STUDENT CORNER

EPIDEMIOLOGY OF NON-COMMUNICABLE DISEASES IN PAKISTAN: ARE WE ON THE RIGHT TRACK?

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ABSTRACT

With a population in excess of a 200 million coupled with an incommensurate allocation of resources, Pakistan has long fallen prey to the scourge of disease. Even more alarming is the insidious rise in the proportion of population 65 years or older; this group is particularly prone to non-communicable diseases (NCDs) which are estimated to contribute well over 50% to total deaths.

This article describes the epidemiologic distribution of NCDs in Pakistan, with a special emphasis on the 4 main afflictions (Cardiovascular diseases, Cancers, Chronic Respiratory Diseases, and Diabetes) which together account for 36% of total deaths, a disconcerting figure considering that the approach to these conditions is largely preventive. In addition, an overview of current response strategies are provided in the hopes that future policy may be better guided

KEYWORDS: Diabetes Mellitus, Cardiovascular Diseases, Epidemiology, (Lung Diseases, Obstructive), Pakistan, Neoplasms

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INTRODUCTION

Seven decades after its inception, Pakistan still suffers from health crises. The nature of these crises, however, has far from remained constant; a burgeoning population in the 65 years and older age bracket along with changing lifestyles has resulted in a gradual transition from acute, communicable diseases to complex, chronic non-communicable diseases (NCDs). As of 2015, estimates from the World Health Organization (WHO)of proportion of mortality attributable to NCDs (excluding injuries) stand at 51%, a number expected to rise with the concomitant increase in life expectancy. Of these, the 4 priority NCDs (i.e., cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes) account for 36% of total deaths and contribute 21% to premature mortality (defined as the probability of dying between ages 30 and 70 years). The other 15% is accounted for by miscellaneous conditions of which mental disorders are of particular concern since mean prevalence rates may be as high as 34% in the general population. Taken together, these regrettable figures are directly linked to some of the country's bitter facts: poverty levels are worsening, economic development is being continually hampered, and achievement of the MilleniumDevelopment Goals was proved exceedingly difficult. If Pakistan is to actualize the 9 global NCD targets set by the WHO in its Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020, strategic priorities must be made that mitigate key risk factors and thus prevent the increasing NCD burden. To this end, immediate action is required involving participation from both state and non-state actors.

In this review, focus is directed towards the four major NCDs that plague the country. A key purpose is to inform readers of existing statistics regarding these conditions and the initiatives taken to tackle the problem.

Cardiovascular Diseases (CVDs):
The importance attached to this category can be gauged by the simple fact that ischemic heart

disease was, and likely continues to be, the leading cause of death, with over 111,000 lives lost in just 2012.[4] Though not based on any official national NCD mortality data, CVDs are estimated to contribute 19% to total deaths, with age-standardized death rates of 255 and 295 per 100,000 for males and females, respectively. As of 2012, the associated premature mortality was 95,000 and 100,000 for males and females, respectively. Stroke stands at number 3 in the top 10 leading causes of death – an increase in rank since 2000 – with a 6.3% (84,600) contribution towards total deaths. The disability-adjusted life years (DALYs) of CVDs and diabetes combined approaches 10,000, with a large part of this burden being attributable to stroke morbidity.[1,4] Risk factors are numerous. Based on a landmark study by Lee *et al*., physical inactivity, a key risk factor in the development of NCDs, is estimated to cause 3.2% and 3.9% of the burden from coronary heart diseases and type 2 diabetes, respectively, in Southeast Asia.[5] A separate meta-analysis highlights the risk contribution of high salt intake towards stroke (pooled relative risk 1.23) and cardiovascular diseases (1.17).[6] Considering its well-established link with hypertension – from which a total 25.2% of the Pakistani population suffers – salt intake needs to serve as an additional area of control. Simply lowering salt intake by 6 grams a day could reduce blood pressure to levels that, at the population level, predict an average lower rate of 24% for stroke and 18% for coronary heart disease.[7] Though far from the only established risk factors for CVDs, physical inactivity and salt intake represent opportunities for relatively easy control; measures as specific as a reduction in the level of salt in food (prepared or processed) or promotion of physical activity through adjustments in daily living (e.g., more "active transport" through better infrastructure for walking and cycling), are elaborated in the WHO's Global Action Plan.[3] Implementation could wellpave the way for an overall reduced NCD burden.

