



Addressing the Burden of Non-communicable Diseases: Saudi Arabia's Challenges in Achieving Vision 2030

Fahad Albejaidi¹ and Kesavan Sreekantan Nair^{2*}

¹College of Public Health and Health Informatics, Qassim University, Al Bukayriyah-51941, Saudi Arabia.

²Department of Health Administration, College of Public Health & Health Informatics, Qassim University, Al Bukayriyah-5194, Saudi Arabia.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i35A31871

Editor(s):

- (1) Dr. Syed A. A. Rizvi, Nova Southeastern University, USA.
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Reviewers:

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 - (5) Monicah Njambi Kibe, Rift Valley Institute of Science and Technology (RVIST), Kenya.
- Complete Peer review History: <http://www.sdiarticle4.com/review-history/69969>

Original Research Article

Received 25 April 2021
Accepted 30 June 2021
Published 03 July 2021

ABSTRACT

Non-communicable diseases (NCDs) pose critical challenges in achieving Saudi Arabia's Vision 2030. This paper provides an overview of NCDs in Saudi Arabia and identifies various critical issues and challenges in reducing the burden of NCDs. All relevant data for this paper was extracted from existing published literature in various database including Medline, Scopus, ScienceDirect and PubMed. Google Scholar search engine was used to identify papers and reports on relevant literature published after the year 2000. NCDs account for about 73% of all deaths in Saudi Arabia. Deaths due to cardiovascular diseases account for 37% of all deaths, cancers 10%, diabetes mellitus 3% and other NCDs cause 20% of all deaths. Economic costs of NCDs likely to increase with the undesirable life style of youths and increasing share of old population. Further,

*Corresponding author: E-mail: k.nair@qu.edu.sa;

the shortage of local health workforce, lack of primary health care focus and covid-19 pandemic are likely to affect the government efforts to prevent and control NCDs. Ministry of Health (MOH) needs to play a catalyst role in raising awareness of population through multi-sectoral linkages and policies to reduce the exposure to NCD risk factors. There is a need to review all relevant policy documents to ensure consistency of these policies with prevention and control measures of NCDs.

Keywords: *Non-communicable diseases; prevention; health policy; pandemic.*

1. INTRODUCTION

Non-Communicable Diseases (NCDs) are becoming an important threat undermining health gains and imposing heavy economic burden on governments and households worldwide. Today NCDs cause death to 41 million people annually, which is equivalent to 71% of all deaths globally [1]. The burden of alarming increase in NCDs is enormous, not only in diagnosis and costs of treatment, but also in premature deaths. An estimate in the United States suggests that economic loss from premature deaths due to NCDs will be more than US\$ 30 trillion in the next 20 years, which was equivalent to 48% of Gross Domestic Product (GDP) in 2010 [2]. The World Health Organization (WHO) projected that NCDs will account for almost 70% deaths globally by 2025, with 85% of these occurring in developing countries [3]. Almost 80% of all NCD deaths in Saudi Arabia may be due to the factors that cause four major diseases such as cardiovascular diseases (including stroke), cancer, diabetes and chronic respiratory diseases [1].

In Saudi Arabia, NCDs pose a substantial public health challenge largely due to changing pattern of diseases and life styles of population [4]. These diseases account for 73% of all deaths in the Kingdom in 2019 [5]. Heart diseases alone accounts for about 46% of all deaths [6]. The premature death, morbidity and disability associated with these diseases have significant adverse effect on country's socio-economic development. Currently, NCDs are estimated to cost Saudi Arabia US\$18.6 billion per annum, or 2.8% of GDP [7]. Over last decades, Saudi Arabia has made remarkable progress in improving the health of its citizens; especially in areas of maternal and child health and reducing communicable diseases, which resulted in improved life expectancy at birth from 64 years (1970) to 75 years (2015) [8]. With improvement in life expectancy, the number of old population is expected to reach from 1.96 million (2018) to 4.63 million by 2030 [8]. Further, Saudi Arabia's

population of 33.5million (2018) is expected to reach 39.5 million by 2030 [9]. Saudi health system is largely a public funded and delivers comprehensive health care services to its population through vast network of over 2390 primary healthcare centers and 284 hospitals (with 43680 beds) managed by the Ministry of Health (MOH) and 47 hospitals (with 12662 beds) by other ministries and government agencies. The private sector delivers health services through 163 hospitals (18883 beds), 1376 general polyclinics, 1546 specialized poly clinics and 63 private clinics across the country [8].

