



## INTERLEUKIN 6 AND TUMOR NECROSIS FACTOR IN TYPE 2 DIABETES MELLITUS PREDICTION. CROSS-SECTIONAL STUDY IN CENTRAL KAZAKHSTAN.

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**Background and aim:** Obesity is one of the fundamental risk factors of diabetes, that stimulates pro-inflammatory activity long before the first clinical manifestation. Excessive inflammatory response enhances insulin resistance, which contributes to the manifestation and gradual deterioration of diabetes. The goal of the study is to determine pro-inflammatory cytokines IL-6 and TNF in patients with type 2 diabetes mellitus risk.

### Study design

Cross sectional study of 203 study participants:  
101 male and 102 female aged 18 to 65 years with  
risk of diabetes mellitus type 2

Exclusion criteria: psychiatric disorders,  
pregnancy, chronic inflammatory diseases

FINDRISC questionnaire was used to estimate diabetes mellitus risk. IL-6 and TNF plasma concentration was measured by multiplex immunoassay method. FINDRISC scale was modified on low (less than 15 points) and high (more than 15 points) diabetes risk.

IL-6 and TNF are positively correlated with BMI and waist circumference. IL-6 and TNF are positively correlated with systolic blood pressure index, while the correlation with diastolic blood pressure was detected only for TNF. There was no correlation between TNF and capillary blood glucose level, whereas for IL-6 has a weak positive correlation with it.

Variables	r (IL 6)	r (TNF alfa)
IL 6	-	0.276
Age	-0.065	0.024
BMI	0.182*	0.455*
Waist circumflex	0.174*	0.350*
Systolic blood pressure	0.006*	0.123*
Diastolic blood pressure	0.137	0.211*
Glucose	0.119	0.025
Cholesterol	0.067	0.064
FINDRISC questionnaire	0.224*	0.170*
*P<0.001		

The binary logistic regression model constructed for IL-6 (OR: 1.992 [95% CI: 1.394-1.2863], P <0.001) showed positive link with the level of prediabetes according the FINDRISC scale. TNF also showed significant association with the risk of developing type 2 diabetes mellitus (OR: 2.018 [95% CI: 1.393-2.931], P <0.001).

Variables	B (se)	OR[95%CI]	P level
IL-6	0.673 (0.182)	2.02 (1.39-2.93)	<0.001
TNF- $\alpha$	0.703 (0.190)	1.21 (1.12-1.33)	<0.001

### Conclusion

Proinflammatory cytokines IL-6, TNF- $\alpha$  are associated with type 2 diabetes mellitus risk with weakly positive correlation. High FINDRISC grade increases the IL-6 and elevation possibility approximately in two times, while low FINDRISC not.