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EDITORIAL

BEFORE AND DURING THE OUTBREAK:
PREREQUISITES FOR THE HIGH COVID-19 MORTALITY RATE IN BULGARIA.
EMPIRICAL INSIGHTS FROM SHARE DATA

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Abstract

The first wave of Covid-19 (March-June 2020) did not hit Bulgaria to the same extent as it did other countries in Europe (Italy, Spain, Belgium, United Kingdom). The severe second wave of the pandemic in Bulgaria was in November-December 2020, with a third wave in March-April 2021, but Bulgaria had the second highest case mortality rate in Europe. The aim of this article is to analyse the empirical insights into the health expectancy and self-rated health of Bulgarians aged 50+ before and during the outbreak, which need to be taken into account as one of the important factors contributing to the high mortality rate of Covid-19. The analysis is based on SHARE wave 7 and the SHARE corona survey, conducted in July-August 2020. The data analysis results indicate that a significant share of Bulgarians aged 50 and over suffer from conditions considered high-risk for Covid-19. A steady tendency to overestimate personal health can be observed even before the pandemic. The general health attitudes of elderly Bulgarians have not changed much. The overestimation of personal health, despite the presence of more than 2 chronic conditions, regular medication, combined with non-attendance of preventive examinations, dangerous habits and physical immobility increase the risk of acute viral diseases. The deteriorating health status of the elderly in Bulgaria appears to be a strategic risk factor in the case of an epidemic, which is confirmed by the Covid-19 crisis outcomes. In spite of the problems in the Bulgarian health system as a whole, personal attitudes towards health should be prioritized by public measures and policies, along with promoting an improvement in health culture, physical activity and preventive medical examinations.

Keywords

SHARE Corona survey – SHARE wave 7 – Covid-19 – Health status – Mortality – Bulgaria

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Introduction

Severe acute respiratory syndrome Coronavirus 2, or Covid-19, is a viral disease caused by an RNA virus[1], referred to in the literature as both the '2019 novel coronavirus' and the '2019-nCoVH'. The virus causes an acute respiratory syndrome resembling flu symptoms, but with an asymptomatic and atypical course and can cause death.

The Covid-19 virus is spread mainly by infected respiratory fluids when a person coughs or sneezes[2]. The course of the disease (asymptomatic), the incubation period and the high virulence allowed this viral infection to develop instantly. Globally, there have been 198,778,175 confirmed cases of COVID-19, including 4,235,559 deaths[3] (August 2021).

In Bulgaria the start of the pandemic was officially announced on March 13, 2020. The first wave of Covid-19 in Bulgaria (March 2020) was characterized by low intensity compared to the European Union, while the second developed aggressively (Figure 1).

In October 2020 almost 1,000 Covid-19 positives cases were registered in 1 day[4], reaching 4 828 positives in 1 day in November 2020[5]. The high point of the second Covid-19 wave in Bulgaria was in November-December 2020, and the third wave - in March-April 2021, when Bulgaria had the second highest excess mortality rate[6] per 100,000 after Peru[7]. In September 2020 Bulgaria was among the high-risk countries in EU for Covid-19 transmission[8].

Figure 1. Excess mortality rate: EU average, Bulgaria (Jan 2020-May 2021).

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[1] According to P. Poltronieri; B. Sun and M. Mallardoc, "RNA Viruses: RNA Roles in Pathogenesis, Coreplication and Viral Load", Current Genomics: 16 (2015): 327, https://doi.org/10.2174/1389202916666150707160613, RNA viruses that cause human disease are, for example, orthomyxoviruses, hepatitis C virus (HCV), Ebola virus, SARS, influenza, polio and retrovirus, including human T-cell lymphotropic virus type 1 (HTLV-1) and human immunodeficiency virus (HIV).

[2] World Health Organisation (WHO) definition of Coronavirus disease (COVID-19) is available at: https://www.who.int/health-topics/coronavirus#tab=tab_1.

[3] WHO Coronavirus (COVID-19) Dashboard is available: at https://covid19.who.int/.

[4] Unified information portal (UIP),17.10.2020, https://coronavirus.bg/bg/statistika.

[5] E. Dimitrov, "Poredni rekordi: 4 828 dushi zarazeni s koronavirus za den, nad 1 200 sa ozdraveli", Actualno.com, Sofia, 18.11.2020, https://www.actualno.com/healthy/poredni-rekordi-4-828-dushi-zarazeni-s-koronavirus-za-den-nad-1-200-sa-ozdraveli-news_1521326.html.