In 2016, Saudi Arabia implemented a comprehensive strategic plan "Vision 2030", which has added new challenges as well as opportunities for the health system [10]. The vision provides a new direction in ascertaining strategic goals, priorities, and objectives across all economic sectors including the health sector. Reducing the burden of NCDs is one of the key aspects of the vision. The National Transformation Program (NTP) - 2020, was one of the executive programs to achieve the vision, has identified various challenges for realizing the goals [11]. The NTP, for the health sector has approved 15 strategic objectives and 16 key performance indicators (KPIs). In order to implement the NTP in preferred direction, the MOH developed a long-term road map called the Health Sector Transformational Plan (HSTP) [11]. The MOH's Health Sector Transformation Strategy (HSTS) also identified key policies including prevention and control of the risk factors of NCDs [9].

The objective of this paper is to provide an overview of NCDs in Saudi Arabia, effect of covid-19 pandemic and various critical issues and challenges that need to be addressed in achieving NCDs related goals envisaged in the Vision- 2030. The inferences based on this paper will be a valuable step towards development of an appropriate policy for prevention and control of NCDs in Saudi Arabia.

2. METHODOLOGY

This paper is primarily based on literature review and documentation analysis. All relevant information for this paper was extracted from existing published literature in various databases including Medline, Scopus, Science Direct and PubMed. Google Scholar search engine was used to identify papers and reports on relevant literature and reports published after the year 2000. In exploring the issues of NCDs under the vision-2030, the researchers used key words 'Saudi healthcare system, Saudi vision-2030, 'non-communicable diseases', prevention and control' 'health workforce', 'health financing', 'primary health care' and 'covid-19' to select peer reviewed articles and reports. Other documents that have been significant for the paper includes research publications, policy and planning documents, government reports, publications of the World Bank, WHO, annual reports of the MOH in Saudi Arabia and newspaper reports. All information thus collected was analyzed for their contents and the significant information related to search areas was included.

3. BURDEN OF NCDs IN SAUDI ARABIA

It is estimated that NCDs account for about 73% of all deaths in Saudi Arabia in 2016. The cardiovascular diseases account for 37% of all deaths, cancers for 10%, diabetes mellitus for 3% and other NCDs caused 20% of all deaths [12]. The prevalence rates of these diseases are expected to continue in the future. The probability of dying prematurely before attaining the age of 70 years from any of these diseases is 17%. Among cardiovascular diseases, deaths due to coronary heart diseases account for 24.25% of total deaths in 2017 with the age adjusted death rate of 174.22 per 100,000 population. Deaths due to stroke account for 11.71% of all deaths with the age adjusted death rate of 82.82 per 100,000 population [13]. Risk factors of these diseases are common among general population, with hypertension as a leading cause of mortality and disability, prevalent among nearly 17.7% of males and 12.5% of females. The risk of hypertension increases with ages and it recorded 65.5% among 65+ year population. Kidney diseases which account for almost 5.78% of all deaths with the age adjusted death rate of 41.05 per 100,000 population, ranks 11th in the world. Other major NCDs are diabetes and liver diseases accounting for 2.33% and 2.05% of all deaths in 2017. The global burden estimates 2017 shows that Saudi Arabia has an age-

standardized incidence of cancer at 91 per 100, 000 and a mortality rate of 54 per 100, 000 population per year [6]. Breast cancer accounts for the highest (8.7%) incidence and mortality rates, with nearly 2800 new cases diagnosed every year, leading to about 800 deaths. Other type of cancers among females include colorectal, corpus uteri, thyroid and non-Hodgkin lymphoma. The most common cancers among males include colorectal, lung, prostate, non-Hodgkin lymphoma and livers.

