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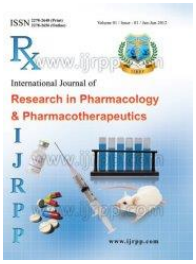

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Research article ***Open Access***

Prevalence of overweight /obesity and associated factors among preschool children of private kindergarten in Jigjiga town, eastern Ethiopia

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ABSTRACT

Introduction

Childhood obesity has become a public health concern in many industrialized and less-developed nations. Of the world's 43 million overweight and obese preschoolers, 35 million live in developing countries. Only EDHS 2011 report is available about the extent of preschool children and overweight and obesity in Ethiopia and no data at all in the study area, Jigjiga Town. The main objective of this study was to determine the prevalence of Overweight /Obesity and associated factors among preschool-age children of private kindergarten (KG) in Jigjiga town, eastern Ethiopia.

Materials and Methods

The study subjects were selected by simple random sampling in proportion to the size of the children in KGs. A structured questionnaire, portable electronic weight scales with a digital screen and height board / commercial standiometer was used to collect the data. NCHS and Center for Disease Control and Prevention chart was used to locate the percentile in which children are found after BMI was calculated.

Results

This study indicated that the prevalence of overweight and obesity in preschool children were19.9% and 14.7% respectively. Children who often reach junk food are more likely to be overweight/obese than children who seldom reach (AOR=10.484, 95%CI= (2.006-54.790)). Children who eat diary food product often are more likely to be overweight/obese compared to those who eat seldom (AOR= 13.570, 95%CI= (2.461-74.820)). Children who have overweight/obese mothers are 9 times more likely to be overweight/obese compared to those who have none overweight/obese mother (AOR=9.030, 95%CI= (2.087-39.067)).

Conclusion and Recommendation

This study showed that prevalence of overweight and obesity in preschool children were high so it is recommended that Regional Health Bureau, Education Bureau and others NGO's working in the region should work hard inawareness creation on eating too many sweet, TV watching and maternal BMI that may contributes to overweight and obesity in preschool-age children using Kindergarten as an opportunity.

Keywords: *Obesity, Kindergarten, Regional Health Bureau*

INTRODUCTION

Background

Overweight and obesity can be characterized as having a high amount of body fat compared to the optimal amount and this increase in body fat may cause health problems. Children's obesity occurs as a result of over-consumption of calories and low physical activity [1]. Total contribution to overweight and obesity are attributable to several factors including; foods that are high in fats, sugars and increasing low-intensity work due to urbanization, new modes of transportation, and decreased physical activity in general [2]. Relatively fewer studies have looked at childhood overweight among populations in Africa [3].

Statement of the problem

Childhood obesity has become a public health concern in many industrialized and less-developed nations. Overweight and obese children are shown to have higher risk of becoming overweight/obese adults[3]. Globally, an estimated 43 million preschool children (under age 5) were overweight or obese in 2010, a 60 percent increase since 1990. Of the world's 43 million overweight and obese preschoolers, 35 million live in developing countries [4]. In Jigjiga Town, though there is no research done in this area, changing of feeding pattern (to fast/junk food) and life style of the society especially in the urban areas due to urbanization, change in transportation system, expansion of cafeterias and supermarket is evident which will contributes to overweight/obesity as research conducted in different part of the world indicates. The main objective of the study is to determine the prevalence of overweightand obesity in the preschool-age children and to assess factors associated with overweight /obesity in the preschool-age children.

METHODOLOGY

Study Area and Period

Jigjiga is a city in eastern Ethiopia and the capital of the Somali Region. Jigjiga zone is located approximately 625km from Addis Ababa and the study was conducted from Feb 1 to 28/2013.

Study Design

The study design was institution based quantitative cross-sectional study.

Source Population

All preschool-age children of KG with their mothers in private schools enrolled in 2012/2013 academic year in Jigjiga Town.

Study Population

The study population were all preschool children (students of KG) in the selected Kindergarten of private schools.

Sample Size Determination

Both single population proportion and double population proportion formula has been used to determine maximum sample size. With the use of single population proportion formula.

$$(n= \frac{(Z_{\alpha/2})^2 p (1-p))}{d^2}$$

With the use of design effect of 2 and adding a 5% non-response rate sample size.

