Volume 2 / Number 4 / 2014 ISSN 2303-4092

Balkan Journal of Health Science

Volume 2 / Number 4 / 2014

Balkan Journal of Health Science

Address: Sarajevo,
Bolnicka bb,
Bosnia and Herzegovina

E-mail: balkanjournal@yahoo.com
Web page: http://www.drunpp.ba/bjhs.html

Published by DRUNPP, Sarajevo
Volume 2 *Number 4, 2014*
ISSN *2303-4092*

Balkan Journal of Health Science is indexed in:

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Determination of early and late complications rate in diabetic dialysis patients with permanent native vascular access (AVF) age over 65

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Abstract

Aim: Malfunction of permanent native vascular accesses or (AVF) arteriovenous fistula remains a main and frequent cause of problems in chronic patients receiving hemodialysis. Frequency of early and late complication rate occurred in case of diabetes mellitus patients with constructed AVF and is still a subject of intensive research. In this research we intend to improve quality of treatment in diabetes mellitus patients with constructioned permanent native vascular access (AVF), as well as life expentations and improving quality of life.

Patients and methods: This study was preformed at Clinic for Vascular surgery and Clinic for hemodialysis in University Hospital in Sarajevo. Research has be done during 6 month /from beginning of January 2012 till end of June, 2012; treated 100 patients – 50 suffering diabetes mellitus and 50 without it, both genders and over age of 65, on dialysis. The study was approved by an institutional review board and all patients gave their written confirmed consent.

Results: For analysis of late and early complication with diabetic patients was statistically considered significant by using p value less than 0,05. The difference in late complications rate between diabetic patients groups over 65 years and non diabetic patients group over 65 years was statistically significant 28% vs 1% and early complications rate 18% vs 2% ($\chi 2=7,111$; p=0,008) . The reconstruction of the AVF is often higher statistical significance (p <0.05) in diabetic patients (26 or 52%) compared to patients without diabettes mellitus (11 or 22%).

Conclusion: In this study we have concluded that dialysis high risk patients age over 65 who suffered from diabetes mellitus also suffer from AVF function deficiency. Indication for construction of radiocephalic fistula should seriously be considered preferable as method of treatment used in diabetic patients over 65, compared with indication of brachio-cephalic fistula construction above the elbow. Possibility of early and late complication occurred in case of diabetic patients. There was statistically significant difference in the higher incidence of brachio-cephalic fistula, late thrombosis complication, AVF function efficiency in diabetic dialysis patients with permanent native vascular access age over 65.

Key words: permanent native vascular access, Arterialvenous fistula (AVF), dialysis, diabetes mellitus.

Introduction

The construction of permanent native vascular access or native arterialvenous fistula AVF, as a basic access to a blood stream applied for treating patients with chronic renal insufficiency as a method which is directly connected with lowest level of morbidity and mortality of patients on dialysis. Nevertheless, in spite of advantages that AVF have, certain early and late complications occurs, such as thrombosis, infection and appearance of aneurysm, followed by diabetes mellitus as one of risk factors (1). Diabetes mellitus is key factor for best performed surgical intervention AVF, because it is a leading risk factor, which has direct influence on surgical treatment success, directly connected with quality and lasting of dialysis treatment of patients with constructed AVF. The native arteriovenous fistula AVF, as a superior vascular access in comparison to AV grafts has a much lower risk of thrombosis (2). A prospective study on 220 patients with native vascular access "*Predictive measures of vascular access thrombosis*" by Richard E and coauthors, published in 1997, proved that only in one of the 48 arterio-venous fistulas (2%) thrombosis was developed, which was a significantly lower rate of thrombosis than PTFE

grafts (20%). The study by Stehman-Breen CO in year 2000 and Pisoni RLin the year 2002 also was statistically signified that diabetes has been associated with a lower prevalence of fistulas (2, 3, 4), In this studies we can see the importance of native vascular access in diabetic dialyse patients. It is a common fact that a many surgeons prefer side to-end anastomoses in order to avoid early and late complications rates and long-term patency. (5) Idealizing of development of the arteriovenous fistula (AVF) as a golden standard for dialyse patients since 1966 Brescia and Cimino, has provided the best vascular access and solution with a lowest risk of early and late complication in high risk diabetic dialyse patients. Despite the obvious superiority of the native arteriovenous fistula AV F and proved disadvantages of prosthetic devices, many nephrologists and surgeons are forced to use prosthetic devices instead taking into consideration the vascular access and better benefit of dialyse treatment (6.) Invested efforts to prevent early and late complication rate of vasluar access should concentrate on increasing construction of native arteriovenous fistulas in order to preserve native venous access of recklessness puncture as ever possible. Success of preventing early complication therapy such is AVF is that thrombosis is determined by; occurrence of occlusion (under 48 hours should been start with appropriate surgical treatment), age, constructions level of AVF, diabetes mellitus as a leading risk factor and patency rate of functioning. Native forearm AVF thrombosis on the basis of anastomosis stenosis indicates that surgical reconstruction Treatment of AVF on upper arm shows satisfying results in diabeic patients age over 65, although it is still object of intensive study. Aneurysm of arteriovenous fistula are possible late complications in diabetic dialyse patients, and appears in 5-8% of all complications caused by excessive dilatation and displacement of affected vein structure, damaging blood vessel walls and forming aneurysm, till finally caused dysfunction of AVF.(7,8). Most of infections complications on diabetic dialyise patients are caused by staphylococcal organisms. Major source of infection rate among diabetic hemodialysis patients are caused by the dialysis vascular access, especially by prosthetic arteriovenous graft composed of polytetrafluoroethylene (PTFE), which has become an acceptable alternative to the native arte riovenous fistula and central venous catheter.(9) The lowest percentage of infection rate is connected with construction of native arteriovenous fistula and justifies the first main indication level whenever it is possible(9,10). Bacteremia is one of most complication of prosthetic arteriovenous graft and native arterioveinous fistula AVF. These bacteremias are caused by staphylococcal microorganisms and are directly connected with high rates of mortality (8 to 25%), recurrence (14.5 to 44%), and serious infectious complications, developing the metastatic complications (14.5 to 44%) (10,11). In the report of retrospective autopsy study, based on analysis of causes of mortality in 63 insulin-dependent diabetic patients on dialyises, Zander et al documented that infection rate was present in 20.6% of total dead diabetic dialayse patients (10,11,12,). In the study the documented possibility of significant reduction was presented, as well as efficiency of dialysis adequacy of clearance Kt/V(amount of dialysis delivered: K = clearance of urea, t = time on dialysis, V = estimated total body water) in diabetic dialyse patients. The purpose and goal of the study is to evaluate early and late complication rate of native arteriovenous fisula (AVF) in diabetic dialyse patients age over 65 establishing and improving surgical construction criteria witch the ameliorate dialyse treatment and life dignity of the patients. (11,13)

Aim of the study

In this study we aim to investigate a possibility of improving of constructed permanent native vascular access (AVF) in diabetic dialyse patients age over 65, in order to provide and improve better life expectations and also to achieve a adequate response to the therapy in diabetic patients during dialysis treatment investigating complications rates, preserving at the same time life dignity of the patients.

Patients and methods

Our study will confirm the early and late appearance of complications AVF in the case of risky dialysis population group of patients, with or without diabetes mellitus, during a six months period between January 1, 2012, and July 1, 2012; rese-

arch treated 100 patients suffering diabetes mellitus, both genders and over age of 65, on dialysis. The study was performed at Clinic for Vascular surgery and Clinic for hemodialysis, treated on chronic dialysis project at least for 6 months on University hospital in Sarajevo. Comparison will be done between two groups of 50 patients each, A patients suffer of diabetes mellitus and B group patients whish do not have diabetes mellitus. Both groups are on dialysis treatment 3 time a week Preoperative and postoperative management of indication of level of hemodialyisis access construction was controlled by physical examination.

Results

Table 1. Review of the AVF reconstruction in patients with Diabetes Mellitus age over 65

		Presents of Diabetes mellitus		total
		Yes	No	
Yes	N	26	11	37
	%	52,0	22,0	37,0
No	N	24	39	63
	%	48,0	78,0	63,0
total	N	50	50	100
%	50,0	50,0	100,0	

χ2=9,653; p=0,003

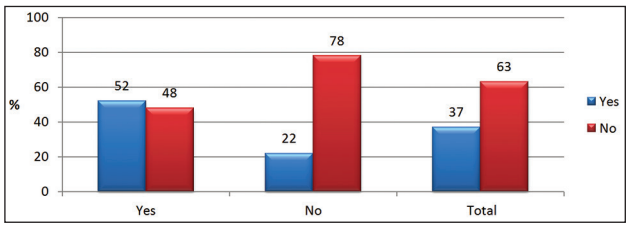

Figure 1. Review of the AVF reconstruction in patients with Diabetes Mellitus age over 65

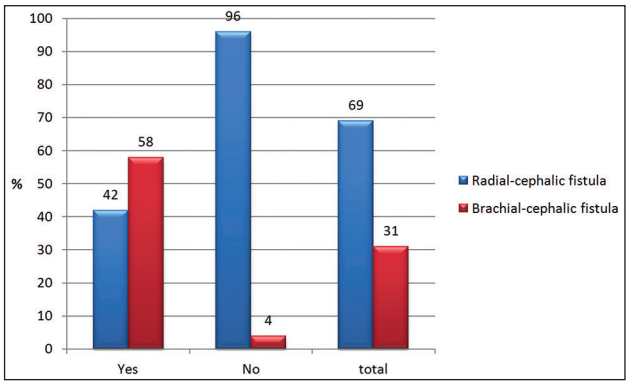

Figure 2. Review of AVF construction Types in patients with Diabetes Mellitus age over 65

