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## Preamble

While diabetes is usually described as an epidemic, it has actually gained endemic status in many parts of the world. Data from the International Diabetes Federation (IDF) suggest a current (2017) global prevalence of 425 million; with the number expected to increase to 629 million by 2040 <sup>(1,2)</sup>. There are 78 million people living with diabetes in South Asia today. This number is expected to double to reach 140 million by 2040.

A healthy diet, regular physical activity, and maintaining a normal body weight are the three key strategies to prevent or delay the onset of type 2 diabetes (T2D). Diabetes can be treated and its consequences avoided or delayed with healthy eating practices, physical activity, medication and regular screening and treatment for complications.

The impact of diabetes on individual, family and societal health is enormous. First of all, economic productivity is impaired, as two-thirds of persons affected with diabetes are of working age. Diabetes is also a major cause of blindness, renal failure, heart attack, stroke and lower limb amputation. In 2016, an estimated 1.6 million deaths were

directly caused by diabetes. Another 2.2 million deaths were attributed to high blood glucose according to 2012 statistics <sup>(2)</sup>. Every year, 1.2 million lives in South Asia are lost prematurely to diabetes. At a global level, diabetes care consumes 12% of the total health expenditure. Therefore, it is imperative to prevent and control diabetes, and to do so, with immediate effect.

## Levels of prevention

Prevention of disease can be carried out at various levels. Conventionally, these are classified as primary, secondary and tertiary <sup>(3)</sup>. In recent years, the concepts 'primordial prevention' and 'quaternary prevention' have also gained attention <sup>(4, 5)</sup>. To this list, we propose the addition of another level, which we term 'quinary prevention'. The definitions of the traditional levels of prevention are given in the table below.

Table 1. Levels of prevention

Level of Prevention	Description
<b>Primordial prevention</b>	Considered as a subset of primary prevention, implies the institution of preventive measures in the absence of risk factors, in the population at large.
<b>Primary prevention</b>	The institution of preventive measures in the absence of disease, in persons in whom risk factors are present
<b>Secondary prevention</b>	Measures for early detection and treatment of disease to prevent complications.
<b>Tertiary prevention</b>	Strategies put in place to minimize ill-health due to pre-existing complications, and to prevent their worsening
<b>Quinary Prevention</b>	Addressing the spread of myths and misconceptions regarding diabetes by advanced means of communication.

The novel concept of quaternary prevention calls for the avoidance of overdiagnosis, over-labeling, and overtreatment <sup>(5)</sup>. This much-needed cautionary wisdom reminds medical professionals to refrain from unnecessary investigations and treatment, while ensuring that appropriate care is provided to all.

Modern technology has facilitated the spread of information through diverse communication channels. While such media is useful in conveying health-related messages, they can also become the means of spreading misinformation. This is termed e-hearsay. Put simply, quinary prevention is the “means of preventing health-related hearsay or misinformation, or its ill effects on the health of individuals” <sup>(6)</sup>. Thus, quinary prevention of diabetes would minimize or prevent the spread of misinformation related to diabetes.

These levels of prevention have been conceptualized and implemented by member societies of the South Asian Federation of Endocrine Societies (SAFES), through multilevel prevention programs in the South Asian region.

### Primordial prevention

Although diabetes causation is multifactorial, interventions that target lifestyle can reduce the incidence of diabetes <sup>(7)</sup>. These entail changes in personal lifestyle and environment backed by proper legislature and societal action. Some of the legislative changes that could be implemented include taxation on unhealthy foods and subsidies to promote consumption of healthy food. Additionally, intervention in schools and workplaces to encourage the consumption of healthy food and increase in physical activity would also contribute to creating a healthy society <sup>(8,9)</sup>. Finally, in order to reduce fetal ill effects and to minimize adverse intrauterine developmental programming, it is imperative to encourage young women to be ‘healthy’ in order to become ‘healthy mothers’. A program that screens for gestational diabetes (GDM) and educates pregnant women not only reduces the associated maternal, perinatal morbidity and mortality, but also ensures the transgenerational prevention of several chronic diseases <sup>(10)</sup>.

Included below are a few examples of primordial prevention initiatives that have been successfully implemented in South Asia.

