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Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 PREDICTION MODEL OF OBESITY AMONG TEACHERS IN SENIOR HIGH SCHOOL IN KENDARI La Banudi 1 * , Wenny Ino Ischak 2 , Suriana Koro 1 , Purnomo Leksono 1 1 Politeknik Kesehatan Kendari, Kementerian Kesehatan Republik Indonesia 2 Politeknik Kesehatan Gorontalo, Kementerian Kesehatan Republik Indonesia *Correspondence: La Banudi Politeknik Kesehatan Kendari, Kementerian Kesehatan Republik Indonesia Jl. Jend. A.H. Nasution. No. G.14 Anduonohu, Kota Kendari, Sulawesi Tenggara, Indonesia, Postcode: 93232 Email : labanudibanudi@yahoo.com Abstract Background : Obesity that occurs in adolescents (age > 18 years) shows a significant increase, from 12% in 2007 to 13% in 2010 and 19% in 2019 in males, and from 13% to 28% in 2013 in females. Objective: To analyze the prediction model of obesity among teachers in senior high school in Kendari.

Methods: This was a prediction cross - sectional study. There were 250 high school teachers were recruited from 12 senior high schools using purposive sampling. The instruments used were questionnaires (food frequency, consumption recall, and activities recall questionnaire), Seca weight scale, anthropometry microtoice, meter, computer program, and stationery. Data were analyzed using Chi - Square.

Results : Findings showed that there was a significant correlation between age group ($p = 0.05$), knowledge ($p = 0.02$), stress ($p = 0.05$) and diet ($p = 0.013$). The prediction factor of obesity among high school teachers is that teachers with an upper age (age > 45 years) tend to be obese 2.64 times that teachers at a young age (age < 45 years). And if teachers experience stress, then they will suffer from obesity 2.17 times compared with teachers have no stress.

Conclusion: Factors associated with obesity in high school teachers in Kendari is age group, knowledge, stress and dietary factors while the factors that are not related in this study are attitudes about nutrition, activity and smoking habits. The highest predictors of obesity in teacher of senior high school are age and stress.

Keywords: prediction model, obesity, Kendari, Indonesia INTRODUCTION Overweight and obesity are rising rapidly in different parts of the world toward epidemic proportions. This is due to the increased diet high in fat and sugar, along with a decrease in physical activity. In developed countries, obesity has become an epidemic by contributing 35% to morbidity and contributing 15 - 20% to death.

Recent reports indicate that the prevalence of obesity worldwide in both developing and developing countries has risen in alarming numbers. Balanced Nutrition Behavior is essential to prepare a healthy lifestyle in the face of the double burden of nutritional problems, namely deficiencies and excess nutrients that occur together (Widyantara, Zuraida, & Wahyuni, 2014) .

Sobal and Stunkard's research concludes that in developed countries, women's groups in low socioeconomics have an obesity prevalence 6 times higher than women in top socioeconomic groups (Sobal & Stunkard, 1989) . In Sweden, low socioeconomics is a strong determinant of the incidence of overweight and obesity in middle - aged Banudi, L., et al. Belitung Nursing Journal.

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ORIGINAL RESEARCH ISSN: 2477 - 4073 411 Banudi, L., Ischak, W. I., Koro, S., Leksono, P . (2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 women. In Syria, the incidence of obesity is increased in women with multiparity and low physical activity.

Studies in Korea show that low education and income levels are the leading cause of obesity in both sexes. However, in developing countries such as Africa and Asia, the incidence of obesity is more common in urban areas than in rural areas, meaning that obesity is more common in high socioeconomic groups (Widianti & Candra, 2012) .

In 2007 in Indonesia found that the prevalence of central obesity is higher with increasing socioeconomic status (Jafar & Gobel, 2011) . The rise of fast food and

unhealthy lifestyle are not only in big cities but also up in small towns in Indonesia. This affects changes in eating behaviors and healthy life behaviors, so some of them become obese until eventually suffering from obesity.

Susenas 2004 data shows the population aged 15 years and over 85% less physical activity, and only 6% of the population is entirely physical activity (Statistik, Nasional, Macro, Kesehatan, & MEASURE/DHS+, 2003). Data of Riskesdas, national prevalence of General Obesity in adult population (Above 15 years) is 10.3%. A total of 12 provinces have prevalence of general obesity in adult population above national prevalence, that is Bangka Belitung, Kepulauan Riau, DKI Jakarta, Jawa Barat, Jawa Timur, Kalimantan Timur, Sulawesi Utara, Sulawesi Tengah, Gorontalo , Maluku Utara, Papua Barat, and Papua (B. P. D. P.