Table 3. Review of AVF construction localisation in patients with Diabetes Mellitus age over 65

Armside localisation of construction AVF				
		Diabetes mellitus		Total
		Yes	No	
Left	N	28	29	57
	%	56,0	58,0	57,0
Right	N	22	21	43
	%	44,0	42,0	43,0
Total	N	50	50	100
%	100,0	100,0	100,0	

χ2=0,041; p=500

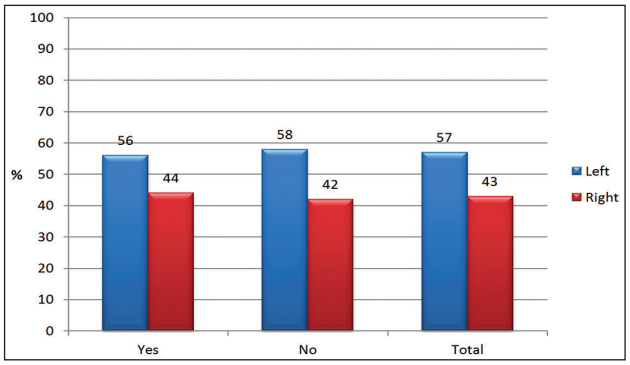

Figure 3. Review of AVF construction localisation in patients with Diabetes Mellitus age over 65

Table 2. Review of AVF construction Types in patients with Diabetes Mellitus age over 65

AVF construction Types in patients with Diabetes Mellitus age over 65				
		Diabetes mellitus		total
		Yes	No	
Radial-cephalic fistula	N	21	48	69
	%	42,0	96,0	69,0
Brachial- cephalic fistula	N	29	2	31
	%	58,0	4,0	31,0
Total	N	50	50	100
%	50,0	50,0	100,0	

χ2=37,081; p=0001

Table 4. Review of early complications rate of postoperativ bleeding and postoperativ Thrombosis

Early complications - Postoperativ bleeding * Diabetes mellitus				
		Diabetes mellitus		total
		Yes	No	
No	N	50	50	100
	%	100,0	100,0	100,0
total	N	50	50	100
%	50,0	50,0	100,0	

Early complications - postoperative thrombosis * Diabetes Mellitus				
		Diabetes mellitus		total
		Yes	No	
Yes	N	9	1	10
	%	18,0	2,0	10,0
No	N	41	49	90
	%	82,0	98,0	90,0
total	N	50	50	100
%	50,0	50,0	100,0	

χ2=7,111; p=0,008

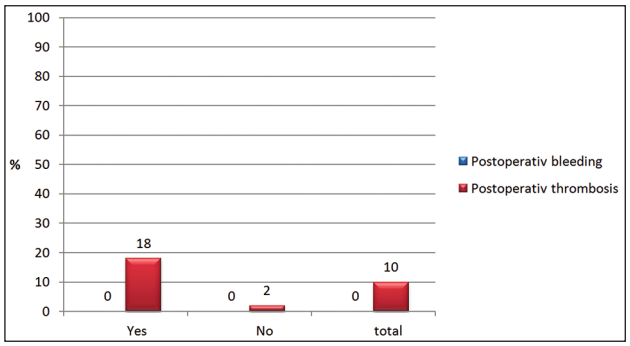

Figure 4. Review of early complications rate of postoperativ bleeding and postoperativ Thrombosis

Table 5. Review of late complications rate of Thrombosis, Aneurysms and Infection

Late complications - Thrombosis * Diabetes Mellitus				
		Diabetes mellitus		total
		Yes	No	
Yes	N	14	1	15
	%	28,0	2,0	15,0
No	N	36	49	85
	%	72,0	98,0	85,0
total	N	50	50	100
%	50,0	50,0	100,0	

χ2=13,255; p=0,0001

Late complications - Aneurysms * Diabetes Mellitus				
		Diabetes mellitus		total
		Yes	No	
Yes	N	1	0	1
	%	2,0	,0	1,0
No	N	49	50	99
	%	98,0	100,0	99,0
total	N	50	50	100
%	50,0	50,0	100,0	

χ2=1,010; p=0,500

Late complications - infection * Diabetes Mellitus				
		Diabetes mellitus		total
		Yes	No	
No	N	50	50	100
	%	100,0	100,0	100,0
total	N	50	50	100
%	50,0	50,0	100,0	

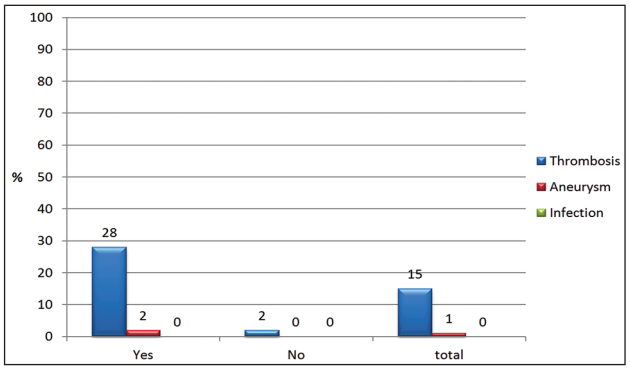

Figure 5. Review of late complications rate of Thrombosis, Aneurysms and infection

There was statistically significant difference in the higher incidence of thrombosis in patients with DM ($p < 0.05$).

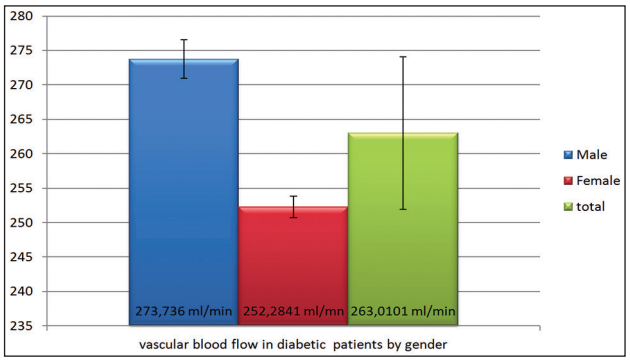

Figure 6. Review of vascular blood flow in diabetic patients by gender

Table 6. Review of vascular blood flow in diabetic patients by gender

Vascular blood flow in diabetic patients by gender (ml/min)						
	N	AS	SD	SEM	Min. ml/min	Max. ml/min
Male	25	273,7360	2,81516	,56303	270,00	280,00
Female	25	252,2841	1,55365	,31073	250,00	255,00
total	50	263,0101	11,06608	1,56498	250,00	280,00

t=12,746; p=0,00001
(ml/min)

Table 7. Comparison of the adequacy of hemodialysis treatment by gender

Comparisons by gender							
		N	AS	SD	SEM	Min.Kt/V	Max.Kt/V
Diabetic patients t=4,914; p=0,0001	M	50	,914	,0452	,0064	,9	1,1
	F	50	,838	,0490	,0069	,8	,9
Non diabetc patients t=5,340; p=0,0001	M	50	1,082	,0523	,0074	1,0	1,2
	F	50	,920	,0495	,0070	,9	1,1
total t=10,419;p=0,0001	M	100	,998	,0974	,0097	,9	1,2
	F	100	,879	,0640	,0064	,8	1,1
	total	200	,939	,1016	,0072	,8	1,2

t=0,208; p=0,650

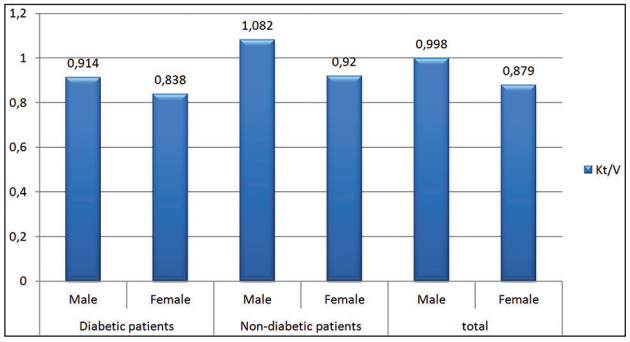

Figure 7. Comparison of the adequacy of hemodialysis treatment by gender

Results

In this study we have concluded that dialysis high risk patients age over 65, who suffered from diabetes mellitus also suffer from AVF function deficiency. We found in our analysis that type of AVF construction indication (radio-cephalic or bracho-cephalic) is not adequately set and assessed because of risk factors such as diabetes mellitus and age over 65. For analysis of late and early complication in patients on dialysis age over 65, with diagnosis of diabetes mellitus was statistically considered significant by using p value less than 0,05. The difference in late complications rate between diabetic patients groups over 65 years and non diabetic patients group over 65 years was statistically significant 28% vs 1% and early complications rate 18% vs 2% ($\chi 2$=7,111; p=0,008). None of the studied subjects in both groups had complications in the quality of postoperative bleeding, while postoperative thrombosis in diabetic patients occurred as early statistically significant (p <0.05) and appears more common in patients with diabetes mellitus (9 patients or 18%) than in patients without diabetes mellitus (1patient or 2%). We documented statistically significant difference in the higher incidence of thrombosis in patients with diabetes mellitus (p <0.05). Comparison of mean values by gender shows that there is a statistically significant differences within the groups of diabetics and non-diabetics, within the total sample (p <0.05). AVF construction localisations are significantly recorded in 29 diabetic patients with 58% of all diabetic patients (p <0.05), which leads to conclusion about neglecting the importance of diabetes in age over 65, as main unpredictable risk factors. Radio-cephalic AVF was reported in 96% and was effectively proven in all non diabetic patients (p <0.05). Considering the arm side /left-right/ of AVF, there were no statistically significant differences documented in both groups. In diabetic patients 56% were left side re-