In Saudi Arabia, chronic obstructive pulmonary diseases (COPDs) forms about 3% of all deaths, with a higher prevalence among males (3.5%), compared to 1% for females. Prevalence of diabetes is growing and currently it is estimated that more than 3 million people diagnosed with the problem. The diabetic prevalence is higher among males (14.8%), as compared to females (11.7%). Hypercholesterolemia is found to be 9.5% among males and 7.3% among females; a higher cholesterol prevalence of 29% is found among population over 65 years [5]. A recent study across national surveys across 13 regions of the Kingdom, assessed the prevalence of NCDs among Arabic speakers aged 18 or older according to their self-reported medical conditions [14]. The most reported conditions were cardiovascular diseases (15.1%) followed by respiratory diseases (14.16%). An analysis of the cancer registry of patients in the Kingdom during 1999 – 2015, has projected an increase in number of cancer cases by 63% by 2030, with a greater proportionate increase in female cases [15].

There are few estimates available on economic burden of NCDs in Saudi Arabia. A recent estimate shows the future cost of all cancers at \$7.91 billion in 2015 value which includes \$3.76 billion for case management and \$4.15 billion for lost productivity [7]. Another study on diabetes estimated that people diagnosed with diabetes, on average, have medical expenditures that are ten times higher (\$3,686 vs. \$380) than what expenditures would be in the absence of diabetes [16]. Over 96% of all medical expenditures attributed to diabetes treatment of Saudi nationals, with the remaining 4% incurred by persons of non-Saudi nationality. The national healthcare burden because of diabetes is much higher than \$0.87 billion estimated in this study, because it does not include the indirect costs associated with diabetes, such as lost productivity from disease-related absenteeism, disability and mortality. Moreover, the social cost

of intangibles such as pain and suffering and care provided by non-paid caregivers as well as healthcare system administrative costs, cost of medications, clinician training programs, and research and infrastructure development were excluded in this study. A review based on studies conducted in the Arab region revealed that NCDs' management costs in the region are high; however, there is a large variation in the methods used to quantify the costs of NCDs in these countries, making it difficult to conduct any type of comparisons [17]. A study on cardio-vascular diseases (CVDs) in Saudi Arabia projected a total number of CVD cases in the country by 2035 and estimated an increase in economic burden to US\$9.8 billion [18]. CVDs remained the top ranked level 2 cause of disability adjusted life years (DALYs) in the country [5].

4. RISK FACTORS OF NCDs

The major NCD risk factors in Saudi Arabia include tobacco use, unhealthy diet and physical inactivity. Although the overall prevalence of tobacco use in the country (12.4%) is lower than global prevalence of tobacco use (18.7%), this risk factor has shown a steady increase in both males and females [7]. The national health survey shows that about 50% of the women and 23% of the men were physically inactive; the rate of obesity has reached 28.7%, while overweight was reported as 30.7% in the age group of 15 years and above for males and females; daily consumption of fruits and vegetables remains low, almost 61% of men and 57% of women do not consume even one portion of vegetable every day and only 7.6% of adult population reported to be consuming the recommended intake of at least 5 servings of fruit, fruit juice and vegetables [19]. Similarly, sodium chloride intake per day is found to be high, with a mean sodium chloride secretion of 9.3 g/day in 2016 as against the WHO recommendation of lower than 5g per day [19,20].

A cross-sectional study among employees at King Faisal University found that more than 50% of the respondents had 3 or more NCD risk factors. Of all respondents, 22.75% were current smokers, 73% were physically inactive, 64% were overweight or obese, 22.1% had hypertension, and 21.5% had diabetes [21]. High cholesterol levels and elevated triglycerides were found in 36.6% and 36.1% respectively. According to the WHO's diabetes country profile report (2016) of Saudi Arabia, 58.5% of the adult population was considered physically active with

women outnumbered (67.7%) the men (52.1%) [22]. Another study reveals that more than 40% of individuals who had developed diabetes were not aware of it, and almost 39% of those who were taking treatment did not control their diabetes [23]. Available estimates showed that almost 4.5 million people in Saudi Arabia is likely to be affected by diabetes mellitus by 2030. A recent study on association between NCDs and behaviour risk factors among 18 years old population in the country showed that 30% of them had CVDs, 23% had respiratory diseases, while 3% had diabetes [24]. Among these populations, the habit of smoking was found among 52%, inadequate physical activity 49%, skipping of meals by 24% and inadequate smoking by 30% respectively. These findings reflect the fact that NCDs has reached an alarming proportion in Saudi Arabia.