The Bangladesh Diabetes Samity (BADAS) has introduced a nationwide preconception care program to disseminate the concept of 'healthy mother- healthy baby' towards mitigating the fetal origins of adult disease. A healthy lifestyle for future fathers is also important for the health outcome of children. The Endocrine Associations of Bangladesh, Nepal, Pakistan and Afghanistan regularly conduct public awareness campaigns to encourage a healthy lifestyle. The Diabetes Education Foundation (DEF) based in India has been conducting public awareness programs regularly, for almost two decades, and has pioneered the launch of health and nutrition education initiatives among school children to spread awareness of obesity amongst the youth. The Sri Lankan government has included multiple legislations that include sugar tax, color coded labelling of beverages and packaged food, warning messages on cigarette packages and a ban on advertising of alcohol. In addition, the Sri Lanka College of Endocrinologists (SLCE) has launched the Sri Lanka Diabetes and Cardiovascular Disease Initiative (SLDC) that works with communities on health promotion and in the training of health sector staff to screen and educate all pregnant women on the 'healthy mother- healthy baby' concept. The SAFES has conceptualized and launched the Run For Life® campaign that encourages school children to engage in regular sports activity, and the Pakistan Endocrine Society has spearheaded such campaigns in schools across the country. This campaign received international recognition from the International Society of Endocrinology for the concept and its execution.

Although civil society and grassroots movements are crucial in this effort, the prevention and management of diabetes also requires the highest political attention. To this end, the SAFES and its member societies are working together with the International Society of Endocrinology (11) to ensure that diabetes remains a priority on the global NCD agenda of the WHO while more prevention efforts are undertaken by governments to halt the epidemic, especially in Lower Middle-Income Countries. The Year 2013 was an important year for diabetes (and NCDs) as WHO adopted voluntary NCD targets. An overall goal of a 25% reduction in premature mortality from NCD by 2025 and within the nine voluntary targets on NCDs including a 0% increase in diabetes and obesity prevalence, and an 80% access to essential medicines and devices by 2025 was included (12). However, it is regrettable that despite global political commitment, many countries have not made adequate progress to meet their targets.

## Primary prevention

Multiple trials have shown that the prevention of diabetes is possible in those who are obese or overweight and in those who have impaired glucose tolerance (13). The key interventions that have been shown to be effective include vigorous physical activity and adoption of a lower calorie diet that is rich in fiber and low in carbohydrates. Weight reduction is yet another powerful tool for the prevention of diabetes in those at risk. The identification of high-risk groups such as prediabetes, gestational diabetes mellitus (GDM) and obesity is crucial to the success of primary prevention. Studies from India, Pakistan and Bangladesh have shown the benefits of targeting women with a history of GDM to prevent diabetes. The Dhaka Declaration of 2015, released by SAFES, underscored the importance of this high-risk cohort; in choosing GDM as its theme. Guidelines for the Management of GDM were published in the Journal of Pakistan Medical Association and endorsed by The South Asian Federation of Obstetrics and Gynecology (SAFOG).

The Indian Diabetes Prevention Program used lifestyle modification and metformin to prevent diabetes in a high-risk cohort of prediabetes. Telephonic SMS- (short message service) based contact has also been demonstrated to reduce the risk of diabetes among the Indian population. BADAS and SLDC have conducted programs using multiple integrated interventions such as mass awareness, education and capacity building, screening and early intervention of risk factors, creating ambassadors, mobilizing community leaders, use of folk songs, utilizing religious leaders and school teachers, awareness programs in transport media and a multimedia campaign. A comprehensive primary prevention program through the institution of screening and early treatment at primary health care settings has been implemented in Bangladesh and Sri Lanka.

## Secondary prevention

Timely diagnosis of diabetes allows the early institution of both non-pharmacological and pharmacological therapy. Studies of semipiternal value, such as the Diabetes Control and Complications Trial (DCCT) in type 1 diabetes, and The United Kingdom Prospective Diabetes Study (UKPDS) in T2D, have proven the effectiveness of glycemic control in the reduction of chronic complications. The Steno-2 study, which evaluated a multifactorial intensive treatment approach in T2D and microalbuminuria, achieved a 7.9 year increase in survival over a 21-year follow up period. These data, along with encouraging results from various cardiovascular outcome

trials, emphasize the importance of secondary prevention in diabetes <sup>(14)</sup>.

Modern endocrinology seeks to provide timely, comprehensive vasculo-metabolic care, in a patient-centered manner, to all persons with diabetes. Diabetes has a heavy disease burden on the healthcare system and South Asian endocrinologists are tasked with educating their peers on the advances in the secondary prevention of diabetes.