presented and 44% the right side of arm (p >0.05) and in non diabetic patients there were 58% left side and 42% the right side of arm AVF location (p >0.05). This study also documented problems in evaluation of AVF in diabetic patients, age over 65, with minimal efficiency of ability to support a minimum dialysis blood flow of 350 ml/min. We found in also that AVF function efficiency by sex in diabetic patients shew that the average increase in value recorded in men (273.7 ± 2.8, range 270-280ml / min) compared to women (252.3 ± 1.22; range 250-255ml / min). Referring to this analysis we can conclude that diabetes mellitus, as risk factor should not be neglected concerning that its presence leads to a greater number of complications, often early complications and a greater number of late complications. Kt/V, is the most commonly used indicator for dialysis adequacy in diabetic dialyse patients. The optimal dose of Kt/V for hemodialysis according to current guidelines should be l.4 or above but 'a fully adequate dialysis prescription is provided with Kt/V=1.0 . Comparison of mean values by gender shows that there are a statistically significant differences between the groups of diabetics and non diabetics patients and within the total sample (p <0.05). In female diabetic patients we found the poor minimum of dialysis adequacy Kt/V of 0.92 and in male diabetic patients Kt/V of 1,082 which makes the bottom line for dialysis adequacy.

Conclusion

Construction of native vascular access or native arteriovenous fistula AVF is still the gold standard of most preferred and reliable vascular access of all hemodialysis access possibilities and it has been the main choice in application after kidney transplantation which is the life important treatment for diabetic dialysis patients. Although it is a supportive treatment, hemodialysis is the only choice of treatment in our country for most of diabetic patients. Expected prognoses are proved in this study performing forearm fistulas as hemo dialysis access to diabetic patients over age of 65 years. The frequency of early and late complications occurred in case of diabetes mellitus patients with constructed radio-cephalic forearm fistulas and low quality of patency rate compare with diabetic patients with constructed upper arm brachiocephalic fistula. This study should have drew more attention to indication of construction at diabetic patients over 65 years. The effective methods for the elimination of the aneurysm, thrombosis and infection are adequate measures and precautions, accuracy in preoperative and postoperative evaluation of vascular access and appropriate surgical construction or reconstruction treatment. Ability to know and determinate the most adequate and most optimal surgical indications for construction of vascular access should draw more attention. The connection between diabetes mellitus and dialysis adequacy Kt/V remains not fully recognized and still is a subject of intensive studies

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Pregnancy women and diabetes

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Abstract

Pregnancy is a complex, metabolic diabetogenic process comprising the use of fuel by foetus increasing gradually as well as an increase in the hormonal levels. Diabetes mellitus is an issue taken into consideration because of the fact that it has an impact on the metabolism of both the mother and the foetus. Diabetes and pregnancy relation is of importance in three points: the period before pregnancy starts (preconceptional), diabetes at pregnancy (gestational), pregnancy with current diabetes. Pregnancy mixed with diabetes is a risky pregnancy that is necessary to be followed up closely in maternal and foetal respects. When adequate glycaemic control cannot be obtained, it becomes a metabolic disorder that causes a great range of morbidity and mortality to the baby from congenital malformations to death in uterus, from low level of diabetics to diabetic ketoacidosis, to increase in retinopathy and nephropathy.

Key words: Pregnancy, diabetes, insulin, nutrition and mother

1. Introduction

Diabetes is a medical complication having a quite high incidence (1). Diabetes Mellitus (DM) in pregnancy is a chronic disease that requires to have a careful and conscious follow-up as it has a risk of having significant complications in terms of both the mother and foetus. An inattentive diabetes could lead to important complications that have a threat upon life for both the mother and the baby (2).

If diabetes is diagnosed before pregnancy, it is called pre-gestational and if it is diagnosed during pregnancy for the first time, it is called Diabetes Mellitus (DM) (1). Being the most frequent metabolic disorder of pregnancy, gestational diabetes is encountered in different frequency in different countries, however it has a mean incidence of 3-5%, and as for pre-gestational diabetes, it causes troubles at 0.3 – 0.5% of the pregnancies (2). In the current study, it was aimed to investigate how carbohydrate metabolism, diabetic nutrition at pregnancy, exercise and insulin therapy should be with regard to pregnancy.

Carbohydrate metabolism at pregnancy is a diabetogenic process (3). The purpose of the metabolic changes to the mother in the period of pregnancy is to supply enough energy for the foetus. The energy stored in the first half of pregnancy is spent for the needs of the foetus later on (1). Due to an increase in the environmental usage of glucose in the first trimester, the level of fasting glucose is lower and this decrease is approximately 15mg/dl. Towards the twelfth week of pregnancy, the level of fasting glucose is at its lowest. Because of the smooth muscle relaxation in gastrointestinal system emptying the stomach is delayed and fasting glucose is increased with a slow tendency after meals. As a result, the first half of the pregnancy is a period when maternal glycogen, protein and fat stores increase and the developing embryo is protected from the teratogenic effects of hyperglycaemia (1).

As for the second half of pregnancy, a catabolic process comes to the forefront. In order to meet the increased need of a foetus, the blood glucose level is kept high in the case of both fasting and postprandial blood sugar. And a diabetogen environment is formed with an effect of oestrogen, progesterone, cortisol and prolactin hormones, in particular HPL (human placental lactogen) against insulin. As a result of increased insulin resistance throughout pregnancy, the amount of insulin secreted from the pancreas is over two folds compared to those who are not pregnant. This case in women with a normal pregnancy could be tolerated physiologically while it is encountered in women with diabetics and the ones who are not known to be diabetics during pregnancy and the balance of carbohydrate metabolism is lost. Typically, pre-

gnancy is characterized with fasting hypoglycaemia, postprandial hyperglycaemia and hyper insulin (1).

2. Diabetes in pregnancy

Two different diabetes are encountered in pregnancy. One of them is "gestational diabetes mellitus" (GDM), which is known as "type 3 diabetes." The second one is "pre-gestational diabetes mellitus" which exists before pregnancy and is classified as Type 1 DM, Type 2 DM. And 90 % of diabetes and pregnancy phenomena are GDM and the remaining 10 % are type 1 and type 2 diabetes phenomena (5).

2.1. Gestasyonel Diabetes Mellitus

Gestational diabetes mellitus (GDM) is defined as the diabetes formed during pregnancy, having a course with glucose intolerance at different severity and mostly lost after birth. The fact that it is lost after birth, in particular, helps to differ it from type 2 diabetes mellitus (type 2 DM), which is not defined before pregnancy (6). There is an insulin resistance and unspoiled insulin secretion at the source of GDM. It is of importance that GDM should be defined and pregnant women should be followed up closely because of the fact that it increases maternal and foetal morbidity (7). Its real incidence is not known clearly since the data in the literature differ depending on the community it was carried out and the diagnosis criteria (8). Even though GDM prevalence differs according to countries and ethnic groups, it varies from 1% to 14 %. It was found that GDM prevalence has a range of 3-8 % in the studies carried out in different regions of Turkey (7).

Risk factors in pregnancy are classified in three groups as low risk, medium risk and high risk ones. Pregnant women under 25 years of age, with normal weight before and after birth, having no diabetes in her first degree relatives, belonging to an ethnic group with a low GDM prevalence, having no bad birth results and no big baby history are considered within the low risk group. Those belonging to an ethnic group with a high prevalence of GDM (Spanish, American Indian, Far Easterner, South Asian) and the ones who are not included in the high and low risk group (i.e.,:28 age, light weight) are regarded as the medium group. The pregnancy women with a serious diabetes, having a strong history family of diabetes anamnesis, GDM anamnesis and big baby history are included in the high risky group (9). Depending on the selective screening criteria, a routine screening is recommended if there is a risk of miscarriage in terms of diabetes. If there is a medium risk, a screening test is recommended between the weeks of 24-28. In the case of a high risk, a possible earliest glucose measurement should be done and a challenge test should be repeated at in the weeks 24-28.

2.2. Diagnostic Criteria at Gestational Diabetes

In general, diagnosis and screening tests are made between the weeks 24-28 in pregnancy, as the diabetogenic effects of pregnancy appear in these weeks and there is enough time to treat the effects likely to be encountered both in the mother and baby. For the diagnosis of oral glucose tolerance test (OGIT) GDM that is carried out with 100g currently, golden-standard is considered as a test. GDM diagnosis is taken directly or if they have a positive result at the test carried out with 50g or (plasma glucose concentration $\geq$ 140 mg/dL) for the patients by applying 100g OGIT (7). Threshold values recommended by O'Sullivan and Mahan were calculated for venous blood. However, blood tests today are mostly done on plasma, so it is necessary to convert these values into plasma. In this conversion, two different criteria came out as "the Criteria of Carpenter and Coustan (C&C)" and the criteria of "National Diabetes Data Group" (NDDG) (Table 1).

