

Anthropology

Anthropometrical Nutritional Status of Adult Bulgarian Population at the End of the 20th Century

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Characteristics of anthropometrical nutritional status in adult Bulgarian population at the end of the 20th century is made, as well as, the frequency of individuals with different anthropometrical nutritional status according the WHO classification norms is assessed. It is established that during the steadiest biological age (30-40 years), the Bulgarians have an anthropometrical nutritional status between the categories "healthy" and "overweight". The individuals with BMI over 30 kg/m², which marks the obesity, are 15.8% from the males and 17.6% from the females. According to the WHO data about obesity in Europe, the frequency of obesity Bulgarians at the end of the 20th century is near to the mean frequency for the European population.

Key words: Anthropometrical nutritional status, anthropometry, BMI, Bulgarian adult population.

Introduction

During the past years more and more often data about the alarming obesity of the population in the well-developed countries are published [1,4]. Publications about the increase of the frequency of obesity people in Bulgaria are not an exception [5, 8].

As an appraiser of the anthropometrical nutritional status (ANS) when making large-scale investigations, the WHO still recommends the data of BMI to be used instead of the critics concerning its informative possibilities [2, 3]. More often the applied and recommended by the WHO demarcation cut off values about ANS categorization are those worked out by Garrow in 1981 [2].

The aim of the present work is to assess the anthropometrical nutritional status in adult Bulgarian population (30-40 years old) at the end of the 20th century.

Material and Methods

For the evaluation of ANS in the present work are used data about BMI of a representative for Bulgaria subpopulation of 30-40 years old males and females. These

data are a part from the National program "Anthropological characteristics of the Bulgarian population". The program is confirmed by the Educational and Scientific Ministry, as well as by the Bulgarian Academy of Sciences and is the only representative for Bulgaria as a complex anthropological investigation at the end of the 20th century. The study includes 2413 males and 2842 females at the age 30-40 years from 120 settlements (showed in the Bulgarian map) in the 9 regions of the country. The districts division corresponds to the administrative regions of the country during the period in which the program took place and includes representative sub-populations from the 9 regions in this time (Fig. 1).

For the categorization of ANS are used the cut off values of BMI recommended by the WHO and worked by Garrow in 1981, and the classification is made according to the scheme of Balabansky [5]. (Tabl. 1).

Results and Discussion

The mean values of BMI give a mostly general idea about ANS of the investigated individuals. The data from the representative for the country investigation (Table 2, Figure 1) show that at the end of the 20th century, the 30-40 years old Bulgarians have mean values for BMI between 25.3 and 26.8 kg/m². These data assign their ANS to the upper limit of the category "norm" and the lower limit of the category "overweight". By the regional comparison is established that biggest BMI have the males and females from Sofia and Montana regions (more well expressed in males), and lowest is the BMI for the females from Sofia town and the males and females from Bourgas and Rousse regions.

Next to this common idea about body nutritional status of the adult Bulgarian population at the end of the 20th century, received from the mean values of BMI, we shall analyse the frequency of the individuals from the different categories ANS, as for the whole country, so in a comparative aspect between the separate regions (Tables 3 and 4). In Fig. 3 is presented the frequency of the individuals from the different categories ANS totally for the whole country. The data show that 1.6% of the males and 4.2% of the females are with weight below the norm. Healthy ANS have 35.7% from the males and 43.9% from the females. Overweight are 46.8% from the males and 34.4% from the females, and with obesity, commonly for its three degrees (BMI > 30 kg/m²) are 15.8% from the males and 17.6% from the females. The com-

T a b l e 1. BMI cut off values for the classification of anthropometrical nutritional status

Body mass index (BMI)			
categories	by L. Ballabansky, 1990	categories	WHO by Garrow, 1995
thin	x - 19.9	thin	x - 19.9
normal	20.0 - 24.9	normal	20.0 - 24.9
overweight	25.0 - 29.9		—————
obesity grade I	30.0 - 34.9	overweight grade I	25.0 - 29.9
obesity grade II	35.0 - 39.9	overweight grade II	30.0 - 39.9
obesity grade III	40.0 - x	overweight grade III	40.0 - x

