

## Conference Paper

# Socio-cultural Influence on Lifestyle of Prediabetes Causes T2DM in Ethnic Society in South Sulawesi Province

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## Abstract.

Cases of diabetes mellitus (DM) in the world are increasing, Indonesia ranks fourth after India, China, and America. The most common DM is type 2 DM (T2DM), which is about 90%. The incidence of T2DM is caused by people's lifestyles, which are influenced by socio-cultural factors. The highest risk of suffering from T2DM is prediabetes, which is a condition where a person's blood glucose level is higher than normal but not high enough to be categorized as T2DM.

This study aims to determine the socio-cultural influence on the lifestyle of prediabetes causing T2DM in the Bugis, Makassar, and Toraja tribes in South Sulawesi Province.

The research design is qualitative with the rapid assessment procedure method. The population were prediabetics from biomedical samples in 7 regencies of South Sulawesi Province at the time of Riskesdas 2013. The samples were residents who are still prediabetes and T2DM in Jeneponto Regency (Makassar Tribe), Pare-Pare City (Bugis Tribe), and Tana Toraja Regency (Toraja Tribe). Information collection was carried out in 2017 through focus group discussions with two groups, non T2DM and T2DM. In-depth interviews with health program managers at the health office, puskesmas officers, health cadres, and community leaders.

The study explains that there is a socio-cultural influence of prediabetes, ethnic groups in South Sulawesi Province in shaping the lifestyle that causes T2DM. Socio-cultural influences are the use of vehicles and the habit of doing activities in the Bugis, Makassar, and Toraja tribes. The perception of obesity in the Bugis and Makassar tribes and the habit of consuming alcohol in the Toraja tribe

**Keywords:** T2DM, socio-cultural, Bugis, Makassar, and Toraja

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Published 4 August 2023

Publishing services provided by Knowledge E

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Selection and Peer-review under the responsibility of the ICHSSE Conference Committee.

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## 1. Introduction

Diabetes Mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occur due to abnormalities in insulin secretion, insulin action or both [1,2] with the most cases is T2DM. The prevalence of DM is increasing in the world, WHO reports that in 2000 DM patients were 170 million people (2.8% of the world's population) with 2.9 million deaths (5% of all deaths) will increase to 360 million or 4.4% of the world's population by 2030 [3,4]. DM cases in Indonesia are in fourth place after India (79,400,000 people), China (42.3 million people), America (30.300,000 people) and Indonesia (21.300.000 people) [4,5,6]. One of the provinces with a high prevalence of DM from 2013-2018 is South Sulawesi (1.8%) [7].

The highest risk of someone suffering from T2DM is prediabetes which will occur between 4-10 years later [8]. This is because prediabetes already experience insulin resistance [3,9,10] which causes blood glucose levels to be higher than normal. Prediabetes or glucose intolerance, which is a condition where a person's blood glucose level is higher than normal but not high enough, is categorized as type 2 diabetes because of impaired glucose tolerance (IGT) and/or impaired fasting blood glucose (IFG)[3]. Changes in prediabetes to T2DM are caused by a lifestyle in the form of smoking habits, physical activity, eating fibrous and risky foods [11,12], socio-cultural influences in shaping lifestyles [13].

In contrast to other studies that have been carried out to prevent T2DM from the normal population, the study of prevention of T2DM from the prediabetes population. Prevention of prediabetes to T2DM is very necessary because in prediabetes it is still very likely to return to normal, but if it is too late to become T2DM then it is very difficult to cure [5]. In addition, prevention of T2DM in the form of medication has not been recommended while changing lifestyle is very difficult because type 2 DM is already a social disease so a socio-cultural approach is needed to suppress the increasing prevalence of T2DM [6].

The purpose of this study was to determine the influence of socio-cultural on the lifestyle of prediabetes causing T2DM in ethnic communities in South Sulawesi Province. The ethnic groups in South Sulawesi Province are the Bugis, Makassar and Toraja tribes

## 2. Methods

The research design is qualitative with the "Rapid Assessment Procedure" method. The study population was prediabetes in 7 districts of South Sulawesi Province which were selected as biomedical samples at the time of Riskesdas 2013 namely Pare-Pare Regency/City, Makassar, Tanah Toraja/Tator, Luwu, Sidenreng Rappang, Maros and Jeneponto. The sample is a resident who remains prediabetes and suffers from T2DM representing 3 ethnic groups, namely in Jeneponto Regency (Makassar Tribe), Pare-Pare City (Bugis Tribe) and Tana Toraja Regency (Toraja Tribe).

