



SOCIO-ECONOMIC FOUNDATIONS OF THE PREVALENCE OF OBESITY AND ITS IMPACT ON THE FEMALE REPRODUCTIVE SYSTEM

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Abstract

Objective. According to the World Health Organization (WHO), currently 1 in 8 people on the planet is obese and worldwide Between 1990 and 2022, obesity among children increased from 2% to 8%, and among adults from 7% to 16%. Obesity in particular is increasing faster in women than in men, and according to the WHO, overweight and obesity in women will reach 50% by 2025, leading to an increase in diseases related to women's reproductive health, including polycystic ovary syndrome (PCOS), dysfunctional uterus bleeding, endometriosis, infertility, fetal and pregnancy pathologies. However, the mechanisms and causes of obesity are not fully understood and require comprehensive investigations.

The aim. To study the effect of people's standard of living on obesity, to determine the gender difference in the prevalence of obesity, to study the effect of obesity on the female reproductive system.

Materials and methods Articles on obesity, its etiology, and female reproductive system diseases are available in electronic databases: PubMed, Medscape, Elsevier, ResearchGate, and GoogleScholar.

Results Obesity is more common among the urban population compared to the rural population, the rates of obesity in men are close to each other in the urban and rural population, and the general rate of men is lower than that of women. Correspondingly, indicators of pregnancy and fetal pathologies in women increase according to BMI (body mass index).

Summary The fact that obesity has become an epidemic is causing an increase in women's reproductive health problems and fetal pathologies. This, in turn, requires an in-depth study of the mechanisms and causes of its spread and their minimization.

Keywords

Obesity, urbanization, infertility, fetal pathologies.

INTRODUCTION

Obesity is a chronic progressive disease, which is the accumulation of excess fat tissue in the body. Although there is no universal classification that fully reflects obesity, the BMI classification proposed by WHO in 1997 is widely used (Table 1).

Table 1
BMI classification

BMI	Category
<18,5	Underweight
18,5-24,9	Normal weight
25,0-29,9	Overweight
30,0-34,9	Class I obesity
35,0-39,9	Class II obesity
>40	Class III/morbid obesity

Currently, attention is being paid especially to the sex difference, which allows to study the neurohumoral, social, genetic, and lifestyle aspects of the etiology of obesity.

In recent years, the improvement of people's lifestyle, urbanization, wide application of technologies in life have a comprehensive effect on the health of the population. In a 2014 study of the population of Myanmar, Rupa Thapa and colleagues examined the prevalence of obesity among rural and urban populations and socioeconomic differences. BMI and waist and hip circumference ratios of 8390 men (n=2947) and women (n=5443) aged 25-64 years were examined and the average BMI was higher 2.49 kg/m² in urban residents compared to rural residents 2.49 kg/m² ($\beta=2.49$ kg/m²; 95% CI 2.28 to 2.70; $p<0.001$). A similar result was recorded in the ratio of waist and hip circumference, and the index of urban residents was higher by 0.015 ($\beta=0.015$; 95% CI 0.011 to 0.020; $p<0.001$). In terms of socio-economic factors, BMI was studied in the population with high and middle socio-economic status (SES) [2].