KESEHATAN & RI , 2006) . While at Riskesdas in 2013 is Sulawesi Utara, Gorontalo, Kalimantan Timur, Bangka Belitung, DKI Jakarta, Maluku Utara, Sulawesi Tengah, Sumatra Utara, Papua Barat, Aceh, Jawa Barat and Jawa Timur (D. Kesehatan & Ri, 2013) . Riskesdas results in 2007 that are overweight nationally by 12.2%. Riskesdas in 2010 increased to 14.0% while Southeast Sulawesi's Riskesdas particular data in 2013 was 11.9%. Obesity that occurs in adolescents (age > 18 years) shows improvement.

In the male gender, Riskesdas in 2007 by 12% increased to 13% in Riskesdas in 2010 and 19% in Riskesdas 2013. While in women higher Riskesdas 2007 i.e. 13%, increased to 20% at Riskesdas 2010 and 28 % on Riskesdas 2013 (D. Kesehatan & Ri, 2013) . Similarly, central obesity (male abdominal circumference >90 cm and in women >80 cm) for Southeast Sulawesi increased data, whereas at Riskesdas in 2007 only 18% increased to 27% at Riskesdas in 2013. Obesity based on body mass index (BMI) at age > 18 years, Riskesdas in 2007 of 10.3% increased to 12.2% in 2010 Riskesdas and 15.4% in Riskesdas 2013. Nationwide prevalence of general obesity in men is lower than women (13.9% and 23 respectively, 8%).

According to Riskesdas 2013, cross tabulation result of nutritional status of adult population according to BMI with some variable of respondent characteristic seen that: prevalence of general obesity is higher in urban area compared to rural area and the higher level of household expenditure per capita per month tend to higher prevalence of obesity common, also for the prevalence of more weight and obese.

High school teachers in Kendari are teachers who are in the urban environment and have less activity so that the risk of obesity. This study aims to analyze the prediction model of obesity among teachers in senior high school in Kendari. METHODS Study design This was a cross - sectional study conducted in the Senior High School in Kendari

City.

Sample There were 250 high school teachers were recruited from 12 senior high schools using purposive sampling based on the inclusion criteria, including: the teacher who was still active working, suffering from overweight and obesity, and were ready to be respondent. The exclusion criterion was respondent who was pregnant. Instrument The instruments used in this study were questionnaires (food frequency, consumption
412 Banudi, L., Ischak, W. I., Koro, S., Leksono, P .

(2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 recall, and activities recall questionnaire) developed by the authors with sound validity and reliability. The other instruments used were Seca weight scale, anthropometry microtoice, meter, computer program, and stationery. Data analysis Data were analyzed using univariate and bivariate analysis. Bivariate analysis used Chi - Square test.

Ethical consideration This research has been approved by the Medical Research Ethics Commission of Hasanudin University Faculty of Medicine the Number: UH16070578.

RESULTS Distribution of respondents' characteristic aged <45 years as many as 122 people or 48.8% and > 45 years as many as 128 people or 51.2%. The majority of respondents were women as many as 155 people or 62.0 %, and most of them were working in private sectors as many as 127 people or 50.8% (see Table 1). Table 1 Characteristics of respondents Characteristics of respondent Total Percentage Age (years) = 45 122 48.8 > 45 128 51.2 Sex Men 95 38.0

Women 155 62.0 Employment Government 97 38.8 Military 6 2.4 Private sectors 127 50.8 Housewife 20 8.0 Table 2 shows that 163 people (65.2%) were not stress, 155 people (62.0%) were in a good diet, 195 people (78.0%) with obesity status, and 198 people (79.2%) with light activity category. Based on the category of knowledge and attitude, 179 people (71.6%) had a good knowledge, and 143 people (57.2%) had good attitude.

Table 2 Distribution of respondent by stress factor, diet and obesity status Variable Total Percentage Stress factors Stress 87 34.8 Not 163 65.2 Dietary habit Good 155 62.0 Not good 95 38.0 Obesity status Obesity 195 78.0 Overweight 55 22.0 Activity Heavy 52 20.8 Light 198 79.2 Knowledge Good 179 71.6 Not good 71 28.4 Attitude Good 143 57.2 Not good 107 42.8 413 Banudi, L., Ischak, W. I., Koro, S., Leksono, P .