5. CURRENT POLICIES TO REDUCE RISK FACTORS

Saudi Arabia has considered health as a cross-sectoral strategy and emphasized on social determinants of health. The General Directorate of NCDs at the MOH coordinates efforts of all sectors to improve awareness of NCDs among people and promote prevention and control of all risk factors. However, in practice, most of NCDs prevention and control in the country is health sector driven and role of non-health sector' has been limited. Non-health ministries were neither involved in the development of plan nor any mechanism available for joint implementation by different ministries. Similarly, the Kingdom's current plan for NCDs, based on the Gulf Cooperation Council (GCC) approach has not given due importance to non-health sector. However, vision-2030 and its corresponding NTP-2020 have provided a basis for planning, coordination and implementation of multi-sector and multi-stakeholder approach to prevention and control of NCDs [10,11]. The NTP-2020 in the health sector also provides a framework to scale up involvement of non-health sector into prevention and control of NCDs strategic plan. Currently, the screening program for NCDs has been actively implemented by the MOH across the Kingdom. However, there exists poor coordination and linkages with non-state sectors and stakeholders in the program. In order to reduce the prevalence of tobacco use, the government has initiated measures like increasing value added tax, curtailing promotion, warning labels on package, announcing smoke free places, strengthening smoking cessation

counseling sessions in primary health centres. However, limited information is available on the effectiveness of these measures on reducing prevalence among adult population.

6. IMPACT OF COVID-19 ON NCDs

The covid-19 has produced a profound blow to the health systems in most countries including Saudi Arabia. In the early outbreak of the virus, the WHO cautioned that almost 150 million people living with NCDs in the eastern Mediterranean region including Saudi Arabia, are at increased risks of becoming critically ill with covid-19 due to pre-existing diseases [25]. The region has reported surge of NCDs due to risk behaviour such as use of tobacco, unhealthy dietary habits and lack of physical activity leading to high blood pressure, high level of fat in the blood and obesity [25].

NCDs are the major risk factors for patients suffering with covid-19 and hence prevention and control of NCDs are significant during the covid-19 pandemic [26]. Initial data from Italy showed that almost 98.8% of covid-19 deceased patients had comorbidities and most common comorbidities were hypertension, diabetes and ischemic heart diseases [27]. The exponential growth of the covid-19 pandemic gives rise to critical concern with regard to the functioning of health systems not being able to cope with increased health care needs of population in a short time period. Global evidences suggest that covid-19 affect all people irrespective of their ages and sex, but the virus is more likely to affect older age group and those people with pre-existing NCDs. Evidences also show that people are badly affected with acute morbidities unrelated to covid-19 due to reorganization of existing health resources and redeployment of health workforce for treating covid-19 patients; early discharge of patients to free up beds, postponing treatment for existing patients including specialist appointments [28-31]. Another dimension of impact is of people with chronic illnesses, or those requiring less urgent care which might have been disturbed. Any disruptions in seeking medical assistance for non-covid symptoms or failure of early detection of some of NCDs due to limited access to health care are likely to compound the health problems of people.

The covid-19 has created a huge socioeconomic uncertainty among countries, the impact of which is much higher in developed nations. The countries have adopted varying degree of social

distancing policies to mitigate the spread of the virus and those introduced such policies for longer time are expected to face serious economic repercussions in terms of productivity, growth and employment. Although social distancing measures have tremendous benefits to reduce the spread of the virus, but are likely to have a huge impact on the economy due to loss of employment and income of workers [32,33]. An economic impact analysis of covid-19 in Canada establishes that benefit of a lockdown of economic activity in a short period can outweigh the potential cost of enormous spread of the virus, particularly when the health systems are overloaded [34]. If employment and income continues to fall, there will be permanent increase in NCDs, particularly conditions like cardio vascular diseases, respiratory illnesses and mental health conditions. This reflects that the government's response to covid-19, will not just to protect employment and income in the short run, but also needs to address methods to increase budget requirements for treatment of increasing number of NCDs.