Its repetition is low since it forces the patient during the application of 100g OGTT application. OGTT applied frequently throughout the world in

Table 1. Diagnosis Criteria for 100g OGTT in GDM Diagnosis (8)

Diagnosis Criteria for 100g OGTT in GDM Diagnosis	Fasting *	1st Hour *	2nd Hour *	3rd Hour *
C&C	95	180	155	140
NDDG	NDDG 105	190	165	145

** mg/dl*

Table 2. Diagnosis Criteria for 75g OGTT in GDM Diagnosis (8)

Diagnosis Criteria for 75g OGTT in GDM Diagnosis	Fasting *	1st Hour *	2nd Hour *
WHO	126		140
ADA**	95	180	155
CDA***	95	190	160

** (mg/dl)*
***American Diabetes Association*
****Canada Diabetes Association*

the current time is the one made with 75 grams. World Health Organization recommends this test as well and has been used out of the USA, in particular in Europe and Japan so frequently. The one applied in the USA is 100 gram OGTT (8).

2.3. Foetal and Maternal Complications at Gestational Diabetes

2.3.1. Foetal complications

There is a hyperinsulinism in diabetic mother and her child. Organic and functional caused by hyperinsulinism include disorders of vital functions and developments of some organs, hyaline membrane disease in lungs, erythroblastosis fetalis, increased lipogenesis at lipid metabolism (macrosomia) and polycythaemia. In addition, diabetes increases the risk for miscarriage and stillbirth, congenital anomaly, developmental retardation, and neonatal hypoglycaemia (2). Macrosomia is one of the complications which is paid attention the most among other complications. The generally accepted definition of macrosomia is that baby's weight is over 4000 grams. In some studies, macrosomia incidence at gestational diabetes is given as 16-29 %, while it is 10 % in the ones having no gestational diabetes. However, when treated properly, metabolic disorders don't have long term affects in babies. In addition, the risk for the babies of mothers with GDM to develop Type 2 diabetes and obesity is increased in the coming periods (8).

2.3.2. Maternal Complications

Diabetes could lead to hypoglycaemia in pregnant women, hyperglycaemia, polyhydramniosis, ketoacidosis and hypertensive complications, hard delivery and urinary system infections, interventional birth, caesarean birth and preterm action. Such chronic complications as retinopathy, nephropathy and neuropathy could be encountered in diabetic mothers (2). In patients with gestational diabetes, the possibility to develop Type 2 diabetes in the following periods is higher. This risk is much higher in the patients who are obliged to have an insulin therapy during their pregnancy (8).

2.4. Gestational Diabetes Mellitus Treatment

The purpose of Gestational Diabetes Mellitus treatment is to eliminate the maternal and foetal complications based on excessive foetal growth and other GDM (10).

2.4.1. Nutritional Treatment

The first choice at Gestational Diabetes Mellitus treatment is diet and it is known that exercise and unless adequate response is obtained, insulin treatment is essential (10). If medical nutritional treatment applied is properly, blood glucose levels could be kept at the desired limits for most of the patients with GDM without needing to use insulin (11). There is an increase in energy metabolism at the level of 22-23 %. Depending on the weight at the start of pregnancy, weight gaining varies. Such neurophysiological as ketosis, night hypoglycaemia are likely to occur. It is also known that excessive weight gaining could lead to death at birth or premature birth. Weight gaining at diabetic pregnant should be between 7.5 – 10 kg at least (11).

In order to prevent hypoglycaemia and hyperglycaemia at pregnancy, it is necessary to pay attention to the number and time of the meals. Almost 50-60 % of daily energy should be taken from carbohydrates. Carbohydrates with low glycaemic index increasing blood sugar slowly should be preferred at the diet. Protein should contain 12-15 % of daily energy and fat should contain 25-30 % of it (11).

Table 3. Desired Weight Gaining at Diabetic Pregnant (11)

Weight before pregnancy (BMI: kg/m^2)	Recommended weight gaining during Pregnancy
Underweight (<20)	15 kg and more
Normal (20-25)	12-15 kg
Overweight (25-30)	10-12 kg
Obese (> 30)	7.5-10 kg

While a diet of 30kcal/kg/day designed according to kilograms before pregnancy at non-obese GDM phenomena is ideal, it is recommended for obese women (BMI>30kg/m^2) to have a calorie limitation of 30-33 % and 25 kg/kcal/day calories depending on their weight before pregnancy. This limitation will lower hyperglycaemia and triglyceride while preventing ketonuria (10). In particular, it is known to us that the rate of macrosomia and caesarean decreases nearly half with a decrease at the calories to 35-40 % depending on carbohydrates in diet. Glucose is the primary energy source in terms of foetal growth. The purpose in recommending diet at GDM is to prevent high blood sugar. This can keep the insulin secretion and insulin resistance secreted from the placenta at a balanced level. When diets having carbohydrates are consumed, there will be an increase at blood glucose levels and then a decrease when it is at its highest level. It is necessary to bear in mind that when the level of blood sugar is kept high at GDM after meals, there will be an excessive foetal growth. It is known that blood glucose secretion will be more controlled at food with low glycaemic index (i.e. multi-grain bread) compared to food with high glycaemic features (white bread, potato) (10).

2.4.2. Exercise Treatment

It is clear that physical activity has a direct or indirect effect on glucose haemostasis and insulin sensitivity and that it is arranged with various mechanisms. In addition, it decreases non-fat tissue amount and has a long term effect (10). Exercise increases insulin sensitivity in tissues and supports the arrangement of blood sugar. In general, it is recommended to have an exercise for 15 -30 minutes three times a week (8). The first choice in gestational DM is diet and exercise. It should be kept in mind that when diet treatment and exercise is applied properly, medical treatment will be delayed (10).

2.4.3. Insulin Treatment

When diet and exercise are not adequate in the arrangement of blood sugar, insulin treatment is applied (8). Almost 93% of the women with GDM start insulin treatment when their fasting hyperglycaemia is over 105mg/dl despite diet treatment. However, latest studies show that insulin secretion is lower and there appear foetal macrosomia the most at the phenomena where the fasting blood glucose level is over 95 mg/dl. The threshold level for starting insulin is recommended as 95 mg/dl.

2.4.4. Oral Antidiabetics

Since most of the oral antidiabetics pass through the placenta, their usage in pregnancy is not recommended. However, it has been indicated that gliburidin do not pass through placenta and there have been some studies carried out with regard to its usage in pregnant women (8).

Definite treatment for gestational diabetes is giving a birth. While some studies show that shoulder dystocia lower to 1.4% from 10% with the induction of birth in 38-39th weeks, it was indicated that birth induction would be beneficial in reducing complications in the baby. There is a need for more detailed studies in this issue (8).

2.5. Pregestational Diabetes Mellitus (PGDM)

Diabetes existing before pregnancy is called Pregestational Diabetes Mellitus. It is classified as Type 1 DM and Type 2 DM (2). Type 1 DM, which is a case called as insulin based diabetes mellitus and diabetes with a juvenile start beforehand, usually occurs as a result of auto immune destruction of pancreas beta cells. As for Type 2 DM, almost 90-95% of the diabetic patients comprise this group. There is an abnormal insulin secretion and a resistance at target tissues. Most of the patients are obese and it is believed that obesity-based periferic

insulin resistance leads to beta cell consumption. Contrary to Type 1 diabetes, Type 2 diabetics do not need insulin in most cases (1). The incidence of Type 1 and Type 2 DMs varies depending on races. In the diagnosis of diabetes existing before pregnancy, the findings are the existence of polyurea, polydipsia, unexplained weight loss and the fact that plasma glucose concentration examined at any time is > 200 mg/dl or fasting plasma glucose value is > 126 mg/dl, or second hour plasma glucose value at OGTT is > 200mg/dl. If only one of these values is positive, any of the tests are repeated to verify the diagnosis (2).

2.5.1. Treatment at Presentational Diabetes

In pregnant women with a presentational diabetes, both the foetus and the mother are under a definite risk. Controlling the blood sugar in the early period of pregnancy just starting with the pregnancy would reduce congenital anomaly and spontaneous abortion (1).

2.6. Diet Arrangement in the Pregnant Women with Type 1 Diabetes

It is necessary that some variables must be taken into consideration at the pregnancy with Type 1 diabetes. These are the phases of pregnancy at first examination, lifestyle, food preference, meal timing, level of physical activity and energy need for pregnancy. Food intake will be less in the first trimester due to nausea, vomiting and reduced physical activity. As most of the pregnant women encounter with hypoglycaemia and ketonuna (fasting ketosis), a diet and insulin arrangement that could regulate the level of blood glucose the best will be necessary. A nutrition arrangement that will be planned with 3 main meals and 3 snacks and daily KH distribution to balance it with an insulin regiment will provide ideal nutrition. As nocturnal hypoglycaemia is a case that is encountered frequently, moving very slowly in pregnant women with Type 1 diabetes, it is necessary to put an emphasis on night meal containing 25 g complex carbohydrate at least. Since insulin before dinner leads to asymptomatic hypoglycaemia that will develop at midnight sleep, it should be arranged well (12).

Because pregnancy is a dynamic phenomenon, the diet of the pregnant women should be designed depending on the weight increase, insulin need and exercise of the women. Weekly medical and dietetic evaluations are required for an optimal control.

2.7. Arrangement of Diet in the Pregnant Women with Type 2 Diabetes

As most of the obese diabetic people non-dependant on insulin and having an insulin resistance at a varying level before pregnancy are not aware of how much the glucose tolerance is disordered, arranging glycaemia during pregnancy will be difficult. Dieticians and physicians are of the opinion that pregnancy is not a suitable time for losing weight. However, an excessive weight gaining is not true during pregnancy. Even though losing weight or gaining normal weight is not seen during pregnancy in obese women with Type 1 diabetes, ketonuria can rarely be encountered. High carbohydrate food and food with a high pulp will decrease the need for insulin (12).

