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Commentary

Early diagnosis of T2DM using high sensitive tests in the mandatory medical examinations for fishers, seafarers and other transport workers

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**A B S T R A C T**

Transport workers like seafarers, truck-, bus-, train- and taxi drivers and fishers have a known great inequity in health work including high risk of developing type 2 diabetes. Their routine mandatory medical examinations use urine glucose for diabetes check with more than 50% false negatives, which should be replaced by high sensitive tests for diabetes-2, like A1C, Fasting Glucose (FPG) or Oral Glucose Tolerance Test (OGTT).

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The prevalence of type 2 diabetes (T2DM) is globally increasing and especially increasing with social inequity in health in relation to work and living conditions [1]. Transport workers like seafarers, truck-, bus-, train- and taxi drivers and fishers have a known great inequity in health at work [2]. They have annual or biannual mandatory “fit for duty” medical examinations including screening for diabetes with urine glucose according to the proposal in the international guidelines [3]. The medical certificates for seafarers and fishermen, have historically been issued with the aim to secure the workers’ fitness to stay safe and healthy on long distance travels at sea and on the roads, far away from hospitals. We now suggest the mandatory medical examinations to address both fitness–check and health promotion by using a valid test for diabetes screening to be decided by the national authorities. There are several good reasons as explained in the following.

Urinary glucose has been widely used as a screening tool for diabetes being non-invasive, cheap and easy to perform. However, due to a low sensitivity it cannot be recommended as a screening test. In a cross-sectional random sample the urinary glucose test strip was 14% sensitive, and 12% in another [4,5]. Continued use of a screening method with such a low sensitivity will cause a false sense of safety among users, and might lead to a delayed diagnosis of diabetes. Like other national diabetes associations, the American Diabetes Association recommends the use of either Glycated Hemoglobin (HbA1C), Fasting Blood Sugar Test (FBG) or Oral Glucose Tolerance Test (OGTT) for diabetes screening in healthy populations [6].

Few studies have investigated the effect of workplace screening on detection rates, however a number of studies have shown a beneficial effect of Diabetes Prevention Programs (DPP) and other lifestyle intervention programs when applied in a workplace setting [7]. A number of psychosocial factors that are likely to be prevalent in transport workers have also been associated with development of T2DM. These include job insecurity [8], work stress [9], long working hours [10], workplace related bullying and violence and a high degree of manual work [11]. Following diagnosis, psychosocial factors may also play a role and work environment related factors has been shown to affect self-management in persons with already developed diabetes [12].

According to the European guidelines for prevention of non-communicable diseases (NCDs), the key challenge for the future is ensuring that NCDs can be monitored and evaluated by building up capacity in information systems so that the health outcomes of such interventions can be adequately measured [13]. There is no specific policy for early diagnosis for T2DM for the most vulnerable groups of workers neither in the European guidelines nor in the WHO Global Action Plan for the Prevention and Control of NCDs [14].

According to a Canadian modelling study, costs for each quality-adjusted life-year (QALY) gained for conventional screening with a frequency of once every 3 years were $22,821 compared to no screening $2890. Thus, there are financial benefits when impaired fasting glucose tolerance (IGT) screening occurs every 3 years for those without pre-diabetes and every year for those with pre-diabetes [15]. Another cost-effectiveness analysis found that screening for T2DM is more cost-effective when initiated between the ages of 30 and 45 years (<$11,000 per QALY gained) compared to other screening strategies [16]. In a recent systematic review, nine studies assessed the cost-effectiveness of the early detection of T2DM. They found that incremental cost-effectiveness ratios of early detection programs for cardiovascular diseases and T2DM were below a threshold of US $42,900 (equivalent to £30,000) per QALY gained [17].

Simple lifestyle measures have been shown to be effective in preventing or delaying the onset of T2DM when supportive environments are established by the shareholders with the needed conditions for good health practices for persons with diabetes and all others with risk for chronic metabolic diseases; time and allowance for sufficient work breaks, restroom visits, access to low calories healthy meals in social company, and access to perform physical activities [18]. There is a significant underreporting of T2DM, and the true prevalence is not known [19]. Systematic monitoring of the prevalence of HbA1c and centralizing the data are needed for prevention planning. National/International central registration of T2DM prevalence in workers, as for example the National Diabetes Registers, fails to include data in relation to the workplaces. Such a register for the most vulnerable groups of workers could be of great help for the prevention planning [20].

In conclusion, there is substantial evidence for the need of upgrading the routine “fit for duty” medical examinations for various jobs including fishermen, seafarers and other transport workers. The urine glucose strip test for early diagnosis of T2DM should be replaced by either Glycated Hemoglobin (HbA1c), Fasting Blood Sugar Test (FBG) or Oral Glucose Tolerance Test (OGTT), to be decided by the corresponding national authorities. Increased focus on T2DM may act as a lever for prevention of other metabolic diseases due to the addition of a cost-effective health promotion part to the routine fitness checks with benefit for the workers and employers. International policies for early diabetes diagnostics and follow-up control schemes among transport workers and other vulnerable groups at the workplaces ought to be updated.

Data availability

Data will be made available on request.

All foci coordinates, activation probability maps, in addition to the supplemental information will be available on ANIMA: a data-sharing initiative for neuro-imaging meta-analyses: anima.fz-juelich.de.

Conflicts of interest

The authors declare to have no conflicts of interests

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