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Letter to the Editor

Diabetes and COVID 19 in South-East Asia



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Diabetes in SAER 2020

The South-East Asia Region (SEAR) comprises only seven countries [India, Bangladesh, Nepal, Sri Lanka, Mauritius, Bhutan and the Maldives] but is the second most populous IDF region, after the Western Pacific Region. All countries region are classified as low- or middle- income in 2020, they also experienced as annual economic growth of over 2.59% until the Covid –19 pandemic. The SEAR included more than 1.1 billion adults from 18 to 79 years in 2019 and by 2045 the region is predicted to be home to about 1.3 billion. This region is predominantly represented by India and all other countries are small which leads to heterogeneity in the data. The current 2020 estimates indicate that 8.8% of the adult population from age 18 to 79 years has diabetes. This is equivalent to 87.6 million people living with diabetes. About 56.7% of these are undiagnosed and one third are in urban areas and half live in large cities. Mauritius has the highest adult diabetes prevalence rate in this region (22% age-adjusted prevalence), followed by Sri Lanka (10.7% age-adjusted prevalence) and India (10.4% age-adjusted prevalence). India is home to the second largest number of adults living with diabetes worldwide, after China (rapidly changing). India is expected to overtake China as the world's most populated country. There are an estimated 184,100 children and teenagers under the age of 20 living with type 1 diabetes in the South East Asia Region.

India is home to the second largest number of children and teenagers from age 0 to 19 with type 1 diabetes in the world (171,300), after the USA, and accounts for the majority of the children and teenagers. With 1.2 million deaths in 2019, the region had the second highest number of deaths attributable to diabetes of any of the seven IDF regions, after the Western Pacific Region. Nearly half (51.5%) of these deaths occurred in people under 60 years of age. India was the largest contributor to the regional mortality, with more than 1.1 million deaths attributable to diabetes [1].

COVID 19 in SAER

Covid 19 has spared no country of the region. India leads with 190,791 cases with the states of Maharashtra, Tamil Nadu, Delhi and Gujarat leading the numbers with a Case fatality rate of 2.8% compared to the global 6.2% [2]. Bangladesh has 47,153 cases with 650 deaths and has used many innovative regimens for treatment. Sri Lanka has 1620 cases with 10 deaths. Mauritius has 335 cases with 10 deaths. Nepal has 1401 cases with 6 deaths. Bhutan has only 43 cases with no death. Maldives has 1672 cases with 5 deaths.

COVID 19 and Diabetes

Type 2 Diabetes is an important comorbidity the region and is part of the covid vulnerability and mortality score (Table 1) [2]. Diabetes especially male sex, elderly, obesity and with associated hypertension and heart disease acceler-

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Table 1 – Indian COVID-19 risk score (vulnerability, mortality risk).

1. Age more than 55 years
 2. Male gender
 3. Hypertension
 4. Diabetes
 5. Obesity
 6. Chronic heart disease
 7. COPD or asthma or chronic lung disease
 8. Chronic kidney or liver disease
 9. Any congenital or acquired immunodeficient state
 10. Any users of corticosteroid or immunosuppressants or transplant recipients
- *Pregnancy or children below 10 years need attention

(Adapted from Joshi SR, JAPI with permission)

ates progression to severe covid 19 including cytokine storm, coagulopathy and death. Many patients in the ‘hot spots’ of India had diabetes ketoacidosis as the first presentation with the virus. Covid 19 initially worsens hyperglycaemia as it progresses and also unmasks diabetes in prediabetes. Ten percent of Covid 19 subjects with no diabetes history have hyperglycaemia which could be due to pancreatic isletis or stress hyperglycemia. Mortality is common in diabetes accounting for almost in one third of deaths. As the pandemic evolves, various national societies (Association of Physicians of India, Indian College of Physicians) have evolved recommendations for care of diabetes and covid 19 [3].

Coronaviruses are enveloped non-segmented positive sense RNA viruses belonging to the genus *Beta coronavirus* of the subfamily *Orthocoronavirinae* in the family *Coronaviridae*. The classical virus docks via its spike S protein of the viral envelope to the angiotensin converting enzyme type2 (ACE2) in the lungs and the gut. A variety of human proteases, such as trypsin, tryptase clara, human airway trypsin-like protease (HAT) and transmembrane protease serine 2 (TMPRSS2), are known to cleave and activate the S protein of SARS-CoV. The current SAR S CoV2 typically attaches via the Spike protein to the ACE 2 enzyme and TMPRSS protease play the crucial role in its tropism and expression. The ACE 2 enzyme polymorphisms in the south Asian population are well known but currently we don't have data to suggest that they are linked to the higher mortality in the regional ethnic groups. The high prevalence of Insulin resistance seen in the SEAR ethnicities with the local geographies as well as the migrant populations in UK and USA may be linked to the higher mortality in this cohort [2–4].