3. Conclusion

Having a successful pregnancy for both the mother and the foetus depends on the changes in carbohydrate metabolism during pregnancy. In the case of diabetes in pregnancy, both the mother and the baby should be followed closely. The purpose for the mother with diabetes is to give a birth to a healthy baby at normal weight and also having a low risk as much as possible. High blood sugar of the mother is a big risk factor for the foetus and it should be aimed to keep the foetus healthy in the womb of the mother by checking it well enough.

In order not to encounter for the mother with negative results, it is necessary to take some measurements. First of all, it is necessary to have oral glucose tolerance test between the weeks 24 and 28 and determine if it has a risk. At the moment when the mother has a diagnosis of GDM, some precautions should be taken. These measurements should contain nutritional treatment and exercise and in the case of these two are adequate, insulin and oral antidiabetics should be applied. Some educational courses should be taken with the support of the Ministry of Health and mothers with GDM

and candidate mothers should be encouraged to take these courses and trained. Definite solution for GDM is giving a birth. However, it is also essential to check the blood of the mother after birth.

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Dimensions of personality as predictors of self-esteem

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Abstract

The aim of this study is to examine the contribution of personality traits in the interpretation of self-esteem in adolescents. The general level of self-esteem was examined via the Rosenberg self-esteem scale, while the dimensions of personality were examined through The Big Five Inventory (BFI) questionnaire.

The study included a total of 60 high school students, aged between 15 and 19 years, out of which 43 were female and 17 male.

The results indicate that there is a statistically significant difference in regard to gender, which shows that male adolescents, when compared to female adolescents, have higher scores on the self-esteem scale.

Results of regresional hierarchical analysis indicate that dimensions of agreeableness and school success are the only dimensions that have a statistically significant contribution in interpreting self-esteem in high school students.

Key words: personality, dimensions of personality, self-esteem, adolescence

Introduction

According to Allport (1937) and Murray (1938) personality is a set of psychological traits and mechanisms within the individual that are organized and relatively permanent, these traits and mechanisms influence the interaction and adaptation of the individual to intrapsychic, physical and social environment (Fulgosi, 1987)[1]. In this definition the term "psychological traits" represents ways in which people are similar or different, while the term "mechanisms" refers to processes that take place in the personality. To date, many theories of personality have been developed in psychology, each attempting, in its own way, to make a contribution to understanding of personality. An all-encompassing theory of personality does not exist. Currently the most widely accepted model of personality structure is the Five factor model developed by McCrea and Costa within the factor oriented approach to psychology of personality (McCrae and Costa, 1990, per Marić, 2010)[2]. Galton was one of the first authors to contribute to this model, by using vocabulary as means of estimating the number of words that describe personality.

The five big dimensions of personality are first mentioned in a research paper by Fiske (1949) who revised a paper written by Cattle and reduced his 16 factors to 5. Soon afterwards these five factors can be found in many research papers. Of these factors, derived by factor analysis, most researchers agree on the nature of first four factors: extraversion, agreeableness, conscientiousness and neuroticism (emotional stability). As for the fifth factor, researchers disagree on its nature, hence the use of different terms for this factor, such as "intellect" and "openness to experience" (Ivanović and Ivanović, 2010)[3]. Extraversion and neuroticism form the axis of the five factor model. In this sense, extroversion, which is characterized by positive emotionality, contains sociability, initiative, ambition and assertiveness as components, while neuroticism or negative emotionality contains emotional reactivity, irritability and uncertainty as its components. Agreeableness is most commonly conceptualized as a global latent variable that summarizes the specific tendencies and behaviors such as kindness, cooperativeness and tendency to help others, while conscientiousness includes components such as the need for control (as opposed to impulsivity), caution, reliability, responsibility, and a tendency for hard work and achievement. Openness to experience, as well as the previous four traits, presents a mixture of va-

rious components of personality functions among which are the intellect in the narrow sense (e.g. intelligence, insight, creativity), openness to experience (e.g. curiosity, imagination, liberalness), as well as some aspects of culture, personal attitudes, preferences and orientation e.g. artistic interests, nonconformity, progressive and nonconventional values, the need for diversity of experiences etc. (Krapić, 2005)[4].

Study goals

The main goal of this study is to examine the predictive value of dimensions of personality, gender, age and the success achieved in the last semester in the interpretation of self-esteem of adolescents (as criteria) as well as to determine whether there is a difference in the level of self-esteem in relation to the gender of participants.

Based on the aformentioned, research tasks have been designated as:

1. To examine the differences in the level of satisfaction with life in relation to gender.
2. To examine the contribution of dimensions of personality, gender, age and academic success in the interpretation of self-esteem.

Participants and research methodology

The study included a total of 60 high school students, aged from 15-19, of whom 43 were female and 17 male. The study was conducted in "Rizah Odžekić" Gymnasium in Zavidovići, BiH during March 2013. The data was collected by authors. The survey was conducted during regular classes.

Instruments

The following measuring instruments were used in this study:

1. Big Five Inventory (John, Donohue, and Kentle, 1991). Cronbach's alpha coefficients in our study are: for Extraversion α= .69, for Agreeableness α= .70, for conscientiousness α= .73, for Neuroticism α= .61 and Openness to experience α= .69.
2. Self-esteem scale (Rosenberg, 1965). Cronbach's alpha coefficient, in our study, is 0,73

Study results

1. Examination of differences in self-esteem levels in relation to gender.

The Mann-Whitney test was used to examine gender differences relative to the criteria. The basic statistic indicators of results on the self-esteem scale relative to gender are shown in Table 1.

Table 1. Arithmetic mean and standard deviation for criterion variable self-esteem relative to participant's gender. (N=60)

	N	M	SD
Gender	60	1.2833	.45442
TOTAL	60	3.8069	.31855

Values of the results of the Mann-Whitney test are shown in Table 2. Based on Table 2. it is shown that value Z is -3.337 with the level of significance of .001, leading to a conclusion that there is a statistically significant difference when comparing male and female participants in assessing the level of self-esteem. To discover where the dependent variable group average is larger, the median values were calculated for male and female respondents.

Table 2. Mann-Whitney test results

Mann-Whitney U	162.500
Wilcoxon W	1108.500
Z	-3.337
p	,001

Table 3. The difference in median values for male and female participants

Female	43	3.7647
Male	17	4.0000
Total	60	3.8235

Based on these results it can be concluded that there is a statistically significant difference in the assessment of self-esteem, so that male respondents (Md 4.00; N = 17) showed higher self-esteem compared to female participants (Md 3.76, N = 43). That is, male adolescents show greater satisfaction in the evaluation of self-competence and self-image when compared to female adolescents of the same age.

2. Examination of the contribution of dimensions of personality, gender, age and academic success in the interpretation of self-esteem

Statistical significance of the model of individual personality traits of age, gender and academic achievement in the interpretation of self-esteem in adolescents is determined by hierarchical regression analysis. Prior to hierarchical regression analysis, correlation coefficients among self-esteem, age, gender, academic achievement and personality were calculated. Overview of all correlations between the self-esteem test results and the aforementioned predictors are shown in Table 4.

Results of correlations from Table 4. show that dimensions of extraversion, conscientiousness, agreeableness, openness to experience and academic achievement have a significant correlation with self-esteem. The most significant correlations are found between self-esteem and academic achievement, agreeableness and openness to experience, whilst the least significant correlations are found between self-esteem and age as well as neuroticism. Based on the derived correlations predictor variables were selected that will eventually be used in the adolescent self-esteem level predictive model. In the first step of hierarchical regression analysis, variables of age, gender and academic achievement were introduced. In the second step the dimensions of extraversion, agreeableness, conscientiousness, neuroticism and openness to experience were introduced. At each step of the analysis, standardized regression coefficients of predictor variables (ß), coefficient of multiple determination (R^2), changes in the size of the coefficient of determination (ΔR), and the significance of changes in the coefficient of determination (ΔF), were calculated. Since the beta coefficients take into account not only the correlation of the respective predictor with the criterion, and the correlation of other predictors with the criterion and the correlation of this predictor with other predictors, the value of the beta coefficient will be used to assess the function of individual significant predictor variables. The regression analysis results are shown in Table 5.

Results of the hierarchical analysis indicate that the described set of predictor variables can explain 26% of the total variance of self-esteem. By including age, gender and academic achievement in the first step of the hierarchical regression analysis, academic achievement (β=.396, $p<.01$) and gender (β=.009, $p<.01$) stand out as significant predictors of self-esteem.