[6] F. Checchi and L. Roberts, "Interpreting and using mortality data in humanitarian emergencies", Humanitarian Practice Network: num 52 (2005): 1, https://odihpn.org/wp-content/uploads/2005/09/networkpaper052.pdf.

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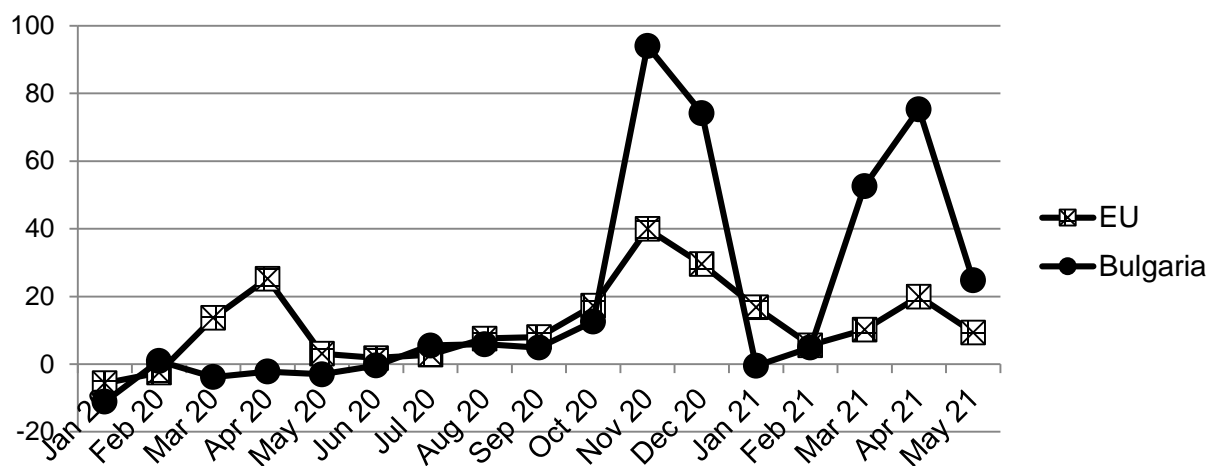
Source: Eurostat[9] (demo_mexrt)

An unhealthy population is vulnerable not only in the case of a highly contagious viral pathogen such as Covid-19. The state of health in Bulgaria before the outbreak highlights numerous challenges, such as the second lowest life expectancy in the EU, around 6 years below the EU average[10]. Excess mortality rate[11] refers to the number of deaths from all causes during a crisis above and beyond what is expected under 'normal' conditions[12].

In 2020 the mortality rate (18.0%) in Bulgaria was the highest historically since 1945[13]. The overall mortality rate of the population in Bulgaria was the highest among EU member states each year in the period from 2010 to 2019. The leading cause of death in Bulgaria is cardio-vascular diseases, with a rate of 1 100 deaths per 100 000 inhabitants in 2016 (around three times the EU average of 360)[14]. Estimated total mortality (the relative proportion of SARS-CoV-2 deaths in total patients with SARS-CoV-2) shows that Bulgaria ranks first in EU (4.2%), almost twice the EU average (2.2%)[15].

THEORETICAL CONSIDERATIONS

Some of the factors determining the growing mortality and morbidity among Bulgarians are related to changes in demographic structures that began in previous decades. In particular, the aging of the population, which has intensified since 1990 due to

[9] The data set is available at: https://ec.europa.eu/eurostat/statistics-explained/images/4/4e/Table1-excess-mortality-202108.png

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[14] OECD and European Observatory on Health Systems and Policies, Bulgaria: Country Health….

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the sharp decline in birth rates and increasing external migration, has led to an increase in the share of the adult population with higher morbidity and mortality rates[16].

Age and gender are well-established risk factors for severe COVID-19 outcomes[17]. Adults of any age are more likely to become severely ill from COVID-19, and may need hospitalization, intensive care, and may even die. More than 80% of COVID-19 deaths occur in people over age 65, and more than 95% of COVID-19 deaths occur in people older than 45[18]. COVID-19 does not affect all population groups equally. The risk of severe COVID-19 increases as the number of underlying medical conditions increases at an individual level[19]. Among the medical conditions associated with a high risk for severe Covid-19 are heart attack, high blood pressure or hypertension, high blood cholesterol, diabetes or high blood sugar, chronic lung disease, chronic kidney disease, obesity[20]. However, excess weight (defined as a body mass index (BMI) > 25 kg/m2 but < 30 kg/m2) and obesity (BMI ≥30 kg/m2), increase the likelihood for severe illness from COVID-19. Obesity can cause health conditions such as diabetes, high blood pressure, heart disease, asthma (moderate to severe), hypertension, liver disease, metabolic syndrome, lung disease[21].

