Community Research

Prevalence and determinants of obesity in students with intellectual disability in Jakarta

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Abstrak

Latar belakang: *Kelompok masyarakat yang mempunyai masalah kesehatan dan belum mendapat perhatian semestinya adalah penyandang disabilitas intelektual (DI) dengan obesitas. Penelitian ini bertujuan memperoleh prevalensi obesitas dengan DI di SLB di Jakarta, serta mengetahui hubungannya dengan usia, jenis kelamin, dan pendidikan orangtua.*

Metode: *Penelitian ini menggunakan studi potong lintang (*cross sectional study*). Subjek penelitian adalah pelajar SLB C/C1 di wilayah DKI Jakarta berumur antara 10-30 tahun. Batasan obesitas untuk umur 10-20 tahun menggunakan IMT ≥ persentil ke-95 untuk kelompok umur dan jenis kelamin yang sesuai. Batasan obesitas untuk umur 21-30 tahun adalah IMT menurut WHO untuk Asia Pasifik, yaitu IMT ≥ 25,0. Analisis untuk menguji faktor determinan mengunakan uji kai kuadrat.*

Hasil: *Prevalensi obesitas pada DI pelajar SLB C/C1 di wilayah DKI Jakarta sebanyak 282 orang atau sebesar 16% dari total 1.760 subjek penelitian. Terdapat perbedaan bermakna secara statistik antara obesitas dengan faktor usia (p < 0,001), jenis kelamin (p = 0,039), dan pendidikan orangtua (p < 0,006 untuk tingkat pendidikan ayah dan p < 0,001 untuk tingkat pendidikan ibu).*

Kesimpulan: *Prevalensi obesitas pada pelajar DI di SLB C/C1 di Jakarta sebesar 16%, dengan faktor determinan yang berhubungan dengan obesitas adalah usia, jenis kelamin, dan tingkat pendidikan orang tua.*

Abstract

Background: The group of people with health problems and has not received a proper attention is those with intellectual disability (ID) with obesity. The study aimed to get the prevalence of obesity in ID students in Jakarta, and to assess its relationship with age, sex, and parental education.

Methods: This is a cross sectional study. The subjects are students of special schools for the disabled type C/C1 in DKI Jakarta area aged 10-30 year old. The definition of obesity for subjects aged 10-20 year old utilized the ≥ 95th percentile of BMI according to the appropriate sex and age group. Meanwhile, the definition of obesity for those aged 21-30 year old is the BMI according to WHO for Asia Pacific, which is ≥ 25.0. The analysis to test the determinant factors was performed using chi-square test.

Results: The prevalence of obesity for ID students of special schools type C/C1 in DKI Jakarta area is 282 people or 16% of the total of 1,760 subjects, and there are statistically significant difference between the prevalence of obesity among the age groups (p < 0.001), sex (p = 0.039) and parental education (p < 0.006 for father's education and p < 0.001 for mother's education level).

Conclusion: The prevalence of obesity among ID students in special schools for the disabled type C/C1 in Jakarta is 16%, with the age, sex, and parental education level as determinant factors associated with obesity.

Keywords: determinant factors, intellectual disability, obesity, prevalence

The American Association of Mental Retardation (1992) defines the term intellectual disability (ID) person as one whose intellectual value is sub average (IQ less than 70). There is a limitation on two or more areas of adaptive skill covering the areas of communication, self-treatment, social/interpersonal ability, academic ability, working ability which occur before the age of 18.[1-4]

Individuals classified as ID represented 1-3% of the global population, and only 0.3% of the global population suffers from the severe IQ disability.[5,6] It means that there are approximately 190 million people with ID in the world.[5] ID is more commonly reported in males with the male-to-female ratio of 2:1 and 1.5:1 for mild and severe ID, respectively.[7] The prevalence of moderate ID is greater than mild and severe ID especially in the lower social economic group.[8]

In 1997-1998, there were approximately 600,000 children receiving ID service at school programs in the United States. The data also indicates that around 11% from the total of ID subjects are school-age children.[7] In relation with the presence of cognitive impairment, ID subjects usually require special care in terms of education. Individuals with ID are enrolled in special schools for the disabled (*Sekolah Luar Biasa*) type C for ID with IQ in mild category and type C1 for ID with IQ in moderate and severe category.[9]

Individuals with ID have not attained proper attention yet and data on the prevalence of ID in Indonesia is very scarce. The occurrence of some health problems that can happen to ID are the musculoskeletal disturbance (34%), obesity (28%), respiratory disturbance (22.6%), neurological disturbance (22.3), deafness (20%), etc.[10]

