

Prevalence and fatality rates of COVID-19 in the elder age groups of Azerbaijan population

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The research aimed to study the age-related pattern of infection, and death rate among the confirmed positive cases of coronavirus (COVID-19) infection in people aged 60 and over. The statistical data on the prevalence and fatality rate of COVID-19 were provided by the Gerontological Center (Baku, Azerbaijan) and the Polyclinic of the Central Hospital in Lankaran, located in the south-eastern part of Azerbaijan. The analysis of statistical material has shown that the prevalence rate for COVID-19 is the highest for the age group of 60-75 years. It was also found that the fatality rate among the people aged 60+ with coronavirus infection was age-associated, and was the highest in the 80-89 age group. The obtained findings are consistent with the statistical data for COVID-19 prevalence and fatality rates for other countries and are indicative of a higher risk of death from coronavirus infection in older people.

Keywords: COVID-19, coronavirus infection, age groups, Azerbaijan population

INTRODUCTION

Since the coronavirus outbreak to this day, the COVID-19 pandemic has claimed the lives of more than one million people and infected more than 40 million people in 190 countries (<https://worldometers.info>). The number of the infected is increasing, and there are warning signs of new waves. According to the World Health Organization, the largest number of people infected with coronavirus is reported in the USA (8,489,786), India (7,606,256), Brazil (5,264,293), Russia (1,147,954) and Spain (1,015,795). At the same time, the fatality rate for these countries has the following values: USA - 2.7%, India - 1.5%, Brazil - 2.9%, Russia - 1.7%, Spain - 3.34%.

Officially, the spread of COVID-19 in Azerbaijan began on February 28, 2020, when the first case (a Russian citizen who crossed the border between Azerbaijan and Iran) in the country was reg-

istered by the newly established Operational Headquarters under the Cabinet of Ministers of the Republic of Azerbaijan (<https://koronavirusinfo.az>). According to official statistics, 45,879 COVID-19 cases, 635 deaths and 40,272 recoveries were registered in Azerbaijan as of October 20, 2020 (<https://www.worldometers.info>). The fatality rate of the infection in the country is 1.4% and this figure is lower in comparison with data for other countries, including those with more developed economies (<https://worldometers.info>).

Since the early days of the pandemic, COVID-19 has had the greatest impact on older people worldwide in terms of number of cases, hospitalizations, and deaths (Sudharsanan et al., 2020; Liu et al., 2020). Several months after the beginning of the coronavirus pandemic, older people have been continuing to be at highest risk for severe illness and death from COVID-19 (Omori et al., 2020). Age is undoubtedly the most important factor in predicting the probability of survival of patients

with COVID-19 (Davies et al., 2020). The pandemic is far from over, and therefore, there is a need for more effective ways to minimize the death rates. In this regard, Azerbaijan has promptly responded to the pandemic by timely imposing lockdown, and the number of new cases and deaths is relatively low at present as compared to other countries, however, the scale of the problem and factors of vulnerability cannot be underestimated. Therefore, the main objective of the present study was to identify the most vulnerable population groups for further adherence to COVID-19 prevention measures in a comparative perspective.

MATERIALS AND METHODS

The statistical data on prevalence and fatality rate of COVID-19 among people aged 60 and over were provided by the Gerontological Center (Baku, Azerbaijan) and the Polyclinic of the Central Hospital (Lankaran, Azerbaijan). In our study, we used the data which cover the period 07.06.2020-11.08.2020. The statistical analysis was performed with application of Microsoft Excel and a software package Statistica for Windows.

RESULTS AND DISCUSSION

According to the official statistics by the Gerontological Center, the population of Baku is 2,293,047, of which 319,788 (13.9%) are people aged 60+, with age group of 60-75 making up 11.4% (261,046) of Baku total population at age of 60+. The 75-90 age category represents 2.4% (55,640) of the population of Baku, while the people aged 90+ make up only 0.14% (3,102). Over the mentioned period, 2,469 people aged 60+ tested positive for COVID-19. As can be seen from the above data, this figure is 0.11% of the total population of Baku and 0.77% of the number of people aged 60+. Among the surveyed people with confirmed diagnosis of COVID-19, 54.8% were women (1,354) and 45.2% were men (1115). In our work, it was shown that 1,801 people out of those, who tested positive for COVID-19, recovered, while the fatality rate was 3.7%. Important to note that this figure is 2.4 times higher than that characterizing the general fatality rate of the coronavirus infection in Azerbaijan (<https://worldometers.info>). At the time of our study, 602 people were kept under medical su-