Adding a 5% non-response rate sample size become 414 and using double Population proportion with Epinfo statistical software), with 95% Confidence interval, and Power of 80% final sample size become 429.

Sampling Procedures

6 private kindergartens with KG 1, 2 and/or 3 were selected randomly from 20. Using multi stage sampling procedure again the all randomly selected kindergarten was classified in to KG-1, KG-2 and/or KG-3, and the sampling size allocated proportionally for each kindergarten was again proportionally be allocated to all the three KG classes found in each school respectively and finally sample size from all KG of selected school was drawn randomly using Simple Random Sampling by using lottery methods.

Variables

Dependent variable- -Overweight / Obesity

Independent variables

Demographic and socioeconomic status such as age, sex, ethnicity, maternal educational status, family size, monthly family's income and History of overweight/obesity in family. Eating habit, Sedentary behaviour (TV watching / Playing with Video Game /computer), Physical activities and Maternal BMI

Data Collection

A structured questionnaire was used to collect the data by interviewing the mothers of the children, measurements of weight of both mothers and children was taken by portable electronic weight scale with a digital screen designed and manufactured under the authority of UNICE to the nearest 0.1 kg without shoes and height was measured with height board / commercial standiometer with their head aligned in Frankfurt plane to the nearest 0.1 cm at the school after the mother have been informed by respective school directors to come.

Data quality assurance

Data quality was assured by using different approach like translation of questionnaire to Amharic and Somali language, provision of adequate training and orientation, pretest of questionnaires calibration of weight scale to Zero(0) with known object and standardization of measurements.

Data Processing and Analysis

Height and weight of childrenwas used for calculating BMI for children and Height and weight of mother was used for calculating BMI for them. Children's BMIwas calculated according to the National Center for Health Statistical (NCHS) and Center for Disease Control and Prevention. The BMI for age percentiles for children was used which are specific for boys and girls to know their weight status. Then, the data were exported to SPSS program Version 16 for data analysis. Bivariate tests using crude odds ratio was used to assess the strength of the association. Variables with p value less than 0.05 in the bivariate logistic regression were entered into the final multivariate logistic regression model. For all statistical tests P-value less than 0.05 was considered as a cut off point for statistical significance.

Ethical Considerations

Ethical clearance was obtained from Haramaya University, Harar campus Institutional Research Ethics Review Committee. The interviewers explained the objective , benefit and risks of the study to get informed written consent from study participants prior to data collection.

RESULTS

The total of 429 study participants (mothers and their preschool children), were enrolled in this study. Of them, 408 (95.1%) participated in the study, and the remaining 21(4.9%) were non respondents. From the total of 408 study participant of preschool children 6(1.5%), 171(41.9%) and 231(56.6%) of them were in the age range of 36-47months (3 to <4 years), 48-59months (4 to<5years) and 60-72 months (5-6 years) respectively. And from the total of 408 children enrolled in this study, 216(52.9%) of them are males and the rest 192(47.1%) were females.

Concerning monthly income of the family 37(9.1%) of them earn less or equal to 2500 birr per month, 150(36.8%) of them earn between 2501-5000 birr per month, 116(28.4%) of them earn between 5001-7500 birr per month and the rest 105(25.7%) of them earn greater than 7500 birr per month.

From the total of 408 mothers interviewed or responded to whether their child used to eat junk food which include food item that are more convenient and easy to obtain in a ready-to-eat form like chocolate, soft drinks, cakes, ice cream, potato chips and some takeaway foods, such as burgers, hot chips, 12(2.9%) of children never eat, 130(31.9%) used to eat occasionally, 119(29.2%) of the children used to eat usually and the rest 147(36%) of the children used to eat junk food always.