The prevalence of ID subjects with obesity is around 16-29%.[11] Obesity in ID subjects may be caused by a decrease in aerobic capacity. Obesity may develop due to inactive lifestyles, poor work performance, and quality of life including low basal metabolism rate (BMR). When BMR is low, ID subjects will release less energy for a day than those without low BMR, thus increasing the risk of obesity.[12] Chow B, et al[13] found that ID patients had 15% lower BMR than non-ID patients. Endurance levels of ID patients are also low and may result from the lack of physical activity. Pitetti, et al[14] found that physical capacity of young adults with ID measured by 20 m running test was lower compared with that of non-ID. Some diseases, including type 2 diabetes mellitus, coronary heart disease, respiratory disease, hyperuricemia, sleep apnea, gallbladder disease, dyslipidemia, metabolic syndrome, hypertension, osteoarthritis, and others have been known as the complications of obesity.[15]

Based on these data, the objective of this study is to determine the prevalence of obesity in ID students at special schools for the disabled in Jakarta and determinant factors based on age, sex, and parental education level. Data on the prevalence of obesity among ID subjects is necessary to assess the magnitude of this problem in order to develop countermeasures planning. Finally, it can reduce obesity complications that eventually improve the quality of life of ID subjects with obesity.

METHODS

This is a cross-sectional study performed as a part of a larger study by Tamin TZ, which is aimed to increase physical fitness on ID patients with obesity.[16] The target population in this study is ID students aged 10-30 year old from all special schools type C and C1 in Jakarta on 2008-2009. The study has been approved by Jakarta Education Bureau of Primary and Secondary Education (*Dikmenti*). The subjects were included in the study after their parents gave informed consent to participate. The study has obtained ethical clearance from the Study Ethics Committee of the Faculty of Medicine of Universitas Indonesia, Cipto Mangunkusumo Hospital, Jakarta.

The weight and height of the subjects were measured to confirm obesity. The body weight was measured using Seca digital scale, California, USA. The subjects were weighted while wearing minimal clothes without sandals/shoes, in the straight position with straightly fixed gaze, in kilogram count. The body height was measured by using SMIC stadiometer with the accuracy 0.5 cm. The subjects were measured while standing straight from the floor to the tip of the head in centimeter unit without wearing shoes/sandals. BMI was calculated by dividing body weight by the squared height (BW/BH^2). The obesity criteria for subjects aged 10-20 year old used BMI $\geq$ the 95th percentile for the respective age and sex, while the obesity criteria for subjects aged 21-30 year old was the BMI recommendation by WHO for Asia Pacific ($\geq$ 25.0).[17] Their intellectual level was subsequently measured using The Wechsler Test Intelligence Scale for Children (WISC) for 10-17 year old age

group and The Wechsler Test Intelligence Scale for Children (WISC) for 18-30 year old age group.

Sample size was determined based on a single sample calculation to estimate the proportion of a population, the minimum sample coupled with the possibility of drop-outs. From the calculation, the total of 206 subjects was obtained. However, we collected the data from all students of special schools type C and C1 students in Jakarta. There were 1,760 subjects who participated in this research. Data was analyzed using SPSS 11.0 windows program. The general characteristics for ID subjects with obesity was analyzed using the mean value ± (SB) age and frequency distribution of gender, nutritional status and obesity presented in tabular and textural form. The presentation of data was adjusted to data scale and data distribution. The analysis to determine the determinant factors of obesity among ID subjects including to age, gender, and parental highest level of education was performed using chi-square test. A significant level at a p value ≤ 0.05 was used for analysis.

RESULTS

A total of 1,760 subjects who fulfilled the inclusion criteria were fulfilled in this study. These subjects lived in Central Jakarta, North Jakarta, West Jakarta, South Jakarta and East Jakarta. Among the 1,760 subjects, 592 persons (33.6%) were enrolled in special schools for disabled students in North Jakarta, 577 persons (32.8%) in East Jakarta, 273 persons (15.5%) in West Jakarta, 202 persons (11.5%) in Central Jakarta and 116 persons (6.6%) in North Jakarta.

Subjects characteristics

The characteristics of the subjects are presented in Table 1. The majority (41.80%) of subjects belong to the 10-13 year-old age group. There were more male subjects than female subjects. The majority of subjects were enrolled in elementary school (57.10%) and the majority of parental latest level of education was junior and senior high school (50.50% and 40.80%).

Prevalence of obesity in intellectual disability students

We found that the prevalence of obesity in ID students of special schools for the disabled C/C1,

in Jakarta was 282 persons or about 16% of 1.760 person in total. The comparison of nutritional status of this study is shown at figure 1.