pervision and were receiving treatment. With consideration age classification by the World Health Organization, our work shows that the COVID-19 cases most often occurred in the age group of 60-75. Their number is 2209, which is 89.5% of the total number of those with a positive test outcome. These people make up 0.85% of the total population of Baku in this age category. Of them, 1010 are men (45.7%) and 1199 are women (54.3%). In the 76-90 age group, 249 people tested positive for COVID-19, which in turn amounts to 10.1% of all people with a positive test outcome for COVID-19 and 0.45% of the population of Baku in this age category. Of them, 89 (35.7%) are men and 160 (64.3%) are women. As to age category of long-livers (age 90+), in total 11 long-livers were recorded as infected by coronavirus in Baku, which make up 0.4% of the total number of subjects with a positive test result and 0.35% of Baku residents of this age. Of them, 4 are men (36.4%) and 7 (63.6%) are women.

In general, our work shows that among the representatives of the population of Baku, who aged 60+, the COVID-19 cases most often occurred in the age group of 60-75 years (Fig. 1). It should also be noted that that age group contains the largest number of people in comparison with the other groups studied in our work. In addition, in each studied age group, the number of women who tested positive for COVID-19 is higher than the corresponding number of men.

The quantitative indices of COVID-19 cases among people aged 60+ in various districts of Baku during the survey period are presented in Table 1. As can be seen from the table, the proportion of infected people aged 60+ to the total population of the corresponding district was $0.1 \pm 0.01\%$ (σ : 0.04), which indicates a relatively low number of cases of infection with COVID-19 in each district of Baku. The proportion of COVID-19 cases among people of the above-mentioned age to the population of the same age of the corresponding district was equal to $0.73 \pm 0.08\%$ (σ : 0.27), which, in our opinion, may be associated with an increase in the risk of contracting COVID-19 with age. Obviously, the Pirallahi district shows the smallest number of COVID-19 cases among people aged 60+ in comparison with the other districts of Baku. This fact is presumably due to geographical location of the district in one of the Absheron peninsula islands which prevents the spread of infection.

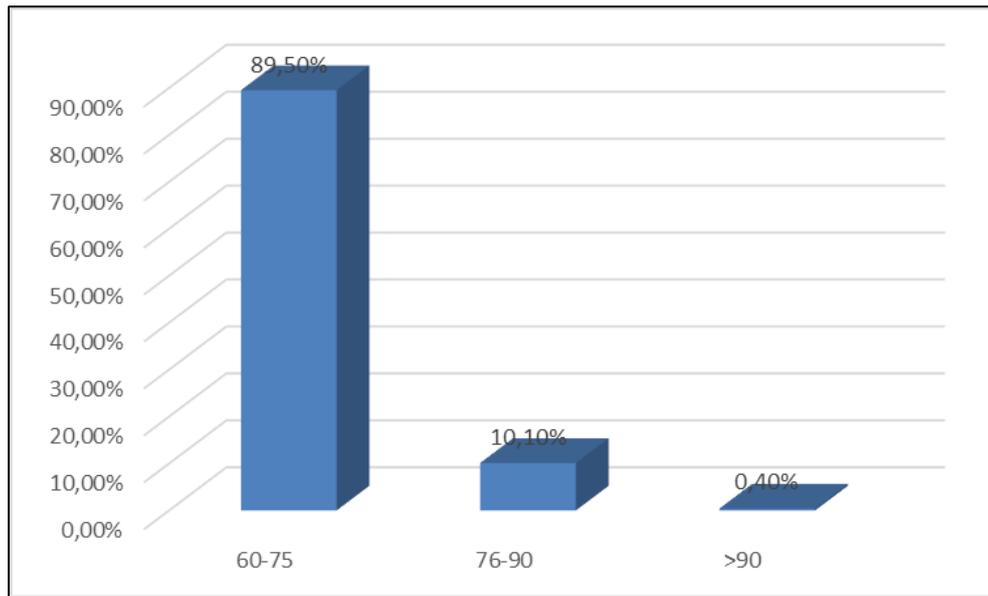


Fig. 1. COVID-19 cases in Baku during 07.06.2020-11.08.2020 (data provided by Baku Gerontological Center)

Table 1. COVID-19 situation by the districts of Baku (07.06.2020-11.08.2020)

Districts of Baku	COVID-19 cases among people aged 60+	Proportion of COVID-19 cases among people aged 60+ to all cases	Proportion of COVID-19 cases among people aged 60+ to the total population of the district	Proportion of COVID-19 cases among people aged 60+ to the population aged 60+ of the district
Binagadi	409	16.6%	0.15%	1.2%
Yasamal	314	12.7%	0.13%	0.79%
Khatai	307	12.4%	0.11%	0.74%
Surakhani	271	11%	0.12%	0.9%
Narimanov	259	10.5%	0.14%	1.0%
Sabunchi	224	9.1%	0.08%	0.7%
Nasimi	212	8.6%	0.1%	0.64%
Nizami	121	4.9%	0.06%	0.4%
Garadakh	119	4.8%	0.09%	0.87%
Sabail	119	4.8%	0.12%	0.75%
Khazar	108	4.4%	0.06%	0.51%
Pirallahi	6	0.2%	0.03%	0.21%