(2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 Table 3 shows that there were significant relationships between age group, stress status, diet and knowledge with obesity status ($p < 0.05$), while attitude and activity had no correlation

with obesity status ($p > 0.05$). Table 3 Relationships of age group, stress status, diet, knowledge and activities with obesity status in high school teachers in Kendari

Variable	Status obesity	Total	Pv	X 2 hit	Obesity	Overweight	n %	n %	n %	Age group (years)
	< 45	86	70.49	36	29.51	122	100	0.005	7.828	> 45
	109	85.16	19	14.84	128	100				Status of Stress
	59	67.82	28	32.18	87	100	0.005	8.065	No stress	136
	83.44	27	16.56	163	100					Dietary habit
	Good	113	72.90	42	27.10	155	100	0.013	6.175	Not good
	82	86.32	13	13.68	95	100				Knowledge
	Good	133	74.30	46	25.70	179	0.025	5.024	Not good	62
	87.32	9	12.68	71	100					Attitude
	Good	108	75.52	35	24.48	143	100	0.278	1.193	Not good
	87	81.31	20	18.69	107	100				Activity
	Heavy	41	78.85	11	21.15	52	100	0.869	0.027	Light
	154	77.78	44	22.22	198	100				Bivariate test results show

a significant relationship between age, diet, stress, and knowledge.

Analysis of this mode I provides an overview of the variables that are very influential on the incidence of obesity. Furthermore, model analysis/path analysis is shown in Figure 1. Figure 1 Analysis of Model / Path Analysis of Prediction of Obesity by Age, Diet, Stress, and Knowledge Figure 1 illustrates that the higher age will affect the increase in the value of BMI or obesity that is equal to 2.64 times compared with under - age.

Similarly, stress conditions indicates that the more stress the high school teacher will increase the value of BMI or obesity, with a ratio of 2.17 times compared with no pressure. In addition, the less proper diet will increase the value of BMI or obesity. But good food will decrease the amount of BMI or obesity, and the lower level of knowledge will lead to an increase in BMI or obesity.

Obesity Age Dietary habit Stress Knowledge - 0.87 (2.64) - 0.56 (- 1.50) 0.72 (2.17) - 0.74 (- 0.82) 414 Banudi, L., Ischak, W. I., Koro, S., Leksono, P. (2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 DISCUSSION Age with obesity status in high school teacher in Kendari Age is one factor that causes obesity in high school teachers in Kendari. Age includes elements that cannot be fixed in obesity conditions.

With the age that there will be attention in the field of health improvement, both at a higher age and at a young age (Aini, 2014). This study found that there was a significant relationship between age groups with obesity status among high school teachers, which in teachers with an upper age (age > 45 years) tend to be obese while the prevalence of obesity at a young age (age < 45 years) was less.

Increased age group in men and women will have higher metabolic syndrome and obesity in adolescents. The addition of age is one of the factors triggering obesity in high school teachers in Kendari, which should be a main concern in Kendari (Jafar & Gobel, 2011).

This study is in line with other studies on the relationship between characteristic factors, hypertension and obesity with the incidence of diabetes mellitus in regional general hospital Dr. H. Soewondo Kendal. The results of this study explained that there was a statistical relationship between age with the incidence of obesity, the higher the age of high school teachers, the more the occurrence of obesity (Bhatta, Assad, & Shakya, 2014 ; Rahayu, Utomo, & Setiawan, 2012). Knowledge with obesity status in high school teacher in Kendari Education is the result of knowing. Here happens after people do the sensing of an object against a particular purpose.

Sensing occurs through post - human senses, namely the sense of sight, sound, smell, taste, and touch. Most knowledge is obtained through the eyes and ears. Understanding of cognitive is a very important pre dominant in shaping one's actions (Notoatmodjo, 2007 ; Supariasa & Nyoman, 2012). The results showed that from 250 samples, there were 179 have good knowledge.

This is because in general, the respondents knows about the definition of obesity, the risk of obesity and efforts made to combat the occurrence of obesity, it is in accordance with the results of interviews with informants who suggested that obesity is the advantage weight, and of course if excess weight from standard weight. This is in line with the opinion of researchers that obesity is a condition where someone is overweight compared with normal weight, and then respondents also have known and make efforts to lose weight.