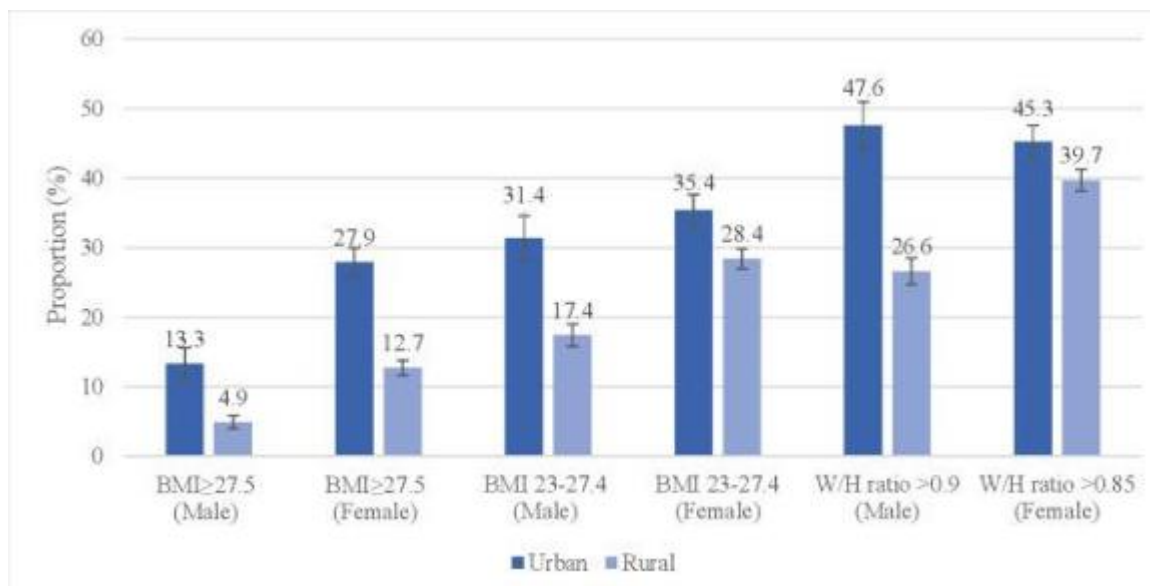


Figure 1. Differences in participants' BMI and waist-to-hip ratio by gender and place of residence.

But lifestyle, eating habits, and traditions are complex factors, and many studies are needed to investigate them [3]. In addition, the development of a reliable scale of urbanization allows for the development of effective strategies to minimize the negative social and health consequences of urbanization [4]. In a study conducted by Tsygankova DP et al., gender and socioeconomic differences in the prevalence of obesity were studied among 1600 people aged 35-70 (mean age 54.3 ± 9.88). Subjects were evaluated in 5 categories: BMI, waist circumference, waist-to-hip ratio, visceral fat content, visceral obesity index. In addition, social status and education were studied. According to the obtained results, there was no significant difference in the prevalence of obesity among men in urban and rural areas ($p=0.474$). Among women, it was found that among rural residents, BMI is 1.74 kg/m² ($p=0.0000$), waist circumference is 6.6 cm ($p=0.0000$), and visceral fat is 1.1 conditional units higher ($p=0.0000$) than urban women. Economically, the increase in income is led to an increase of BMI 0.75 kg/m² ($p=0.026$), visceral fat is 0.63

conditional units

($p=0.002$) [5]. In Uzbekistan, the rate of urbanization has increased in recent years, and in 2020 it was 50.5% [5] and occupies the 3rd place in Central Asia [6] (Figure 2). Obesity also increased in direct proportion and the average BMI reached 26.5 kg/m² and is the highest index in Central Asia. By 2060, the loss due to excess weight is expected to exceed 21.6 billion dollars. Because the treatment of obesity and its related complications, the employee's absence from the workplace during the treatment and the low efficiency compared to healthy people increase the health care and related costs [7].

Рисунок 1.2 Урбанизация в странах Центральной Азии и Китае

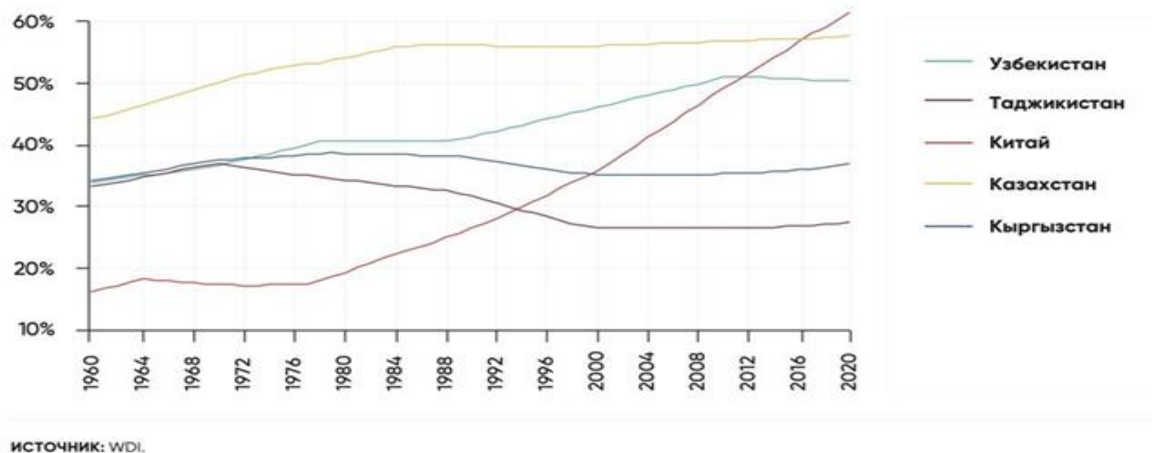


Figure 2. The degree of urbanization of Central Asia and China

The rate of obesity is increasing rapidly, especially among women, and it is becoming an urgent problem in the health care system (Figure 3) [8]

