Correlative Factors on Type 2 Diabetes Prevention Efforts of the Senior High School Students in Makassar

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ABSTRACT
The aim of this study is to analyse associated factors with prevention efforts on diabetes mellitus (DM) type 2 in high school student in Makassar. This study was used observational analytic with cross-sectional study conducted in January-February 2016 with samples of 318 high school students of class X in six selected schools in Makassar. The data collection is done by using a questionnaire. The data was analysed by univariate and bivariate with chi-square test and presentation of data in tabular form with the narration. The results showed there was a relationship between parental education level (p = 0.000), hereditary (p = 0.000), benefits perceived (p =0.000), barriers perceived (p = 0.001), knowledge (p = 0.000), parental support (p = 0.002), peer support (p = 0.000) and media support (p =0.000) with prevention of DM type 2.

CCS Concepts
- **Social and professional topics → User characteristics**

Keywords
Type 2 diabetes mellitus; prevention efforts; high school student

1. INTRODUCTION
An estimation of 40 million of death every year due to noncommunicable disease (NCD) [1]. NCDs consists of chronic respiratory, cancer, diabetes and cardiovascular disease [2]. The mortality of NCDs is higher in developed countries compared to undeveloped and developing countries [3]. The lifestyle is main cause which increasing exposure to NCDs included unhealthy food and drink, alcohol, tobacco products, and limitation in physical activities [4, 5].

DM is a multifactorial metabolic disorder which body cannot control high sugar (glucose) level in the blood [6,7]. This disease affected more than 400 million people globally [8]. The main factors for DM are lifestyle changes with unhealthy dietary, decreased in physical activities and increased in human lifespans [9].

In Indonesia, DM prevalence is estimated increase from 8.4 million to 21.3 million between 2000 and 2030. Indonesia is predicted to be fifth ranked in the world with highest number of DM after India, China, United States and Pakistan [10]. DM disease prevalence in South Sulawesi was reached at 4.6%. In 2010, DM became main cause of NCDs mortality in South Sulawesi equivalent to 41.56% [11]. Based on City Health Office Makassar data, there are 14,067 cases in 2012 increased to 21, 452 cases had recorded in 2014. In Indonesia, there are few limitations in study of prevention on DM type 2. The aim of this study to determine factors associated with prevention efforts of DM type 2in senior high school students in Makassar.

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2. METHODOLOGY

2.1 Study Type
This study was used quantitative research using primary data. Besides, this study was a non-experimental (observational) analytic study with cross sectional study design.

2.2 Location and Time
This study was conducted at several high schools within one month period.

2.3 Population and Sample
The population for this study are all senior high school students of class X in high schools of Makassar city. The sample sizes were 318 students by using simple random sampling technique.

2.4 Data Collection
Primary data was collected by questionnaire, while secondary data was obtained from selected high schools in term of school profiles and number of students.

2.5 Data Processing and Data Analysis
Data processing was done by using SPSS program version 18. The univariate analysis was performed on variables related respondent characteristics, parental education level, hereditary, benefits perceived, barriers perceived, knowledge, parental support, peer support and media support and prevention efforts on DM type 2. The bivariate analysis was conducted to determine relationship of independent variables and dependent variables.

The analysis was done by using cross tabulation and chi square statistical test.

3. RESULT AND DISCUSSION

3.1 Univariate Analysis

Based on Table 1, most respondents were female (60.1%) and 127 respondents (39.9%) were male. In additions, 216 respondents were age of 15 years old and only 1 respondent was aged 17 years old. The highest students were recorded in Makassar 5 senior high school, 93 respondents and 16 respondents from Kartika Wirabuana XX-I senior high school. Besides, 83 respondents were Buginese and only 4 respondents were Mandarese. Meanwhile, 288 respondents are living with their parents and only 1 respondent living in studio housing area.

Table 1. Distribution of respondents based on general characteristic of senior high school students in Makassar city.

Variable	n	%
Gender		
Male	127	39.9
Female	191	60.1
Age		
14 years	32	10.1
15 years	216	67.9
16 years	69	21.7
17 years	1	0.3
School		
Makassar 1 senior high school	85	26.7
Makassar 5 senior high school	93	29.2
Makassar 17 senior high school	68	21.4
Islam Athirah senior high school	24	7.5
Cendrawasih Catholic senior high school	32	10.1
Kartika Wirabuana XX-I senior high school	16	5.0
Race		
Bugis	83	26.1
Makassar	78	24.5
Bugis-Makassar	72	22.6
Mandar	4	1.3
Toraja	30	9.4
Other races	51	16.0
Residence		
Parent	288	90.6
Other family	25	7.9
Studio housing	1	0.3
Others (Hostel and maid)	4	1.3