Table 2. COVID-19 situation in Lankaran by age

Age	Male	Female	Deaths	Deaths (male)	Deaths (female)
60-69	38	55	5	3	2
70-79	8	5	2	2	-
80-89	4	4	2	2	-
≥90	-	1	-	-	-

The statistical data on the situation with COVID-19 prevalence and death rate among the elder population (age groups of 60+) in Lankaran (a city located 276 km away from Baku) were pro-

vided by the local Polyclinic of the Lankaran Central Hospital. The analysis of statistical material has showed that among the people aged 60+ (60-69, 70-79, 80-89, ≥90), COVID-19 cases most often occurred in the 60-69 age category (Table 2),

while the fatality rate was 7.8%. This figure is 2.1 times higher than the analogous index obtained from the data provided by the Gerontological Center in Baku and 5.6 times higher than the total death rate of the coronavirus infection in Azerbaijan.

Along with the above, it was also found that the fatality rate among the people aged 60+ with coronavirus infection was age-associated, and it was highest in the 80-89 age group (Fig. 2).

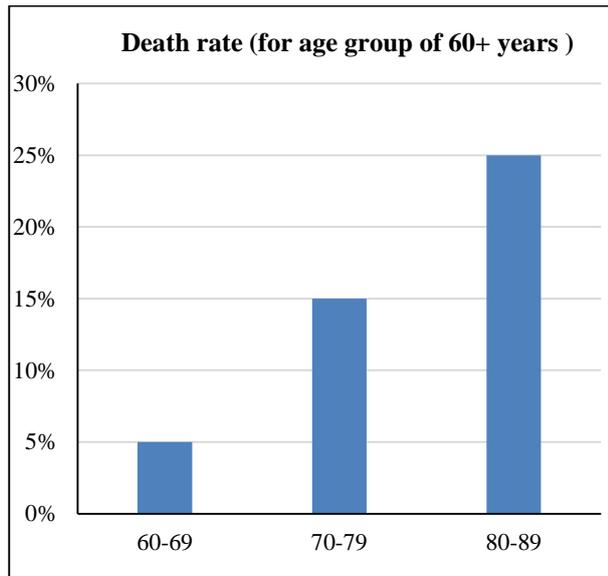


Fig. 2. The death rate among people with COVID-19 in Lankaran by age groups

Our findings serve as one more evidence of the wide-spread opinion by the experts that the elderly population is at the greatest risk for severe illness from COVID-19. At the same time, the case of the full recovery from COVID-19 for female patient at age of 96, which was recorded in Lankaran, is indicative of role of other factors conditioning the final outcome of the disease.

In conclusion, with due consideration of the huge negative impact of the outbreak of coronavirus there is an urgent need to identify the age groups at the highest risk in terms of the disease outcome. As show numerous studies age is one of the major factors conditioning the COVID-19- associated death rate (Zhou et al., 2020). This is because aging is associated with certain changes in lung function during the period of pulmonary infection, and thus age-related differences in responsiveness and tolerance become apparent and lead

to worse clinical outcomes in older people (Liu et al., 2020). Immune aging is one of the first signs of the aging process. So, both innate and adaptive parts of the immune system are impaired with age. In addition, the elderly have a constant production of inflammatory mediators and cytokines (Perrotta et al., 2020). It is known that people under 65 have a very low risk of dying from COVID-19 even in the epicenters of a pandemic, and deaths of people under 65 without underlying predisposing conditions are extremely rare (Ioannidis et al., 2020). Thus, comparing the findings obtained in our study with the data on the other countries, special attention should be paid to the strategies aimed at protecting older people as the most vulnerable population group.

