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NON-COMMUNICABLE CHRONIC DISEASES RISK PREVALENCE OF FAMILY MEDICINE PATIENTS IN THE FEDERATION OF BOSNIA AND HERZEGOVINA

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ABSTRACT

Aim: The aim of this study is to represent the prevalence of non-communicable diseases risks among patients of family medicine practices in the Federation of Bosnia and Herzegovina. Risks prevalence was obtained from an organized massive screening being performed by 100 family medicine teams in four cities of the Federation of B&H during 2013. **Material and Methods:** Our concept of “preventive treatment of a patient” included detecting and monitoring the following chronic non-communicable diseases risk factors: (a) hypertension; (b) obesity; (c) smoking; (d) physical inactivity; and (e) dyslipidemia; (f) diabetes mellitus. Our sample of examined patients was 46.638. **Results:** Highest risk prevalence within entire F B&H is observed for dyslipidemia (90.3%) and physical inactivity (64.7%). Lowest prevalence was found for blood sugar and hypertension at 19.2% and 21.6%, respectively. Smoking prevalence of the examined patients was 28.4%. Prevalence of the obesity as health risk (ITM > 30) was 25.5 %. It is of interest that statistically significant differences of individual risk prevalence among cities are evident. Risk distribution among cities ranked from highest to lowest prevalence, shows clearly that Sarajevo is leading in four risks compared to the other cities, while Zenica is ranked lowest for four risk factors. The examined population of the four cities can be ranked from lowest to highest prevalence of the examined risk factors as follows: Sarajevo, Mostar, Tuzla, and Zenica.

Key words: non-communicable diseases risks prevalence, regional differences, preventive-promotive program, family medicine, Bosnia and Herzegovina.

1. INTRODUCTION

There is general trend of increased overall mortality rate, rates of malignant and cardiovascular diseases, as well as unhealthy lifestyles in Bosnia and Herzegovina (1). Very often it is explained by the consequences of the latest war, as well as unhealthy lifestyles (2, 3). A study of Marmot (4) on how social standing affects our health and longevity is based on theory that there is a link between socio-economic determinants of health and level of stress. Stress itself could affect life styles or could be harmful to the health status directly through the influence of adrenalin and corticosteroids. However status syndrome could protect human organism from harmful influence of hormones. Overall social transition in B&H after the war has created lower socio-economic conditions for the great majority of the population in comparison to the pre-war period. Our recent study refers to statistical correlation between social status,

related to income and education, to prevalence of risk factors of non-communicable diseases, such as high blood pressure, dyslipidemia, body mass index, lack of physical activity and blood glucose level (5). A phenomenon of social exclusion and high unemployment rate are remarkably spread throughout our society (6). In addition to these processes, there is psychological effect of a continuous political and economic environment instability in the country.

The aim of this study is to represent the prevalence of non-communicable diseases risks among patients of family medicine practices in the Federation of Bosnia and Herzegovina. This study presents the overall risks prevalence, as well as regional differences. In order to carry out this research we had to develop a bonus payment schemes, as well as a set of preventive-promotional services adjusted for family medicine practices as an organized massive screening for entire population being registered with fam-

ily medicine teams (7). The aim of this paper is to represent an outcome evaluation of our organized massive screening on risk factors.

2. METHODOLOGY

Bosnia and Herzegovina Health Sector Enhancement Project (2012 - 2014), financed by the World Bank, implemented a component entitled „Family Medicine Teams Bonus Payment Testing for Prevention and Promotion Services Standardized Set Implementation“. Two main objectives of the World Bank financed project were the following: (a) develop mandatory standardized set of prevention and promotion tasks for family medicine (FM) teams; (b) test “bonus payment” for good practice in implementation of the said prevention and promotion set of services on pilot sample of 100 FM teams in the Federation of Bosnia and Herzegovina in the following cities: Tuzla, Zenica, Sarajevo and Mostar (7). This Study can be considered as “cross-sectional study” being designed to evaluate the prevalence of risk factors within family medicine patients.

Our concept of “preventive treatment of a patient” included detecting and monitoring the following chronic non-communicable diseases risk factors: (a) hypertension; (b) obesity; (c) smoking; (d) physical inactivity; and (e) dyslipidemia; (f) diabetes mellitus. The said six risk factors were subject of *organized screening* (7), and reporting to Health Insurance Institute aimed to make “bonus payment”. Screening programs clear guidelines in terms of screening interval and targeted age groups were worked out in the Project Methodology Instructions (8).