Information collection was carried out in 2017 through focus group discussions (FGD) with two groups, namely prediabetes and T2DM, and in-depth interviews with program managers from the Health Office, Puskesmas officers, health cadres and community leaders. The FGD and in-depth interviews materials include social variables (vehicle use) and cultural variables (activity habits, perception of obesity and alcohol consumption). Discussions and interviews were conducted by researchers who were assisted by research assistants by using discussion and interview guidelines. The stages of the research are carried out as follows:

### 2.1. Primary data

The population is prediabetes in the people of South Sulawesi Province aged > 15 years. Data were obtained from the 2013 Riskesdas biomedical sample from urban and rural areas as many as 31 sub-districts and 7 districts/cities. Prediabetes if the biomedical sample has IFG: 110-125 mg/dL and/or IGT: 140-199 mg/dL [5] at the time of Riskesdas 2013 and resides in the district/ City of Pare-Pare, Makassar, Tanah Toraja/Tator, Luwu, Sidenreng Rappang, Maros and Jeneponto. The sample is a population with prediabetes or T2DM who was selected to represent ethnic groups, namely Jeneponto Regency (Makassar Tribe), Pare-Pare Municipality (Bugis Tribe), and Tanah Toraja Regency (Toraja Tribe) in South Sulawesi Province.

### 2.2. Check blood glucose levels

The population with prediabetes at Riskesdas 2013 was used as the research population. The population was re-examined blood glucose levels in 2017. The examination aims to determine the status of whether they suffer from T2DM or not T2DM. If the IFG

is >126 mg/dL and/or, IGT with a glucose load of 75 grams >200 mg/dL and/or taking anti-diabetic drugs or insulin, it is declared to have T2DM, the sample group with type 2 diabetes mellitus is the rest. included in the group not T2DM [5].

The mechanism for checking blood glucose levels begins with clarifying and tracking on behalf of the population at the district/city Health Office and Puskesmas. The population being tracked was carried out by the following steps: 1) being informed the day before the blood glucose test was conducted to fast for at least 8 hours (it is allowed to drink water) from the evening until the next day before capillary blood was taken for examination. 2) After taking the first blood preparation, the respondent was given a 200 cc drink of water which had been dissolved by 75 grams of unhydrated glucose. 3) After 2 hours, blood glucose levels are checked again. The results of two examinations of blood glucose levels determine the status of the population from T2DM or not T2DM.

### 2.3. Focus Group Discussions and In-depth Interviews

Information is obtained by conducting Focus Group Discussions (FGD) and In-depth Interviews. FGD was carried out in each ethnic group followed by 2 groups of sample respondents, namely suffering from T2DM vs not T2DM. Each group consists of 6 respondents so that there are 12 respondents from each ethnic group so that a total of 36 respondents were used by FGD in this study. In-depth Interviews is carried out on key informants. In-depth Interviews uses interview guidelines with socio-cultural materials. Besides being recorded in daily field notes, In-depth Interviews was also recorded with a tape recorder. The technique of finding informants is by snowball sampling. The number of key informants is not determined, it is said to be sufficient (adequacy) if there is no more variation in the required information. Key informants are district/city Health Office officers, Puskesmas officers, health cadres and community leaders. The In-depth Interviews material is socio-cultural. The information collection description matrix is as shown in table 2.3.1

The validity of information is maintained through data triangulation by reviewing all available data from interviews, observations, field notes and other supporting documents and then compiled in the form of transcripts. Triangulation is also done by grouping respondents based on informants and variables, theme analysis by reducing data through abstraction, classification, interpretation and conclusion. Data triangulation matrix as in matrix 2.

TABLE 1: Information Gathering Description Matrix.

Respondents	Type of Information	Method	Instrument
Informants: T2DM vs non T2DM	Social influence (utilization of motorized vehicles). Cultural influence (activity habits, perceptions of obesity, and alcohol consumption).	FGD	Question guides
Key informants: District/ city Health Office officers, Community Health Center officers, health ca-dres and community lea-ders.	Social influence (utilization of motorized vehicles). Cultural influences (activity habits, perception of obesity, and alcohol consumption).	In-depth Interviews	In-depth interview guides

TABLE 2: Data Triangulation Matrix.