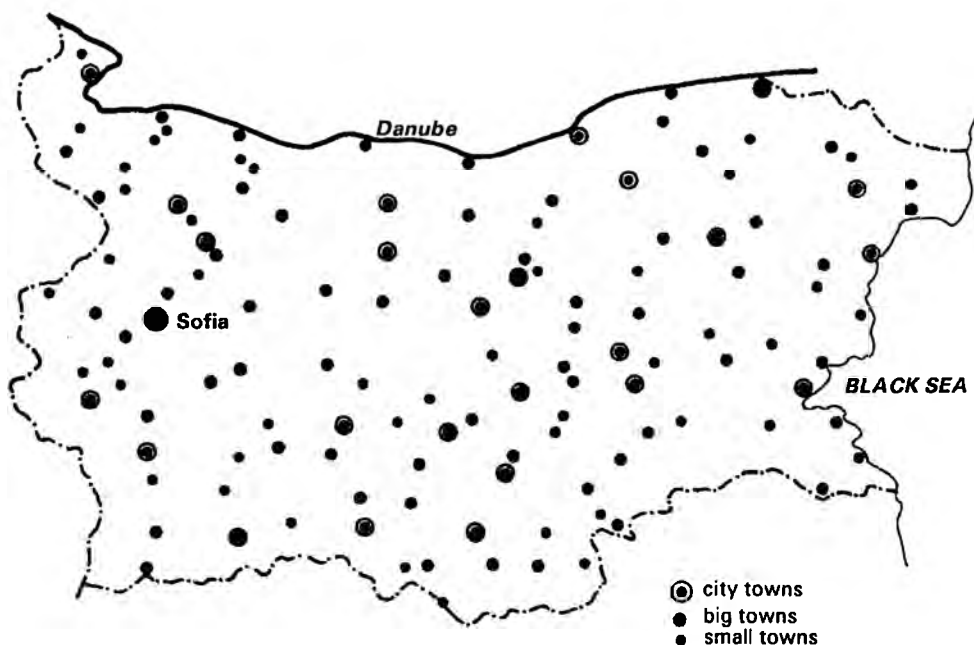


Fig. 1. Investigated settlement in Bulgaria

parison of these data with the data of WHO for the European countries in which the frequency of obesity individuals is between 10% and 20% in males, and between 10% and 25% in females shows that the frequency of the obesity Bulgarians at the end of the 20th century is near to the mean frequency for the European population [4, 8].

Of special interest is the sexual comparison of the frequency of individuals with healthy and overweight ANS in males and females. The frequency of females with healthy ANS is higher commonly for the whole country with 8.2 % than it is for males. The males, however, from the category "overweighed" are considerably more frequent — with 12.4% than the frequency of the females in this category.

T a b l e 2. Anthropometrical nutritional status of the Bulgarian population (30 — 40 years old)

No	Territorial division	Males							Females							
		n	mean	SD	SEM	V	min	max	n	mean	SD	SEM	V	min	max	
1	Sofia city	234	26.3	3.8	0.2	14.2	19.1	41.7	275	25.3	4.9	0.3	19.3	18.3	43.8	
2	Districts	Sofia	310	26.8	3.7	0.2	13.9	18.0	39.2	370	26.4	4.7	0.2	17.8	15.5	44.8
3		Plovdiv	276	26.4	3.6	0.2	13.5	19.2	40.7	339	26.1	4.3	0.2	16.6	17.9	41.8
4		Haskovo	288	26.4	3.2	0.2	12.1	18.7	37.2	351	26.0	4.1	0.2	15.9	17.2	46.2
5		Bourgas	247	26.4	3.9	0.2	14.8	18.2	45.6	336	25.3	4.2	0.2	16.6	17.6	43.6
6		Montana	344	26.7	4.1	0.2	15.4	16.4	41.5	357	26.6	4.9	0.3	18.4	16.8	46.8
7		Lovech	266	26.3	3.9	0.2	14.7	18.1	47.9	316	26.0	4.6	0.3	17.8	17.0	45.2
8		Rousse	186	25.6	3.4	0.2	13.5	17.4	36.0	204	25.9	4.3	0.3	16.7	18.7	41.0
9		Varna	262	26.0	3.9	0.2	14.9	16.1	39.9	294	25.8	4.4	0.3	17.3	17.0	41.2
10	Whole country	2413	26.4	3.8	0.1	14.3	16.1	47.9	2842	26.0	4.5	0.1	17.4	15.5	46.8	