REFERENCES

- Davies N., Klepac P., Liu Y., Prem K., Jit M., CMMID COVID-19 working group and Eggo R.M.** (2020) Age-dependent effects in the transmission and control of COVID-19 epidemics. *Nature Medicine*, **26**: 1205–1211.
- Ioannidis J., Axfors C., Contopoulos-Ioannidis D.** (2020) Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters. *Environmental Research*, **188**: 109890, doi: 10.1016/j.envres.2020.109890
- Liu Y., Mao B., Yang J.W., Lu H.-W., Chai Y.-H., Wang L., Zhang L., Li Q.-H., Zhao L., He Y., Gu X.-L., Ji X.-B., Li L., Jie Z.-J., Li Q., Li X.-Y., Lu H.-Z., Zhang W.-H., Song Y.-L., Qu J.-M., Xu J.-F., on behalf of the Shanghai Clinical Treatment Experts Group for COVID-19** (2020) Association between age and clinical characteristics and outcomes of COVID-19. *Eur. Respir. J.*, **55**(5): 2001112. doi: 10.1183/13993003.01112-2020
- Omori R., Matsuyama R., Nakata Y.** (2020) The age distribution of mortality from novel coronavirus disease (COVID-19) suggests no large difference of susceptibility by age. *Scientific Reports*, **10**(1): 16642. doi: 10.1038/s41598-020-73777-8

Perrotta F., Corbi G., Mazzeo G. (2020) COVID-19 and the elderly: insights into pathogenesis and clinical decision-making. *Aging Clin. Exp. Res.*, **16**: 1–10, doi: 10.1007/s40520-020-01631-y

Sudharsanan N., Didzun O., Barnighausen T., Geldsetzer P. (2020) The Contribution of the Age Distribution of Cases to COVID-19 Case Fatality across countries: A 9-country demographic study. *Annals of Internal Medicine*. M20-2973 <https://doi.org/10.7326/M20-2973>

Zhou F., Yu T., Du R., Fan G., Liu Y., Liu Z., Xiang J., Wang Y., Song B., Gu X., Guan L., Wei Y., Li H., Wu X., Xu J., Tu S., Zhang Y., Chan H., Cao B. (2020) Clinical course and risk factors for mortality of adult in patients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*, **395**: 1054–1062

<https://who.int>

<https://koronavirusinfo.az>

<https://worldometers.info>

Azərbaycan populyasiyasında yuxarı yaş qruplarının COVID-19 xəstəliyinə yoluxma və ölüm halları

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Tədqiqatın əsas məqsədi COVID-19 koronavirus infeksiyasına müsbət testlərin statistik məlumatları əsasında Azərbaycan populyasiyasının yuxarı yaş kontingentinin (60+) müxtəlif qruplarında yoluxmaların və ölüm hallarının rastgəlmə səviyyələrinin təhlili olmuşdur. Bundan ötrü Bakı şəhər herontoloji mərkəzindən və Azərbaycanın cənub-şərq bölgəsində yerləşən Lənkəran şəhərinin mərkəzi xəstəxanasının poliklinikasından təqdim edilən statistik məlumatlar istifadə olunmuşdur. Statistik materialın təhlili göstərir ki, 60 və yuxarı yaş kateqoriyasına daxil olan şəxslər üçün ən çox yoluxma halları 60-75 yaş qrupuna təsadüf edir. Eləcə də müəyyən edilmişdir ki, koronavirus infeksiyasına müsbət test nəticələri təsdiq olunmuş 60+ yaşlı şəxslərdə ölüm halları göstəricisi yaşla bağlılıq nümayiş etdirir və ən yüksək göstərici 80-89 yaş qrupunda aşkar edilib. Əldə nəticələr yuxarı yaş qruplarında koronavirus infeksiyasına yoluxanlar arasında yüksək ölüm riskinin olmasına dəlalət edən digər ölkələrin statistik məlumatlarına uyğundur.

Açar sözlər: COVID-19, koronavirus infeksiyası, yaş qrupları, Azərbaycan populyasiyası

**Заболееваемость и смертность от COVID-19 в старших возрастных группах
Азербайджанской популяции**

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Основной задачей исследования было выявление распространенности заражения и уровня смертности на основе статистических данных о положительных тестах на коронавирусную инфекцию COVID-19 у лиц в возрасте 60 лет и старше. Для этой цели были использованы статистические данные о заболеваемости и смертности от COVID-19, представленные Бакинским геронтологическим центром и поликлиникой Центральной больницы г.Ленкорань (юго-восточный регион Азербайджана). Анализ статистического материала показал, что у лиц в возрастной категории 60 лет и старше наибольшая встречаемость случаев заражения COVID-19 имела место в возрастной группе 60-75 лет. Также было установлено, что у людей 60 лет и старше с положительным результатом на наличие коронавирусной инфекции, показатель смертности имеет возраст-зависимый характер, а наибольший показатель был обнаружен в возрастной группе 80-89 лет. Полученные результаты подтверждаются данными по другим странам, что свидетельствует о высокой степени риска летального исхода у лиц старшего возраста с коронавирусной инфекцией.

Ключевые слова: COVID-19, коронавирусная инфекция, возрастные группы, Азербайджанская популяция