

POTENTIAL ENERGY OF HUMAN LIFESPAN AND IMPACT OF FATTY OVERWEIGHT FOR THE LIFESPAN

K. Oshakbayev , B. Dukenbayeva , Y. Seitkulov

¹Department of Science and Education, CF "University Medical Center"(Astana, Kazakhstan)

Faculty of forensic medicine, Medical University Astana (Astana, Kazakhstan)

³Faculty of Information Technologies, L.N.Gumilyov Eurasian National University (Astana, Kazakhstan)

Kuat.Oshakbayev@umc.org.kz; okp.kuat@mail.ru

Key Words: Human Lifespan, Energy expenditure, Overweight.

Introduction: The body spends more own life energy per unit time when he has a high basal metabolic rate (BMR). Aim of the study was to account how much potential energy has human body during his life and how changes lifespan in people with overweight.

Methods: Math and scientific data methods are used. The body deprives in average 50 kcal/day of total daily energy expenditure for each 1 kg fatty overweight. In people with overweight BMR is 20-30% more compared to non-overweight [Schutz Y, et al., 2001]. According to thermodynamics principles $E_{LS} = E_k + E_p + U$, or $E_{LS} = TMR \times T_{LS}$, where E_{LS} - lifespan potential energy expenditure, E_k - system kinetic energy, E_p - system potential energy; U - thermal energy. TMR - total metabolic rate (kcal/day), where $TMR = BMR + AMR$, where BMR is Basal metabolic rate, and AMR is Active metabolic rate (kcal/day). T_{LS} is lifespan in days. E_k is directly correlated with body mass and TMR. The higher the body mass and TMR, the higher the body kinetic energy expenditure, and the lower the LS.

Results: In average TMR for human body equals to about 2300 kcal/day. If an average human potential lifespan is 120 years [Goldsmith ThC et al., 2014], that is 43800 days, then $E_{LS} = TMR \times TLS = 2300 \text{ kcal/day} \times 43\ 800 \text{ day} \sim 109.5 \text{ million kcal}$, or 458.4 million kJoule (1 kcal = 4.186 kJ), or $4.584 \times 10^8 \text{ kJ}$. It is equal to a small nuclear explosive with more 100 tons of TNT equivalents. LS human potential energy is equal to the small nuclear explosion energy.

The body deprives about 2.2 million kcal (50 kcal/day x 43 800 days) on each 1 kg of fatty overweight for lifespan which is 2% of lifespan energy expenditure. If now person has overweight + 10-20 kgs, then he losses 20-40% of his LS.

Conclusions: The potential energy of human LS is equal to the small nuclear explosion energy. Human lifespan is shortened on 2% for each 1 kg of fatty overweight. In average, overweight people loss 20-40% of his LS.