2.41%)</td>
<td>(3.01%)</td>
</tr>
<tr>
<td>GROUP 11</td>
<td>(2.28%)</td>
<td>(6.36%)</td>
</tr>
<tr>
<td>GROUP 12</td>
<td>(1.89%)</td>
<td>(1.9%)</td>
</tr>
<tr>
<td>GROUP 13</td>
<td>(3.98%)</td>
<td>(1.9%)</td>
</tr>
<tr>
<td>GROUP 14</td>
<td>(3.94%)</td>
<td>(0.24%)</td>
</tr>
<tr>
<td>GROUP 15</td>
<td>(0.32%)</td>
<td>(0.05%)</td>
</tr>
<tr>
<td>GROUP 16</td>
<td>(17.27%)</td>
<td>(19.42%)</td>
</tr>
<tr>
<td>GROUP 17</td>
<td>(32.78%)</td>
<td>(17.35%)</td>
</tr>
<tr>
<td>GROUP 18</td>
<td>(4.33%)</td>
<td>(14.57%)</td>
</tr>
<tr>
<td>GROUP 19</td>
<td>(0%)</td>
<td>(0%)</td>
</tr>
</tbody>
</table>

GROUP 1 INFECTIOUS AND PARASITIC DISEASE; GROUP 2 CANCER; GROUP 3 ENDOCRINE, NUTRITIONAL, METABOLIC AND IMMUNE DISORDERS; GROUP 4 DISEASES OF THE BLOOD AND HEMATOPOIETIC ORGANS; GROUP 5 MENTAL DISORDERS; GROUP 6 DISORDERS OF THE NERVOUS SYSTEM AND SENSORY ORGANS; GROUP 7 CARDIOVASCULAR DISEASES; GROUP 8 RESPIRATORY DISEASES; GROUP 9 DISORDERS OF THE DIGESTIVE SYSTEM; GROUP 10 URINARY SYSTEM DISORDERS; GROUP 11 COMPLICATIONS RELATED TO PREGNANCY, CHILDBIRTH AND THE POSTNATAL PERIOD; GROUP 12 DISORDERS OF THE SKIN AND SUBCUTANEOUS; GROUP 13 OSTEOARTICULAR SYSTEM AND CONNECTIVE TISSUE DISORDERS; GROUP 14 CONGENITAL MALFORMATIONS; GROUP 15 SOME MANIFESTATIONS OF MORBID PERINATAL ORIGIN; GROUP 16 SYMPTOMS, SIGNS AND ILL-DEFINED MORBID CONDITIONS; GROUP 17 INJURY AND POISONING; GROUP 18 ADDITIONAL CLASSIFICATION OF FACTORS INFLUENCING THE STATE OF HEALTH AND RECURSUE TO HEALTH SERVICES; GROUP 19 ADDITIONAL CLASSIFICATION OF EXTERNAL CAUSES OF INJURY AND POISONING.

* Percentages calculated on a total of 1,542,026 admissions to A&E by Italian citizens (January 2000-June 2014) ** Percentages calculated on a total of 13,868 admissions in 2010 in the to A&E by Bangladeshi citizens (January 2000-June 2014).

Discussion

The data at our disposal show that the Bangladeshi population that came to our A&E between 2000 and 2014 was primarily represented by young males. This finding is to be related with the fact that it’s mostly young working age men that migrate to our country. An interesting fact is an increase in admissions by females from 2010; this is probably due to the arrival in Italy of the companions of the Bangladeshi citizens that initially set off alone for economic and work reasons. Our data showed that admissions by Bangladeshi women for gynecological and obstetric problems prevail over Italian women’s admissions. The use of hospital health care during pregnancy is probably linked to economic reasons.

With regard to the reasons for admission to A&E, it is apparent that the Bangladeshi population turns to the A&E mainly for small traumas, probably related to minor injuries in the workplace. Bangladeshis are mostly employed in the service sector (75.6%). In particular Bangladeshi manpower is occupied in the Hotel and Catering sector of activity (23.3%), and in the Trade field (27.8%). The industrial sector accounts for 24% of workers belonging to the community (4).

Another significant finding is the numbers of patients that come in to A&E, but are not present on the premises of the Emergency department when called for the examination. It is mostly for minor triage codes (pain in various organs, fever, minor infections of the upper airways) and they leave because of the long wait before the consultation. The reasons that bring these people to A&E are mostly of secondary importance from a critical medicine point of view, since it is linked to diseases pertaining to general medicine. Foreign citizens who are not in compliance with residence permits and that are not in possession of the STP card (Foreigners Temporarily in the Country) only have the A&E department as their source of healthcare.

Amisth our figures there are particularly interesting ones regarding access to A&E for coronary heart disease: our records confirm those reported in literature that recognize a particular predisposition in South-East Asia for the early onset of coronary heart disease. It is not so much the number of individuals affected, but the earliness of the onset of coronary events: in Caucasians, events of acute ischemic heart disease occur on average around the age of 62 (INTERHEART study in 2008 which however, considered only patients admitted to the CCU or in the Cardiology Unit) in our study we highlighted an average age of 42...
and among these, critical cases (one death from cardiac arrest, a case of T.V., three cases of Pulmonary Edema and 89 events of Acute Coronary Syndrome), 12 other cases had a history of coronary heart disease.

The age of our patients seems to also be lower than the one reported in the INTERHEART research (5), showing an average age of 51 for the onset of ACS in the population of Southeast Asia, although considering the scarcity of our sample and the location where the study was conducted (CCU and Cardiology in HINTERHEART and A&E).