Following the Covid-19 outbreak, the EU registered a general trend towards a decline in life expectancy, with the largest drops recorded in Spain (-1.6 years compared with 2019), Bulgaria (-1.5), Lithuania, Poland and Romania (all -1.4)[22]. Behavioural risk factors such as obesity are associated with a shorter life expectancy, as well as a shorter healthy life expectancy[23]. Healthy life expectancy could be measured by disability status or chronic conditions. The presence of chronic comorbidity[24] of high-blood pressure, respiratory disease, diabetes, cardiovascular disease, and kidney disease is an additional factor for Covid-19 severity and deaths[25]. Self-rated health has often been used to compute "healthy life expectancy".

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[16] E. Dimitrova, "Social determinants of self-rated health of the population in Bulgaria. Results of European Social Survey", Papers of BAS. Humanities and Social Sciences: num 5 (2019): 200.

[17] E.J. Williamson; A.J. Walker; K. Bhaskaran, et al., "Factors associated with COVID-19-related death using OpenSAFELY", Nature: 584 (2020): 430, https://doi.org/10.1038/s41586-020-2521-4.

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Previous research[26] indicates that a person's self-rated health status depends on certain socio-demographic characteristics. A strong educational gradient is related to self-reported health - higher for persons with a higher educational status. Women have lower self-rated health than men. Higher age is related to lower subjective health.

Preliminary scientific expectations are that a significant proportion of Bulgarians aged 50+ suffers from certain conditions critical to the course of Covid-19, such as high blood pressure, diabetes, obesity, etc.

The article addresses the following research questions:

1. What proportion of the 50+ population suffers from conditions that represent a high risk for Covid-19, such as high blood pressure, hypertension, diabetes, chronic lung disease, obesity, high cholesterol?

2. Is there a relationship between the subjective self-assessment of health status and comorbidity? Who is more likely to overestimate their personal health?

3. What is the behaviour of people aged 50+ during the Covid-19 outbreak in relation to a doctor's visit, hospital stay and delayed medical examinations? How does the presence of chronic illnesses, health self-assessment, socio-demographic characteristics (age, gender and education) affect this behaviour?

DATA, VARIABLES AND METHODS

The data set includes two SHARE consecutive waves: SHARE wave 7[27] and SHARE wave 8[28] Corona[29] survey (conducted July – August 2020). The total sample size for SHARE wave 7 in Bulgaria includes 2006 panel respondents. The sample of SHARE Corona Survey consists of 819 respondents. The object of the observations in all SHARE waves, as well as in the SHARE Corona survey, is the population aged 50+ and their partners, who can be younger than 50. The subsample of interest (only those aged 50+) includes 1950 respondents for wave 7.

The integrated data set with panel members for both waves includes 612 persons aged 50+. Descriptive statistics are presented in Table 1. The data is analysed with SPSS - version 26.0 (IBM, 2019).

Table 1. Comparative descriptive statistics for SHARE wave 7 and integrated data set in Bulgaria

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[26] E. Dimitrova, "Social determinants of self-rated health of… 200-215.
[27] A. Börsch-Supan, Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 7. Release version: 7.1.1. Data set (Munich: SHARE-ERIC, 2020), https://doi.org/10.6103/SHARE.w7.711.
[28] A. Börsch-Supan, Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. Release version: 1.0.0. Data set (Munich: SHARE-ERIC, 2021), https://doi.org/10.6103/SHARE.w8ca.100.
[29] A. Börsch-Supan, Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. Covid-19 Survey 1. Release version: 1.0.0. Data set (Munich: SHARE-ERIC, 2021), https://doi.org/10.6103/SHARE.w8ca.100, http://www.share-project.org/special-data-sets/share-corona-survey.html.