Information	Triangulation	Source of informants
Variables: Social: vehicle utilization. Culture: activity habits, perceptions of obesity, and alcohol consumption habits	Source	Informants (T2DM Vs not T2DM) Key informants (district/city Health Office officers, Puskesmas officers, health cadres and community leaders)
Variables: Sosial: pemanfaatan kendaraan bermotor Social: use of motorized vehicles Culture: activity habits, perceptions of obesity, and alcohol consumption habits	methods	FGD and In-depth Interviews

## 2.4. Data analysis

Data analysis was carried out on the findings by the following processes: a) triangulation process by reviewing all available data from interviews, observations, daily field notes/recordings and other supporting documents. b) all files are arranged in the form of a transcript. c) classifying information based on informants and variables. d) perform theme analysis by reducing data by abstracting, classifying, interpreting and drawing conclusions. e) display data by arranging data in units by making a matrix to find data that has the same characteristics or patterns. f) Interpretation of data and conclusions

## 2.5. Ethical Clearance and informed consent

Ethical approval from the Health Research Ethics Committee of the Faculty of Public Health, Universitas Indonesia (No. 103/UN.2.F10/PPM.00.02/2016) and the Health Research Ethics Committee of National Institute Health Research Development, the

Indonesian Ministry of Health (LB.02.01/5.2/KE.433 /2016). Informants involved in this study gave their consent by signing the informed consent.

### 3. Results

#### 3.1. Characteristics of respondents

##### 3.1.1. FGD respondents

Respondents from each ethnic group were 12 people, consisting of 6 people T2DM and 6 non T2DM. Respondents from the Bugis ethnic group, T2DM are mostly women. 33-72 years old, the lowest education is not in school and the highest is high school graduate, the same number of those who work and those who do not work. Respondents who do not T2DM are mostly male, aged 22-54 years, the lowest education is not in school and the highest is Diploma, the same between those who work and those who do not work.

Makassar ethnic respondents, T2DM are mostly women. 45-56 years old, the lowest education is elementary school and the highest is PT, the same between those who work and those who don't work. Respondents did not T2DM, most of them were male. age 23 - 77 years, the lowest education has not finished elementary school and the highest is junior high school, the same between those who work and those who do not work.

Respondents from the Toraja tribe, most of the patients with T2DM were male. age 43 - 66 years, the lowest education did not finish elementary school and the highest high school, most of them work. Respondents do not T2DM most of the women. age 33 - 80 years, the lowest education did not finish elementary school and the highest high school, most of them work.

##### 3.1.2. Key informants

Bugis key informants; (1) Manager of the nutrition program of the City Health Office, female, 32 years old, education Nutrition Associate's Degree, Nutritionist at the City of Pare-Pare Health Office. (2) Male health center nutrition manager, 50 years old, with a bachelor's degree in nutrition, expert nutritionist at Puskesmas Madeceng na Mario Pare-Pare. (3) Female health cadre, 48 years old, high school education, health cadre in

Labosang village, Labukkang village, Ujung sub-district Pare-pare. (4) Male community leader, age 68, diploma education, retired principal/priest of Darussalam mosque, Pare-pare.

Makassar ethnic key informants; (1) Manager of the nutrition program of the District Health Office, female, 50 years old, education Bachelor Degree of Public Health, head of the nutrition section of the Jeneponto District Health Office. (2) Nutrition manager of female health center, 43 years old, education Bachelor of Public Health Nutrition, nutritionist at Tino Public Health Center. (3) Health cadre, female, 39 years old, junior high school education, Posyandu cadre Anda Kunjung Mange Timur, Sidenreng Village, Jeneponto district. (4) Community leader, female, 74 years old, elementary school education, community leader in Sidenreng village.

Key informants of the Toraja tribe; (1) Manager of the nutrition program of the District Health Office, female, 28 years old, education Nutrition Associate's Degree, implementing the nutrition section of the Tana Toraja Regency Health Office. (2) Nutrition manager of female health center, age 48 years old, education Bachelor Degree of Public Health, nutrition officer at Makale Tana Toraja Health Center. (3) Health cadre, female, 34 years old, high school education, Posyandu Bofang cadre. (4) Community leader, male, 60 years old, doctoral education, community leader in Lembang Sanggala' Tana Toraja Regency.