Source: Primary data, 2016

Based on Table 2, 293 respondents had parent with high education level and 25 respondents had parent with low education level. There were 180 respondents with hereditary and 138 respondents without hereditary. In additions, 235 respondents had positive benefits perceived, while 83 respondents had negative barriers perceived. Besides, 212 respondents had positive barriers perceived and 106 respondents had negative barriers perceived. In term of knowledge, 223 respondents had knowledge and 95 respondents had no knowledge related on DM type 2. 279 respondents with parental support on prevention efforts of DM type 2. There were 165 respondents had peer support in efforts to prevent DM type 2. In media support, 197 respondents had media support, while 121 respondents claimed no media support in prevention efforts of DM type 2.

Table 2. Univariate analysis of independent variables on prevention efforts in DM type 2 in senior high school students of Makassar city.

Variable	n	%
Parental education level		
Low	25	7.9
High	293	92.1
Hereditary		
No	138	43.4
Yes	180	56.6
Perceived benefits		
Negative	83	26.1
Positive	235	73.9
Perceived barriers		
Negative	106	60.1
Positive	212	39.9
Knowledge		
No	95	29.9
Yes	223	70.1
Parental support		
No	39	12.3
Yes	279	87.7
Peer support		
No	153	48.1
Yes	165	51.9
Media support		
No	121	38.1
Yes	197	61.9

Source: Primary data, 2016

Based on Table 3, 195 respondents (61.3%) had prevention efforts in DM type 2, while 123 respondents had no prevention efforts in DM type 2.

3.2 Bivariate Analysis

Based on Table 4, 19 respondents (76.0%) had parent with low education level and 104 respondents (35.5%) had parent with high education level and no prevention efforts in DM type 2. From 195 respondents doing prevention efforts as many as 6 respondents (24.0%) had parent with low education level and 189 respondents (64.5%) with high parental education level. Based on chi square test analysis showed there was a significant relationship between parental education level with prevention effort of DM type 2 among senior high school students of Makassar.

Table 3. Distribution of respondents based on prevention efforts of DM type 2 in senior high school students in Makassar.

Prevention efforts in DM type 2	n	%
No	123	38.7
Yes	195	61.3
Total	318	100.0

Source: Primary data, 2016

Table 4. Relationship between parental education level with prevention efforts of DM type 2 in senior high school students of Makassar.

Parental education level	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
Low	19	76.0	6	24.0	25	100.0	0.000
High	104	35.5	189	64.5	293	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table 5, 123 respondents who did not make efforts to prevent DM type 2, there were 86 respondents (62.3%) without hereditary and 37 respondents (20.6%) were hereditary. Besides, 195 respondents had prevention effort on DM type 2, while 52 respondents (37.3%) with hereditary and 143 respondents (79.4%) with hereditary. There was a significant relationship between hereditary and prevention efforts in DM type 2 of senior high school students in Makassar city.

Table 5. Relationship between hereditary with prevention efforts of DM type 2 in senior high school students of Makassar.

Hereditary	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
No	86	62.3	52	37.3	138	100.0	0.000
Yes	37	20.6	143	79.4	180	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table 6, there were 123 respondents did not have any prevention effort of DM type 2, 73 respondents (88.0%) had negative benefits perceived and 50 respondents (21.3%) had positive benefits perceived. Meanwhile, 195 respondents had prevention efforts, 10 respondents (12.0%) had negative benefits perceived and 185 respondents (78.7%) had positive benefits perceived There was significant relationship between benefits perceived and prevention efforts in DM type 2.

Table 6. Relationship between benefits perceived with prevention efforts of DM type 2 in senior high school students of Makassar.

Benefits perceived	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
Negative	73	88.0	10	12.0	83	100.0	0.000
Positive	50	21.3	185	78.7	235	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table 7, There were 54 respondents (50.9%) who had negative barriers perceived and 69 respondents (32.5%) had positive barriers perceived. Meanwhile, 52 respondents (49.1%) had negative barriers perceived and 143 respondents had positive barriers perceived with prevention efforts in DM type 2. Based on chi square statistical test, a significant relationship between barriers perceived and prevention efforts in DM type 2 among senior high school students in Makassar.

Table 7. Relationship between perceived barriers with prevention efforts of type 2 DM in senior high school students of Makassar.