In the second step, by adding dimensions of personality (extraversion, agreeableness, conscientiousness, neuroticism and openness to experience) a statistically significant model is provided, this model explains about 26% of the variance of results,

Table 4. Corelation of self-esteem and predictor variables

	Self-esteem	Gender	(High school) Grade	Academic achievement	Extraversion	Neuroticism	Conscientiousness	Agreeableness	Openness to experience
Self-esteem	1,000	-.069	.032	.389**	.217*	.060	.293**	.364**	316**
Gender		1.00	.330**	-.155	-.121	.003	-.064	.018	-.108
(High school)Grade			1.00	.157	.031	-.083	-.119	.014	.007
Academic achievement				1.00	.191	.145	.229*	.235*	.337**
Extraversion					1.00	.270**	.487**	.372**	.239*
Neuroticism						1.00	.394**	.419**	.209*
Conscientiousness							1.00	.562**	.354*
Agreeableness								1.00	.378**
Openness to experience									1.00

*Remark: *correlation significant at p<.05; **correlation significant at p<.01*

Table 5. Results of hierarchical regression analysis with self-esteem as a criteria variable

Predictors	ß	R^2	ΔR^2	ΔF
Step I Gender	.009**	.152	.106	3.292*
Age	-.033			
Academic achievement	.396**			
Step II Extraversion	.045	.266**	.148	2.262*
Agreeableness	.257*			
Conscientiousness	.079			
Neuroticism	.-061			
Openness to experience	.117			
Gender	.010			
Age	-.027			
Academic achievement	.291*			

*Remark: * p<.05; ** p<.01; ß – standardized regression coefficient, R^2 - coefficient of determination; ΔR - changes in the size of the coefficient of determination, ΔF – significance of changes in the coefficient of determination*

and academic achievement (β=.291, p<.05) and the dimension of agreeableness(β=.257, p<.05) stand out as significant predictors of self-esteem. Results show that adolescents who achieve more academic success and exhibit specific behaviors such as kindness, cooperation and a tendency to help others, have more self-esteem.

Discussion

1. Examination of differences in the level of self-esteem with regard to gender

By studying gender differences in self-esteem, most authors come to two types of conclusions. (Dukez and Martinez, 1994, according to Mirolović Vlach, 2005)[5]. First conclusion is that, Men and women did not differ significantly in the issue of self-esteem, that is, they relatively equally assess themselves, their competency and ability. On the other hand, studies that manage to find a difference in self-esteem in relation to gender usually state a higher self-esteem among male respondents. These differences are mainly observed in the context that women have a greater inclination towards depression, and also a greater tendency for generalized anxiety. The frequency of anxiety symptoms in girls and boys differs, in a way that girls report symptoms of anxiety more frequently than boys. Through development categories these symptoms range from general anxiety and somatic difficulties in young girls, through fears of school exams and tests, to generally greater fears of school and future that are found in older female students (Mirolović Vlach, 2005)[6]. Differences between girls and boys are observed in the structure of depressive symptoms, girls show more feelings of sorrow, desire to cry and suicidal thoughts, when compared to boys, which may favor the development of a negative self-image in females. Girls are more prone to react to stress by doubting their qualities, thus creating a negative self-image and a negative perception of their capabilities. Meta-analysis of gender differences in self-esteem conducted by Feingold (1994), and Larsen and Buss (2008, according to Mazar, 2011)[7] also indicate more self-esteem in male adolescents compared to female adolescents, indicating that these differences are most pronounced in the age of adolescence (15-18 years), noting that these differences decrease with age. Taking into account the results of studies by which persons of a higher self-esteem have a number of positive developmental results, it follows that according to the results of our study, male adolescents when compared to female adolescents show better physical and mental health, are more resistant to stress, more satisfied with their place in the social group, are more confident that their efforts will result in success, they plan more often, participate in discussions, collaborate with others, feel more competent in school and in contact with peers, have better mood, are less depressed, more

willing to stand up to others, tolerate criticism better, and self assess as happier and more content. On the other hand, adolescent females who show lower self-esteem compared to male adolescents are more likely to believe that other people do not have a high opinion of them, which makes them more likely to feel rejected, resulting in less inclination to initiatives in social contacts. With this in mind, it is possible that female adolescents will show less assertiveness in social interactions, less creativity and a lower degree of confidence in their own abilities. The obtained result, that speaks in favor of the existence of higher self-esteem in male adolescents, is completely excepted if, in addition to the aformentioned, we take into account the fact that female adolescents are often faced with high requirements regarding fulfillment of very strict criteria for evaluating their physical appearance, and, also, the fact that parents themselves are often more persistent in the regulation of behavior of girls in comparison to boys (Sabljak, 2005)[8].

2. Examination of the contribution of dimensions of personality, gender, age and academic achievement in the interpretation of self-esteem

According to Robins et al. (2001) understanding of the relationship of self-esteem and personality traits is important for several reasons. First reason, the understanding of this relationship will enable the prediction of results such as job performance, academic performance, the emergence of delinquent behaviors, personality disorders etc. Second reason, personality traits and self-esteem have a common basis. This common development basis refers to the fact that personality traits and self-esteem show a moderate tendency of heritability (Kendler, Gardner, Prescott, 1998). This can be explained by the role of temperamental traits that have a know tendency toward heritability. For example, people who have a strong temperament tend to develop positive emotionality, as opposed to people who have weaker temperament. Positive and negative emotionality are the basis of high self-esteem and the basis of neuroticism and extraversion as well. Third reason, as well as a common basis, personality traits and self-esteem share a common mutually direct impact. For example, a person with low self-esteem may lack the courage to engage in a wider range of social behaviors, which can lead it to become a dominantly introverted personality type.

Ultimately, self-esteem in its definition implies the existence of positive personality traits that are socially desirable. When we discuss the results of correlation between self-esteem and personality traits in the student population, the results generally indicate a high positive correlation of self-esteem and positive emotionality, and a moderately positive correlation between self-esteem, extraversion and conscientiousness, and a weak positive correlation with the dimensions of openness to experience and agreeableness (Goldberg and Rosolack, 1994; Jackson and Gerard, 1996; Kwan, Bond and Singelis, 1997; Keller, 1999; Robins, Hendin and Trzesniewski, 2001, according to Robins et al., 2001)[9]. Other studies also suggest that the five personality factors are moderately, but consistently associated with self-esteem (Mlačić et al., 2007). However, the dimensions of neuroticism and psychoticism stand out as the most important predictors of self-esteem in studies carried out in many countries (Schimmaack et al., 2002). In the late 90's a meta-analysis by Genoa and Cooper (1998) recognized two other personality traits as important, openness to experience and conscientiousness. On the other hand, personality traits are often recognized and interpreted as mediators of self-esteem and sense of well-being (Kwan et al, 1997; Furnham and Cheng, 2000, according to Joshanloo, 2001)[10].

In the results of the hierarchical model of our study, the only dimension of personality which has been shown as a significant predictor in the interpretation of self-esteem in adolescents is agreeableness. Similar results were noted by Graziano, Jensen-Campbell and Finch (1997) on a sample of children aged from 10 to 14 years, where very low, almost insignificant, correlation between personality traits and self-esteem has been reported. These differences are interpreted as developmental changes of self concept, in a manner that young people experience themselves equally in various domains of functioning. As children grow up into adolescents, self concept becomes more differentiated which changes the correlation between dimensions of personality and self-esteem (Harter, 1998, according to Robins et al., 2001)[11].

Conclusion

1. Research on the contribution of dimensions of personality in the interpretation of self-esteem in adolescents, was conducted on a sample of 60 high school students, ages 15 to 19, of which 43 were female and 17 male.

2. Examination of differences in the level of self-esteem in relation to gender of adolescents showed statistically significant differences between male and female participants, in a way that male adolescents indicate greater satisfaction in self evaluation of competence, efficiency and dignity, and also a more positive attitude towards their ability, importance, performance, value and self-image when compared to female adolescents.

3. In examining the contribution of dimensions of personality in the interpretation of self-esteem in high school adolescents, a statistically significant contribution of some individual predictors has been confirmed. The results show that certain personality traits can explain the variance of self-esteem. The best predictor variable of self-esteem is agreeableness, suggesting that adolescents, who express this personality trait more prominently, show more self-esteem.

4. The variable of academic achievement has been proved as a statistically significant predictor of self-esteem. This means that adolescents who have higher values of standardized beta coefficients in the dimension of academic achievement, have better self-esteem and display specific behaviors such as kindness, cooperation and a tendency to help others, have more self-respect.

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Javnozdravstveni značaj bolesti koje se prenose hranom na Kantonu Sarajevo

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Abstract

Foodborne diseases each year are becoming increasingly important infectious diseases. Millions of people around the world each year suffer from foodborne diseases, and because of that foodborne diseases received public health importance. The causes of these diseases are different: bacteria, viruses, parasites. The number of patients is increasing. There are several reasons for increasing number of infected people and some of them are : changes in nutrition habits, the more important industrial production of food, international trade with food and more frequent consumption of food outside the home. The little children, the elderly, and immunocompromised persons are in the case of these diseases vulnerable category.

The aim is to explore the public health importance of foodborne diseases in the Sarajevo Canton , and their distribution by months and by age groups of patients.

Materials and Methods: The data from individual applications, monthly and annual bulletins on the occurrence of infectious diseases that must be reported, collected in the Department of Epidemiology, Institute of Public Health of the Sarajevo Canton.This retrospective descriptive- analytical study for the period 2009th-2013th.Analyzed to demonstrate the differences in individual parameters used Kolmogorov- Smirnov test and x^2.

Results: Diseases transmitted by food in the observed period accounted for a significant segment of infectious diseases with a share of 31.16 % .Their average incidence was 392.48.The most frequently registered a disease that is transmitted by food at the Sarajevo Canton in the last five years was :enterocolitisacuta with 79.47 % share of all diseases transmitted by food . The following are the salmonella with a share of 10.84 %. Of these disease primarily affects people age group 15-64 years.more common are in the warmer months, and in summer, indicating seasonality of these diseases.

Conclusion: The public health significance of diseases transmitted by food each year is increasing.From these diseases most frequently affected radon active population, which entails additional costs for both zravstveno insurance, and employers.Given that tourism is becoming more represented sectors of the economy , the frequency of occurrence of these diseases during the hot summer months is reflected by the number of visits to the length of stay of tourists.