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	SHARE Wave7	SHARE Corona Survey 1*
	n=1950 %	*n=612* %
Gender		
Male	42.8	42.0
Female	57.2	58.0
Level of education**		
Primary	28.1	28.7
Secondary	53.5	57.1
Tertiary	18.4	14.2
Age group		
50-59	27.7	18.3
60-69	34.7	45.4
70-79	27.1	28.4
80 and more	10.5	7.8

* integrated data set with panel members from both waves

** based on valid answers (n=1884 and n=599)

Source: SHARE Wave 7, Release version: 7.1.1; SHARE Wave 8 COVID-19 Survey 1, Release version: 0.0.1 beta

The data analysis is based on the following logic:

The variables of interest from SHARE wave 7 are related to medical conditions that present a risk for severe outcomes of Covid-19 and that have been diagnosed by a doctor at any time. According to the above-quoted medical studies and available empirical information about conditions that pose an increased risk for Covid-19, SHARE data provides information about the following chronic conditions:

- heart attack
- high blood pressure or hypertension
- high blood cholesterol
- diabetes or high blood sugar
- chronic lung disease
- chronic kidney disease

A new variable is constructed based on the positive answers to at least one of these conditions, measuring the presence or absence of at least one condition representing a risk for Covid-19.

The other four variables of interest from SHARE wave 7, are: the number of chronic illnesses (0, 1 or 2 and more) and body mass index - BMI (in four categories – underweight, normal, overweight, obese), self-perceived health (in three categories – poor or fair; good; very good or excellent), the number of contacts with a medical doctor or nurse[30].

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[30] Contacts exclude dentist visits and hospital stays, but include emergency room or outpatient clinic visits.

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The following are variables of interest from wave 8 SHARE Corona survey-1: medical treatment received since the outbreak, doctors` visit and treatment in hospital since the outbreak (all dichotomous).

The analysis is conducted in two ways: for the whole target population and for sub-groups formed by gender, educational level (primary or lower secondary; secondary education or post-secondary non-tertiary education and tertiary education[31]) and age cohorts (aged 50-59, 60-69, 70-79 and 80 and more).

Descriptive analyses and hypothesis testing methods to explore the relationships between variables of interest and socio-demographic factors are used to highlight the groups most vulnerable to Covid-19.

Multiple logistic models are constructed to estimate the odds ratio (the proportion between positive and negative answers) of doctor visits before and during the outbreak, as well as medical treatment received.

RESULTS AND CONCLUSIONS

A large share of Bulgarians over the age of 50 has at least one risk condition (61.6%), high blood pressure being the most frequent. Between 11 and 14% have had a heart attack, diabetes or high blood cholesterol. 5.3% and 3.7% respectively have been diagnosed with chronic lung or kidney disease (Figure 2).

The data shows that a large proportion of the population aged 50+ is potentially at risk of severe Coronavirus infection. Moreover, the comorbidity among the surveyed population is high - 640 (32.8%) of the respondents indicated that they have two or more chronic illnesses, of which 241 (or 12.4% of all respondents) have three or more chronic illnesses.

These results confirm the unfavourable health status of the Bulgarian population over the age of 50+, which is undoubtedly a factor in the large number of patients in intensive care units and the high mortality in the subsequent waves of COVID-19.

Figure 2. The share of respondents with conditions representing a potential risk for Covid-19 (%).

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[31] Further called primary, secondary and tertiary education.
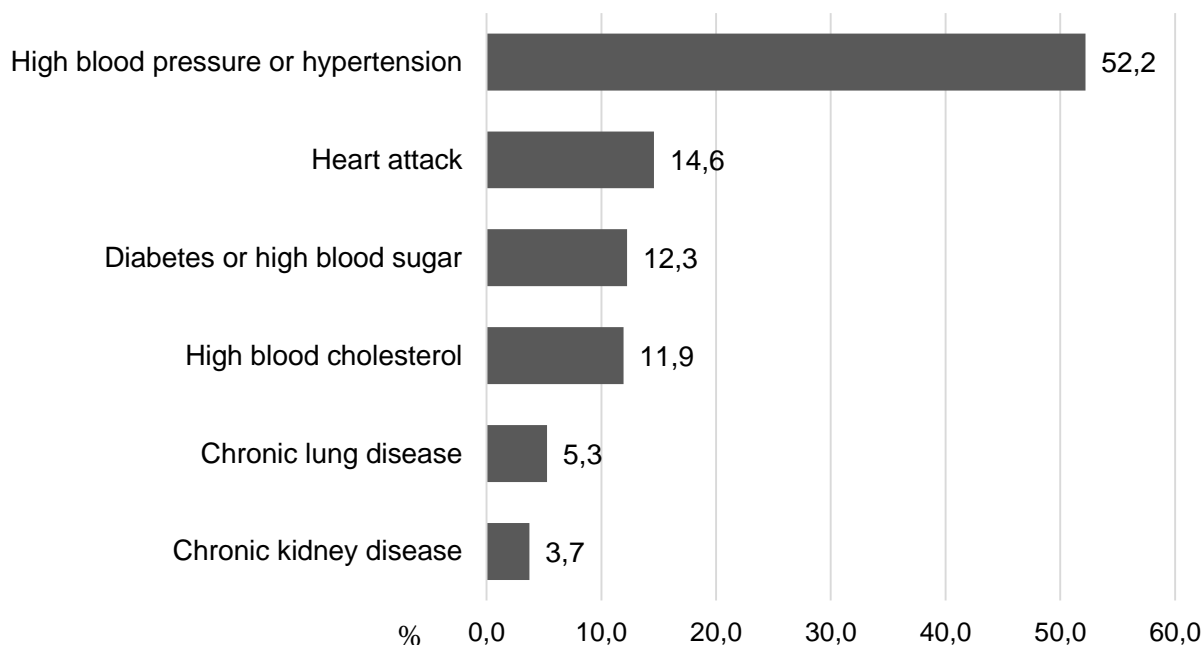
Source: SHARE Wave 7, Release version: 7.1.1; SHARE Wave 8 COVID-19 Survey 1, Release version: 0.0.1 beta