7. DISCUSSION

In September 2011, the UN General assembly endorsed a declaration urging all member states to integrate NCDs prevention and control into their national agenda [35]. Global action plan [36] for the prevention and control of NCDs (2013 - 2020) adopted by the WHO aims to reduce premature deaths due to NCDs by 25% by 2025. Further, the sustainable development goal [37] reiterates nations' commitment to reduce premature mortality due to NCDs by one third by 2030. In this context, Saudi Arabia's vision-2030 focuses on overall health care development and NTP for the health sector has also identified key targets related to NCDs and reduction of risk factors to be met by 2020 [10-11].

Despite facing huge challenges in terms of major NCDs, there is limited information available on economic costs associated with these diseases, although at international level, studies have shown that these diseases result in huge health care costs for governments and individuals leading to catastrophic health expenditure for the households. A recent review of costs of NCDs in the Arab region shows that mortality and morbidity related to NCDs are rising in the region and across different income strata. However, due to paucity of data and methodological issues involved in estimating the cost of NCDs in most studies making any comparison has become

difficult [17]. An estimate on economic burden of NCDs by the WHO and the United Nations Development Program (UNDP) in Saudi Arabia has shown that these diseases currently cost US\$18.6 billion annually, which includes direct health care costs of US\$5.5 billion and costs from lost productivity of US\$ 13.1 billion [7]. This accounts for about 2.8% of the Kingdom's GDP. According to the World Bank (2016), probability of dying from any CVD, cancer, diabetes and chronic respiratory diseases between age 30 and 70 years was 16.4% in Saudi Arabia against 14.6% in the United States of America (USA) and 10.9% in the United Kingdom (UK) [29,38]. This share is expected to increase with the demographic transition and increasing old age population in the Kingdom. This clearly suggests that unless suitable policy measures are undertaken, the number of deaths and economic burden due to NCDs will increase further, compromising the assurances of vision-2030. Further, there is need for studies estimating economic burden of diseases, financial impact on the government and households including cost management of NCDs, so that policy makers have evidence while managing the financial burden of NCDs in health system reforms. Current evidences show that more than 80% of these premature deaths can be prevented by eliminating the risk factors, mainly tobacco use, physical inactivity and unhealthy diets [1].

In the arena of health financing, the government's commitment to health care has led to increased budgetary allocation to the MOH to 7.2% of government budget [8] in 2018, and this allocation is likely to increase in view of vision-2030. However, Saudi Arabia's present share of health expenditure to national GDP is much lower in comparison to developed countries. In 2016, its health expenditure was 5.7% of GDP as against 17.1% in the USA and 9.8% in the UK; while per capita health expenditure was US\$ 1147 in comparison to US\$ 9870 of USA and US\$ 3958 of UK [38]. Historically, Saudi Arabian health system has depended on expatriate nationals to meet its health work force needs. Currently almost 67% of physicians and dentists employed in the Kingdom are expatriates [8]. The policy of 'Saudization' introduced by the Kingdom aims at increasing the overall share of employments by Saudi nationals and reducing reliance on expatriates. According to the MOH report (2018), the country has a total number of 104775 physicians, 184565 nurses, 29125 pharmacists and 124312 allied health personnel. The private health sector employs about 28.3%

of all health workforce in the Kingdom [8]. The density of physicians per 10,000 population in Saudi Arabia is 23.9 during the period 2009 - 2018 which is quite lower as compared to countries like Sweden (54), Denmark (44.6), and Australia (35.9). Likewise, density of nursing and midwifery of 57 per 10,000 population is quite low in comparison to countries like Australia (126.6), New Zealand (109.6), Denmark (103), UK (82.9) and USA (57) [38]. Additionally, a huge number of Saudi nationals are required to be recruited in health sector to fulfill various objectives of vision 2030 and NTP 2020. In order to meet this benchmark, the country requires supply of 360,000 health professionals additional to the existing stock of health workforce [10,39]. Under the vision-2030, the government has committed to produce 4000 doctors every year and employment of these doctors in both public and private sectors is likely to reduce reliance on expatriates by 2030. However, the number of Saudi students graduated in medicine and nursing is inadequate to replace health professionals who retire or quit from service annually [40]. For instance, the country requires 6000 -7000 new nurses to join the health workforce every year, but only 1561 nursing students were graduated in the year 2017 [8,41].

