

## ORIGINAL RESEARCH

# The problem of being overweight among the Armenian population

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## ABSTRACT

**Background and objective:** Overweight and obesity are the most prevalent risk factors of noncommunicable diseases (NCD) in Armenia. Nearly every second person aged 15 and above is exposed to this problem.

**Methods:** To study the NCD problem and the prevalence of risk factors in people aged 15 and above in Armenia, a representational, multistage, stratified cluster survey was conducted within the framework of the National Program on Health System Performance Assessment (HSPA), with technical and financial assistance from the Ministry of Health, Health Project Implementation Unit (HPIU) of Armenia and the World Bank.

This article presents the findings of surveys on the prevalence of overweight and obesity across demographic and social groups, public awareness of the harmful health effects of being overweight, as well as the impact of risk factors (RF) on the quality of life (QL).

**Results:** The findings suggest that, despite the remarkably high level of public awareness of the noxious influence of overweight and obesity on human health, the prevalence of the aforementioned risk factors has reached an alarming level of 51%. Analysis of eight domains of the QL revealed that all domains of physical and psychic components reflecting QL in respondents with overweight and obesity were 1.8 times lower compared to those with normal weight or underweight. The most significant deviations were detected in general health and physical functioning.

**Conclusions:** The presented data finds that, despite high awareness by the population of the harmful effects of obesity, obesity has an epidemic nature.

**Keywords:** NONCOMMUNICABLE DISEASES, RISK FACTORS, QUALITY OF LIFE, OBESITY, OVERWEIGHT

## INTRODUCTION

In Armenia, as in other countries of the European Region, noncommunicable diseases (NCDs) are the lead cause of morbidity, disabilities and premature death. In particular, these NCDs include four nosological groups – circulatory system diseases, malignancies, chronic lung diseases, and diabetes mellitus – which predefine the morbidity and mortality burden (1, 2). NCDs account for 75% of deaths in Armenia (3). The harmful effects of risk factors on population health are not revealed immediately but comparably, rather, over the long term.

According to WHO, the main risk factors of NCD-induced deaths include hypertension, tobacco use, high blood glucose level, poor physical activity, and overweight and obesity (4).

Intensive clinical and epidemiological surveys were conducted over the past years to reveal the causes and mechanisms of NCD development. The findings confirmed that NCDs, or the factors

contributing to their development, stem from an unhealthy lifestyle, such as through an unhealthy diet, smoking, sedentary lifestyle, and abuse of alcohol, or an unfavorable physical and social environment (4, 5).

Overweight and obesity are among the main risk factors of NCD development. Obesity has been increasing in all countries. The worldwide prevalence of obesity nearly doubled between 1980 and 2014. In 2014, 11% of men and 15% of women worldwide were obese. Thus, more than half a billion adults worldwide are classified as being obese (6).

The link between obesity, poor health outcomes and all-cause mortality is well-established. Obesity increases the likelihood of diabetes, hypertension, coronary heart disease, stroke, certain cancers, obstructive sleep apnoea and osteoarthritis. It also negatively affects reproductive performance. Overweight and obesity – i.e. with a body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup> and  $\geq 30$  kg/m<sup>2</sup>, respectively – were estimated to account for

3.4 million deaths per year and 93.6 million disability-adjusted life years (DALYs) in 2010 (7). To achieve optimal health, the median BMI for adult populations should be in the range of 21–23 kg/m<sup>2</sup>, while the goal for individuals should be to maintain a BMI within the range of 18.5–24.9 kg/m<sup>2</sup>. The risk of comorbidities increases with BMI within the range of 25.0–29.9 kg/m<sup>2</sup>, and the risk is moderate to severe with a BMI greater than 30 kg/m<sup>2</sup> (8).

According to Global Health Statistics data (8), the three most deadly risk factors categorized as so-called dietary risks in 2013 were diets high in sodium, diets low in fruits, and diets low in whole grains, respectively, making up 59.4% of all deaths from dietary risks in Armenia.

- Diets high in sodium caused 131.7 deaths per 100 000 population in 2013. Moreover, the mortality rate of diets high in sodium in Armenia has increased by 44% since 1990.
- Diets low in fruits caused 85.1 deaths per 100 000 population. Moreover, the mortality rate of diets low in fruits in Armenia has increased by 35% since 1990.
- Diets low in whole grains resulted in 68.0 deaths per 100 000 population. Moreover, the mortality rate of diets low in whole grains in Armenia has increased by 58% since 1990.

