ELECTIVE (SSC5a) REPORT (1200 words)

A report that addresses the above four objectives should be written below. Your Elective supervisor will assess this.

Report

It is estimated that over 75% of total deaths (1) in Sri Lanka during 2019 in were due to NCDs (non-communicable diseases), encompassing conditions such as arthritis, cardiovascular disease and cancer that lasted more than one year, yet could not be cured through simply medication.

These changes are largely due to a demographic transition, where the shift to an older population has predisposed individuals to a greater risk of developing NCDs. Similarly, physical and behavioural patterns such as increased smoking and a trend toward a sedentary lifestyle have been contributing factors, leading to a rise in chronic health conditions. As echoed by the World Bank (3), this is attributed to Sri Lanka's urbanisation and economic development and reflects a movement away from agricultural lifestyles that were once dominant. Additionally, there has been a rise in NCDs simply due to an improvement in detection and reporting (2). This is especially pertinent given the civil war that ended in 2009, which previously placed strain on the country and made medical recording impossible.

As displayed in Figure 1, Sri Lanka largely now shares a similar disease profile to the rest of the world, with ischemic heart disease most prevalent with regards to both DALY (disability-adjusted life years) and total mortality. Additionally, diabetes has become more prevalent, although globally (4) this only ranks 9th, with stroke ranking second, chronic obstructive pulmonary disease and other respiratory tract infections ranking 2nd to 4th respectively. It is therefore apparent that diabetes remains a major source of concern within Sri Lanka compared to the rest of the world.

Ranking diseases by DALY

Rank	Top Diseases in 2019	DALYs in 2019	DALYs in 2009	% change	Change in rank
1	Diabetes mellitus	492,203	365,144	34.8%	↑
2	Ischemic heart disease	489,315	448,210	9.2%	↑
3	Stroke	317,411	307, 676	3.2%	↑
4	Self-harm	198,570	203,206	-2.3%	↓
5	Low back pain	194,301	161,816	20.1%	↓
6	Chronic kidney disease	167,230	138,216	21.0%	↑
7	Asthma	166,925	170,001	-1.8%	↓
8	Road injuries	156,809	158,673	-1.2%	↓
9	Neonatal disorders	146,548	227,163	-35.5%	↓
10	Headache disorders	145,955	134,626	8.4%	↓

Ranking diseases by number of deaths

Rank	Top Diseases in 2019	Deaths in 2019	Deaths in 2009	% change	Change in rank
1	Ischemic heart disease	23,968	20,741	15.6%	↔
2	Stroke	14,363	14,201	1.1%	↔
3	Diabetes mellitus	13,273	10,280	29.1%	↑
4	Asthma	8,228	8,259	-0.4%	↑
5	Chronic kidney disease	5,559	4,582	21.3%	↑
6	Chronic obstructive pulmonary disease	5,027	4,432	15.8%	↑
7	Lower respiratory infections	4,699	4,091	14.8%	↑
8	Self-harm	4,424	4,383	0.9%	↓
9	Cirrhosis and other chronic liver diseases	4,368	4,215	3.6%	↔
10	Alzheimer's disease and other dementias	4,140	2,778	49.0%	↑

Rank Legend : ↔ Same Level ↓ Decrease ↑ Increase

Figure 1 – Table showcasing the disease profile within Sri Lanka (3). As can be seen, the prevalence of T2D, low back pain and CKD has risen substantially, whilst neonatal conditions have decreased. Ischaemic heart disease remains a substantial cause of both death and DALY.

While this effect can be attributed to the aforementioned demographic transition and rapid urbanization and lifestyle changes, it is also thought to be due to a genetic predisposition (5). In this instance, South Asians and specifically Sri Lankans, are more susceptible to developing diabetes even at lower levels of obesity.

Given this issue, Sri Lanka has already tried to implement a few healthcare screening and prevention strategies directly related to diabetes. The Diabetes Prevention Task Force (6), for example, was formed in 2005 under the instruction of the Sri Lanka Medical Association and has only been growing in strength. It consists of three components with the primary aim centred around training nurses from the state health service to become diabetes educators. The course is quite revolutionary in that it focuses on a cost-effective approach to prevention, whereby nurses undergo a detailed training program that includes a two-week initial course covering facets of diabetes, including surrounding psychosocial issues and pharmacological and non-pharmacological solutions for its treatment. Upon completion, nurses then work in medical clinics, providing patients with advice on lifestyle modification and

encouraging self-care.