### 3.2. Social (use of motorized vehicles)

The results of the FGD on the variable use of motorized vehicles provide information that there are differences in the use of motorized vehicles between the two groups of informants in the Bugis, Makassar and Toraja tribes. Most respondents with T2DM are accustomed to using motorbikes to travel even though the distance is relatively short, while respondents who do not T2DM are accustomed to walking when traveling which can still be reached on foot, for example to the market. In-depth Interviews explained that almost all people already have motorbikes and use these motorbikes for all purposes without looking closely. They still want to walk only people who are aware of the benefits of walking.

*"I go everywhere by motorbike, for example to the market which is 1 KM away, my mother's house is about 1 KM or just to a shop which is about 200 meters. The principle is that as long as the motorbike can be passed, I ride the motorbike to be fast because*

*in Pare-Pare it is hot and climbing. I walk mostly to the mosque which is only a few steps away” (Mrs. YS, T2DM respondent group, Bugis ethnic)*

### 3.3. Culture (activities)

The results of the FGD on the variable of activity habits provide information that there are differences between the two groups of respondents in the Bugis, Makassar and Toraja ethnic groups. Most respondents with T2DM said that they had never exercised for various reasons, such as working, hoeing in the fields and climbing the stairs of the house every day were considered sufficient. In-depth Interviews explained that some people do not understand the benefits of exercise for health and also the limited facilities.

*”Toraja people, nowadays, if their children have succeeded overseas, their parents are willing to go back to the fields because they already have someone who guarantees their life every day, the children are obliged to send money to their parents, so if not, the parents usually pay for it. ask and feel no need to work in the fields” (Toraja community leader Sanggala”.*

### 3.4. Culture (perception of obesity)

The results of the FGD on the variable perception of obesity, provide information that there are differences between the two groups of respondents in the Bugis and Makassar ethnic groups, but there is no difference in the Toraja ethnicity. Most respondents with T2DM in the Bugis-Makassar ethnic group perceive that obese people are good because it means their lives are prosperous, have lots of money and always eat good food. In-depth Interviews explained that people who are thin in society are considered to be people who are not rich. Those who are rich are generally fat so that in order to hold the principle of self-esteem (*siri*) so that they are considered affluent people, they prefer being fat.

*”Obesity are nice to look at, if thin people are sad, we can see, because fat people have a prosperous life, although it is possible to eat dry fish but it’s said to eat chicken every day, so it’s better to be fat than skinny” (Mr. Y, T2DM respondent group , Bugis tribe).*



### 3.5. Culture (alcohol consumption habits)

The results of the FGD on the variable of alcohol consumption habits provide information that there is a difference between the two groups of respondents in Toraja ethnic, but there is no difference in the Bugis-Makassar ethnic group. Most respondents with T2DM rarely consume alcohol (*tuak*). Most respondents who do not suffer from T2DM are accustomed to consuming *tuak* because *tuak* is a mandatory drink for men while smoking. In-depth Interviews explained that the Toraja area is mountainous so it is cold. People who are active outside the home, especially at night, definitely drink *tuak* to get rid of the cold. Moreover, *tuak* and smoking are symbols of friendship in society and must be served at parties. In the Bugis-Makassar tribe, consuming alcoholic beverages (*ballo*) is a forbidden act so it is almost avoided by all people.

*"Tuak in Toraja is the usual drink we drink every day, if there are guests it must be given to guests, especially if there is a death party that makes us have to stay up late, so drinking tuak or coffee and smoking must always be at the party. But the tuak in Toraja doesn't make us drunk, no one has ever drunk it, because it is drunk as a cold repellent. In Toraja it is very cold. After drinking palm wine, we eat more rice until we are full"* (Mr. AK, respondent of the non-T2DM group, Toraja ethnicity)

## 4. Discussion

The understanding of socio-culture in this study is socio-cultural from the anthropological aspect of health so that the socio-cultural aspects discussed are related to health and disease [14], especially T2DM because the socio-cultural factors that exist in the South Sulawesi ethnic group greatly influence the behavior and views of the community related to occurrence of health problems [14].