Perceived barriers	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
Negative	54	50.9	52	49.1	106	100.0	0.001
Positive	69	32.5	143	67.5	212	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table 8In additions, 93 respondents had less knowledge and 30 respondents (13.5%) had knowledge on DM type 2. Meanwhile, only 2 respondents (2.1%) had less knowledge and 193 respondents had knowledge on prevention efforts in DM type 2. The chi square test showed there was a significant relationship between knowledge with prevention efforts of DM type 2 among senior high school students in Makassar.

Table 8. Relationship between knowledge with prevention efforts of DM type 2 in senior high school students of Makassar.

Knowledge	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
No	93	97.9	2	2.1	95	100.0	0.000
Yes	30	13.5	193	86.5	223	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table.9, 24 respondents (61.5%) had no parental support and 99 respondents (35.5%) had parental support. Furthermore, 15 respondents (38.5%) without parental support and 180 respondents had parental support in prevention efforts for DM type 2 among high school students in Makassar. There was significant relationship between parental support and prevention efforts in DM type 2.

Table 9. Relationship between parental support with prevention efforts of DM type 2 in senior high school students of Makassar.

Parental support	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
No	24	61.5	15	38.5	39	100.0	0.002
Yes	99	35.5	180	64.5	279	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table 10, Meanwhile, 97 respondents had no peer support and 26 respondents had peer support without prevention efforts in DM type 2. There were 139 respondents had peer support with prevention efforts in DM type 2.

Table 10. Relationship between peer support with prevention efforts of DM type 2 in senior high school students of Makassar.

Peer support	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
No	97	64.3	56	36.6	153	100.0	0.000
Yes	26	15.8	139	84.2	165	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

Based on Table 11, there were 111 respondents (91.7%) had no media support and 12 respondents had media support without prevention efforts in DM type 2. Besides, 10 respondents (8.3%) had no media support and 185 respondents (93.9%) had media support with prevention efforts in DM type 2. The chi-square test found a significant relationship between media support and prevention efforts in DM type 2 among senior high school students in Makassar.

Table 11. Relationship between peer support with prevention efforts of DM type 2 in senior high school students of Makassar.

Media support	Prevention efforts in DM type 2				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
No	111	91.7	10	8.3	121	100.0	0.000
Yes	12	6.1	185	93.9	197	100.0	
Total	123	38.7	195	61.3	318	100.0	

Source: Primary data, 2016

3.3 Overall Discussion

The result found only 6 respondents (24.0%) had parent with low education level and 189 respondents had parent with high education level in prevention efforts on DM type 2. There was a significant relationship between parent education level and prevention efforts in DM type 2 for senior high school students in Makassar. A study found people with low education level had 1.27 times at risk of suffering DM than people with high education level [12]. From this study showed high incidence number of DM type 2 because of low of parental education level on prevention of DM type 2 incidence.

In study, there were 143 respondents (79.4%) with hereditary and did prevention efforts on DM type 2. Most of DM type 2 is due to hereditary, not contagious disease. The person with parent or family members had DM type 2 history having high risk in suffering DM type 2. Based on chi square showed a significant relationship between hereditary and prevention efforts DM type 2 among senior high school students in Makassar. The DM type 2 was due to genetic and various mental factors [13]. This disease has considered to be related with family aggregation.

In contrast, 185 respondents (78.7%) had benefits perceived with prevention efforts in DM type 2. Meanwhile, a significant relationship between benefits perceived and prevention efforts in DM type 2. A person would not have any treatment recommendation unless treatment helped in reduce threat or illness [14].

The study found a significant relationship between barriers perceived and prevention efforts in DM type 2. Higher barriers perceived would reduce prevention efforts in DM type 2. Based on 143 respondents had negative barriers perceived with prevention efforts of DM type 2.

Besides, the study suggested person with knowledge in DM type 2 have more prevention efforts in reducing DM type 2 risk. The study showed a significant relationship between knowledge and prevention efforts in DM type 2 among senior high school students in Makassar. The person with knowledge help in decision making to form better action or effort in problem handling.

The parental support is needed in prevention of DM type 2. The parental support had included giving education and information about DM type 2 to their children. The result showed a significant relationship between parental support with prevention efforts of DM type 2 among senior high school students. The parents play important roles as managers of their children's opportunities, supervising their social activities and be initiator and organizer in social life [15].

The peer support also had influenced in prevention efforts of DM type 2 among senior high school students. The peer support was referred as providing information, advice and prevention on DM type 2. The peer support is a mutual support that peer can share their experiences, giving and receiving support and build up mutual and understanding which benefits for both parties [16].

4. CONCLUSION

In conclusions, this study showed a significant relationship between parental education level, hereditary, benefits perceived, barriers perceived, knowledge, parent support, peer support and media support toward prevention efforts of DM type 2 in senior high school students in Makassar.

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