Saudi health system is considered more hospital centric rather than focusing on primary health care, which is also evident from the government's budget allocation to primary health care. Health system lacks allocative efficiency with respect to funds allocation as about 90% of the capital budget of MOH is used for development of hospital infrastructures [39]. Consequence of lower spending on primary care is lack of necessary infrastructure facilities and supplies for smooth functioning of primary health centers. It was reported that majority of primary health center buildings are functioning at rented buildings which are not designed as per standards [39]. A robust primary health care system, which is considered as a cornerstone for more inclusive and performing health system requires right organizations and right resources [42]. Health care system in Saudi Arabia needs to shift its focus from the hospital based health care services to the primary, preventive and promotive health services to effectively deal with increasing burden of NCDs and other life style diseases. The country needs to introduce a comprehensive health promotion and disease prevention program at national level which will be responsible for screening for blood pressure, diabetes, obesity, early detection of and effective

treatment of NCDs at community level. This is imperative to meet the target set in the World Health Assembly of 25% reduction in mortality from four major NCDs, including CVDs, cancer, diabetes and chronic respiratory diseases (CRDs) by 2025.

Vision-2030 recognizes that prevention of NCDs and lifestyle disorders not only reduces future health care costs, but will also create a healthier citizens and productive society. While focusing on primary and secondary prevention of NCDs and life style disorders, NTP considers primary health center (PHC) as a cornerstone of all preventive programs and primary health care is considered as the first line of health care services delivered by MOH. Currently, there are 2390 PHCs delivering comprehensive primary care including preventive and curative services across the Kingdom [8]. There are several criticisms against the present primary health care system, which includes unsatisfactory quality of care, ineffective follow up by patients, limited access to health education, low referrals to specialist hospitals, lack of incentives among NCD patients for regular visits, lack of trust in healthcare providers, poor counseling and communication barriers with health service providers [43-46]. Studies on patient satisfaction with respect to health services in Saudi Arabia have also revealed that people are not satisfied with primary health care services. These studies have pointed out inadequate privacy, long waiting time, inadequate physical environment including waiting area, unsuitable location and working hours, absence of specialty services as reasons for such dissatisfaction. Despite these issues, number of consultations in PHCs has increased over the past decade, possibly due to increasing number of health problems and lack of alternative health providers at the community level. International experiences show that primary health care has been a cornerstone of success in many health care systems. For instance, Cuba's primary health care system focusing on social determinants has contributed to making its system one of the best in the world [47]. Another challenge is the lack of health education at PHCs and communication barriers between care providers and patients results in poor understanding of risk factors related to NCDs and life style disorders. There are evidences that health education through primary health care system can be effective for both primary and secondary prevention of NCDs. Studies in Qassim region of Saudi Arabia showed that health education training to doctors

and seminars conducted by medical students at PHCs significantly enhanced the lifestyle practices of the patients, especially in terms of proper diet and exercise [48,49]. Health education and information provided at PHCs may also encourage patients and community to overcome the individual and social barriers to adopting a healthy lifestyle.

Primary healthcare in Saudi Arabia also faces challenges in terms of adequate availability of local health workforce, budgetary support, and effective health information system [50]. In comparison to other countries, there is also shortage of physicians in primary health centres across the country. It was estimated that available number of physician is almost 40% lower than required number [41]. In 2018, there were 11301 physicians employed in PHCs, out of which only 44.3% were Saudi nationals [8]. It is also reported that many of Saudi physicians and nurses are engaged in management or other than clinical activities in their institutions [51]. Skill development of health workforce is also an area of concern due to diversity in terms of their educational and cultural milieu, and a lower budget allocation for trainings in various health specialties. The budget availability for trainings is much lower at 0.4% of MOH budget, in comparison to countries like UK and Malaysia, where 5% of health ministry's budget is allocated for trainings [46].