Determinant factors of obesity in students with intellectual disability

There were statistically significant difference of obesity prevalence among the determinant factors of subjects' age, gender, and parental latest level of education in ID subjects. The determinant factors including age, gender, and parental highest level of education is shown in table 2.

Table 1. Subjects characteristics (n = 1,760)

Characteristics	n (%)
Age	
10-13 year (early teenage)	753 (41.80)
14-16 year (middle teenage)	428 (24.30)
17-20 year (advanced teenage)	400 (22.50)
21-30 year (young adult)	179 (10.20)
Gender	
Male	1,051 (59.70)
Female	709 (40.30)
Grade of school	
Kindergarten	7 (0.40)
Elementary	1,005 (57.10)
Junior high school	404 (23.00)
Senior high school	140 (7.95)
Service unit	204 (11.59)
Special schools for the disabled's clasification	
C	874 (49.70)
C1	886 (50.30)
Father's highest education	
Non graduate elementary	27 (1.50)
Elementary	138 (7.80)
Junior high school	226 (12.80)
Senior high school	889 (50.50)
Graduate	405 (23.00)
Postgraduate	75 (4.30)
Mother's highest education	
Non graduate elementary	34 (1.90)
Elementary	215 (12.20)
Junior high school	296 (16.80)
Senior high school	854 (48.50)
Graduate	331 (18.80)
Postgraduate	30 (1.70)

Table 2. Determinant factors of obesity in ID subjects

| Variable	Non-obese	Obese	OR	95% CI	p
	n (%)	n (%)			
Age (years)					< 0.001
10-13	649 (36.90)	104 (5.90)	3.389	2.341-4.907	
14-16	364 (20.70)	64 (3.60)	3.089	2.059-4.635	
17-20	349 (19.80)	51 (2.90)	3.717	2.430-5.683	
21-30	116 (6.60)	63 (3.60)		Reference	
Gender					0.039
Male	867 (49.30)	184 (10.50)	0.756	0.579-0.986	
Female	611 (34.70)	98 (5.60)	0.756	0.579 - 0.986	
Father's highest education					0.006
Not graduate elementary	22 (1.30)	5 (0.30)	0.829	0.309-2.227	
Elementary	121 (6.90)	17 (1.00)	1.342	0.783-2.299	
Junior high school	205 (11.60)	21 (1.20)	1.840	1.134-2.985	
Senior high school	748 (42.50)	141 (8.00)		Reference	
Graduate	321 (18.20)	84 (4.80)	1.388	1.028-1.874	
Postgraduate	61 (3.50)	14 (0.80)	1.218	0.663-2.236	
Mother's highest education					< 0.001
Not graduate elementary	29 (1.60)	5 (0.30)	1.167	0.444-3.065	
Elementary	192 (10.90)	23 (1.30)	1.679	1.051-2.682	
Junior high school	269 (15.30)	27 (1.50)	2.004	1.298-3.094	
Senior high school	711 (40.40)	143 (8.10)		Reference	
Graduate	255 (14.50)	76 (4.30)	1.482	1.084-3.094	
Postgraduate	22 (1.30)	8 (0.50)	1.808	0.789-4.142	
Total	1.478	282			
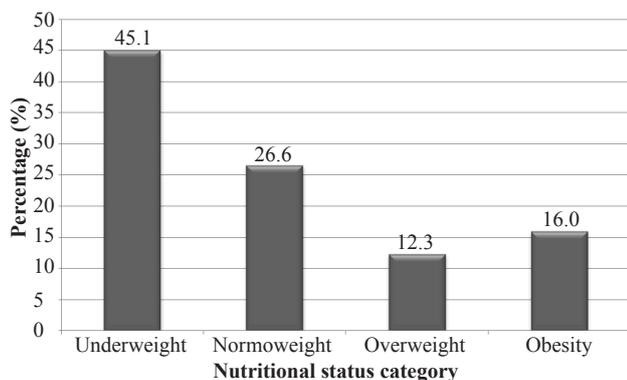
Figure 1. Comparison of nutritional status among students of special schools for the disabled C/C1

DISCUSSION

In this study, it was shown that the majority of subjects were 10-13 year old, represented by 753 subjects (41.80%) with the 21-30 year old age group as the least common age group with 179 subjects (10.20%). Male subjects mostly (25.7%) belonged to the 10-13 year-old age group. This is in accordance with the statement of Selikowitz M,[7] who claimed that ID occurs more frequently in boys than girls with the ratio 2:1 in the mild ID, and 1.5: 1 in the severe ID. This may be due to the x-linked inherited feature of this disorder, causing more males to be affected.[6]

As for education, the majority (1,005 subjects, 57.10%) of subjects were enrolled as elementary school students. Seven subjects (0.40%) were enrolled in kindergarten level, including 6 subjects aged 10-13 year old and 1 subject aged 14-16 year old. These seven subjects have severely low intellectual levels and limited activities. As for special schools for the disabled classification, the number of students from C1 type schools were higher (50.30%) than that of type C schools (49.70%). This is probably because mild ID students commonly go to regular schools. As for nutritional status, most of the subjects (45.10%) were underweight, while the least commonly reported nutritional status was underweight (12.30%).