Table 3. Distribution of the investigated population according to anthropometrical nutritional categories in males

No	Territorial division	Total number	Categories												
			thin x-19.9		normal 20.0-24.9		overweight 25.0-29.9		obesity I 30.0-34.9		obesity II 35.0-39.9		obesity III 40.0-x		
			n	%	n	%	n	%	n	%	n	%	n	%	
1	Sofia city	234	3	1.3	84	35.9	111	47.4	30	12.8	5	2.1	1	0.4	
2	Districts	Sofia	310	5	1.6	100	32.3	144	46.5	52	16.8	9	2.9	0	0
3		Plovdiv	276	3	1.1	96	34.8	141	51.1	29	10.5	6	2.2	1	0.4
4		Haskovo	288	1	0.3	96	33.3	153	53.1	34	11.8	4	1.4	0	0
5		Bourgas	247	1	0.4	98	39.7	108	43.7	33	13.3	6	2.4	1	0.4
6		Montana	344	8	2.3	115	33.4	144	41.9	64	18.6	11	3.2	2	0.6
7		Lovech	266	7	2.6	90	33.8	136	51.1	26	9.8	6	2.3	1	0.4
8		Rousse	186	6	3.2	74	39.8	87	46.8	18	9.7	1	0.5	0	0
9		Varna	262	4	1.6	109	41.6	105	40.1	37	14.1	6	2.3	1	0.4
10	Whole country	2413	38	1.6	862	35.7	1130	46.8	323	13.4	54	2.2	6	0.2	

Table 4. Distribution of the investigated population according to anthropometrical nutritional categories in females

No	Territorial division	Total number	Categories												
			thin x-19.9		normal 20.0-24.9		overweight 25.0-29.9		obesity I 30.0-34.9		obesity II 35.0-39.9		obesity III 40.0-x		
			n	%	n	%	n	%	n	%	n	%	n	%	
1	Sofia city	275	12	4.4	146	53.1	84	30.5	22	8.0	8	2.9	3	1.1	
2	Districts	Sofia	370	14	3.7	144	38.9	134	36.2	54	14.6	21	5.7	3	0.8
3		Plovdiv	339	12	3.5	148	43.7	116	34.2	46	13.6	16	4.7	1	0.3
4		Haskovo	351	11	3.2	146	41.6	139	39.6	47	13.4	6	1.7	2	0.6
5		Bourgas	336	19	5.7	158	47.0	120	35.7	28	8.3	10	3.0	1	0.3
6		Montana	357	16	4.5	144	40.3	119	33.3	52	14.6	21	5.9	5	1.4
7		Lovech	316	13	4.1	140	44.3	99	31.3	50	15.8	12	3.8	2	0.6
8		Rousse	204	5	2.5	92	45.1	71	34.8	28	13.7	7	3.4	1	0.5
9		Varna	294	15	5.1	131	44.6	97	33.0	38	12.9	10	3.4	3	1.0
10	Whole country	2842	117	4.2	1248	43.9	977	34.4	367	12.9	112	3.9	21	0.7	

Table 5. Secular trend of anthropometrical nutritional status

Sex	Parameters	Literature data			Our data 1989 - 1993
		1970 by Janev et al. [9]	1975 by Mutafov et al. [8]	1980 by Slanchev et al. [7]	
males	n	1201	425	744	2413
	x	25.64	25.78	25.98	26.37
females	n	1199	425	741	2843
	x	26.76	27.15	26.05	25.96