Cancers:

Pakistan lacks a national, population-based cancer registry and so data on this NCD is likely a significant underestimation. That notwithstanding, current estimates place cancers (8%) right behind CVDs (19%) in overall NCD contribution to proportional mortality.[1] Data from the International Agency for Research on Cancer (IARC), WHO,[8] reveals that in men, the top 3 malignancies in order are: **Lip, oral cavity** [Incidence (Number: 7068, Age Specific Rate – Weighted: 10.5), Mortality (Number: 4046, ASR-W: 6.3), 5-year prevalence (Number: 16781, Proportions per 100,000: 28.1)], **Lung** [Incidence (Number: 5772, ASR-W: 9.8), Mortality (Number: 5097, ASR-W: 8.7), 5-year prevalence (Number: 4876, Proportions/100,000: 8.1)], **and Non-Hodgkin lymphoma** [Incidence (Number: 3721, ASR-W: 5.3), Mortality (Number: 2719, ASR-W: 4.2), 5-year prevalence (Number: 5970, Proportions/100,000: 10.0)]. Similarly, in women, the top 3 malignancies in order are: **Breast** [Incidence (Number: 34,038, ASR-W: 50.3), Mortality (Number: 16,232, ASR-W: 25.2), 5-year prevalence (Number: 119,710, Proportions/100,000: 205.8)], **Lip, oral cavity** [Incidence (Number: 5693, ASR-W: 9.1), Mortality (Number: 3220, ASR-W: 5.4), 5-year prevalence (Number: 13,866, Proportions/100,000: 23.8)], and **Cervix uteri** [Incidence (Number: 5233, ASR-W: 7.9), Mortality (Number: 2876, ASR-W: 4.7), 5-year prevalence (Number: 15,323, Proportions/100,000: 26.3)]. Further data from Global Burden of Cancer Study 2012 (GLOBOCAN)[8]predicts that 148,000 people are newly diagnosed with cancer (excluding non-melanoma skin cancer NMSC) per year, and the ASR for incidence per 100,000 people per year stands at 111.8. Additionally, the risk of getting cancer before age 75 is 11.8% while 101,000 people are dying from cancer each year. Given its strong relationship with lip and oral cancer, amongst others, tobacco use constitutes the most relevant and modifiable risk factor and hence requires urgent attention at national levels. The National Action Plan for Non-communicable Diseases Prevention, Control and Health Promotion in Pakistan (NAP-NCD)[9], a joint partnership between both public and private health sectors that was initiated in 2004, sought to make cancer prevention a key focus of it's agenda.[10] In it was placed a special emphasis on tobacco control. With concrete evidence of tobacco's causal role in the development of many cancers, this was a step in the right direction. Unfortunately, due to resource constraints, the population-based surveillance system for NCD risk factors – developed by the NAP-NCD – was limited to just one district (Rawalpindi).

Diabetes:

By being a member of the International Diabetes Federation (IDF)[11] , Pakistan has permitted a wealth of epidemiological data to be collected on the distribution of thisdisease. Given Diabetes' associative link with a range of diseases,Pakistan's current trends paint a grim picturethat will likely have repercussions for years to come. Furthermore, recent emergence of the idea that South Asians share a certain predisposing phenotype[12,13], has troubling implications for Pakistan's population as this would imply earlier onset of diabetes and, consequently, greater morbidity due to diabetic complications. As it is included in one of the 19 countries of the IDF Middle East and North Africa (MENA) region, Pakistan's data can be compared with ongoing trends in neighboring countries;[14] the most recent data from 2015 suggest that over 7 million cases of Diabetes exist in Pakistan, a staggering 20% of the 35.4 million cases in the MENA region. Alarming still is the fact that over the next two decades, the MENA prevalence of Diabetes is expected to double. Prevalence in Pakistan's adult population (20-79 years) stands at 6.9% or roughly 7 million of it's 102 million adults. An additional 3 million cases in this