Being overweight is another risk factor, measured by BMI. Information on this indicator is available for 1906 respondents. The results are also alarming for the risk of severe Covid-19 infection. A large share of Bulgarians 50+ years of age suffers from excess weight or obesity (Table 2).

Table 2. The share of respondents with risk factors by socio-demographic groups

Risk factors	Total	Gender		Education			Age group			
		Male	Female	Primary	Secondary	Tertiary	50-59	60-69	70-79	80+
At least one risk disease										
No	38.9%	41.4%	37.0%	29.8%	40.1%	49.0%	59.9%	38.6%	23.7%	23.4%
Yes	61.1%	58.6%	63.0%	70.2%	59.9%	51.0%	40.1%	61.4%	76.3%	76.6%
Number of chronic diseases										
0	35.0%	37.3%	33.2%	26.8%	35.9%	45.3%	56.8%	34.9%	19.3%	17.7%
1	32.0%	33.0%	31.3%	28.7%	34.7%	30.2%	29.4%	34.3%	32.1%	31.0%
2+	33.0%	29.7%	35.5%	44.4%	29.3%	24.4%	13.8%	30.8%	48.7%	51.2%
Body mass index										
Underweight (below 18.5)	1.5%	1.3%	1.6%	1.3%	1.3%	1.4%	.8%	1.1%	1.5%	4.6%
Normal (18.5-24.9)	30.6%	28.5%	32.2%	30.8%	24.6%	35.5%	31.3%	27.2%	29.0%	44.7%
Overweight (25-29.9)	43.2%	46.7%	40.5%	39.9%	46.0%	39.1%	41.6%	46.0%	44.0%	36.0%
Obese (30 and above)	24.7%	23.4%	25.7%	28.0%	28.1%	24.0%	26.4%	25.7%	25.5%	14.7%

Source: SHARE Wave 7, Release version: 7.1.1; SHARE Wave 8 COVID-19 Survey 1, Release version: 0.0.1 beta

The occurrence of risk condition factors varies among different socio-demographic groups. The share of those with comorbidity is significantly higher among women and respondents with a lower level of education[32]. As expected, statistically significant differences are observed by age group.

Respondents in the age groups 70-79 and 80+ are most vulnerable, where every second person has two or more chronic illnesses, and more than 75% have at least one high-risk illness.

With regard to BMI, the differences by gender and education are not significant and respondents aged 80+ have a lower BMI, supporting previous research on the link between BMI and age[33] (Table 2). In addition, these three indicators are interrelated - 72% of overweight people have at least one high-risk illness and 40% have comorbidity.

Despite the objective characteristics showing the unfavourable health status of Bulgarians aged 50+ (unfavourable health), respondents overestimated their health condition in the given self-assessment.

Of all respondents aged 50+, 40% rated their health as poor or satisfactory, 31% as good and 29% - very good or excellent. Almost half of respondents with a high-risk illness and more than half of respondents with obesity describe their health condition as good, very good or satisfactory.