Inviting patient for preventive treatment was done through: (a) system of regular visits to FM doctor; (b) inviting patient to preventive treatment during home visits; (c) media campaign. Criteria based on which patient would be included in preventive services must respect “life cycle” scheme, which indicates the fact that each and every patient has different risk spectrum depending on his/her age and gender. For recording and reporting system simplicity we used the same format of patients’ electronic records for preventive services of all patients. Pursuant to F B&H Law on Patients’ Rights and Obligations, as well as European Declaration on Patients’ Rights, informed consent by patient is prerequisite to include the patient in preventive services (8).

Prevention and promotion services provided in FM facilities, targeted to individual, were recorded as first visit and subsequent visits for the purpose of adequate reporting and bonus payment. *The first visit* is when screening is done and the said risk factors recorded once within a calendar year. *Subsequent visit* is any other visit made and service received in relation to the risk factor identified during the first visit. We have evaluated the prevalence of risks factors discovered within the first visits mentioned hereinbefore for the purpose of this paper. Total number of examined patients by 100 family medicine teams was 46.638. In order to evaluate statistically significant difference we have used SPSS software package’s “Student t-test”.

3. RESULTS

Risk prevalence distribution for massive chronic non-communicable diseases of the examined patients in F B&H

for January-December 2013 period is presented against the following variables: (a) risk prevalence for total number of the examined patients; (b) risk prevalence by Health Center. The said risk prevalence correlation is presented only on annual basis, without distribution by quarters, because of the relevance of the received results.

The Table 1 shows risk prevalence distribution for the examined patients in F B&H during January-December 2013 period. Highest risk prevalence is observed for dyslipidemia (90.3%) and physical inactivity (64.7%). Lowest prevalence was found for blood sugar and hypertension at 19.2% and 21.6%, respectively. Smoking prevalence of the examined patients was 28.4%. Prevalence of the obesity as health risk (ITM > 30) was 25.5 %.

Risk Factor	No. of Processed Patients (N)	No. of Patients at Risk (N)	Patients at Risk (% of Processed)
Hypertension	38006	8211	21.6 %
Obesity	29865	7619	25.5 %
Smoking	32030	9102	28.4 %
Physical Inactivity	30908	19995	64.7 %
Dyslipidemia	19298	17421	90.3 %
Sugar blood	11983	2300	19.2 %

Table 1. Risk Prevalence of the Examined Patients in F B&H for January – December 2013 period

The Table 2 shows risk prevalence distribution of the examined patients at Mostar Health Center during 2013. Highest risk prevalence is observed for dyslipidemia (94.5%) and physical inactivity (63.9%). Lowest prevalence was identified for blood sugar and obesity at 22.2% and 23.7%, respectively. Smoking prevalence among the examined patients was 31.4%, and hypertension prevalence was 27.8%.

Risk Factor	No. of Processed Patients (N)	No. of Patients at Risk (N)	Patients at Risk (% of Processed)
Hypertension	2887	802	27.8 %
Obesity	2152	510	23.7 %
Smoking	2261	709	31.4 %
Physical Inactivity	2345	1499	63.9 %
Dyslipidemia	1851	1749	94.5 %
Sugar blood	1995	443	22.2 %

Table 2. Risk Prevalence of the Examined Patients at Mostar Health Center during January- December 2013 period

The Table 3 shows risk prevalence distribution of the examined patients at Sarajevo Health Center during 2013. Highest risk prevalence is observed for dyslipidemia (93.0%) and physical inactivity (70.7%). Lowest prevalence was identified for hypertension and obesity at 22.1% and 27.8%, respectively. Smoking prevalence among the examined

Risk Factor	No. of Processed Patients (N)	No. of Patients at Risk (N)	Patients at Risk (% of Processed)
Hypertension	8637	1911	22.1 %
Obesity	6585	1832	27.8 %
Smoking	7191	2315	32.2 %
Physical Inactivity	6877	4859	70.7 %
Dislipidemia	5477	5092	93.0 %
Sugar blood	1339	381	28.5 %

Table 3. Risk Prevalence of the Examined Patients at Sarajevo Health Center during January- December 2013 period

patients was 32,2%, and blood sugar prevalence was 28.5%.

The Table 4 shows risk prevalence distribution of the examined patients at Tuzla Health Center during 2013. Highest risk prevalence is observed for dyslipidemia (96.7%) and physical inactivity (63.2%). Lowest prevalence was identified for blood sugar and hypertension at 14.0% and 18.1%, respectively. Smoking prevalence among the examined patients was 27.5%, and obesity prevalence was 27.1%.