population remain undiagnosed. The death toll in just 2015 was 86,364 which places Diabetes as the 4th major NCD contributing towards mortality. These data are further compounded by the prevalence of obesity which, according to last WHO estimates,[1] exists in 5.5% of the adult population - being more than twice as common in females than males (7.8% vs 3.3%). Compared to it's immediate neighbor (India)[15], Pakistan's diabetic prevalence statistics are marginally better (6.9% vs 8.9%). However, serious deficiencies still exist in Pakistan's health system that have been addressed in India; the former has no framework for diabetes monitoring and surveillance nor has a global monitoring framework been adopted.[16] Conversely, India has undergone two large-scale surveillance exercises: one in collaboration with the WHO [the World Health Organization (WHO) – Indian Council of Medical Research (ICMR) NCD risk factor surveillance study],[17] and the other as part of its Ministry of Health (Integrated Disease Surveillance Program)[18]. Such monitoring, though not wholly adequate, has permitted the implementation, albeit partially, of National Diabetes and NCD plans. Monitoring efforts in Pakistan are limited to a few private partners and associations but these are deemed to be largely insufficient. Prevention and control efforts do exist, though the full scope of their impact has yet to be determined: Baqai Institute of Diabetology and Endocrinology (BIDE), through its 'Insulin My Life' project, has expanded its type 1 diabetes service to the majority of Sindh. BIDE has also extended its presence in several areas of Pakistan through its National Diabetes and Diabetic Foot program. Working in collaboration with BIDE is the recently established National Association for Diabetes Educators of Pakistan (NADEP)[19].

Chronic Respiratory Diseases:

As the 3rd leading cause of death in the NCD category, chronic respiratory diseases claimed in excess of 80,000 lives in just 2015, accounting thus for over 6% of proportional mortality.[1]In this context, 'chronic respiratory disease' contains under its rubric the two important afflictions contributing most to mortality and morbidity: Chronic Obstructive Pulmonary Disease (COPD) and Asthma. Age-standardized mortality rate due to chronic respiratory diseases is estimated to be 145 per 100,000 in males and 45 per 100,000 among females. This stark difference between ASMR of men and women – the greatest amongst the 4 NCDs – parallels the tobacco smoking trends in the two populations: 2011 WHO data has 38% of males smoking compared to 7% of females.[1] These estimates of the most important modifiable risk factor have likely increased since then and, consequently, an increase in the burden of chronic respiratory disease is also expected. COPD contributed to 4.6% of total deaths with over 61,600 in just 2012, a modest increase in rank since 2000. The DALYs from chronic respiratory diseases is over 4000 years, with nearly half this figure being attributable to years of healthy life lost due to disability (YLD).[4]Nearly 12% or 20 million of Pakistan's adult population is suffering from asthma. With an annual increase of 5%, the prevalence of asthma is increasing on a daily basis. Of particular concern is that 20-30% of this increase are children aged between 13 and 15 years. The largest set of data came from the BREATHE study,[21] the first regional research on COPD conducted in the MENA region. This observational, cross-sectional study aimed to quantify the true burden of COPD in Pakistan in terms of societal cost and the impact of the disease. One finding was that Pakistan was one of the countries with the highest proportions of subjects who considered their symptoms to be severe. A shortcoming of the BREATHE study, however, was it's external validity given the limited sample size obtained from Pakistan. Considering the massive burden of COPD, with some estimates listing it as the 4th leading cause of morbidity and mortality worldwide, the need for further efforts to determine the magnitude of the problem in Pakistan is dire. The BOLD (burden of lung disease) initiative is a population-based prevalence study that is collecting country-specific data related to COPD.[22] Recently, "the BOLD Pakistan Component" was launched by the Community Health Sciences department of Aga Khan University Hospital with the objective of gathering crucial, policy-guiding data on COPD. Though scheduled to conclude in February 2015, data from the study has yet to be officially released. On a broader scale is the initiative taken by the WHO as part of its Global Alliance against Respiratory Diseases (GARD), a network comprising national and international organizations working towards the common objective of reducing the global burden of chronic respiratory diseases. GARD Pakistan[24] was initiated in 2009 and has members from the Former Ministry of Health, the Former Ministry of Environment, the Chief Commissioner, Islamabad Capital, the Pakistan Chest Society (Federal), and the Allergy & Asthma Institute, Pakistan. Interestingly, there is yet to exist a Ministry of Health Focal Point for GARD.The most recent GARD Country Report from 2016 indicates that considerable work is still left: the national plan for CRDs, activities for preventing COPD and Asthma, and indicators for CRDs need to be established.