Recommendations for Covid 19 treatment in SEAR essentially involve 5 day course of hydroxychloroquine (800 mg day 1, 400 mg day 2–5) with azithromycin (500 mg daily) with ECG monitoring. Bangladesh followed by India now are now using doxycycline (100 mg bid, 5days) and Ivermectin (12 mg daily 3 days) especially with prolonged QT intervals. Antivirals like Remdesivir are available in Bangladesh and are in trials in India. The moderate cases need prone position, oxygenation including non-invasive ventilation and short course of steroids (which can aggravate hyperglycaemia). Severe cases often get IL6 blockers (Itolimab, Tocilizumab) and occasional plasma therapy apart from mechanical ventilators. In hospital diabetes care essentially focuses on Insulin including IV drips and medical nutrition therapy. All

diabetics usually are on low dose aspirin and statin therapy and in hospital on DVT doses of low molecular weight heparin [4].

Covid 19 subjects with diabetes who are asymptomatic with hydroxychloroquine need monitoring for hypoglycaemia, Oral agents usually are continued. However metformin doses are lowered and SGLT2 inhibitors, GLP1 analogues are avoided. Insulin remains the preferred agent apart from DPP4 inhibitors. Currently it is unknown if DPP4 inhibitors or angiotensin receptor blockers (ARB) or angiotensin converting enzyme inhibitors (ACE) are beneficial. They should not be stopped and may prevent lung injury like hydroxychloroquine. Healthcare workers (HCW) have all been given weekly prophylaxis with hydroxychloroquine by ICMR and they have now published data to demonstrate their safety and efficacy [5]. HCWs who took the prophylaxis actually were protected and if they got Covid 19 had milder infection with no deaths [5].

Health expenditure, diabetes care and access during Covid 19 lockdown in SEAR

The total health global expenditure in SEAR on people with diabetes in 2020 was 8.2 billion USD, which makes the SEA region the lowest total health expenditure on diabetes of 7 IDF regions. However, the region will experience a large growth in health expenditure on diabetes in the next decades, reaching USD 14.8 billion (ID 51.8 billion) in 2045. Regarding the mean expenditure per person with diabetes, the highest estimate in 2019 in the region was in the Maldives, while the lowest was in Bangladesh. Despite of the lower numbers here presented in comparison with other parts of the world, these correspond to significant share of the total resources available. On average 8.4% of the total expenditures on health were directed to people with diabetes, being the highest percentage in the Mauritius (16.4%), while the lowest was Nepal with only 4.2%.

All countries of the SEAR were locked down after March and have had issues with access, availability and affordability of Diabetes care and medication supplies during the pandemic. Routine care was almost halted and only emergencies especially cardiac and surgical were attended and they often had delays and hurdles due to resources being diverted to Covid 19 care. People with diabetes on dialysis had to undergo hardship with frequent Covid testing for regular dialysis care. There was initially panic buying and stocking of antidiabetic medicines and insulin which lead to shortages in some geographies

including central India and Sri Lanka. Challenges of lack of cold chain of Insulin and Insulin stocks not been available was seen in remote access and rural places. Type 1 Diabetes and Pregnancy with diabetes were also affected. Ramadan coinciding with the lockdown further made the difficulty of access to care and supplies more acute. The true estimate of the impact of lockdown on diabetes care on glucose control and complications will only be studied after the lockdown will be over.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

- [1] IDF atlas 2019 pg. 74.
- [2] Joshi SR. Indian Covid 19 risk score, comorbidities, and mortality. *J Assoc Physicians India* 2020;68:11-2.
- [3] Joshi SR, Tiwaskar M, Shah SN. Covid 19 diabetes and obesity API-ICP recommendations. *J Assoc Physicians India* 2020;68:13-7.
- [4] Bhandari S, Bhargava A, Sharma S, et al. Clinical profile of Covid 19 patients admitted in a tertiary care hospital in north India. *J Assoc Physicians India* 2020;68:13-7.
- [5] Rathi S, Ish P, Kalantri K, Kalantri S. Hydroxychloroquine prophylaxis for covid 19 contacts in India. *Lancet Infect Dis* 2020. [https://doi.org/10.1016/S1473-3099\(20\)30313-3](https://doi.org/10.1016/S1473-3099(20)30313-3).