Reviewer’s report

Title: Impact of HbA1c criterion on the definition of the metabolic syndrome: the China Health and Nutrition Survey 2009

Version: 1 Date: 18 August 2013

Reviewer: Tone Gretland Valderhaug

Reviewer’s report:

The study entitled “Impact of HbA1c criterion on the definition of the metabolic syndrome: the China Health and Nutrition Survey 2009” is an interesting study presenting important results on the lack of overlap between fasting hyperglycemia and the HbA1c criteria of increased risk of diabetes as introduced by the American Diabetes Association (ADA) in 2010. The results of this study are in coherence with other studies indicating that the different methods used to diagnose hyperglycemia identify persons with different glucometabolic profiles. The study analyses are well conducted and interpreted. However, I have some major concerns about the definitions of the metabolic syndrome (MetS) and the limitations of introducing HbA1c as a screening tool for diagnosing MetS. Also, there are some linguistic ambiguities throughout the manuscript.

Major compulsory revisions

Abstract, methods, line 2-3:
The authors define that the MetS was defined according to the consensus criteria in 2009. However, the ADA criterion of HbA1c 5.7-6.4% for increased risk of diabetes is not acknowledged by the WHO or the IDF, and the introduction of a new method to define MetS should be clarified in the methods’ section.

Background, last sentence:
The aim of the study is unclear. The authors argue that the study was to “examine the efficiency of HbA1c in the definition of MetS”. The aim of the study presumingly was to compare the 2009 criteria with the ADA criteria for HbA1c introduced in 2010. Please, clarify the objective of the study.

Discussion:

Section three, line 4-5:
The authors argue that the discrepancy between FPG-based MetS and Hb1c-based Mets might be more prevalent in a Chinese than in a European population. Do the authors have an explanation for this discrepancy between ethnicities? There seems to be little information about the limitations of the usage of HbA1c in the screening for dysglycemia in the general Chinese population. Do the authors have information about co-morbidities such as renal impairment or conditions with increased red cell turnover that may affect the interpretation of HbA1c? Additionally, do the authors have information about the prevalence of
variant hemoglobin in a Chinese population? Also, the chromatographic methods used for the analysis of HbA1c are more affected by variant hemoglobin’s immunological method (Bry L et al. Clin Chem 2001 Feb;47(2):153-63). How would variant hemoglobin be affected by the method used for the analysis HbA1c in this study?

Furthermore, I would like to see a discussion on possible explanations for the differences in HbA1c-based MetS seen between gender, i.e. HbA1c-based diagnosis of MetS 19.7% in men and 23.0% in women.

Section five, line11:
The authors argue that cardiovascular morbidity and mortality are linearly associated with FPG and HbA1c. However, recent studies have suggested that FPG correlates non-linearly with CVD and mortality (Sarwar et al. Lancet 2010 Jun 26;375(9733):2215-22).

Minor Essential Revisions
Background, line 16:
There seems to be a reference missing after the sentence “However, substantial evidence has suggested that screening performance using HbA1c might differ according to ethnic origin […..].”

Definitions, line 7:
An upper limit to the increased diabetes risk should be included in the definition as an FPG #7.0 mmol/l and an HbA1c # 6.5% defines the diabetes diagnosis.

Results, Prevalence of MetS:
There seems to be a word missing, please complete the sentence: “For each age group, the prevalence of HbA1c-based identification of MetS was significantly …………..than that of FPG-based identification of MetS.”

Discussion, section four, line 4:
There should be a reference included at the end of the sentence “Increased FPG is predominately induced by liver insulin resistance and a defect in the early phase of insulin secretion, whereas increased HbA1c is dominated by a combination of hepatic insulin resistance, muscle insulin resistance and impaired insulin secretion.”

Discretionary Revisions
Abstract:
In general, the introduction in the abstract is long and should be shortened and clarified.

Abstract, results, line5-8:
I recommend that the descriptive data comparing FPG-based diagnosis of MetS with the HbA1c-based diagnosis of MetS are presented earlier in the results’ section. I suggest the sentence “Compared with individuals with FPG-based diagnosis of MetS, individuals with HbA1c-based diagnosis of MetS were older…………” is presented after the sentence “Overall, 1136 (14.9%) had MetS according to FPG # 5.6 mmol/l…….”

Results:
I recommend that abbreviations are not used in the headings or subheadings throughout the manuscript.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interest in relation to this manuscript.