Regarding sweet consumption, from the total 408 of children whose mothers involved in the study, 34(8.3%) of the children never eat sweet, 141(34.6%) of the children eat 1-2 times daily, 164(40.2%) of the children eat 1-2 times per week and 69(16.9%) of the children eat 3-4 times per week**.**

Regarding TV watching from the total of mothers participated in the study, 222(54.4%) of their children watch TV while eating and 186(45.6%) of the children do not watch TV while eating. And of the total of the participants 69(16.9%) of the children never eat diary like (milk, yogurt, cheese), 251(61.5%) of them eat 1-2 times daily, 20(4.9%) of them eat 1-2 times per week and 68(16.7%) of them eat 3-4 times per week

From the total of the children involved in this study,6(1.5%), 261(64%), 81(19.9%) and 60(14.7%) of them are underweight, Normal weight, overweight and obese respectively. And 8(2%), 175(42.9%), 120(29.4%) and 105(25.7%) of the mothers are underweight, normal weight, overweight and obese respectively.

Table 1. Socio demographic characteristics of study participants Jigjiga Town Eastern Ethiopia, 2013

Socio demographic variable of the children		Freq	%	Total Freq	Total %
Age of the child	36-47 month	6	1.5%		
	48-59 month	171	41.9%		
	60-72 month	231	56.6%		
				408	100
Sex of the child	Male	216	52.9%		
	Female	192	47.1%		
				408	100
Ethinicity of the child	Somali	221	54.2%		
	Oromo	44	10.8%		
	Amhara	90	22.1%		
	Gurage	38	9.3%		
	Tigray	12	2.9%		
	Others	3	0.7%		
				408	100
Grade of the child	KG-1	216	52.9%		
	KG-2	158	38.7%		
	KG-3	34	8.3%		
				408	100
Socio demographic variable of the mothers					
Age of the mothers	20-29	181	44.4%		
	30-39	167	40.9%		
	≥40	60	14.7%		
				408	100
Educational status of the mothers	No formal education	104	25.5%		
	1-8 grade	128	31.4%		
	9-12 grade	118	28.9%		
	College/university complete	58	14.2%		
				408	100
Family size	≤4	58	14.2%		
	>4	350	85.8%		
				408	100
Estimated family's monthly income	<2500 birr	37	9.1%		
	2501-5000 birr	150	36.8%		
	5001-7500 birr	116	28.4%		
	≥7501 birr	105	25.7%		
Total				408	100
Family's history of overweight/obesity	Yes	199	48.8%		
	No	209	51.2%		
				408	100

FACTORS ASSOCIATED WITH OVERWEIGHT/OBESITY

In multivariate analysis: reaching junk food often, eating too many sweet often, snack eaten per day, most of the time lunch eaten at school, vegetable eaten seldom, diary eaten often, type of physical activity, TV watching hour, estimated family's monthly income and BMI of the mothers has found to be significantly associated with MBI of the children.

Children those who often eat too many sweets are 3 times more likely to be overweight/obese when compared with those who seldom eat sweet (AOR= 3.279, 95%CI= (7.591-24.673)). children those who eat snack two times per day were 3 times more likely to be overweight/obese compared to those who eat once per day AOR= 3.609, 95%CI= (1.060-12.290)). Regarding consumption of vegetables, children who seldom eat vegetables were 3 times more likely to beoverweight/obese compared to those children who eat often AOR= 3.715, 95%CI= (1.076-12.821)), children who consume diary often were found to be 13 times more likely to be overweight/obese compared to those who consume diary seldom (AOR= 13.570, 95%CI= (2.461-74.820))[5].

Children those who watch TV ≥2 hours per day were found to be 4 times more likely be overweight/obese compared to children those who watch TV <2 hours per day (AOR= 4.944, 95%CI= (1.531-15.969)). And children of whose family's estimated monthly income are high(≥5001 birr) were found to be 8 times more likely to be overweight/obese compared to children of whose families estimated monthly income were low (≤5000 birr) (AOR= 8.130, 95%CI= (2.320-28.492)) and finally children whose mothers are overweight/obese were found to be 9 times more likely be overweight/obese when compared to children whose mothers are none overweight/obese AOR=9.030, 95%CI= (2.087-39.067).