To understand the problem of overweight and obesity, and their impact on population health and the quality of life, a representational survey was conducted within the framework of the National Program on Health System Performance Assessment (HSPA). The survey involved completion of a questionnaire and anthropometric measurements – height and weight to calculate the BMI of respondents – as well as an assessment of the impact of overweight on the QL domains (9). The surveys and monitoring of behavioral and biological risk factors were conducted since 2007 (9, 10, 11, 12, 13, 14, 15).

## METHODS

### STUDY DESIGN

The household sample was created on the basis of a probability proportional to size (PPS) sample. According to PPS, all territorial units of the sample have the same probability of being included in the sample. The defined sample size was 2500 households in 10 regions of the country and the capital city of Yerevan, and the entire population was divided into 25 clusters, each with 100 households. One person in each household was randomly selected for an interview. The first step included a distribution of

all clusters according to regions based on a cumulative method in accordance with the population number. For the second step, a random selection of geographical locations was conducted. In this case, areas corresponding to the number of clusters were selected randomly in every region and Yerevan city. One hundred households were selected on a random basis. Survey participants within the household were selected by 10 quotas defined for gender and age groups.

The survey age groups were as follows: 15–19, 20–34, 35–49, 50–64 and a 65-and-older population. Each gender-age group included 250 respondents with an equal distribution of males and females in each age group.

### THE SAMPLE SURVEY QUESTIONNAIRE

The questionnaire comprised two parts and included 11 chapters.

The first part contained: general information on the household; the respondent's physical and mental health, health complaints, chronic diseases, risk factors contributing to their development, and financial and geographic access to outpatient and inpatient clinics; as well as population satisfaction with received services. Instrumental measurements of blood pressure, and anthropometric measurements of arterial pressure, height, body mass, and waist and hip circumference, were also performed.

The second part included laboratory tests for defining glucose and cholesterol levels in capillary blood.

Fieldwork for the sample survey commenced 1 November 2015 and ended 16 February 2016.

Clusters with their corresponding number of households were selected for each community in advance. Groups were provided with addresses of the cluster households and the gender-age quotas. In the case that no household respondent was found that met the required criteria, another eligible household meeting the requirements was then selected in accordance with developed methodology.

The survey was conducted in 128 communities of the country and 12 districts of Yerevan city.

Overall, 5627 addresses were selected, of which 2075 were not located, and 1037 either refused to participate in the survey or the household did not have a member meeting the gender-age quota. The remaining 2515 households were interviewed and the questionnaire was populated. Anthropometric measurements were taken for 2473 respondents. Data analysis was based on the SPSS 20 statistical program.

To assess the prevalence of overweight or obesity among adults, individual height and weight measurements were taken during the data collection for the surveys. These measurements were used to calculate body mass index where  $BMI = W(kg)/H^2(m)$ :

- Underweight  $BMI \leq 18.5$
- Normal weight  $18.5 \leq BMI \leq 25.0$
- Overweight  $25.0 \leq BMI \leq 30.0$
- Obesity  $BMI \geq 30.0$ .

QL domains were assessed based on a short form-12 (SF-12) questionnaire which reflects the general well-being and level of satisfaction with life activities that are influenced by health status. SF-12 is a non-specific questionnaire which is validated to assess physical and psycho-emotional components of the QL (16).

The SF-12 questionnaire assesses the health status in eight domains. Four of these describe physical health: general health (gh), physical functioning (pf), role physical (rp), and bodily pain (bp). The other four assess mental health (mh), role emotional (re), social functioning (sf), and vitality (vt) aspects. The eight domains were developed based on the provided answers, which were adjusted afterwards within the 0–100 median, where 0 is the lowest or most unfavorable score and 100 is the highest or most favorable score (9).