Among respondents with comorbidity, one fourth rated their health as good and 8.1% as very good or excellent (Figure 3). In practise this means that Bulgarians aged 50+ are probably not aware of the severity of their conditions and the possible risks for their health. This could be a potential factor affecting individual behaviour during the Covid-19 pandemic.

Despite the information available about the risk factors affecting the severity of a coronavirus infection, people often sought medical help too late, leading to the share of severe Covid-19 conditions and high excess mortality in Bulgaria.

Figure 3. Self-perceived health of risk groups

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[32] $\alpha < 0,05$ (Chi-square method)

[33] H.S. Kahn and Y.J. Cheng, "Longitudinal changes in BMI and in an index estimating excess lipids among white and black adults in the United States", Int J Obes (Lond): 32 (2008): 136, https://doi.org/10.1038/sj.ijo.0803697.
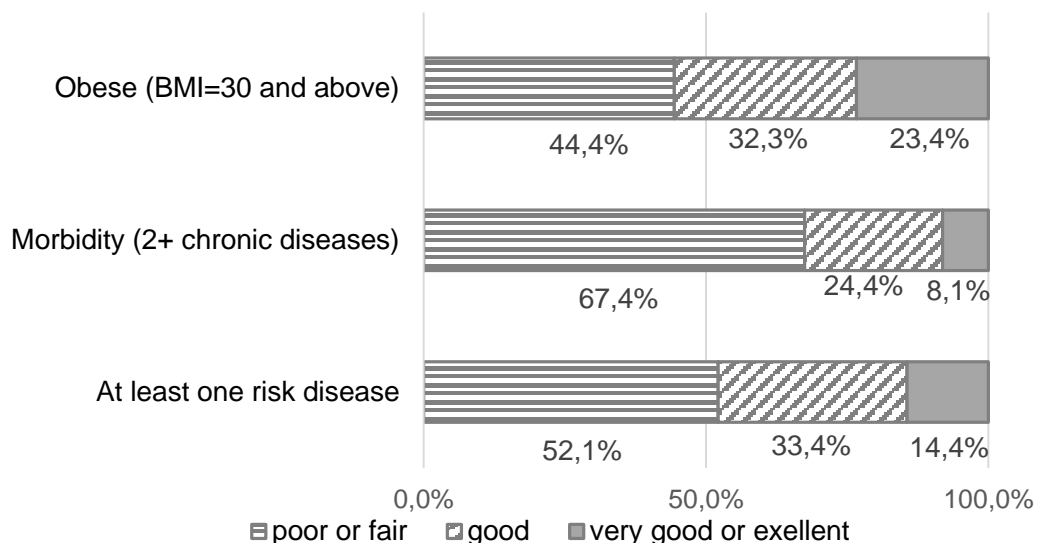
Source: SHARE Wave 7, Release version: 7.1.1; SHARE Wave 8 COVID-19 Survey 1, Release version: 0.0.1 beta

One of the factors affecting people's behaviour during the Covid 19 pandemic is the frequency of doctor's visits. One in five had no contact with a doctor in the 12 months prior to the Covid-19 pandemic (SHARE wave 7), an alarming statistic for a population aged 50+. As expected, people with high-risk chronic illness visit a doctor more often (the relationship is statistically significant at $\alpha = 0.05$). The most frequent visits are reported by people with comorbidity. However, more than 40% of those without a high-risk chronic illness did not see a doctor, which indicates they are not in the habit of monitoring their own health and prevention (Table 3). In terms of demographics, gender and age are statistically significant factors - women and the older age cohorts are more likely to see a doctor.

Table 3. Contact with medical doctor or nurse in the last 12 months by risk factors

	Number of contacts				
	0	**1-3**	**4-6**	**7-12**	**13+**
Total population	21.2%	30.4%	20.4%	23.6%	4.4%
Risk factors					
At least one risk disease					
No	40.2%	34.8%	13.1%	9.8%	2.1%
Yes	9.3%	27.7%	25.0%	32.2%	5.8%
Number of chronic diseases					
0	42.9%	36.0%	12.7%	7.5%	0.9%
1	14.3%	35.3%	22.8%	24.8%	2.8%
2+	5.2%	20.3%	26.2%	39.6%	8.8%
Body mass index					
Underweight (below 18.5)	28.6%	10.7%	14.3%	42.9%	3.6%
Normal (18.5-24.9)	25.3%	32.8%	16.8%	21.3%	3.8%
Overweight (25-29.9)	21.9%	30.9%	21.3%	22.1%	3.8%
Obese (30 and above)	14.1%	29.4%	23.0%	28.6%	4.9%