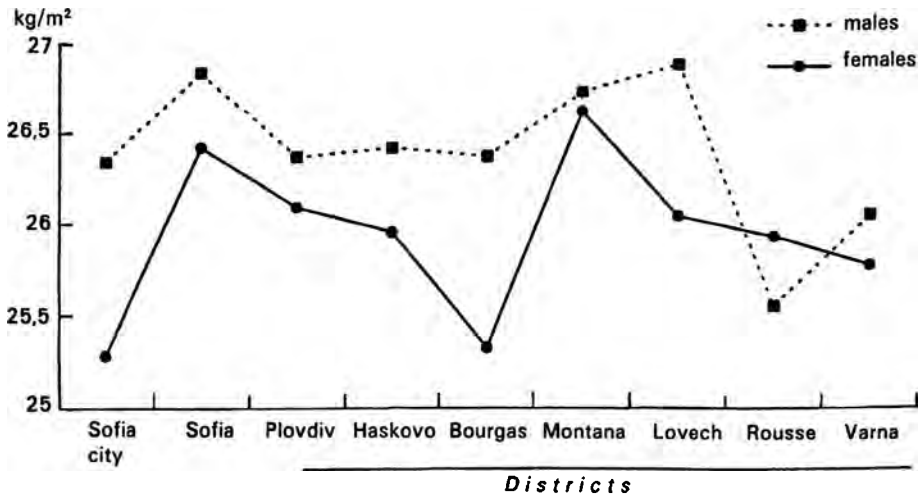


Fig. 2. Mean values of BMI

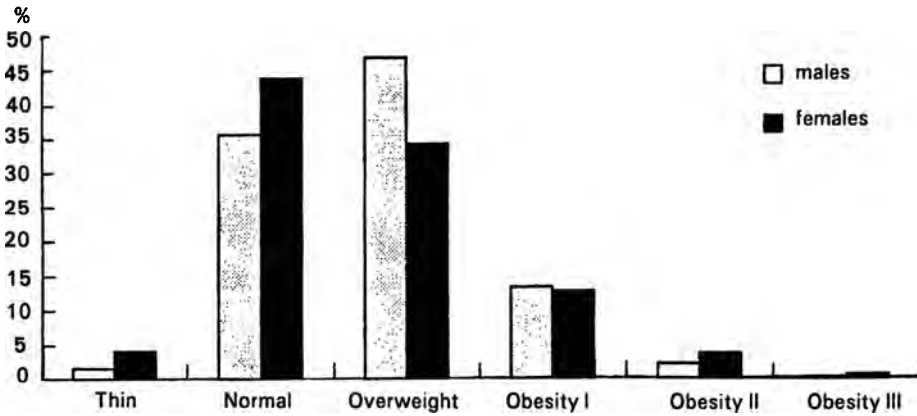


Fig. 3. Distribution of the population in the whole country according to the categories of anthropometrical nutritional status

More detailed information about this tendency could be received from the regional comparison (Fig. 4 and 5). The data show that from all regions in the country higher is the percentage of males with overweight (between 40.1% and 53.1%) than of males with healthy ANS (between 32.3% and 41.6%). Most frequent are the overweighted males in Haskovo, Lovech and Plovdiv regions and those with healthy ANS are most frequent in Varna, Rousse and Bourgas regions. In females the proportion is opposite of those in males. The frequency of females with overweight is lower (between 30.5% and 39.6%) than of females with healthy ANS, whose frequency is between 40.3% and 53.1%. Highest is the frequency of females with over-

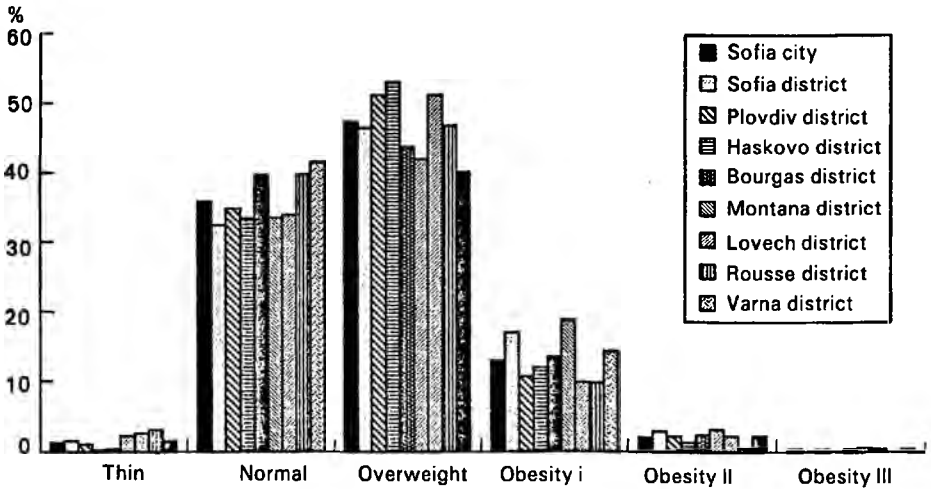


Fig. 4. Distribution of the population in the separate 9 regions according to the categories of anthropometrical nutritional status (*males*)