1. General health (gh) was assessed by asking: “In general how would you assess your health?” The answer options included “excellent”, “very good”, “good”, “fair” and “poor”.
2. Physical Functioning (pf) was rated based on the following two questions:
  - a. “Does your health now limit you in moderate activities, such as moving a table, cleaning the floor or walking?”
  - b. “Does your health now limit you in climbing several flights of stairs?”
 The answers included “limited a lot”, “limited a little” and “not limited at all”.
3. The Role Physical (rp) was rated based on the following two questions:
  - a. “During the past month, have you accomplished less than you would like with your work or other regular daily activities as a result of your physical health?”
  - b. “During the past month, have you been limited in the kind of work that you do or other regular daily activities as a result of your physical health?”

The answer options included “all of the time”, “most of the time”, “some of the time”, “a little of the time” and “none of the time”.

4. Bodily Pain (bp) was assessed by asking: “During the past month, have you been limited in your regular daily activities as a result of various physical pains?” Answer options included “all of the time”, “most of the time”, “some of the time”, “a little of the time” and “none of the time”.

The mental health domains included the following aspects:

5. Mental Health (mh) describes psychological dispersion and anxiety. The two questions asked were:
  - a. “During the past month, how often have you felt calm and peaceful?”
  - b. “During the past month, how often have you felt depressed or anxious?”

The answer options included “all of the time”, “most of the time”, “some of the time”, “a little of the time” and “none of the time”.

6. Role Emotional (re) was rated by the following questions:
  - a. “During the past month, have you been limited in your work or other regular daily activities as a result of being downhearted and blue?”
  - b. “During the past month, have you been less careful than usual because of being downhearted and blue?”

The answer options included “all of the time”, “most of the time”, “some of the time”, “a little of the time” and “none of the time”.

7. Social Functioning (sf) component was rated by asking: “During the past month, how much of the time have your physical health or emotional problems interfered with your social activities such as visiting friends or relatives?” Answer options included “all of the time”, “most of the time”, “some of the time”, “a little of the time” and “none of the time”.

8. Vitality (vt) was rated based on an assessment of: “During the past month, how much of the time did you have a lot of energy?” Answer options included “all of the time”, “most of the time”, “some of the time”, “a little of the time” and “none of the time”.

## ETHICS

Implementation of the survey was approved by the Ethics Panel of the National Center on AIDS Prevention of the Ministry of Health, Armenia. All respondents were introduced to the informed consent, the goal of the survey, risks and advantages of participation, and the right to refuse to participate in the survey. Respondents provided written consent.

## RESULTS

### PREVALENCE OF BEING OVERWEIGHT

Table 1 presents the prevalence of overweight and obesity among the 15-and-older population. Table 2 presents the breakdown of BMI categories for sociodemographic groups.

- The rate of being overweight and obese accounts for 51.2% of the 15-and-older population of Armenia, of which overweight was detected in 22% and obesity in 29%.
- Obesity is more prevalent in females, at 54.1%, than in males, at 47.9%.
- The obesity rate is nearly 1.8 times higher for the female population.
- According to wealth groups, obesity is more prevalent in quintiles II, at 54.0%, and I, at 53.2%. In the highest quintile (V), the rate accounts for 51.9%.
- The problem is more evident in the group with secondary vocational education, with obesity at 59.2%, compared to the other groups. In the group with incomplete secondary education, the prevalence comprises 30.0%, because the majority in this group are students.
- The prevalence of being overweight increases with age. In the 15–19 age group, the share is 13.0%, and in the 50–64 age group, it is 73.9%. The rate declines slightly in the 65-and-older age group, although it remains quite high at 70.5%.
- The prevalence of being overweight seems to be equally distributed across Yerevan and urban and rural settlements.

