3. Prevalence of Metabolic Syndrome and its associated factors in Mongolian population

[1] Third year of Graduate student, Department of Public Health
[2] Department of Public Health
[3] Integrated Research Faculty of Advanced Medical Sciences
Enkhtuguldur Myagmar-Ochir[1], Nobuko Takaoka[2,3], Yasuo Haruyama[3], Gen Kobashi[2,3]

Background Over three quarters of non-communicable diseases (NCDs) deaths occurred in low- and middle-income countries in 2016[1]. In Mongolia, NCDs are estimated to account for 80% of all deaths[2]. A health burden caused by NCDs, such as cardiovascular diseases (CVDs) and cancer in particularly, has increased[2,3]. Metabolic syndrome (MetS) is refers to the co-occurrence of several known cardiovascular risk factors, including central obesity, dyslipidemia, high blood pressure, and high blood glucose[4]. The life expectancy of Mongolian people compared to those in developed countries is shorter as a result of NCDs. As of 2018, the life expectancy at birth was 70.19 years, 75.78 years for women, and 66.11 years for men[5]. Thus, MetS is thought to be an important target for the primary prevention of CVDs.

Mongolia is a landlocked country dominated by sparsely populated steppe and semi-desert with a total area of 1.5 million square kilometers and a population of 3.2 million in 2018[6]. Two third of the population lives in the cities, while around 30% of the country's workforce is nomadic, herding livestock in the extensive pasturelands[5]. Although modern lifestyle factors impacting health is a major problem globally, little information about MetS is available for the Mongolian population. Previous studies have reported that MetS was higher in Mongolian population than in Japanese and Korean people and also a study observed some epidemiological features of MetS in general Mongolian population[7,8]. However, these studies were of a small sample size, participants age was 30 years old and above and they did not use the Japanese criteria.

Purpose Here, we determined the prevalence of MetS and its associated factors by Japanese criteria and based on Stepwise Approach to Surveillance (STEPs) survey from capital city (Ulaanbaatar), Mongolia.

Methods We conducted a cross-sectional survey and sampling was carried out following the WHO STEP-wise approach to surveillance, that is included demographic and lifestyle questionnaires, anthropometric measurements and biochemical analysis. Of the 4515 Ulaanbaatar city representative sample, about 2257 randomly selected to provide blood samples. We used Japanese criteria to definite MetS. The criteria included that waist circumference, an essential component which is 85 cm for men and 90 cm for women. In addition to abdominal obesity, any two of the following three abnormalities should be observed, elevated triglycerides or reduced high density lipoprotein, elevated blood pressure and elevated fasting plasma glucose.

Results Final sample of 2076 adults, aged over 20 years, 53.6% were female. The prevalence of MetS was 36.3% (50.1% in men and 24.3% in women). In the results, the prevalence of MetS was significantly higher in males, older aged and married participants. And, the prevalence of MetS differed across educational attainment and occupational group. For the poor lifestyle factors, the odds of current smokers and high-risk alcohol users were significantly elevated. The adjusted odds of males, older aged participants, married participants and high-risk alcohol users for having MetS were remained significantly. When stratified by sex, older aged people and high-risk alcohol users had significantly high prevalence, and lower level of educational attainment people had low prevalence of Mets in men. In women, older aged and married people had significantly high prevalence.

Discussion The prevalence of MetS as defined by Japanese criteria in Mongolian population was high, without pre-Metabolic syndrome. By tradition, Mongolians prefer a diet of meat and dairy products and as known as the greatest consumers of red meat in Asia. It can also be influenced by ecological factors, such as average atmospheric temperature, atmospheric pressure, precipitation and mineralization of rivers[9]. The present study further revealed that people, who married had higher MetS. The reason behind the higher prevalence of MetS among married participants could also be ascribed to higher prevalence of the obesity, diabetes and hypertension which are the components of MetS[10]. Our findings also demonstrate that lower educational attainment is associated with a lower prevalence of MetS in men, but not in women. For Mongolian herders, lack of access to education because of the nomadic communities living and moving in remote areas[11]. Herders are highly physically active, involving caring for livestock, riding across vast territories, milking, shearing, and combing. This unique lifestyle might be associated with low population body mass index in Mongolians. Recent years, urbanization has been relatively high with nomadic herders moving to city. As well as, the present study found that significant association between the high-risk alcohol use and MetS was observed in men. Moderate consumption of alcohol was associated with a favorable influence on lipids, waist circumference and fasting insulin in comparison to current nondrinkers[12].

Conclusions In conclusion, prevalence of MetS was high in Mongolian urban study population. In order to improve the CVD conditions and overall health in Mongolia, preventive measures are necessary for men with higher level of educational attainment, and high levels of alcohol use, also married men and women.

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