### Tertiary prevention

The philosophy of prevention holds true for all people, irrespective of their diabetic status, or the presence of complications. In a tertiary prevention mode, treating physicians aim to minimize the impact of chronic complications. Post-myocardial infarction rehabilitation, renal replacement therapy, and corrective intervention for diabetic retinopathy are examples of tertiary prevention. Modern diabetes therapies allow the slowing or regression of atherosclerosis and chronic renal disease as well as the prevention of heart failure in high-risk patients. Patients with foot complications can be provided rehabilitation and spared from amputation through multidisciplinary intervention. A close collaboration between endocrine care providers and colleagues from other specialties is required to ensure appropriate tertiary prevention and care of diabetes. The International Federation of Diabetes (IDF) has also established a foot care center and research in the region. The Pakistan Endocrine Society hosts foot clinics and guides and works with other regional countries. The Indian flagship National Health Protection scheme <sup>(15)</sup> aims at making interventions in primary, secondary and tertiary care systems, covering both preventive and promotive health, to address healthcare holistically. The Sri Lankan and Maldivian national health care systems provide access to primary, secondary and tertiary care free of charge and have made several structural modifications of delivery systems to face the challenge of NCDs.

### Quaternary prevention

As diabetes care becomes more and more complex, the need to practice quaternary prevention has become more urgent. Endocrinologists should thus ensure that evidence-based methods of screening, diagnosing and managing diabetes are followed. Improper diagnosis of diabetes and its subtypes such as pancreatic or gestational diabetes may lead to inappropriate management strategies and suboptimal outcomes. Moreover, the unwarranted use of 'labels' such as GDM may have psychosocial ramifications or may result in marital disharmony and

domestic discord. This phenomenon is commonly encountered in certain gender-sensitive cultures of South Asia <sup>(16)</sup>. Overtreatment using novel glucose-lowering drugs, which prescribers are less familiar with, may be associated with avoidable adverse events. Such therapeutic mishaps should be avoided at all costs.

Regular continuing medical education (CME) programs conducted by qualified endocrinologists are needed to instill the philosophy of quaternary prevention in physicians who deal with diabetes. SAFES and its member organizations contribute to the cause of quaternary prevention by organizing biennial South Asian summits, national endocrine conferences, and other CMEs of high academic standard standing. The Journal of Pakistan Medical Association has carried published a series of articles on the quaternary prevention of endocrine conditions, including diabetes <sup>(17)</sup>. The SLDC has trained more than 15,000 health sector workers on the prevention and treatment of diabetes. SAFES has partnered with the Public Health Foundation of India <sup>(18)</sup> to provide training courses i.e. Certificate Course in Evidence-based Diabetes Mellitus (CCEBDM), Certificate Course in GDM (CCGDM) and Certificate Course in Thyroid Disorders (CCMTD) to more than 4000 doctors. BADAS has offered distance-learning certificate program to 16,000 primary care doctors.

### Quinary prevention

Hearsay, including e-hearsay, has emerged as a significant barrier to diabetes care. The spread of myths and misconceptions regarding diabetes has been fueled by advanced means of communication. A concerted and sustained campaign led by the endocrine fraternity is necessary to educate people living with diabetes, and the society at large, by providing them the right knowledge and information about the pathogenesis, management and prevention of diabetes. With the power of multimedia at their disposal, each citizen has become a broadcaster; it is in harnessing this power to propagate the right messages that major societal changes can be achieved. Indian endocrinologists use WhatsApp and Twitter to direct the public towards authentic centers for diabetes care. SLDC and BADAS have used a systematic multimedia campaign to educate and provide information. Bangladesh has utilized the services of religious leaders to spread awareness about GDM and its prevention

### Resolution

We, the participants of SLENDO 2019; the Sri Lanka College of Endocrinologists (SLCE)/ the South Asian

Federation of Endocrine Societies (SAFES)/ the International Society of Endocrinology (ISE) conference, meeting in Colombo from 1st to 3rd August 2019 hereby resolve to:

- Promote the concept of prevention of diabetes, at all levels, ranging from primordial to quinary.
- Practice preventive strategies as an integral part of diabetes and endocrine care.
- Prioritize the prevention of diabetes in public outreach and advocacy activities.
- Proactively launch activities, at micro-and meso-level, to help prevent diabetes and its complications.
- Partner with national and international societies to create and strengthen diabetes prevention programs.
- Prepare endocrine curricula and continuing education modules with an enhanced focus on the prevention of diabetes

- Publicize best practices from Sri Lanka and the South Asian region to encourage idea-generation and sharing

### Summary

The Colombo Declaration 2019, we hope, will serve as a call for action. This Declaration will encourage:

- Communication between various stakeholders in the prevention of diabetes
- Confidence in their ability to work as an effective team
- Consolidation of existing activities and programs related to prevention of diabetes
- Conversion of existing ideas and plans into meaningful and productive action
- Creation of focused and sustained prevention plans, which will help stem the diabetes epidemic.

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