**TABLE. 1. PREVALENCE OF OVERWEIGHT AND OBESITY ACCORDING TO SOCIODEMOGRAPHIC GROUPS**

Age group		Overweight and obesity % (N)	95% confidence interval	Standard deviation
Age group	15–19	13.0% (479)	8.7-17.3	0.337
	20–34	31.8% (511)	28.6-35.0	0.466
	35–49	62.0% (507)	58.0-65.9	0.486
	50–64	73.8% (500)	70.1-77.5	0.440
	65 years and above	70.4% (469)	65.3-75.6	0.457
Gender	Female	54.1% (1277)	51.4-56.8	0.499
	Male	48.0% (1189)	45.1-50.9	0.500
Residence	Yerevan	51.2% (881)	47.9-54.5	0.500
	Urban	51.6% (606)	47.6-55.6	0.500
	Rural	51.0% (979)	47.8-54.1	0.500
Education	Incomplete secondary	51.0% (221)	43.3-58.8	0.501
	Secondary	51.6% (1 124)	48.6-54.5	0.500
	Vocational	59.2% (445)	54.7-63.8	0.492
	Incomplete higher	30.0% ( )	23.5-36.5 (196)	0.460
	Higher	51.1%	46.9-55.3 (470)	0.500
Wealth	I	53.2%	49.5-57.0 (711)	0.499
	II	54.0%	49.6-58.4 (495)	0.499
	III	49.7%	45.2-54.3 (466)	0.501
	IV	45.4%	40.5-50.3 (396)	0.498
	V	51.9%	47.0-56.7 (398)	0.500
Total		51.2%	49.2-53.2 (2473)	0.500

Source: Armenian Health System Performance Assessment Survey, 2016 (9).

TABLE 2. BMI CATEGORIES ACCORDING TO SOCIODEMOGRAPHIC GROUPS

		BMI ≤ 18.5	18.5 ≤ BMI ≤ 25.0	25.0 ≤ BMI ≤ 30.0	BMI ≥ 30.0
Age group	15–19	20.0%	67.0%	10.5%	2.5%
	20–34	10.2%	58.0%	24.0%	7.8%
	35–49	2.2%	35.9%	37.4%	24.5%
	50–64	0.8%	25.4%	31.3%	42.6%
	65 and older	1.6%	28.0%	35.5%	35.0%
Gender	Female	7.5%	38.4%	26.4%	27.7%
	Male	4.5%	47.5%	31.7%	16.2%
Residence	Yerevan	7.0%	41.8%	28.5%	22.7%
	Urban	6.9%	41.5%	30.8%	20.7%
	Rural	4.8%	44.2%	28.1%	22.9%
Education	Incomplete secondary	8.0%	41.0%	24.4%	26.6%
	Secondary	5.7%	42.7%	27.9%	23.6%
	Vocational	3.5%	37.3%	33.0%	26.2%
	Incomplete higher	8.1%	61.9%	18.0%	12.0%
	Higher	7.8%	41.1%	32.1%	19.1%
Wealth	I	5.1%	41.7%	30.3%	23.0%
	II	4.7%	41.3%	31.1%	22.9%
	III	8.4%	41.9%	26.9%	22.9%
	IV	9.0%	45.6%	24.7%	20.6%
	V	4.0%	44.1%	30.3%	21.6%
Total	2016	6.1%	42.7%	28.9%	22.3%
	2012	3.3%	44.6%	29.8%	22.3%

Source: Armenian Health System Performance Assessment Survey, 2016, 2012, (9, 13).

## AWARENESS OF THE HARMFUL INFLUENCE OF OVERWEIGHT AND OBESITY

The survey studied the population's awareness of the harmful influence of overweight and obesity.

Analysis of the levels of awareness of overweight and obesity by sociodemographic groups (Table 3) suggests the following:

- Awareness of the harmful influence of overweight has improved from 65% to 70% between 2012 and 2016.
- Males are less aware of risk factors than females.
- The level of awareness increases with age. The lowest level was detected among the 15–19 age group.

It is apparent that, because of the high prevalence of diseases and health conditions in the older age groups, seniors tend to seek medical care more often, thus receiving information on health risk factors that signify increased risks of their diseases. Therefore, it is essential to step up activities for improving the awareness of health risk factors in risk groups, particularly focusing on the 15–30 age group whose health has not yet worsened.

As expected, the level of awareness of risk factors is lower among:

- people with lower educational attainment
- the rural population and
- low wealth quintiles.