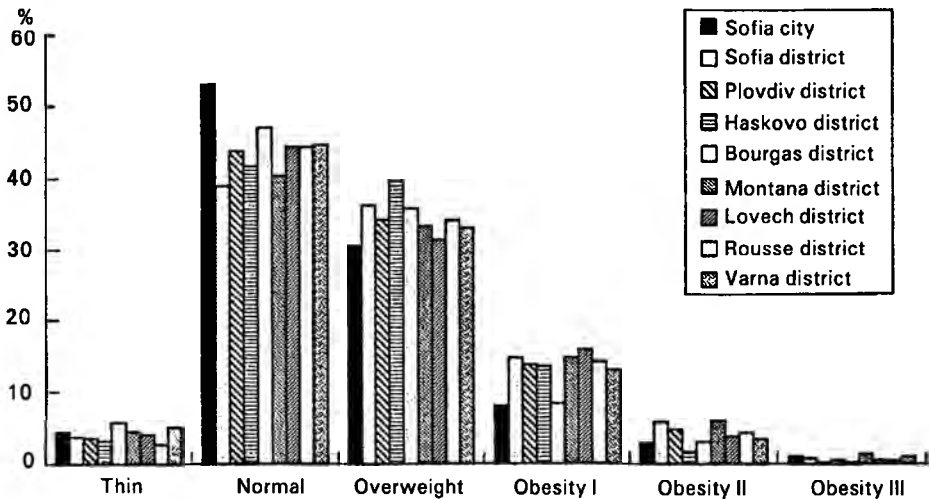


Fig. 5. Distribution of the population in the separate 9 regions according to the categories of anthropometrical nutritional status (*females*)

weight in Haskovo region, and most frequently such with healthy ANS are observed in the capital city of Sofia and Bourgas region.

The data analyses about frequency of individuals with the three obesity degrees are of a special interest (Fig. 6 and 7). Most obese males with BMI > 30.0 kg/m² are found in Montana and Sofia region, and lowest is their frequency in Rouse region. The frequency of obese females is highest again for Montana and Sofia regions, as in the category obese Ist degree with BMI between 30.0 and 34.9 kg/m² their frequency is highest for Lovech region.

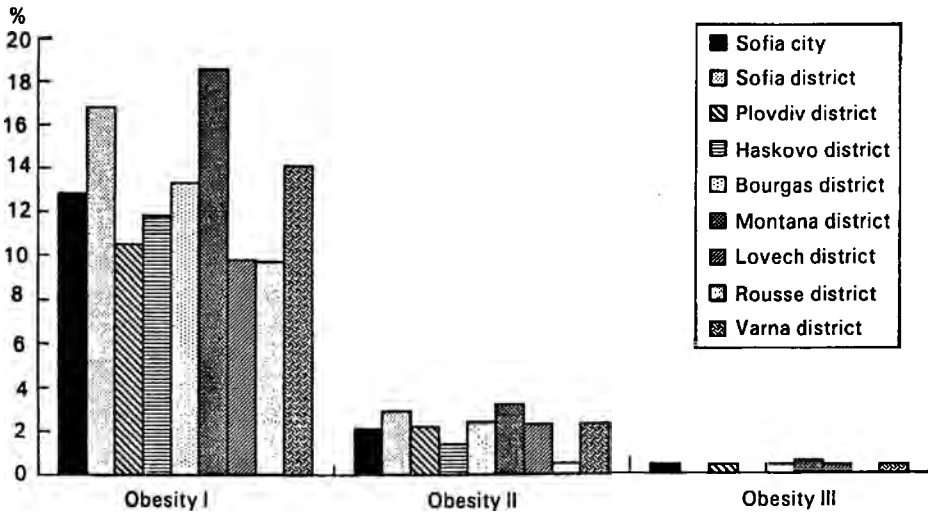


Fig. 6. Frequency of the population from the different obesity categories (*males*)