Table 4. Factors associated with BMI of preschool children among selected private kindergarten in Jigjiga Town Eastern Ethiopia, 2013

variables		**BMI of the children**		**COR (95% CI)**	**AOR (95%CI)**
		None Overweight/ Obese	**Overweight/ Obese**		
Eat junk food	seldom	130(91.5%)	12(8.5%)		
	often	137(51.5%)	129(48.5%)	10.201(5.388-19.314)	.294.059-1.462)
Reach junk	seldom	246(74.5%)	84(25.5%)		
	often	21(26.9%)	57(73.1%)	7.949 (4.548 - 13.892)	10.484(2.006-54.790)**
Eat too many sweet	seldom	196(96.1%)	8(3.9%)		
	often	71 (34.8%)	133 (65.2%)	4.894(2.139-19.468)	3.279(7.591-24.673)**
Snack eaten per day	One times	150(75.0%)	50 (25.0%)		
	Two times	43 (33.6%)	85 (66.4%)	5.930(3.645-9.649)	3.609(1.060-12.290)*
Mostly lunch eaten at school	Injera/Bread with Meat/egg	31 (44.9%)	38 (55.1%)	14.403(4.673-44.394)	1.022(.083-12.566)
	Injera/Bread without Meat/egg	47 (90.4%)	5 (9.6%)	1.250(.316-4.947)	.425(.035-5.172)
	Rice/pasta with meat	142 (60.2%)	94 (39.8%)	7.778(2.712-22.307)	**.038(.003-1.473)**
	Rice/pasta without meat	47 (92.2%)	4 (7.8%)		
Vegetables eaten per week	Seldom	146(55.1%)	119 (44.9%)	4.483(2.679-7.501)	3.715(1.076-12.821)
	often	121 (84.6%)	22 (15.4%)		
Diary eaten per week	Seldom	79 (88.8%)	10 (11.2%)		
	often	188 (58.9%)	131 (41.1%)	5.505(2.748-11.026)	13.570(2.461-74.820)**
Meat eaten perweek	Seldom	85 (93.4%)	6 (6.6%)		
	often	182 (57.4%)	135 (42.6%)	10.508(4.459-	6.117 (.796-

				24.766)	46.990)
Type of physical activities	Football playing	93 (71.0%)	38 (29.0%)		
	Riding bicycle	25 (71.4%)	10 (28.6%)	.979(.429- .233)	.095(.013-.711)*
	Running while playing	112 (77.2%)	33 (22.8%)	.721(.420-1.239)	.418 (.130-1.343)
	Do not participate in any physical activities	37 (38.1%)	60 (61.9%)	3.969(2.274-6.927)	
Frequency of physical activities per week	None every day	129(66.2%)	66(33.8%)	3.445(1.857-6.392)	1.153(.340-3.912)
	Every day	101(87.1%)	15(12.9%)		
Duration physical activities per day	< 60minutes	165(69%)	74(31%)		
	≥60minutes	65(93.5%)	7 (9.7%)	4.165(1.822-9.517)	2.574(.706-9.382)
TV watch Hr	<2hrs	222(89.9%)	25(10.1%)		
	≥2hrs	45(28%)	116(72%)	22.891(13.366-39.202)	4.944(1.531-15.969)**
Family size	≤4	47(81%)	11(19%)	.396(.198-.791)	1.957(.440-8.696)
	>4	220(62.9%)	130(37.1%)		
Family's estimated monthly income	Low (≤5000 birr)	169(90.4%)	18(9.6%)		
	High **(≥5001 birr)**	98(44.3%)	123(55.7%)	11.784(6.774-20.500)	8.130(2.320-28.492)**
Family's history of Overweight/Obesity	Yes	105 (52.8%)	94 (47.2%)	3.086(2.012-4.732)	.711(.182-2.783)
	No	162 (77.5%)	47 (22.5%)		
BMI status of the mothers	None	161 (88.0%)	22 (12.0%)		9.030(2.087-39.067)**
	overweight/Obese	106 (47.1%)	119 (52.9%)	8.216(4.900-13.774)	
	Overweight/Obese				

** Significant at p<0.01, * Significant at p<0.05 OR =Odd ratio, AOR=Adjusted odd ratio, CI= Confidence interval

DISCUSSION

This study showed that the prevalence of overweight and obesity in preschool children are high with the value of 19.9% and14.7% respectively.

According to the finding of this study both overweight and obesity are greater than the report of CDC. Division of Nutrition, Physical Activity, and Obesity Breastfeeding Report Card 2011 in which the prevalence of overweight and obesity in children aged 2-5 years in state of washington and New York city of USA are 18.4% , 17% and 14.4% ,14.5% respectively. This may be due to the fact this study is conducted in school based and there are expansion of supermarket in the city, its accessibility and parents affordability, and mothers assumption and link of overweight and obesity as a sign of normal growth and being health children.