Key words: foodborne diseases, Canton Sarajevo, enterocolitisacuta, salmonellosis, toxiifectioalimentaris

Uvod

Hrana se smatra štetnom i neprikladnom za zdravlje ljudi ako sadrži mikroorganizme ili tkivne parasite opasne po zdravlje čovjeka, bakterijske toksine, mikotoksine, histamin, njemu slične materije ili druge mikroorganizme ili tkivne parasite iznad dopuštene količine. (1) Veliki broj zaraznih oboljenja, preko 200, se prenosi hranom. Nazivaju se "food borne diseases", ali i "crijevne zarazne bolesti", jer se patološki process najčešće dešava u crijevima. (2) Zabrinjavajuća je činjenica da se broj oboljelih od ovih oboljenja iz godine u godinu povećava, a time raste i njihov javnozdravstveni značaj. Otprilike jedna milijarda ljudi godišnje u svijetu oboli od ovih bolesti, a čak pet miliona djece u dobi do pet godina godišnje umire od ovih bolesti. (3) Epidemiologija bolesti koje se prenose hranom se mnogo mijenja, zbog promjena u socijalnom okruženju, kao i adaptaciji patogena na nove uslovеživljenja. (4) Povećanju broja oboljelih od ovih bolesti doprinosi globalizacija I industrijska proizvodnja hrane koja ima sve značajniji udio u ukupnoj industrijskoj proizvodnji. (5) Ove

bolesti se češće javljaju u siromašnim područjima sa lošim higijensko-sanitarnim uslovima života bez adekvatnog vodosnabdijevanja i distribucije otpadnih materija, te kod prisustva velikog broja vektora. U razvijenim područjima se javljaju kao posljedica lošegn adzora u industrijskoj pripremi hrane, te češćem konzumiranju tzv. "brze hrane". Javnozdravstveni značaj bolesti koje se prenose hranom je u svijetu, Bosni i Hercegovini, pa i na području Kantona Sarajevo iz godine u godinu sve veći. Procenat ovih bolesti među svim registrovanim zaraznim bolestima je u porastu. Najveći broj oboljelih je u dobnoj skupini od 15-64 godine, odnosno među radnoaktivnim stanovništvom. Radna produktivnost oboljelih je smanjena, a što se direktno odražava i na smanjenje nacionalnog dohotka. Dijagnostika i liječenje ovih oboljenja uzrokuju dodatne troškove zdravstvenom osiguranju i poslodavcima. Milioni ljudi širom svijeta svake godine boluju od različitih bolesti koje se prenose hranom, te zbog toga ove bolesti dobivaju javnozdravstvenu važnost. (6) Iz godine u godinu broj evidentiranih slučajeva bolesti koje se prenose hranom na području Kantona Sarajevo je u porastu. (7)

Cilj rada

Istražiti udio bolesti koje se prenose hranom u ukupnom broju registrovanih zaraznih bolesti, koje podliježu obaveznom prijavljivanju, dobnu zastupljenost, distribuciju oboljenja po mjesecima, a na taj načini javnozdravstveni značaj bolesti koje se prenose hranom na području Kantona Sarajevo u period 2009.-2013.

Materijal metode i istraživanja

Korišteni su podaci iz individualnih prijava, mjesečnih i godišnjih biltena o pojavi zaraznih bolesti koje podliježu obaveznom prijavljivanju, prikupljeni u Službi za epidemiologiju Zavoda za javnozdravstvo Kantona Sarajevo. Rad je rađen retrospektivno za period 2009.-2013. Korištena je deskriptivno-analitička epidemiološka metoda. Dobiveni podaci su statistički obrađeni. Analizirani su brojevi slučajeva i procenti, te indeks strukture. Za dokazivanje pojedinih postavljenih hipoteza korišten je Kolmogorov-Smirnov i X^2 test, uz Yatesovu korekciju. Rezultati testova uz $p<0,05$ ili nanivou pouzdanosti od 95% je smatra na statistički signifikatnom.

Rezultati

U istraživanom periodu na području Kantona Sarajevo bilo je ukupno registrovano 29590 svih zaraznih oboljenja, od toga je 9220, odnosno 31,16% bolesti koje se prenose hranom.

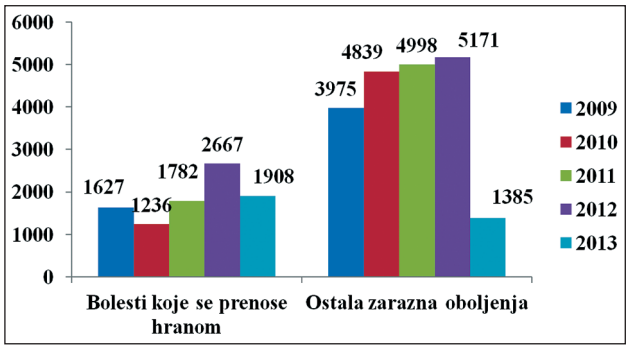
Analiza udjela zaraznih oboljenja koja se prenose hranom u odnosu na ukupan broj oboljenja prema pojedinim godinama istraživanja ukazuje da postoji statistički signifikantna razlika po posmatranim godinama uz $\chi2=54,9$; df=4; p=0,0001, te da je udio bio najniži tokom 2010. godine sa 20,34%, a najveći tokom 2013. godine sa čak 57,94%.

Tabela 1. Distribucija bolesti koje se prenose hranom u odnosu na sva registrirana zarazna oboljenja

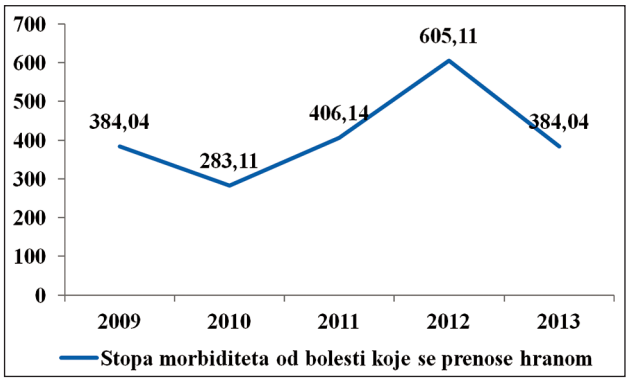
Oboljenje	2009	2010	2011	2012	2013	Ukpno
Bolesti koje se prenose hranom	1627	1236	1782	2667	1908	**9220**
Ostala zar. oboljenja	3975	4839	4998	5171	1385	**20372**
Ukupno	**5602**	**6075**	**6780**	**7838**	**3292**	**29590**

Tabela 2. Učešće zaraznih bolesti koje se prenose hranom među ukupno registrovanim zaraznim bolestima

Oboljenje:	2009		2010		2011		2012		2013		UKUPNO Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Ukupno registrovana zar. obolje.	5602	100,0	6075	100,0	6780	100,0	7838	100,0	3293	100,0	29590	100,0
Bolesti koje se prenose hranom	1627	29,04	1236	20,35	1782	26.28	2667	34.03	1908	57.94	9220	31.16
Ostalazar. oboljenja	3975	70,96	4839	79,65	4998	73,72	5171	65,97	1385	42,06	20372	68,84



Grafikon 1. Odnos bolesti koje se prenose hranom i ostalih zaraznih oboljeja na Kantonu Sarajevo u periodu 2009.-2013.



Grafikon 2. Grafički prikaz stope morbiditeta bolesti koje se prenose hranom

Stopa morbiditeta pokazuje statistički signifikantne tokom godina istraživanja uz $\chi 2=34,562$; df=4; p=0,0001. Najveći morbiditet je bio 2012. godine 605,11/100 000 i najniži 2010. godine 283,11/100 000.

Analiza kretanja svih pojedinačnih oboljenja koja se prenose hranom u promatranom periodu pokazuje statistički signifikante razlike uz $\chi 2=35,784$; df=11; p=0,001

Postoji signifikatna razlika u učestalosti svih posmatranih oboljenja tokom godine. Najveći broj oboljelih je registrovan tokom augusta, septembra i oktobra ($\chi 2=64,57$; df=11; p=0,0001), odnosno ova oboljenja imaju sezonalnost.

Infekcije koje se prenose hranom su se tokom svih godina najčešće javljale u dobnoj skupini od 15-64 godine, a najrjeđe u najstarijoj skupini (preko 65 godina). Uz $\chi 2=8,524$; df=12; p=0,923 ne postoji signifikatna razlika po godinama posmatranja.

Tabela 3. Bolesti koje se prenose hranom na području Kantona Sarajevo u periodu od 2009. do 2013. - broj oboljelih i morbiditet

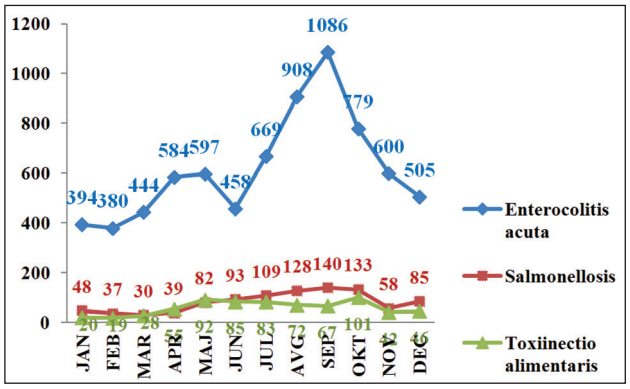
Godina	Broj oboljelih	Morbiditet /100 000 stanovnika
2009	1627	384,04
2010	1236	283,11
2011	1782	406,14
2012	2667	605,11
2013	1908	384,04
Ukupno:	**Prosječan broj oboljelih 1844**	**Prosječna incisenca 392,48**

Tabela 4. Registrovani slučajevi oboljelih od bolesti koje se prenose hranom u periodu 2009.-2013.

