Population Dynamics Leading to Asymptomatic COVID-19

Ashis Shrestha[1]

[1]Department of General Practice and Emergency Medicine, Patan Academy of Health Sciences, Lalitpur, Nepal

ABSTRACT

Considering the population pyramid of our nation, we may get more asymptomatic patients than indicative. The young and asymptomatic population should be aware and take precautions in order to protect the old and vulnerable. The wider population pyramid at younger age group can develop herd immunity which can be our advantage.

Keywords: COVID-19; population dynamics; asymptomatic.

INTRODUCTION

Nepal has observed a surge of coronavirus disease (COVID19) cases in the month of May 2020. As of June 5, 2020, there are 2912 confirmed cases in Nepal, out of which 2879 (98.9%) are in the age group less than 60 years (Figure 1). Inthis less than 60 years population, 1140 (39.1%) patients are in the age group of 21 to 30 years. Male population (2717, 93.3%) are seen to be more affected than female. Till date there has been eleven COVID-19 related deaths.[1]This gives case fatality rate (CFR) of 0.003%. Less than 5% of the confirmed cases are symptomatic.
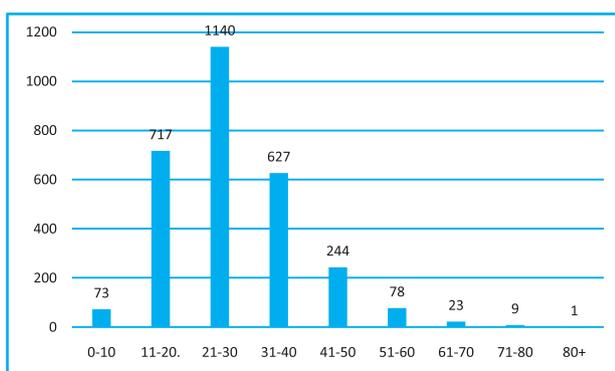
Figure 1. Number of COVID-19 confirmed cases as per age category in Nepal[1]

Correspondence:

Dr. Ashis Shrestha,
Department of General Practice and Emergency Medicine, Patan Academy of Health Sciences, Lalitpur.
Email: ashisshretha@pahs.edu.np

DISCUSSION

Most of the cases of COVID-19 identified in Nepal are asymptomatic or have mild symptoms. This gives us two important hypotheses. Firstly, we have more asymptomatic cases because our most affected populationare in the younger age group. The population above 60 years who are affected is only 1.1%. Secondly, considering the population pyramid (Figure 2) of our country, we may get more asymptomatic patients than symptomatic. If the peak shown in figure 1 shifts towards the population of more than 60 years, we may get increase in proportion ofsymptomatic patientsas well as mortality.

A combined result of 9 countries published on MERS-CoVhas shown the proportion of asymptomatic patients to be 18/144(12.5%).[2] However, asymptomatic COVID-19 patient varies from country to country and dependsupon the population, time and region affected. A report published from China in April 2020 suggested that about four in five COVID-19 infection do not result in symptoms.[3] Another study reported from Beijing showed that 5% of their study

population were asymptomatic with median age of 47.5 years.[4] A total of 634 positive cases detected in Diamond Prince Cruise in Japan had 328 (51.7%) asymptomatic cases and476 (75.1%) cases who were 60 years and older.[5] So, as given in these data, the number of symptomatic patients may increase in Nepal if the population peak of the affectedwill shift from 21-30 years to more than 60 years age group. In Nepal, as most of the population affected are migrant workers who have returned home due to this pandemic, the peak age of incidence and the male preponderance seen at present is just a reflection of this population.