Source: SHARE Wave 7, Release version: 7.1.1

The first wave of Covid-19 in Bulgaria does not negatively influence the visits to doctor/medical facility other than hospital or the need for hospital care based on SHARE Corona survey (Table 4). At the same time 10.7 % reported they had received medical treatment since the outbreak. Only five Bulgarian respondents postponed medical appointment due to the outbreak and two respondents were refused appointments. In general, the SHARE data indicates that Bulgarians aged 50+ had access to medical care during the pandemic (March-June 2020), and cancellations could be put down to fear or following the advice of the medical authorities to avoid visits to a doctor. The results show also that, as expected, the share of visitors to the doctor and hospital is significantly higher among respondents with a high-risk condition, comorbidity, who assessed their health as poor or satisfactory. The share of those who postponed their treatment is also twice as high among respondents with at least one high-risk condition compared to those without high-risk diseases. The relationship between risk factors and visits to medical facilities or medical treatment received is statistically significant ($\alpha < 0.05$). The proportion of women who visited a doctor and postponed their treatment is higher than that of men, but a higher proportion of men were treated in hospitals. Only 25% in the highest age group (80+) visited a doctor, but also the share of those admitted to hospital is logically the highest.

Table 4. Visited medical facilities and medical treatment received since outbreak

	Visited doctor /medical facility other than hospital	Visited hospital	Medical treatment received
Total population	44.8%	6.2%	10.7%
Risk factors			
At least one risk disease			
No	37.9%	3.0%	6.9%
Yes	48.2%	7.9%	12.5%
Number of chronic diseases			
0	37.3%	3.2%	7.6%
1	46.2%	5.8%	13.5%
2+	50.0%	9.3%	10.6%
Body mass index*			
Underweight (below 18.5)	25.0%		
Normal (18.5-24.9)	46.6%	6.7%	13.5%
Overweight (25-29.9)	44.0%	6.4%	9.8%
Obese (30 and above)	46.6%	5.5%	10.4%
Self-perceived health			
poor or fair	49.8%	8.0%	14.7%
Good	48.2%	5.7%	7.8%
Very good or excellent	33.1%	4.2%	7.8%
Socio-demographic factors			
Gender			
Male	40.1%	7.4%	8.2%
Female	48.2%	5.4%	12.5%
Level of education			
Primary	41.9%	9.3%	8.1%

Secondary	45.0%	4.7%	11.2%
Tertiary	49.4%	7.1%	15.3%
Age group			
50-59	43.8%	4.5%	10.7%
60-69	44.2%	7.6%	9.7%
70-79	51.7%	4.7%	14.0%
80+	25.0%	8.3%	4.2%

* based on valid answers
Source: SHARE Wave 8 COVID-19 Survey 1, Release version: 0.0.1 beta

The results of the multiple logistic regression models (Table 5) are in line with the conclusions of the descriptive analysis. The number of chronic illnesses and self-assessment of personal health status have an impact on the likelihood of visiting a doctor prior to the pandemic. As expected, respondents with one chronic illness were 3.6 times more likely to visit a doctor in 12 months than those without. Respondents with comorbidity have a 9.3-fold higher chance of visiting a doctor before the outbreak. Interestingly, the presence of a condition representing a high risk for Covid-19 did not significantly affect doctors' visits prior to the pandemic. This is probably a signal that Bulgarians underestimate the presence of high-risk conditions. Respondents who rate their health as poor or satisfactory show a 2.7 times higher chance of going to the doctor than those with very good or excellent health self-assessment. Significant factors for visiting a doctor before the pandemic are also gender and education-sensitive: women are 1.7 times more likely than men to visit a doctor, while those with tertiary education are 3 times more likely than those with only primary education.

Following the factor selection procedure, the only factors in the model assessing the chance of visiting a doctor during the pandemic are both self-assessment of health and age. One possible explanation might be that respondents with an unfavourable subjective health assessment needed medical help more frequently during the pandemic. Older people were much less likely to go to the doctor and one possible reason could be the fear of visiting medical facilities due to the pandemic. Delayed treatment could also be influenced by the subjective self-assessment of one's own health: respondents' overestimate their health.