The results of research on social aspects in the form of the use of motorized vehicles affect the lifestyle of the Bugis, Makassar and Toraja tribes. Most prediabetes who use motorized vehicles suffer from T2DM. The use of vehicles has an impact on the lack of physical activity which is one of the causes of type 2 diabetes. Physical activity is beneficial in lowering blood glucose and HbA1C levels in prediabetes [15]. Lack of physical activity due to the use of motorized vehicles is a social problem in overcoming the prevalence of T2DM. Increasing the socio-economic status of the community increases the ability to own a vehicle so that people with the excuse of

saving time do not want to walk again to a place, even motorized vehicles are a daily necessity.[16].

The wrong perception of obesity also has an influence in shaping lifestyle. Respondents who perceive obesity as something good have a tendency to be obese so that it has an impact on the occurrence of T2DM. Obesity experienced by prediabetes is an early event for the occurrence of T2DM because they already have metabolic syndrome due to insulin resistance or glucose intolerance [17]. Many studies are in line with the results of this study. The pathogenesis of T2DM is caused by impaired pancreatic islet cells accompanied by insulin resistance that occurs due to weight gain and body mass [18]. Obesity causes insulin resistance and pancreatic cell dysfunction so that controlling body weight so as not to be obese is an effort to prevent prediabetes from developing into T2DM.

The results of this study show that prediabetes who regularly consume alcohol in the Toraja tribe mostly do not suffer from T2DM, but the Makassar Bugis tribe does not show any difference because alcohol is almost never consumed by the Makassar Bugis people. The effect of alcohol on the protection of T2DM is not fully explained, most studies show a "U" relationship between alcohol consumption and the risk of T2DM and its complications [19]. Moderate alcohol consumption can reduce the risk of developing type 2 diabetes and is also associated with improved metabolic system and complications such as microvascular complications (retinopathy and nephropathy) and a reduction in macrovascular events and risk of death [20].

Toraja people generally live in cold mountainous areas so that the culture of consuming *tuak* and smoking has become a tradition. This culture has been passed down from generation to generation which aims to fight the cold, especially when holding a death party culture (*rambu solo*) every year. People consume alcohol never excessively let alone get drunk. People consume alcohol just to warm the body so that consuming alcohol in low doses can prevent the occurrence of T2DM [19]. The benefits of consuming alcohol cannot be generalized to every individual but depend on the amount of moderate alcohol consumption, age, gender, body mass index, ethnicity, and type of alcoholic beverage [19], but consuming excessive alcohol will increase the risk of developing T2DM.

## 5. Conclusion

The results of the study show that there is a socio-cultural influence on the prediabetes lifestyle that causes T2DM in ethnic communities in South Sulawesi Province. The use of motorized vehicles and activity habits have an influence on the occurrence of T2DM in the Bugis, Makassar and Toraja tribes. The higher the frequency of vehicle utilization, the lower physical activity affects the increasing cases of T2DM. A social approach and government policies are needed to overcome this problem, for example providing sidewalks for pedestrians, comfortable and safe infrastructure for those who want to walk to reach public facilities such as markets and schools.

The wrong perception of obesity affects the occurrence of T2DM in the Bugis-Makassar tribe. People who perceive obesity as something good can increase the risk of developing T2DM and early for the occurrence of type 2 diabetes. Cultural approach so that the wrong perception of obesity can be straightened out.

The habit of consuming alcohol has a positive influence on preventing the occurrence of T2DM in the Toraja tribe. A scientific explanation is needed to the Toraja people about the benefits of consuming moderate amounts of alcohol so that the Toraja people can benefit from preventing the development of prediabetes into T2DM.

## 6. Funding

This research was conducted with its own funding sources but supported by the Universitas Indonesia and the National Institute Health Research and Development, the Indonesian Ministry of Health.

## Acknowledgement

The author thanks. Head of the Pare-Pare City Health Office, Tana Toraja and Jeneponto. Highest appreciation to, Darni, SKM, M.Kes, Dr. Rasidin Calundu, M.Si, M.Kes, Elia, SKM, Drg. A. Asis, Kustiah, S.Kep, Lakatutu, SKM, M.Kes, H. Muharram, SKM, M.Kes, Saffar, John Sura, SKM, Nur Rahmatia, SKM, M.Kes and Rinal, S.Kep, M.Kep for the great support to researchers

## Conflict of Interest

The authors have no conflict of interest to declare.

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