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Choice of a suitable diabetes risk assessment tool in Nepal – can we learn from Canada?

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Diabetes is extremely prevalent globally and increasing in prevalence in low and middle income countries (LMICs) [1, 2], such as Nepal. Indeed, the pooled prevalence of type 2 diabetes in Nepal from a systematic review examining data from 2000 to 2014 was found to be 8.4% (95% CI: 6.2–10.5%) [3] – higher than the current national estimate of 4.5% [4]. The South Asian population (comprising of people from India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan and Tibet) [5], is at high risk of developing type 2 diabetes (T2DM) [6, 7].

The culprits causing this rapid surge in diabetes are many. It is due to a variety of factors including a strong genetic predisposition, a preponderance to be sedentary and certain dietary factors [6, 8, 9,10]. Diet and lifestyle are rapidly changing in LMICs in general, mimicking western lifestyle and diet [11, 12].

Biological theory states that adiposity-induced insulin resistance followed by a subsequent decline in pancreatic-cell function, causes T2DM [13]. Indeed, although South Asians have conventionally "normal" BMI ranges, they have a higher percentage of body fat, increased visceral abdominal fat and greater insulin resistance compared with white people [14,15]. Genetic studies suggest that South Asians carry many of the specific genetic variants that are required for T2DM to develop, though the mechanism of activation, whether by environmental or physiological factors, is not clear [16]. Intra-uterine stressors leading to low birthweight in infants may cause epigenetic changes in gene expression and a pre-disposition to visceral adiposity, leading to T2DM [17]. South Asians are physically less active. A systematic review of studies in UK South Asians reported physical activity levels that were 50–75% lower than those of Europeans [18].

The South Asian diet itself is not only higher in overall calories and percentage of carbohydrate content, compared with standard European meals [19,20], but there has been a shift from eating traditional to non traditional foods which are also higher in animal proteins, sugar, fats and trans-fats (20). These trends exist not only in South Asians outside of South Asia, but in those residing in their home countries too – and Nepal is no exception [21]. All this to say that diabetes is in Nepal to stay.

Of course, diabetes is an extremely costly condition [1] and the resource implications of a diabetes epidemic in any LMIC such as Nepal are very serious [11, 12]. One way of curbing such an epidemic would be to diagnose people with diabetes and pre diabetes earlier, thus reducing or even preventing

complications of diabetes [22], by helping them gain access to appropriate help. However, the method of identification for those at risk for diabetes and hence needing screening, is not clear amongst LMICs in general, particularly Nepal.

In Canada for example, the use of the CANRISK diabetes risk assessment tool (23) is now more widespread, and in other countries, ethnic specific diabetes risk tools have been developed [24-28]. However, there is no consensus as to which tool would be appropriate for use in Nepal. Though the existing tools have been developed in specific populations of certain ethnicities, but they may be inappropriate for use in other ethnic groups.

The Indian Diabetes Risk Score (IDRS) was developed for a population living in India, though may be suitable for a Nepalese population as well [29]. It has 4 question categories (age, waist circumference, family history and physical activity), while the CANRISK has at least 12 questions (Gender, Parents' ethnicities, Waist circumference, BMI, Physical Activity, Fruit and Vegetable intake, High Blood Pressure, High Sugar, and Family History). A shorter and less intense screening tool may have advantages for use in the practicalities of administration in a busy rural situation or urban office. The IDRS was found to have an area under the receiver operating curve (AUC) of 0.698 (95%confidence interval (CI):0.663 –0.733); and sensitivity of 72.5% and specificity of 60.1% for determining undiagnosed diabetes with a positive predictive value of 17.0%, negative predictive value of 95.1%, and accuracy of 61.3% [28]. This scoring tool has not been tested in a Nepalese population. There is a need for studies to find suitable tools or for the development of a Nepal specific diabetes risk assessment tool ('NEPAL-RISK') to guide a targeted 2 tier approach for screening, in which individuals are assessed for risk en-masse, but only formally screened according to the risk results, thus saving resources.

If the population can be made more aware about diabetes by the use of a risk assessment tool as an educational tool as well, it could help to curb the diabetes epidemic in Nepal. Education of the masses about diabetes risk factors, prevention, and complications is urgently needed, using clear and simple messages. National policy efforts can be strengthened and health outcomes improved when awareness is increased [30]. Perhaps learning from Canada is a start, and Nepal will be able to make progress with something simple like 'NEPAL-RISK'?

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