The first informant stated that she has been on a diet and exercises to lose weight, then the fourth respondent also stated that the effort made to lose weight is to consume herbal food (Sada, Hadju, & Dachlan, 2012). The respondent revelation is in line with the researcher's opinion that the effort taken to lose weight is a lot of exercises, reduce consumption that contains high fat, eating time setting especially not eating at night time, avoiding stress causing high consumption, consuming weight loss herb but must be balanced with enough activity.

Further research results also indicated that there were 71 people had poor knowledge, because they did not understand about the definition of obesity and risk and efforts to prevent obesity (LUTFIAH, 2013). The findings revealed that there was a significant relationship of knowledge with obesity status in high school teachers in Kendari.

Education can be a guideline to maintain body condition and the healthy weight. Preventive and promotive efforts in dealing with obesity are made by providing knowledge about the ideal weight. The ability to select information from the mass

media is also an important thing that must be cultivated to the public to obtain correct information from the mass media (Ma & Xiao, 2010 ; Tammelin, Laitinen, & Näyhä, 2004).

Dietary habit with obesity status in high school teachers in Kendari Diet is a variety of information that provides an overview of the kinds and amount of food eaten every day by one person and has a 415 Banudi, L., Ischak, W. I., Koro, S., Leksono, P. (2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 unique characteristic for a community group.

Food consumption is the total amount of food available for use (Newell & Cousins, 2015) The result showed that there was association of eating pattern with obesity status in high school teacher of Kendari city, of 250 respondents, 155 of them had a proper diet and 95 had a poor diet. From 155 people who had adequate intake, 72.90% were obese and 27.10% were overweight. And from 95 people who had poor diet, there were 86.32% were fat and the remaining 13.68% overweight.

Five informants stated that the causes of obesity in line with the opinion of researchers that many factors that cause obesity such as stress that leads to many meals, and yet stress will also cause less appetite, lack of exercise and diet and food consumption contain excessive carbohydrates. The other factor is the use of hormonal contraceptive acceptor (Stewart, Chapple, Hughes, Poustie, & Reilly, 2008) .

It is also supported by another opinion that the occurrence of obesity is generally related to the balance of energy in the body. The energy balance is determined by the energy intake derived from the energy - producing nutrients of carbohydrates, fats, and proteins and energy requirements established by the basal energy requirements, the activity of energy, and the thermic effect of food (TEF) i.e.,

the energy required to process the nutrients into energy (Dieny & Dieny, 2007) . Overweight people are more responsive than average body weight to external hunger requirements, such as taste and smell of food, or it is time to eat. Fat people tend to eat when they feel like eating, not eating when they are hungry.

This excessive pattern makes them difficult to get out and overweight if the individual has no self - control and a strong motivation to lose weight (Dewi & Mahmudiono, 2013 ; Dieny & Dieny, 2007) . Another factor causing obesity is poor eating behavior. Poor eating behavior is caused by several reasons, such as environmental and social. This is evidenced by the increasing prevalence of obesity in developed countries.

Another cause of poor eating behavior is psychological factor, which eating behavior seems to be used as a means of stress distribution. Unhealthy eating behavior in childhood resulting in excess nutrients also contributes to obesity, this is based because the rate of formation of new fat cells increases primarily in the first years of life, and the higher the fat storage rate, the higher also the number of fat cells.

Therefore, obesity in childhood tends to lead to obesity in adult later (Çolak, Afzal, Lange, & Nordestgaard, 2016). Stress with obesity status in high school teacher in Kendari. The body responses to emotional, mental health is the release of hormones and neurotransmitters, the most dominant of which is the expenditure of adrenaline and noradrenaline.

Also, emotional, psychological health also secretes the adrenocorticotrophic hormone, cortisol, aldosterone, vasopressin, and thyroid-stimulating hormone. When these substances increase in the body, the heart rate will grow faster and stronger, blood vessels carrying vasoconstriction, increased blood cholesterol, increased blood sugar, blood cells tend to clot (Fox, Gross, Rudser, Foy, & Kelly, 2016).

The results showed that there was a significant relationship between stress and obesity status in high school teacher in Kendari. Of 250 respondents, 163 people experienced stress and 87 people were not stress. From 163 people who were suffering stress, there were 67.82% were obese and 32.18% were overweight. And from 87 people who were not stress, 83.44% were fat and 16.56% were overweight.