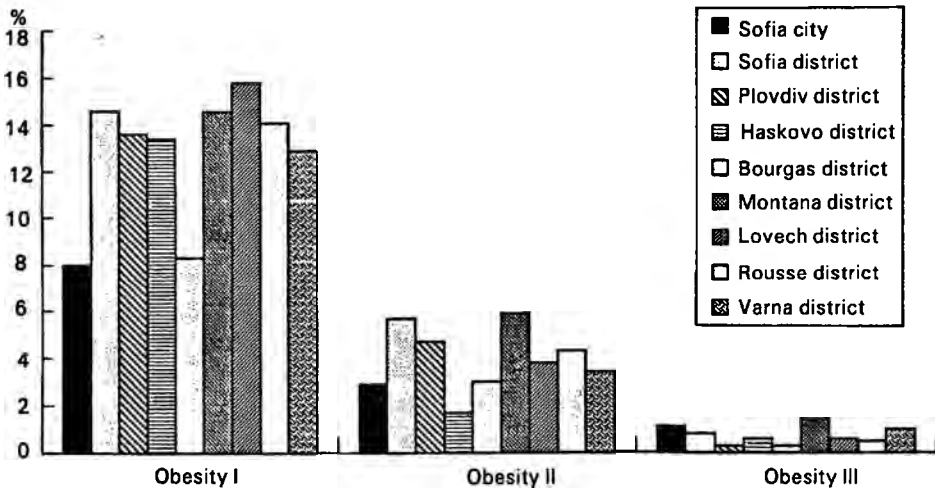


Fig. 7. Frequency of the population from the different obesity categories (*females*)

To study if there are changes in ANS for different generations of the Bulgarian population during the 20th century, i.e. if there are data about secular changes in this period, we made at the end a comparison between our study and the existing similar investigations for Bulgaria in 1970, 1975 and 1980. These are the only representative studies of 30-40 years old Bulgarians which could be used for objective comparisons.

It is obvious from Table 5 and the illustrations in Fig. 8 that there are not big changes in ANS for the Bulgarians from the 70s till the end of the century. Nevertheless, in the sexual aspect it could be accounted a tendency of a BMI increase in

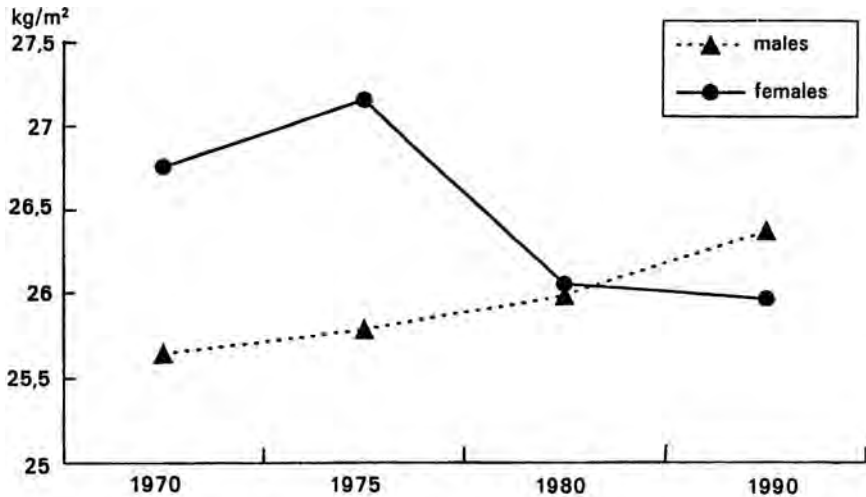


Fig. 8. Secular trend of anthropometrical nutritional status

males for 20 years period with 0.73 points. In females, highest is the BMI for the generation studied in 1975 and lowest — for the studied by the National Anthropological Program (1989-1993). The decrease of the BMI mean values between 1975 and the end of the century is with 1.19 points, and could be discussed as a deceleration tendency about body nutritional status of the Bulgarian females during the last two decades of the 20th century.

Conclusion

The results in the present study show that at the end of the 20th century the 30-40 years old Bulgarians, i.e. the ones in the steadiest biological ages, have anthropological nutritional status between the upper limit of norm and the lower limit of overweight, as in males the frequency of overweighed individuals is higher. It is very important to be verified that in the Bulgarian population, the individuals with BMI over 30 kg/m² which is indicative for the obesity are 15.8% from the males and 17.6% from the females. According to the WHO data, the frequency of obesity for Bulgarians at the end of the 20th century is near to the mean frequency for the European population.

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