Table 5. Results from multiple logistic regression models

Factors	Doctor visits before pandemic		Doctor visits during pandemic		Forwent medical treatment		Doctor visits before pandemic		Doctor visits during pandemic		Forwent medical treatment	
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.
	Models with all factors						**Models with selected factors with forward procedure**					
Risk disease												
No *(baseline)*												
Yes	1.64	0.13	1.16	0.74	7.34*	0.06	-	-	-	-	-	-
Chronic diseases												
0 *(baseline)*												
1	2.24**	0.01	1.04	0.93	0.27	0.22	3.57	0.00	-	-	-	-

2+	5.28**	0.00	1.07	0.90	0.15*	0.08	9.31	0.00	-	-	-	-
BMI												
Underweight or normal *(baseline)*												
Overweight	1.12	0.43	0.87	0.52	0.69	0.25	1.15	0.34	-	-	-	-
Obese	1.72**	0.00	0.91	0.70	0.67	0.26	1.73**	0.00	-	-	-	-
Self-perceived health												
Very good or excellent *(baseline)*												
Poor or fair	2.75**	0.00	1.83**	0.02	2.39	0.04	2.85	0.00	2.00	0.00	2.04**	0.04
Good	1.86**	0.00	1.75**	0.02	0.88	0.77	1.95	0.00	1.90	0.00	0.98	0.97
Gender												
Male *(baseline)*												
Female	1.71**	0.00	1.28	0.16	1.53	0.15	1.69	0.00	-	-	-	-
Education												
Primary *(baseline)*												
Secondary	2.10**	0.00	1.19	0.40	1.60	0.18	1.95	0.00	-	-	-	-
Tertiary	3.33**	0.00	1.44	0.20	2.36*	0.05	3.10	0.00	-	-	-	-
Age group												
50-59 *(baseline)*												
60-69	0.94	0.69	0.93	0.75	0.72	0.41	-	-	0.92	0.72	-	-
70-79	1.56**	0.02	1.13	0.66	1.11	0.81	-	-	1.13	0.63	-	-
80 and more	1.20	0.50	0.36**	0.02	0.32	0.17	-	-	0.36**	0.01	-	-
Constant	0.32**	0.00	0.41**	0.01	0.05**	0.00	0.35**	0.00	0.54**	0.01	0.09**	0.00

**α < 0.05; *α < 0.10

Source: SHARE Wave 8 COVID-19 Survey 1, Release version: 0.0.1 beta

DISCUSSION

Overestimation of personal health in Bulgaria, despite the presence of chronic conditions or comorbidity, combined with non-attendance of preventive examinations, risk habits and physical immobility increase the risk of severe outcomes from acute viral diseases. However, the increase in life expectancy – the goal of many public policies, in general does not necessarily mean an increase in healthy active ageing. Obesity is an increasing challenge for Bulgarians besides the fact that in general, BMI gets lower in high age cohorts[34].

The deteriorating health status of the elderly in Bulgaria seems to be a strategic risk factor in the case of an epidemic, which is confirmed by the Covid-19 crisis. In spite of the problems in the Bulgarian health-care system[35], individual attitudes towards health and increasing health literacy should be prioritized by public institutions in Bulgaria, along with promoting increased physical activity and preventive medical examinations. Due to the Covid-19 restrictive measures people aged 50+ postponed doctor's visits, which further

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complicated their health status and could be seen as „collateral damage" of the pandemic[36]. The effect of Covid-19 on personal health in Bulgaria is complicated by the small proportion of elderly who postponed their doctor's visits, which could be partially explained by the pandemic and stringency of the government measures. Bulgarians aged 50+ demonstrate an overestimation of their personal health, combined with comorbidity and high BMI.

The general debate about the impact of Covid-19 on health and health strategy should be targeted to the country specifics of Bulgaria. The analysis also supports the political debate[37] for nationally targeted policies for prevention and information on the risk factors for the elderly in Bulgaria. The overall integrated strategy of the EU in relation to zoning countries at risk and the increased spread of Covid-19, in fact, must be carefully weighed in line with the national specifics of each individual country. Bulgaria is an extreme case which reveals several paradoxes: on the one hand - overestimated personal self-assessment of health status, on the other – widespread comorbidity of elderly and extremely high excess mortality, in combination with the lowest levels of vaccination against Covid-19. The state of the Bulgarian health system, the level of health culture and prevention[38], as well as the (un)healthy lifestyle of the elderly should be the subject of both future in-depth research and adequate and effective national policies. Bulgarians aged 50+ perceived themselves as healthy, despite many chronic conditions, but overestimating personal health actually poses the risk of a serious health and social crisis due to the challenges of Covid-19.

ACKNOWLEDGMENTS

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