Uzbekistan: % Adults living with obesity, 1996-2017

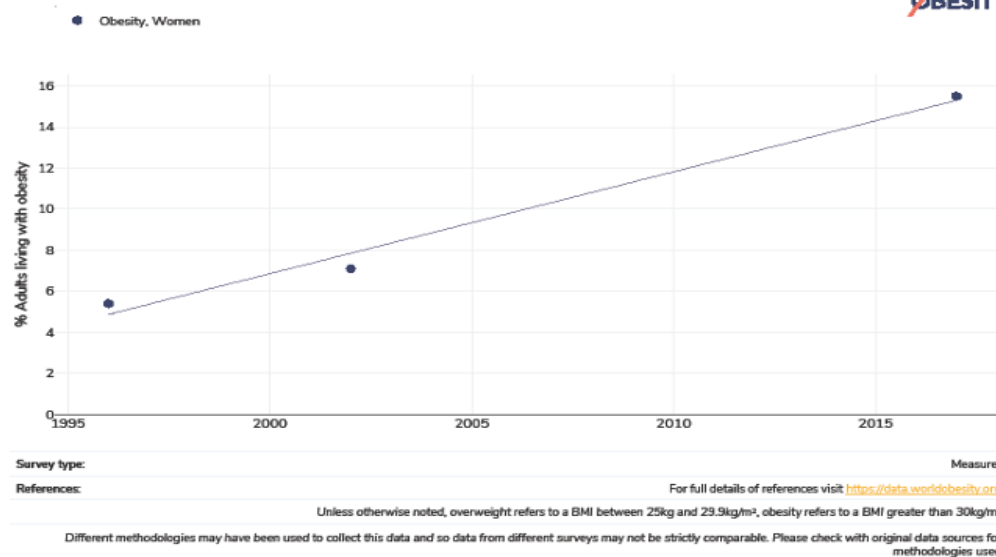


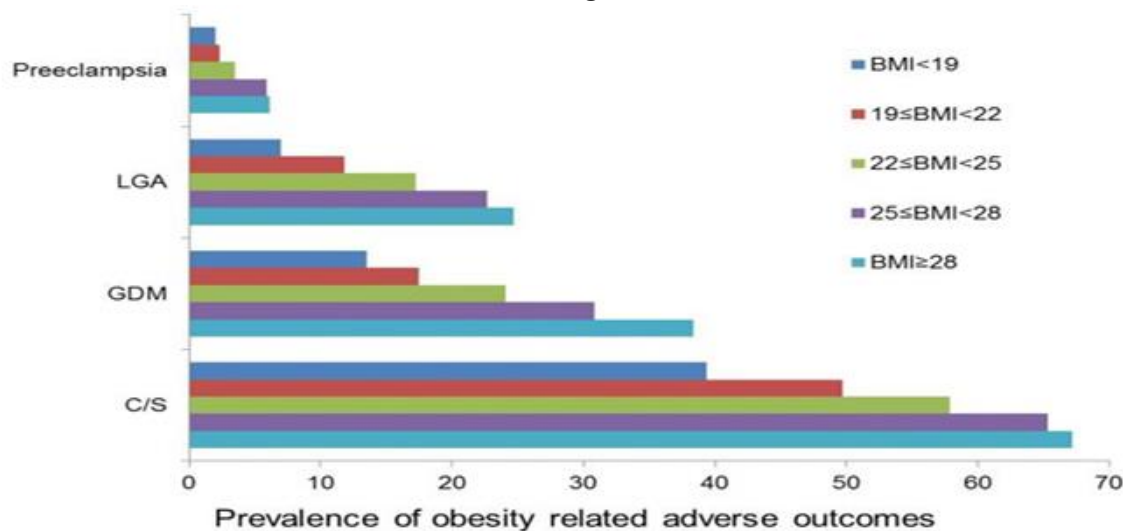
Figure 3. Uzbekistan: Index of adults and women living with obesity

This, in turn, leads to an increase in reproductive diseases among women, especially polycystic ovary syndrome, which is closely related to obesity [9,10]. PCOS involves hyperandrogenism, reproductive and metabolic dysfunction associated with insulin resistance, and obesity aggravates the course of PCOS. According to WHO, PCOS is one of the main causes of female infertility. In the research conducted by G. O. Rajabova and Kh. S. Ikramova during 2019-2022 in order to check the effectiveness of PCOS

treatment, 90 women were examined and divided into 2 groups: women with PCOS complained of infertility (n=70) and practical healthy ones (n=20). During the study, 48.6% of the main group had an eating disorder, and 8% had hypodynamia. According to BMI, 46 (65.7%) of group 1 and 3 (15%) of group 2 were overweight. According to the results of the study, it was found that the efficiency of operative treatment was low in patients with obesity and insulin resistance [11].