Of all the countries in South Asia, Bangladesh has probably the highest rate of cardiovascular disease. The exact prevalence of CAD is unknown, there are only a limited and small-scale number of epidemiological studies available; the latest information indicates the prevalence of CAD in rural areas between 1.85% (6) and 6% (7) and 19.6% in a sample of urban workers (8, 9).

A recent study conducted in rural Bangladesh has shown a dramatic increase in cardiovascular disease from 1986 to 2006; age-standardized mortality rates for this disease increased by 30 times (from 16 to 483 deaths per 100,000) among men and 47 times (7 to 330 deaths per 100,000) in women (10).

Studies involving emigrants overseas have found that, among Asians, the Bangladeshis are more prone to develop CAD and are associated with higher morbidities and related mortality. In New York they had more extensive and severe coronary artery disease with a 53% involvement of the three vessels compared with 26% of other ethnic groups (11).

In the UK Bangladeshi men have a higher mortality rate, 112% for CAD and 220% for stroke than other Europeans (12). Even among South Asians in the United Kingdom, Bangladeshis have the highest prevalence of risk factors for CAD among all ethnic groups (13).

The higher susceptibility of South Asians to CAD may be due to two factors:

1) Genetic changes (increased prevalence of hereditary susceptibility related to coronary artery disease, specific to populations in South Asia): angiotensin-converting enzyme (ACE) apolipoprotein A (apoA) apolipoprotein B (apoB) apolipoprotein E (apoE) (14)

2) Most South Asians have a small body frame. Obesity, by its classic definition, is rare among Asian Indians, who however have a visceral mass higher than people of other ethnic groups with comparable body mass index (BMI). Fat distribution is focused in the abdominal space and this particularity is also present in subjects of a normal body weight. This factor has a direct relationship with an increased risk of CAD (17). Abdominal obesity contributes to the pathogenesis of insulin resistance.

3) In Bangladesh, about 20% of adults and 40-65% of elderly people suffer from high blood pressure. The high incidence of metabolic syndrome and related lifestyles such as obesity, salt intake in the diet and lower physical activity can play an important role in the pathophysiology of hypertension. Hypovitaminosis D as well as arsenic poisoning probably play a role in the etiopathogenesis of hypertension in the population of Bangladesh (18).

4) Coronary anatomy in Asian Indians is significantly different, with the most widespread disease that occurs at an earlier age and is a distinctive hallmark of CAD in South Asians. Compared to Caucasians, their coronary arteries appear smaller and the smaller aspect of the coronary angiography is attributed to the narrowing of the lumen caused by widespread continuing atherosclerosis. It is believed that the settlement of atherosclerotic plaque occurs quite early in these patients. Results from several studies have indicated that the Bangladeshi ethnicity is associated, with the probability greater than 3 times, to the possibility of presenting CAD on all three vessels at the coronary angiography (19).

The greater propensity to dyslipidemia, abdominal obesity, high levels of Lp (a), high levels from homocysteine and low levels from adiponectin have been grouped into an actual syndrome called “AAMSAI” (accelerated atherocoronary metabolic syndrome in the Asian Indians) (20).

In addition to these factors we have to report those linked to the environment and to lifestyles:

a) The dietary pattern can play a role in the etiology of coronary heart disease: the use of generous amounts of cooking oil, fried vegetables and salt added during preparation and pickles are important aspects of the traditional cuisine of Bangladesh (21). In recent years South Asian people showed significant changes in their eating behavior. The availability of low cost vegetable oils and fats has led to an increased consumption of them in low-income countries. All this is contributing to worsening cardiovascular risk factors, already present in the population in South Asia (22).

b) Low birth weight is common in India (36% of children born in Bangladesh have a less than 2500 g body weight) and could represent another potential risk factor for coronary heart disease among the natives of South Asia. It has been suggested that the adjustments made by the fetus in response to malnutrition could persist and increase the risk of atherosclerosis. Low birth weight may also increase the risk of developing type 2 diabetes, probably because of reductions...
in mass of the function of beta cells. These findings support the intrauterine development pattern of the metabolic syndrome (23).

c) The reduced physical activity compared to European populations is an independent risk factor for the development of coronary artery disease (24).

d) Smoking is a common and growing problem in South Asian countries. Tobacco use is high among the population of Bangladesh (25).

e) Groundwater arsenic contamination in Bangladesh is also a recognized public health risk. An estimated 57 million people have been chronically exposed to groundwater with above normal arsenic concentrations and consumption of certain vegetables, especially rice and spices represents an important source of exposure. Chronic exposure to arsenic can facilitate systemic inflammation and vascular endothelial dysfunction, which can in turn increase the risk of cardiovascular disease (26, 27).

Our research provides little known information concerning the healthcare needs of a population migrated from a distant country in South East Asia. The duration of observations (14 years) and the size of the case (over 16,000 admissions to A&E) are variables that make emerging data reliable. These include information about acute coronary events taking a special interest, due to the case size and to the characteristic age of onset of this type of disorders, peculiarities that have attracted the interest of worldwide literature. These last records however appear meager, although collected over a long period of time and the origin of the sample from a single point of observation, even though a big Hospital, would make desirable the involvement in this research of other Roman A&E departments to have a more precise idea of the city’s reality and secondly of other European metropolitan areas to analyze the real impact over time of coronary artery disease in people so young and how the environment and lifestyles may change what is patrimony of the genetic code. The results could have an impact on the organization of the health care systems with the dual aim of drawing the attention of health care providers to early development of major cardiovascular events in populations of Southeast Asia and to place this young population at risk in an outpatient scheme for primary and secondary prevention.

References