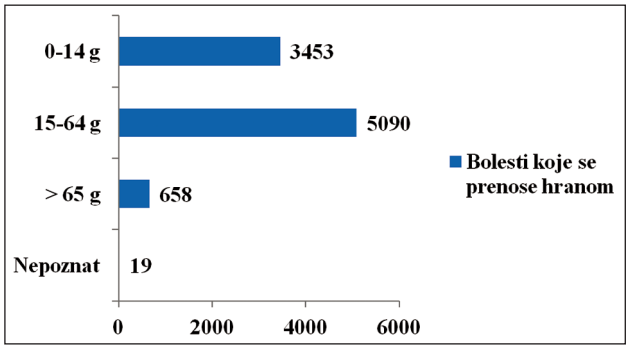
Oboljenje	2009		2010		2011		2012		2013		Ukupno	
	N	%	N	%	N	%	N	%	N	%	N	%
Amebiasis	15	0,92	12	0,97	8	0,44	5	018	2	0,10	42	**0.0**
Ankylostomiasis	1	0,06	0	0,00	0	0,00	0	0,00	0	0,00	1	**0.0**
Brucellosis	32	1,96	14	1,13	4	0,22	5	0,18	2	0,10	57	**1.0**
Dys. bacillaris	0	0.00	1	0.080	0	0,00	1	0,03	0	0,00	2	**0.0**
Echinococcosis	4	0.24	0	0,00	1	0,05	1	0,03	1	0,05	7	**0.0**
Enterocoli. acuta	1293	79,47	917	74,19	1345	75,47	2247	84,25	1602	83,96	7404	**80.0**
Giardiasis	1	0,06	0	0,00	0	0,00	0	0,00	0	0,00	1	**0.0**
HVA	4	0,24	2	0,16	0	0,00	7	0,26	0	0,00	13	**0.0**
Salmonellosis	178	10,94	220	17,78	246	13,80	202	7,57	136	7,12	982	**11.0**
Toxiin.alimentaris	99	6,08	69	5,58	178	9,980	199	7,46	165	8,64	710	**8.0**
Typ. abdominalis	0	0,00	1	0,08	0	0,00	0	0,00	0	0,00	1	**0.0**
Ukupno	**1627**	**100,0**	**1236**	**100.0**	**1782**	**100.0**	**2667**	**100.0**	**1908**	**100.0**	**9220**	**100,0**

Tabela 5. Distribucija bolesti koje se prenose hranom po dobnim skupinama u periodu 2009.-2013. na Kantonu Sarajevo

Dob	2009		2010		2011		2012		2013		Ukupno	
	N	%	N	%	N	%	N	%	N	%	N	%
≤ 14g	791	48,61	487	39,40	684	38,38	819	30,70	672	35,22	**3453**	**37,45**
15-64g	710	43,63	643	52,02	981	55,05	1647	61,75	1109	58,12	**5090**	**55,20**
≥65g	117	7,19	99	8,00	116	6,50	201	7,56	125	6,55	**658**	**7,13**
Nepoznat	9	0,55	7	0,56	1	0,05	0	0	2	0,10	**19**	**0,20**
Ukupno	**1627**	**100,0**	**1236**	**100,0**	**1782**	**100,0**	**2667**	**100,0**	**1908**	**100,0**	**9220**	**100,0**



Grafikon 3. Distribucija bolesti koje se prenose hranom po mjesecima



Grafikon 4. Bolesti koje se prenose hranom po dobnim grupama

Analiza distribucije između dobnih skupina putem Kolmogorov-Smirnov testa pokazuje da postoji statistički signifkantno odstupanje od očekivane distribucije uz $\chi 2=85,623$; df=12; p=0,0001 u korist znatno većeg pojavljivanja oboljenja koja se prenose hranom u dobnoj skupini od 15-64 godine.

Diskusija

Broj oboljelih od bolesti koje se prenose hranom, kao i njihov udio među svim registrovanim zaraznim bolestima se iz godine u godinu povećava, što ukazuje da je i javnozdravstveni značaj ovih oboljenja sve veći. Prema podacima Svjetske zdravstvene organizacije (WHO) svake godine u svijetu oko 500 miliona ljudi oboli, a oko 10 miliona ljudi umire od nepoznatih bolesti zbog upotrebe bakteriološki neispravne vode. Polovina oboljelih i umrlih pripada dječijem uzrastu. (1) Ovo je veoma važna činjenica jer i voda je hrana.

U periodu 2009.-2013. na području Kantona Sarajevo je bilo ukupno registovano 29 590 slučajeva zaraznih bolesti koje podliježu zakonski obaveznom prijavljivanju, od tog broja je 9 220 bolesti koje se prenose hranom, odnosno 31%. Udiobolesti koje se prenose hranom u ukupnom broju registriranih zaraznih oboljenja se kretao 20,34% u 2010. do čak 57,94% 2013.godine. U poređenju sa rezultatima istraživanja provedenog za period 2006.-2010. na području Kantona Sarajevo kada je od bolesti koje se prenose hranom ukupno bilo registrovano 7903 slučaja **(7)** uočljiv je evidentan porast broja oboljelih od ovih oboljenja. U Republici Hrvatskoj crijevne zarazne bolesti čine gotovo trećinu svih prijava zaraznih bolesti u 2011. godini**. (**8**)**

Bolesti koje se prenose hranom imaju veliki javnozdravstveni značaj, kako u svijetu tako I kod nas. Bosnu i Hercegovinui Sarajevo u posljednje vrijeme posjećuje sve veći broj turista iz cijelog svijeta, a u ljetnom periodu se broj turista povećava. Istovremeno je u ljetnom period najlakše kvarenje hrane, a samim tim i rizik od prenosa bolesti i izbijanja epidemija oboljenja koje se prenose hranom. Porast broja oboljelih od bolesti koje se prenose hranom zabilježen je u toplijim mjesecima u godini (od aprila do oktobra), sa najvećim brojem registrovanih slučajeva u julu, avgustu i septembru. Istraživanja iz perioda 2006.-2010. napodručju Kantona Sarajevo, kao i istraživanja provedena u Zagrebu izemaljama Regiona pokazuju na isto. Amebijaza, salmoneloze i virusni hepatitis tipa A nepokazuju

izrazitu sezonalnost. (7) U Evropi je povećan broj epidemija bolesti koje se prenose hranom i vodom u ljetnjim mjesecima, osnovni put prenosa infekcije je hrana i vodeći uzročnik su enterobakterije s predominacijom *Salmonella*, dok u Zapadnom Pacifiku nailazimo na ravnomjernu distribuciju epidemija tokom godine. (9)

Prema istraživanjima Ravela i saradnika salmoneloze kod ljudi se pojavljuju znatno češće u toplijim mjesecima u godini, a što se može povezati sa češćim konzumiranjem hrane s roštilja koja se priprema u porodičnim vrtovima. (10)

Povećan je broj oboljelih od bakterijski uzrokovanih gastroenterokolitisa i enterokolitisa u najtoplijem dobu godine (od maja do septembra) kod djece u dobi do četiri godine, u mlađoj odrasloj dobi (od 20 do 29 godina), a kod osoba starijih od 60 godina registrovani su teži slučajevi. **(**5**)**

Bolesti koje se prenose hranom u najvećem broju slučajeva se javljaju kod radno aktivnog stanovništva, u dobi od 15 do 64 godine, što za sobom povlači posljedice koje se ogledaju u povećanju troškova zdravstvenog osiguranja, te šteta za poslodavce zbog remećenja procesa rada. Iz istraživanja za period 2006.-2010. na području Kantona Sarajevo vidimo da je 4085 evidentiranih slučajeva bolesti koje se prenose hranom bilo u dobnoj skupini od 15 do 64 godine, potom 3662 slučaja u dobnoj grupi od 0 do 14 godina. (7)

Zaključci

Bolesti koje se prenose hranom imaju veliki udio među svim zaraznim bolestima registrovanim na području Kantona Sarajevo u periodu 2009.-2013., te da se taj udio iz godine u godinu povećava, pa je i njihov javnozdravstveni značaj sve veći. Analiza po mjesecima pokazuje da se ove bolesti u najvećem broju slučajeva javljaju u periodu od jula do oktobra, odnosno toplih ljetnjih i jesenjih mjeseci. Distribucija bolesti koje se prenose hranom po dobnim skupinama pokazuje da je najveći broj oboljelih u dobnoj skupini od 15 do 64 godine, odnosno kod radno aktivnog stanovništva. Iz svega predhodno spomenutog očit je javnozdravstveni značaj bolesti koje se prenose hranom na području Kantona Sarajevo.

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Abstract

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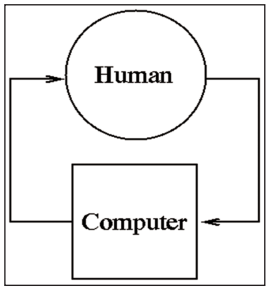

Figure 1. Text here

Conclusion

Be brief and give most important conclusion from your paper. Do not use equations and figures here.

Acknowledgements (If any)

These and the Reference headings are in bold but have no numbers.

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