**TABLE 3. PUBLIC AWARENESS OF THE HARMS OF BEING OVERWEIGHT**

		Not harmful	No	Somewhat harmful	Yes
Age group	15–19	0.8%	15.4%	20.4%	63.4%
	20–34	2.0%	13.0%	17.1%	68.0%
	35–49	1.2%	8.9%	14.4%	75.5%
	50–64	1.2%	8.3%	17.1%	73.5%
	65 and older	1.8%	13.5%	20.2%	64.6%
Gender	Female	1.3%	7.5%	15.6%	75.6%
	Male	1.6%	15.6%	19.0%	63.8%
Residence	Yerevan	2.3%	7.3%	16.7%	73.7%
	Urban	0.7%	11.2%	17.6%	70.6%
	Rural	1.2%	14.9%	17.4%	66.5%
Education	Incomplete secondary	1.6%	23.1%	22.6%	52.7%
	Secondary	1.5%	13.6%	18.9%	66.0%
	Vocational	1.4%	7.7%	18.1%	72.7%
	Incomplete higher	0.2%	10.7%	12.3%	76.8%
	Higher	1.8%	6.0%	12.5%	79.6%
Wealth	NA	0.0%	25.5%	43.0%	31.5%
	I	1.6%	12.7%	17.8%	67.9%
	II	0.6%	10.0%	19.2%	70.3%
	III	2.8%	12.0%	18.6%	66.6%
	IV	1.7%	9.7%	14.4%	74.3%
Total	V	0.7%	11.2%	14.6%	73.5%
	2016	1.5%	11.3%	17.2%	70.1%
	2012	7.1%	5.6%	22.4%	64.9%

Source: Armenian Health System Performance Assessment Survey, 2016, 2012 (9,13).

## DEPENDENCE OF QUALITY OF LIFE (QL) ON BODY MASS INDEX (BMI)

The assessment of general health and the study of the impact of overweight on QL domains enabled the conclusion that all QL domains are nearly 1.8 times lower in respondents with extra weight and obesity compared to those with normal weight and underweight. In particular, general health and physical functioning suffered significantly. Table 4 looks at the correlation of overweight and obesity with the QL domains. As the table data show, being overweight directly reflects the negative impact on health status domains. Thus, being overweight restricts a person's ability to perform physical activities and lowers physical energy.

A correlation of all QL and BMI parameters makes it evident that the higher the body mass index, the lower are the domains.

In underweight persons, all eight QL domains are significantly higher.

## CONCLUSION

The presented data finds that, despite a rather high population awareness of the harmful effects of obesity, obesity has an epidemic nature.

The Ministry of Health should consider developing an action plan promoting awareness-raising about healthy nutrition and nutrition-related issues, such as through mass media, and meetings with, or trainings for, community residents. To reduce the NCD burden and improve population health in 2016, the Government of Armenia adopted the 2016–2020 Strategy on

TABLE 4. IMPACT OF BMI ON QL DOMAINS

Body mass index – BMI (kg/m <sup>2</sup> )		gh	pf	rp	bp	mh	re	sf	vt
BMI ≤ 18.5	Mean	64.1	85.9	75.6	74.2	63.8	66.8	77.0	65.4
95% confidence interval for mean		60.5–67.6	81.1–90.8	70.8–80.5	69.2–79.2	59.8–67.8	62.4–71.2	71.8–82.1	60.9–70.0
18.5 ≤ BMI ≤ 25.0	Mean	60.2	75.9	73.5	72.6	63.0	68.8	77.2	64.0
95% confidence interval for mean		58.8–61.5	73.7–78.0	71.7–75.3	70.7–74.5	61.5–64.4	67.2–70.5	75.4–79.0	62.3–65.7
25.0 ≤ BMI ≤ 30.0	Mean	53.4	61.6	64.5	63.9	60.0	66.4	70.9	59.2
95% confidence interval for mean		51.7–55.0	58.6–64.6	62.0–66.9	61.3–66.5	58.2–61.8	64.1–68.6	68.6–73.3	57.1–61.2
BMI ≤ 30.0	Mean	46.6	40.5	50.0	51.0	52.1	57.4	63.9	52.4
95% confidence interval for mean		44.8–48.3	36.9–44.0	47.2–52.8	48.0–54.1	50.0–54.3	54.7–60.0	61.0–66.8	50.1–54.7

Source: Armenian Health System Performance Assessment Survey, 2016 (9).

Control of Most Prevalent NCDs and the Action Plan. This includes, for example:

- activities targeted at the prevention and control of overweight and obesity, particularly the reduction of salt consumption;
- replacement of trans fats with unsaturated fats;
- implementation of public awareness projects on diet and physical activity;
- reduction of the use of simple sugars, and increased consumption of fruits and vegetables;
- reduction of the impact of marketing foods and non-alcoholic beverages to children; and
- promotion of public awareness of diet and physical activity.

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