Risk Factor	No. of Processed Patients (N)	No. of Patients at Risk (N)	Patients at Risk (% of Processed)
Hypertension	11365	2056	18.1 %
Obesity	9039	2450	27.1 %
Smoking	9774	2685	27.5 %
Physical Inactivity	9026	5702	63.2 %
Dyslipidemia	3981	3850	96.7 %
Sugar blood	4306	602	14.0 %

Table 4. Risk Prevalence of the Examined Patients at Tuzla Health Center during January-December 2013 period

Table 5 shows risk prevalence distribution of the examined patients at Zenica Health Center during 2013. Highest risk prevalence is observed for dyslipidemia (84.2%) and physical inactivity (62.7%). Lowest prevalence was identified for blood sugar and hypertension at 20.1% and 22.8%, respectively. Smoking prevalence among the examined patients was 26.5%, and obesity prevalence was 23.4%.

Risk Factor	No. of Processed Patients (N)	No. of Patients at Risk (N)	Patients at Risk (% of Processed)
Hypertension	15117	3442	22.8 %
Obesity	12089	2827	23.4 %
Smoking	12804	3393	26.5 %
Physical Inactivity	12660	7935	62.7 %
Dyslipidemia	7989	6730	84.2 %
Sugar blood	4343	874	20.1 %

Table 5. Risk Prevalence of the Examined Patients at Zenica Health Center during January-December 2013 period

SPSS software package's "Student-t test" was used to test risk prevalence differences among cities in F B&H. Table 6 shows that among individual cities there are statistically significant risk prevalence differences at confidence level

Risks	Risk Distribution by Cities from Highest to Lowest Prevalence with Noted Statistically Significant Difference (*)				
Hypertension	Mostar (27.8%) >*	Zenica (22.8%) >	Sarajevo (22.1%) >*	>*Tuzla (18.1%)	
Obesity	Sarajevo (27.8%) >*	Tuzla (27.1%) >*	Mostar (23.7%) >	>Zenica (23.4%)	
Smoking	Sarajevo (32.2%) >	Mostar (31.4%) >*	Tuzla (27.5%) >	>Zenica (26.5%)	
Physical Inactivity	Sarajevo (70.7%) >*	Mostar (63.9%) >	Tuzla (63.2%) >	>Zenica (62.7%)	
Dislipidemia	Tuzla (96.7%) >*	Mostar (94.5%) >*	Sarajevo (93.0%) >*	>Zenica (84.2%)	
Sugar blood	Sarajevo (28.5%) >*	Mostar (22.2%) >	Zenica (20.1%) >*	>*Tuzla (14.0%)	

Table 6. Risk Distribution by Cities from Highest to Lowest Prevalence with Noted Statistically Significant Difference (*), *there is statistically significant difference at confidence level of $p < 0,05$

of $p < 0.05$. Statistically significant differences of individual risks among cities are evident. Risk distribution among cities ranked from highest to lowest prevalence, shows clearly that Sarajevo is leading in four risks compared to the other cities, while Zenica is ranked lowest for four risk factors. The examined population of the four cities can be ranked from lowest to highest prevalence of the examined risk factors as follows: Sarajevo, Mostar, Tuzla, and Zenica.

4. DISCUSSION

Economic development is strongly associated with agricultural mechanization and urbanization. Between the years 2000 and 2030 it is estimated that the percentage of the world's population living in urban centers will increase from 47% to 60%. Urban living is often associated with lower levels of physical activity than traditional rural living, increasing the risk of overweight and obesity, metabolic syndrome, diabetes, cardiovascular disease and certain cancers. The trends towards increased consumption of energy dense foods, high in saturated fat, sugar and salt, that is associated with urbanization in the vast majority of low- and middle-income countries has been referred to as the „nutrition transition“ (9).