There is increasing evidence that covid-19 pandemic responses have created multidimensional impact on NCDs, causing potentially unexpected health outcomes. Without adequate management, NCDs lead to traumatic situations resulting from movement restrictions, uncertain economic situations and anxieties. Along with other health care and preventive programs, postponement of routine appointments with medical facilities and laboratory investigations has delayed management of NCDs. Further, physical distances and restricted access to primary health care facilities disrupted continuity of care for NCD patients, which are likely to increase avoidable morbidities, disabilities and mortalities in patients with NCDs. Hence, covid-19 mitigation measures should be more adaptive to the needs of people with NCDs and those are at increased risk factors. This is more crucial when the size of risk groups in the population with NCDs are often underestimated, as many cases of diabetes, hypertension are undiagnosed. The WHO has developed series of actions that could be adapted by the health

systems to address the increasing needs of people at risks of NCDs or that population with NCDs along with practical guidelines for developing covid-19 responses at local, regional and national levels. The team involved in planning for covid-19 responses and strategies should have NCD health staff who can ensure that the needs of patients, their families, and caregivers are addressed. Therefore a rational approach to pandemic responses in the context of NCDs in Saudi Arabia is essential to improve health outcomes and reduce the impact of the pandemic on population vulnerable to NCDs, health workforce and society at large.

The fast growing population, increasing share of old age population raising NCDs and increase in demand for long term care are expected to put huge pressure on government. In order to reduce the increasing burden of public health spending, the MOH needs to play a catalyst role in raising awareness of population and reduce the exposure to various risk factors [52]. The policies and interventions for NCDs need to address different types of risk factors and modifiable behaviors of the population through effective multisectoral approach [53]. The approach should focus on population wide primary prevention and enables an environment for the adoption of healthy behavior and lowering risk factors [54-55]. Moving away from the traditional approach, a strong foundation needs to be created in health professional's education to develop them for delivery of preventive health intervention related to NCDs. Therefore a comprehensive risk reduction strategy of NCDs in the Saudi Arabian context could be incorporated into the curricula of all health professionals' education. There is also a need to review all relevant policy documents to ensure consistency of these policies with prevention and control measures of NCDs in keeping with the concept of 'health in all policies'. Suitable actions at the government level are essential to reduce consumption of sugar, sweetened beverages and fast food which are high in cholesterol and saturated fats. Finally, public health organizations and civil society organizations need to be involved in developing capacity for generating NCDs information, knowledge management and strengthening surveillance system of NCDs in the Kingdom.

This paper is not free from limitations. It provides an overview of NCDs in Saudi Arabia and identifies various critical issues and health system challenges faced by the country in

reducing the burden of NCDs. However, this paper is methodically limited as it is rather an overview of literature than a systematic review. Additionally, there are many socio-economic, epidemiological, cultural and political factors influence the Kingdom's effort to successfully implement the prevention programs to reduce the future burden of NCDs, which are not addressed in this paper.

8. CONCLUSION

In Saudi Arabia, NCDs represent a major public health problem. Currently NCDs account for about 73% of all deaths in the country. Although various initiatives aimed at prevention and control of NCDs were introduced, however they are disjointed, and lacked multisectoral coordination. Economic costs due to these diseases are huge and are likely to increase manifolds due to undesirable life style and behaviour risk factors. Apart from increasing share of old population, other challenges like shortage of local health workforce, lack of primary health care focus and covid-19 pandemic are likely to affect the government's efforts to prevent and control NCDs. Addressing the NCDs burden requires 'best-buy' strategies and their effective implementation at all levels. Health system needs to play a catalyst role in raising awareness of population through multi-sectoral linkages and policies to reduce the exposure to various NCD risk factors. There is also a need to review all relevant policy documents to ensure consistency of these policies with prevention and control measures of NCDs in keeping with the concept of 'health in all policies'. Moreover, MOH needs to make use of every means of promoting lifestyle and reducing risks behavior among population by involving media and non-state sectors.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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