A study conducted by Idris FH[18] found that the prevalence of obesity among young adult SOINA athletes who were special school students were 3.4%

out of 52 subjects in Bandung and 5.2% out of 135 subjects in Bali. The prevalence of obesity in ID in the United States was 29.3% among 350 young adults with BMI $\geq$ 30.[11] Emerson[19] reported the prevalence of obesity with BMI $\geq$ 30 among subjects with ID in England in 1304 people aged > 16 was 27%, with the higher frequency among females.

The prevalence of obesity with BMI > 30 among 202 ID subjects aged 20-50 years old in Australia were 16.3% for males and 26.5% for females. Whereas in Germany, the prevalence of obesity in ID among 105 young adults was 68% for ID living inside the institution, and 23.9% for ID living in the family environment.[11] The prevalence of obesity among the female ID was increased by 22% and 44% during the period of 1985-1988 and 1997-2000 respectively.[20] The prevalence of obesity from 201 ID people aged 16-76 years old was 48%.[21]

In this study, the prevalence of obesity among ID students of special schools for the disabled C/C1 in Jakarta was observed to be 16% from the total 1,760 subjects. From this result, it is necessary to explain that we performed this study in subjects with differences in race, age limit, and target population. In several studies conducted over several countries, the subjects were taken only from representative group of ID. Nevertheless, the target population in this study was drawn from all students in special schools for type C and C1 disability in DKI Jakarta. We also used a different BMI criteria for our study, with the definition of obesity for BMI $\geq$ 25 and not BMI of $\geq$ 30 like the one used in other studies.

Chi-square tests revealed significant differences of obesity prevalence among ID subjects for the determinant factors of age, gender, and parental highest level of education. Regarding the age, previous studies have revealed significant increases in rates of obesity with the increasing age during childhood, from childhood to adolescence and from adolescence through the entrance in adulthood.[19,22,23] Meanwhile, the prevalence of obesity in our study is highest at the age group of 10-13 year old. Our result may be explained by the difference of subjects in our study compared to others. We included special school students for the disabled and elementary school as the highest education level, resulting in the highest prevalence of obesity in this age group.

For the determinant factor of gender, we found that prevalence of obesity is higher in males. This is in contrast with the previous study that found a significantly higher prevalence of obesity among women (43.20%) with ID compared with men with ID (34.30%) in USA and study on 183 subjects of British men and women with ID living with other family members found that the prevalence of obesity among men and women is 19.0% and 34.6%, respectively.[11,24] The difference is may be caused by the higher number of male than female ID students among ID students in Jakarta.

Based on parental highest level of education, we found that the prevalence of obesity is highest for children whose parents completed senior high school. In Indonesia, the government recommended a formal education is up to high school. Educated parents will increase their family's socioeconomic status, thus increasing the family's ability to consume more food or unhealthy food will be greater than the lower socioeconomics. So, the possibility of a child becoming obese may be higher.

By knowing the prevalence of obesity in ID subjects, we can see the magnitude of this problem so it can be made for countermeasures planning, such as assessing the cardiorespiratory endurance level, developing exercise model which is applicable, and can provide an obesity treatment especially in ID subjects. General practitioners or health professionals have and important role and responsibility in preventing and diagnosing weight problems. Finally, these efforts may reduce obesity complications and improve quality of life for ID subjects with obesity.

For further study, associated factors with obesity in persons with ID is needed to determine the correlation between obesity and the environment to identify potential changes that can positively impact health, and exercise model that is applicable for ID subjects with obesity is needed to improve their physical fitness.

This study concluded prevalence of obesity with intellectual disability among students of special schools for the disabled type C and C1 in Jakarta is 16%. There were statistically significant difference of obesity prevalence among the determinant factors of age, sex, and parental education groups. Obesity among ID students is more frequent in male, aged 10-13 year old, and with parental highest

level of education of senior high school level. This data can be useful to illustrate the magnitude of obesity problem among ID subjects, in order to develop countermeasures planning. Finally, these countermeasures can reduce the complications of obesity and eventually improve the quality of life for ID subjects with obesity.

Conflict of interest

The authors hereby affirm that there is no conflict of interest in this study.

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