Some groups have much higher rates of diabetes than others. For example, at a country level it is estimated that over 30% of adults in Nauru, 20% in the United Arab Emirates and 10% in Mexico have diabetes, compared to 2,9% in the United Kingdom (9). Some reported data for diabetes prevalence in Bosnia & Herzegovina refer to the values around 7% of the general population (1). Remarkably high percentage of high blood glucose prevalence in our study within the examined family medicine patients of 19,2 could be explained by a phenomena of "bad-risk selection" during our process of patients recruiting for preventive screenings. Actually, a great majority of examined persons often visits family medicine practices due to some chronic conditions. Therefore, it is rational to expect higher risk factor prevalence compared to healthy population living in the settlements and not asking for any medical care. Also there could be a bias due to low number of glucose measurement (11,983 patients) in comparison to blood pressure measurement (38,006 patients) for instance. In addition, lower sample for glucose measurement was most likely determined by some clinical indications for the possibility for higher glucose values or less healthy people completed the test in laboratory and provided a feedback to a physician. Anyway, our finding refers that blood glucose level screening is very cost-effective due to high prevalence of positive results. Also, there is much variation within each WHO region, with over 70% known in North America and only around 20-30% in

the few countries representing Africa, there is no strong association between level of development and the proportion of people with known diabetes (9).

Latest data collected by the F B&H population health status surveys (1) are interesting to be discussed in this paper, however it should be kept in mind that survey was conducted on a sample of population in communities/households, not health center patients. Percentage of population to which

hypertension was diagnosed by physician during previous 12 month is 21.3% of total surveyed population, with 22.5% and 20.1% were female and male, respectively. However percentage of respondents with potential hypertension (systolic blood pressure > 140, diastolic blood pressure > 90 mmHg) and/or who are on hypertension medication is 42.1%, with 38.9% and 45.3% for female and male, respectively. Percentage of respondents with body mass index above 30 is 21.2% average. Percentage of everyday smokers is 44.1%, with 31.6% and 56.3% for female and male. Percentage of respondents who perform minimum 30 minutes of physical activity demonstrated by deep breathing and sweating 2-3 times a week minimum, is 24.6%, with 20.3% and 28.7% for female and male respectively. Percentage of respondents with triglyceride equal or above 1,7 mol/L is 21.2%. Percentage of respondents with cholesterol equal or above 5 mmol/L is 44.4%. Percentage of respondents with blood sugar values equal or above 5.1 mmol/L is 21.7%. It is important to note that some of the mentioned data were collected by survey questionnaire and some by objective measurement. There is interesting difference among percentage of people who reported that their physician diagnosed hypertension (21.3%) and people with actually measured high value of blood pressure (42.1%). This discrepancy reflects differences between needs and demands for health care. It would not be relevant to compare results of our project survey and surveys conducted by Public Health Institute, since sample population is different. Our project survey consists of family medicine patients, majority of which visits frequently their FM doctors due to chronic diseases. Sample surveyed by Public Health Institute consists of population of the community, among which relatively higher share of healthy people can be expected compared to the sample surveyed under our project. Another possible scenario is to expect prevalence of some risks to be reduces among patients as result of prevention and promotion efforts as well as patients' knowledge, opinion and practices related to healthy life styles. For example, our study shows significantly lower prevalence of smoking compared to general population.

Analysis of risk category structure would be possible in our survey for certain period of time only e.g. during the year one of screening. During the year two, such analysis would provide only arithmetical medium value of individual risks, as well as of risk category structure. However, it is not possible to compare year one and year two screening results in terms of trends monitoring since risk categories are not linked to patients' identity in the software, thus this would be a result of pure arithmetic medium. Having in mind that during year one we examined largest number of older and sicker patients with higher risk prevalence, it is logical to assume that structure of certain patients would be better in the year two, and that would give false picture of declining risk trend.

Duration of this assignment enables evaluation of models and processes, while it would be more difficult to register health outcomes. However, it is to hope that it would be possible, by using software possibilities, to compare effectiveness of prevention services in terms of reduced risk prevalence or risk severity in line with risk categorization. Likewise, incidence of the identified risk factors as well as

early detection of certain diseases, could indicate positive trends of variables in the process of monitoring dynamic system of health and diseases.

5. CONCLUSION

Unfortunately, our study could not take into account differences in social status of our patients because software application was not designed to support that kind of analysis. Within patient data the following data should have been included, such as education, income, employment status, etc. Recent results obtained in Mostar (5) refer to high differences in non-communicable diseases risks prevalence between social classes taking into account education status, as well as income level. Higher prevalence of risks within lower social groups was accompanied by higher level of stress. These findings strongly support thesis of Marmot (4) being based on the role of stress, apart from life style, and protective role of population group social standing. Also, our findings on regional differences of risks prevalence could not be elaborated now without evaluation of a number of variables, such as stress level, geographical differences, cultural differences and mentality, climate differences, etc.

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- **Conflict of interest:** none declared.

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