This study is in line with other studies indicated that emotional factors can also cause obesity. Fat people often say they tend to eat more when they are tense or anxious, and experiments prove the truth. Fat people eat more in a very tense situation while people with normal weight eating in less stressful situations (Ma & Xiao, 2010). 416 Banudi, L., Ischak, W.

I., Koro, S., Leksono, P. (2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 In a study on a group of overweight people and a group of people with underweight weight, serving chips (snacks) after they watched four different films invite different emotions, tense, cheerful, stimulating sexual arousal and a boring lecture.

In obese people found that they spend more on chips after watching a tight film than after watching a boring movie. While people with less weight appetite chips remain the same after watching a tense movie or a boring movie (Manurung, 2009). The results of this study also are in line with a popular view is that obesity begins and emotional problems are not resolved.

Fat people thirst for love, like children, food is considered as a symbol of mother's affection, or overpopulation is as the substitution for substitute other satisfaction that is not achieved in life. Although such explanations are appropriate in some cases, some people who are overweight are not more psychologically disturbed than people with the healthy weight (Park, Sovio, Viner, Hardy, & Kinra, 2013).

Although many opinions say that obese people are usually unhappy, in fact, the inward pressure more results as a result of obesity. This is because in a society is often a skinny body equated with beauty, so fat people tend to play with the appearance and difficulty of controlling themselves, especially in matters relating to eating behavior (Ma & Xiao, 2010 ; Manurung, 2009).

Activity with obesity status in high school teacher in Kendari Performing physical activity or motion on a regular basis is the initial concept of efforts to prevent cardiovascular disease and reasonable efforts for patients with cardiovascular disorders (Tammelin et al., 2004). Results from many studies have shown that physical activity decreases the incidence of hypertension, obesity, stroke, osteoporosis, urinary and coronary heart disease (Khairud din, 2014). In association with coronary heart disease, it has been reported that inactive persons are 1.9

times more likely to have coronary heart disease than those who are active in exercise (Tammelin et al., 2004). In this study, there was no relationship between physical activities with obesity p - value (0.869), X² count (0.027). Indeed this is supported by some opinions. The influence of physical activity on adolescent weight is still controversial.

There is evidence that obese teenagers are less active than usual, but the aspects of the physical activity that are very influential on obesity cannot be clearly defined. Several studies have suggested that there is a connection between sedentary lifestyles (such as mention television) with obesity. Where the total amount of physical activity or duration and the severity of physical activity performed is a critical factor in the occurrence of obesity (Okop, Mukumbang, Mathole, Levitt, & Puoane, 2016).

In adolescent girls and men in the United States age 11 - 15 years show that the lack of severe physical activity is the only risk factor for obesity in children and adolescents (Yusuf et al., 2005). In American children aged 8 - 16 years, the prevalence of obesity in children who watch TV <1 hour per day, and the highest in children who watch > 4 hours per day (Wang, Monteiro, & Popkin, 2002).

Girls generally perform less physical activity than boys, and watching TV has a positive correlation with obesity in girls, controlling for age, race, family income, weekly physical activity, and energy intake (Piepoli et al., 2016) . In Pima Indians aged 5 and 10 years old children show that obesity in 5 - year - olds is associated with decreased participation in exercise, increased TV time, but is not associated with reduced participation Physical Activity Level (PAL), while obesity at the age of 10 years relates these three factors.

Based on these results it can be concluded that the decline in PAL seems to follow, rather than precede the development of obesity (Piepoli et al., 2016 ; Tammelin et al., 2004) . Physical activity done outdoors will be associated with eye exposure to the risk of obesity and heart function. Outdoor activities exposed to the sun will affect the metabolic processes that will

417 Banudi, L., Ischak, W. I., Koro, S., Leksono, P .
(2018) Belitung Nursing Journal, Volume 4, Issue 4, July – August 2018 affect obesity. Besides, more eye exposure will be associated negatively, especially in skin cancer (Córdova, 2016) . CONCLUSION Factors associated with the incidence of obesity in high school teachers in Kendari are the age group, knowledge, stress, and diet.

The prediction factor of obesity among high school teachers is that teachers with an upper age (age > 45 years) tend to be obese 2.64 times that teachers at a young age (age <45 years) . And if teachers experience stress, then they will suffer from obesity 2.17 times compared with teachers have no stress. REFERE NCES Aini, S. N. (2014). Faktor risiko yang berhubungan dengan kejadian gizi lebih pada remaja di perkotaan.

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