Obesity during pregnancy increases the risk of gestational diabetes, preeclampsia, premature birth in the mother, and may cause the child to be born later to be prone to metabolic syndrome and cardiovascular diseases [12]. A retrospective analysis by Yanxin Wu and colleagues examined the effect of obesity on pregnancy complications. In the study, 11,494 birth histories with 1 live birth recorded between January 2016 and December 2016 were studied. Subjects' age, medical history, pre-pregnancy weight, height and quality of medical care were evaluated. According to WHO obesity classification for Asian population, 824 (7.2%) subjects were obese. Obese mothers were found to be older women with a history of caesarean section (C/C) and high fetal weight ($p < 0.001$). It was found that increased BMI and pregnancy pathologies, including gestational diabetes, preeclampsia, C/C, high fetal weight for gestational age are directly proportional to each other (Fig. 4) [13].

Figure 4.



In parallel with obesity, cesarean deliveries are increasing, with the highest rate among Latin American and Caribbean populations (40.5%) [15]. In Uzbekistan, this indicator reached 13.6% in 2015 according to WHO data.

Excess weight in pregnant women also affects fetal development and increases the risk of stillbirth. Lisa M Bodnar and colleagues studied 1,829 singleton deliveries from 68,437 deliveries at Magee-Women's Hospital in Pittsburgh, Pennsylvania between 2003 and 2010. In 658 cases, the baby was stillborn. Causes were studied in 5 categories: maternal medical condition, obstetric complications, fetal pathology, placental pathology, and infection. According to BMI, the number of stillbirths per 1000 live births was 7.7, 10.6, 13.9 and 17.3 among thin, overweight, obese and morbidly obese women, respectively. It was found that the reason for this is placental diseases that develop in the mother as a result of excess weight, and hypertension is one of the main causes of stillbirth.

Table 2

Association between maternal TVI and infant stillbirth

Outcome/prepregnancy BMI category	Cases, n	Unadjusted rate 2 per 1000 live-born and stillborn infants (95% CI)	Unadjusted HR (95% CI)	Adjusted HR (95% CI) ³
Stillbirth				
Lean	292	7.7 (6.7, 8.7)*	1.0 (reference)	1.0 (reference)

Overweight	173	10.6 (8.7, 12.5)	1.4 (1.1, 1.7)	1.4 (1.1, 1.8)
Obese	100	13.9 (10.3, 17.5)	1.8 (1.4, 2.4)	1.8 (1.3, 2.4)
Severely obese	93	17.3 (12.9, 21.8)	2.3 (1.7, 3.1)	2.0 (1.5, 2.8)
Antepartum stillbirth				
Lean	220	5.8 (4.9, 6.6)*	1.0 (reference)	1.0 (reference)
Overweight	135	8.5 (6.8, 10.1)	1.5 (1.1, 1.9)	1.5 (1.1, 1.9)
Obese	82	11.5 (8.3, 14.8)	2.0 (1.5, 2.8)	2.0 (1.4, 2.7)
Severely obese	76	14.2 (10.3, 18.2)	2.5 (1.8, 3.5)	2.3 (1.6, 3.2)
Intrapartum stillbirth				
Lean	72	2.0 (1.5, 2.5)	1.0 (reference)	1.0 (reference)
Overweight	38	2.2 (1.5, 3.0)	1.1 (0.7, 1.7)	1.2 (0.7, 1.8)
Obese	18	2.5 (1.2, 3.8)	1.2 (0.7, 2.3)	1.2 (0.6, 2.2)
Severely obese	17	3.3 (1.6, 5.0)	1.6 (0.9, 2.9)	1.4 (0.8, 2.6)

Average BMI by category: normal 21.7 (n = 1043), overweight 26.8 (n = 457), obese 32.1 (n = 183), morbidly obese 39 (n = 146)

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