DISCUSSION

Pakistan's health system has been in a chronic state of poorfunction. Numerous factors are attributable but one that lies at the forefront, and is particularly relevant in the case of NCDs, is the minimal public sector allocations for health as a per cent of GDP; in just 2014, total expenditure on health as a % of GDP was a paltry 2.6. The effect of such underfunding has been felt in all aforementioned NCD categories, where initiatives were often cut short due to lack of resources stemming from insufficient funds. As a result, desired end-points have persistently

been missed.The NAP-NCD, a tripartite, public-private partnership, is a case in point. Amongst the first concerted, national responses to the NCD problem, *the Action Plan* elaborated a most extensive, evidence-based strategy for tackling the overwhelming burden of NCDs, with focus on the 4 major NCDs in addition to 'Mental illnesses' and 'Injuries'. A key highlight of the *Action Plan* was its recognition of the complexities in diagnosing chronic NCDs, and so an approach in line with the detection of NCD risk factors - through the development of a population-based surveillance system - was adopted instead. As mentioned earlier, the surveillance system could not be expanded past one district due to resource constraints. In the Action Plan's 2007 update,[25] it was revealed that fund utilization targets were not being met by the Ministry of Health, and this likely served as the major impediment to the upscaling and institutionalizing of the NAP-NCD. Similarly, progress in Diabetes control has been an excruciatingly slow process with prevention of a meager 0.4% of diabetes-related deaths in 2013. Not surprisingly, the Member Association of the IDF Pakistan chapter cited "budget restraints and inadequate distribution of funding" as primary causes for the insufficient Diabetes and NCD services. Improving data collection on CRDs - a much needed prerequisite for the upscaling of GARD Pakistan given that the last national survey on CRDs was conducted in 2002 – is, again, critically dependent on financial support.

Part of what defines NCDs is the shared link they each have with a set of common risk factors. Never is this truer than in the case of tobacco control. With an annual global death toll attributable to its use exceeding 5 million, the importance attached to this modifiable risk factor cannot be overstated.Inextricably linked to each one of the 4 major NCDs, the use of tobacco products warrants special mention due to the insurmountable burden that it poses, one that is clearly avoidable, and the relative ease with which changes in this parameter can be measured over time. In 2013, Pakistan Medical Research Council jointly working with the Tobacco Control Cell managed to collect data on the smoking habits of adolescents by conducting the Global Youth Tobacco Survey,[26] a WHO- and CDC-developed school-based questionnaire that monitors tobacco use trends in students primarily aged between 13 and 15 years. A worrying highlight was that 87.6% of current cigarette smokers obtained cigarettes by buying them from a store, shop, street vendor, kiosk, school canteen, or pharmacy. Similarly, the Global Adult Tobacco Survey revealed an overall tobacco use prevalence of 19.1% - or 23.9 million of Pakistan's adult population. An encouraging finding, however, was that 74.8% of adults were in the favor of increasing taxes on tobacco products. In fact, tax hike as means of decreasing tobacco consumption has been explored in Pakistan's setting, with one study[27] predicting an 11.7% long-term decrease in cigarette consumption if prices were increased by 10%.

Despite the broader context in which Nishtar elaborated the "considerations for moving forward" in the post-2015 health agenda,[28] such suggestions may well be applicable to Pakistan's increasingly burdensome NCD problem.Creating "measurable, time-bound and outcome-based" goals can centeron the recognition that, unlike communicable diseases in which there is a greater reliance on acute parameters, significant timescales are involved in the risk-exposure relationship of NCDsand so development of an NCD surveillance system that focuses on *risk factors* as the variable to measure would better help to achieve reporting at the national level. Currently, such a monitoring system to enable reporting against the nine global NCD targets is not in place.Additionally, in light of the population-based approach that NCDs inherently demand,intersectoral involvement has become an absolute prerequisite before any progress can be envisioned. With development thinking shifting from diseases to systems, the onus of responsibility no longer lies exclusively on the health sector but is instead distributed amongst various domestic stakeholders. Already such multisectoral collaboration has been witnessed in Pakistan, perhaps best exemplified by the NAP-NCD and GARD Pakistan, but the outreach of these efforts has been severely restricted. The enormous challenge of NCDs must be given due recognition at the highest political level if progress is to be envisioned in this domain and if dreams of universal health coverage are to be actualized.

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