From the Study done in Kenya in preschool children on the prevalence of overweight and obesity 18% of them are overweight and 4% of them are obese which is lower compared to this study. This may be due to the fact that this study is done in Private kindergarten and based on CDC NCHS growth standard compared to nationwide study of Kenya which used WHO Z-score A. O [6]. And at the same time this study shows higher prevalence of overweight and obesity compared to the reports of EDHS 2%[7]. This is due to the fact this study done only in one city and in private kindergarten as compared to the nationwide survey of EDHS of 2011. There is significant association of reaching junk food often by the children from where their parents kept without questioning them compared to those children who reach seldom (AOR=10.484, 95%CI= ((2.006-54.790))[2]. This might be due to parents less

control over their children regarding reaching junk food and lack of awareness on health consequence of being overweight/obesity.

This study revealed that eating too many sweets by children have found to be associated with overweight/obesity, Children who eat sweet often are 3 times more likely to be overweight/obese compared to those children who eat seldom [8]. This might be due to the location of the city in the border of the country where sweets largely enter into the town and it becomes accessible for children to buy, children high interest for sweet food and lack of awareness of the parents regarding health consequence of eating too much sweet food. This study is in agreement with report[9] of Parkes.A *et al.,* 2012 and study conducted in Tehran (0.9-3.0)[10,11].

This study revealed that there are strong association between estimated family's monthly income and overweight/obesity of the children, children whose their family's estimated monthly income high (≥5001 birr) were found to be 8 times more likely to be overweight/obese compared to those children whose estimated family's income is low (≤5000) (AOR= 8.130, 95%CI= (2.320-28.492)). This may be due to the fact as monthly income of the family increase the ability of the family to buy sweet and junk food will be improved and also the family's affordability to take their children to the kindergarten by taxi on daily basis which promote sedentary behavior that finally contribute for children's overweight/obesity [12,13].

The finding of this study shows that there are significant association between children overweight/obesity and BMI of the mothers[14-16]. Children whose mothers were found to be overweight/obese are 9 times more likely to be overweight/obese compared to children whose mothers are not overweight/obese with value of (*P* <0.003), AOR=9.030, 95%CI= (2.087-39.067)). This may be due to lack of awareness regarding undue weight gain and related consequence of health problem and at the same time due to wrong perception of gaining excessive weight is a sign of health and good economic status by the society.

CONCLUSIONS

From the result of this study we understand that overweight and obesity in private kindergarten especially where the study has conducted were high and no doubt that it become the main public health problem in the area.unlike eating junk food reaching it has been found to be positvely associated with BMI of children. Eating too many sweets like candy, chocolate and cake often, eating snack two times a day,eating vegetables seldom, eating dairy often were some of the important food that have been associated with childrens' BMI. The study also showed that although some of the children are engaged in recommended frequency and duration of physical activities still majority are below the recommended one. Children's screen time which promotes sedentary behavior is also another important factor that has found to be strongly associated with children's overweight/obese specially watching TV for at least ≥2 hours on daily basis. The study also revealed that increased monthly income of the family were found to be associated with childrens' overweight/obesity and finally there is also having overweight/obese mothers were found to be strongly associated with childrens' overweight/obesity.

RECOMMENDATION

Based on the finding of this study the following recommendation are forwarded

Parents should have to keep junk food from reach out of children, control over children's excessive sweet consumption , screen time, and pay due attention to their own weight status.

Kindergarten should pay due attention to importance of recommended children's physical activity, teaching the health consequence of eating too many sweet and TV watching ≥2hrs per day.

Kindergarten should have to avoid promotion of cartoon TV program via poster in the wall of class room which may encourage children to spent more time on TV watching,

Regional Health and Education bureau and other NGOs working in the region should work hard in collaboration in awareness creation on eating too many sweet, TV watching and maternal BMI that may contributes to overweight and obesity in children using Kindergarten as an opportunity.

Further researches including regionally and nationally with increased sample size should be conduted in order to lay the base for national and regional comparison as this research lack comparison in both regionally and nationally.

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