Additionally, the second component aims to establish a partnership between primary and specialised tertiary care services to ensure continuity of care. The last component focuses on health promotion, targeting schools and urban communities to encourage healthy eating and increase educational awareness and/or screening.

On a more national scale, Sri Lanka has tried to assess quality of care for diabetes through implementing national guidelines for the treatment and management of diabetes. While it can be argued that guidelines have the potential to reduce clinical autonomy, in conditions where pathology is less ambiguous, they can provide a useful framework for quickly assessing and treating patients, optimising efficiency. For instance, it can be seen that Sri Lanka follows similar diagnostic guidelines and that the management is identical (7).

There are numerous other programmes that also exist, including the National Initiative to Reinforce and Organise General Diabetes Care in Sri Lanka (NIROGI Lanka) project, which function similar to the Diabetes Prevention Task Force, but are limited in its geographic coverage as only dense areas such as Colombo, Kalutara, Ratnapura, Kandy and Galle are covered.

The UK, in contrast, also employs guidelines similar to that of Sri Lanka, with the National Institute for Health and Care Excellence (NICE) outlining the diagnostic criteria and treatment plans necessary for various forms of diabetes. However, what is worth noting is that the UK benefits from a centralised primary care medical record system, whilst in rural Sri Lanka (comprising greater than 80% of the population) this is not possible. As such, the UK benefits from a more integrated healthcare system where it is possible to track HbA1c levels and monitor diabetes on a more routine basis. Having said that, the UK National Screening Committee does not currently recommend screening for type 2 diabetes, given there is no evidence that it is beneficiary and that finding it earlier results in greater health benefit. Perhaps this is reflective in the UK's confidence in its' advanced healthcare system, where is believes it is able to capture diabetes patients routinely and where necessary. In addition, the 'Healthier You: NHS Diabetes Prevention Programme' helps identify high-risk patients and refers them onto a nine-month, evidence based lifestyle change programme.

Overall, when comparing between Sri Lanka and the UK, it can be seen that both employ low-cost measures such as the use of national guidelines. However, the UK's advanced healthcare system means screening is not as necessary and the control of disease is not as reliant on small teams of nurses as per the Diabetes Prevention Task force and the NIROGI Lanka Project. Additionally, the issue does not seem to be growing as rapidly as in Sri Lanka. While these initiatives are to be commended, it is simply not feasible for Sri Lanka to implement such a strategy on a national basis, not to mention there are clear downsides in geographical accessibility. This creates inequality and an unfair healthcare system.

One way in which AI could assist in tackling this healthcare problem is through the adoption of predictive analytics. Whilst the UK uses models such as QDiabetes2018, it is not as widely accepted in clinical practice. In contrast, risk prediction models could harness large datasets to identify individuals at high risk of developing diabetes based on risk factors such as age, weight and family history. In more urban areas, such as where NIROGI Lanka is deployed, this alternative could free up resources to rural and underserved areas. Given cost is the major barrier, this could be highly effective.

Additionally, large language models (LLMs) could supplement nursing educators by providing information in a conversational matter. For example, what dietary advice should be followed or perhaps specific exercises that may be helpful. Certainly, in a more global context, this is the premise behind software such as ChatGPT and Perplexity and again, would be a cost-effective measure that conveys the same information perhaps even in a more comprehensive manner. Given how complex AI can be, this could be further developed into more interactive learning aids, with adaptive games or adaptive virtual assistants able to function as teachers.

Finally, AI could help implement a more autonomous monitoring of medical conditions such as diabetes. For instance, as continuous glucose monitoring becomes cheaper, AI could help analyse data from wearables to provide insights and personalised healthcare alerts to at risk patients. This could also facilitate virtual consultations and make diabetes treatment more accessible even in remote areas. Whilst Sri Lankans otherwise have good access to healthcare and primary providers, this could provide means to access secondary care specialists, especially if each town was equipped with the appropriate technology.

What is apparent, however, is that whilst the implementation of AI above is specific to diabetes within Sri Lanka, the same principle can be applied globally to countries where healthcare accessibility is an issue and where cost represents a significant barrier. AI, in that sense, has the means of facilitating a high quality of reliable and consistent care. Throughout this project, this is something I have personally grown to appreciate, having built Chatbots using Python as part of Codecademy's self-directed learning platform. This has helped me appreciate how AI truly can be applied to help solve medical problems globally.

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