At present, COVID-19 related mortality rate is higher in the age group of more than 80 years. In a study published by China,the CFR was 0.4% for age group of 40-49 years while it was 14.8% for those more than 80 years.[6] In Italy as of March 30, 2020, the reported CFR is 0.7% for those 40 to 49 years, and 27.7% for those above 80 years, with 96.9% of deaths occurring in those aged 60 years and over.[7]A study of CFR of Italy and China shows that the CFR is 0-0.2% in the age group less than 30 years, 0.2-1.3% in the age group of 30 to 60 years and 3.5-20.2% in age group more than 60 years.[8] If we see the demographic characteristics of Italy, 23% of the Italian population are in the age group of more than 65 years.[8]However, in Nepal, only 8.5% of our total population are above the age of 65,[9] (figure 2). Thus, we may observe less symptomatic patients and lesser mortality in comparison to other countries in coming days. This is also evident by a study published from Italy, showingan overall infection fatality rate of 1.31%, as well as large differences by age, with a low infection fatality rate of 0.05% for under 60-year-old (and a substantially higher 4.16% for people above 60 years of age.[10]
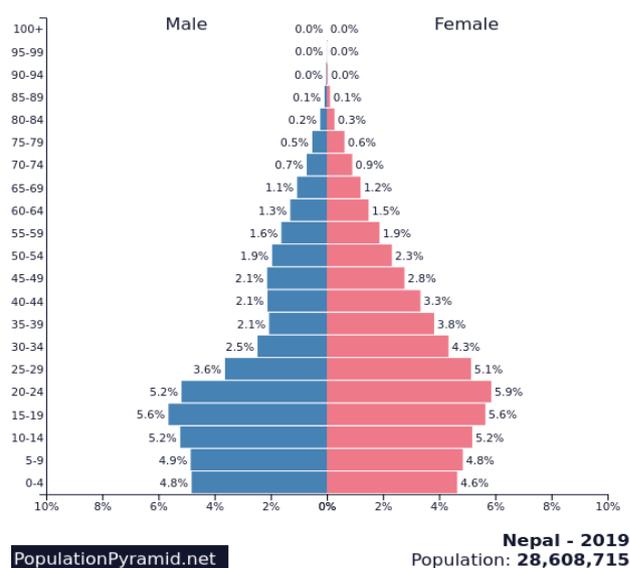
Figure 2. **Population pyramid of Nepal[9]**

Considering total world population of 7.8 billion[11], and 6535354[12]COVID-19 cases identified as of June 6, 2020, the proportion of affected population worldwide is 0.08%. If we hypothetically project this number to our population, minimum population that will be affectedis about 22,887. Proportionating this number with population pyramid of Nepal, which shows that 8.5% of our population are above the age of 60 years, approximately 1945 patients of this age group will be affected and may have moderate to severe symptoms during this outbreak. The average duration of major outbreak in Western countries has been shown to be 127 days (ranging 115 to 138 days).[13]

Mortality however, needs to be analyzed carefully. There needs to be a clear distinction between mortality associated with or directly due to COVID-19 in order to avoid overestimation of the CFR. A study done in a sample population of 355 in China, showed117 patients (30%) had ischemic heart disease, 126 (35.5%) had diabetes, 72 (20.3%) had active cancer, 87 (24.5%) had atrial fibrillation, 24 (6.8%) had dementia, and 34 (9.6%) had a history of stroke. The mean number of pre- existing diseases was 2.7 (SD, 1.6). Overall, only 3 patients (0.8%) had

no diseases, 89 (25.1%) had a single disease, 91 (25.6%) had 2 diseases, and 172 (48.5%) had 3 or more underlying diseases.[8]Thus, the predictors of a fatal outcome in COVID- 19 cases includesincreased age, the presence of underlying diseases and the presence of secondary infection.[14]

CONCLUSIONS

To minimize the mortality rate, the age group of 60 and above needs to protected. In our coming days, rational planning needs to be done in order to identify as many asymptomatic cases as possible. A young asymptomatic or mildly symptomatic population can be returned to the community with awareness and monitoring of precautions to save the population aged more than 60 years. Role of vaccination is important to this specific age group and moreover, we have an advantage of wider population pyramid at younger age group which can develop herd immunity. With respect to a country like ours, with low GDP and developing health care facilities, there needs to be clear balance between lockdown, case identification-treating protocol, quarantine-isolation and the entire economy of the country.

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