ORIGINAL ARTICLE

Influence of maternal level of education and socioeconomic status on maternal knowledge of nutrition, physical activity and children's bodyweight of Nigerian school pupils

Adebisi I. Hammed[1]✉ • Suleiman O. Usman[1] • Onyemechi Ezekiel[1] • Joy C. Duru[1] • Oluwaseun J. Oladimeji[1] • Ogolo Jirho[1]

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Abstract

This study investigated the influence of maternal level of education and socioeconomic status on maternal knowledge of nutrition, physical activity, and children's body weight of Nigerian school pupils. A total of four hundred and twelve (412) primary school pupils participated in this study. A structured questionnaire was used to assess the maternal level of education, material's knowledge of nutrition, and physical activities. Body height and body weight were measured with a wall-mounted stadiometer in meters and a bathroom weighing scale in kg, respectively. The children's body weight was determined using the formula weight (kg)/height (m^2). The children were then categorized into different classes of body mass index based on the recommendation of Centers for Diseases Control and Prevention (2015), which is age and sex-specific for children and teens from two years old through 20 years. The differences in maternal educational qualification and children's bodyweights were analyzed using the independent sample t-test. However, the influence of maternal SES on maternal knowledge of nutrition, physical activities, and children's body weights were analyzed using ANOVA. Statistical significance was accepted for a p-value of <0.05. The outcome of this study showed that the educational qualification of mothers had a significant ($p<0.05$) influence on children's bodyweights. It was also observed from this study that the maternal SES significantly ($p<0.05$) influenced maternal nutritional knowledge, maternal knowledge of physical activities, and children's bodyweights. This study therefore concluded that the maternal level of education and SES do influence maternal knowledge of nutrition and physical activity as well as children's bodyweights.

Keywords educational qualification • nutritional knowledge • knowledge of physical activities • bodyweight • grade-schoolers.

Introduction

Even though nutrition plays a key role in human health and well-being, right from conception to the later stages of infancy or early childhood life, the knowledge of the type, time, and quantity of nutritional intake to ensure energy balance remains a great challenge, especially among mothers (Shakkwar, 2007). Although food occupies the first position in the hierarchy of human needs, ignorance of many basic facts relating to food and nutrition is still widespread in the society. Traditionally, a mother is the principal provider of the primary care that her child needs especially during the primary school years of life. Moreover,

✉ aiadebisi@yahoo.com

[1] University of Benin Teaching Hospital, Department of Physiotherapy, Benin City, Nigeria

the type of care she provides depends, to a large extent, on her knowledge and understanding of some aspects of basic nutrition and healthcare (Caldwell, 2008). Proper nutrition can make people stronger, healthier, and more productive which can eventually strengthen the body's immune system, decrease illnesses and improve general health. Thus, the basic function of nutrition is to keep humans alive and healthy to grow and reproduce. It has been affirmed that well-nourished infants, children, and adolescents grow, develop and learn better compared to their mal-nourished counterparts (Youngson, 2004). Although, being adequately nourished will depend on getting enough of the nutrients the body needs but not so much as to keep the body within a healthy range (desirable bodyweight). The quality of children's diets can have consequences for physical growth, cognitive development, and health. The problems of both over and under-consumption can increase children's risk for diet-related diseases later in life (Cole, Bellizzi, Flegal, & Dietz, 2000). Better-informed mothers are familiar with the basic nutritional plans for their children, and they are actively involved in disease prevention programs, especially timely vaccinations; also, they seek health care promptly in case of any problems (WHO, 2014; Wachs, Creed-Kanashiro, Cueto & Jacoby, 2005). It is believed that the beneficial effect of maternal education could be explained by better socioeconomic status (SES) and improved housing conditions, including living in a geographic area that allows easier access to health facilities (Desai & Alva, 1998).

Paradoxically, although excess weight in children is increasing worldwide, underweight remains a serious health problem in low-income countries (Black, Victora, Walker, Bhutta, Christian & De-Onis, 2013). The influence of several factors, including genetic, environmental, cultural, and SES on weight status in children has been extensively described in developed countries (Sanchez-Cruz, de Ruiter & Jimenez-Moleon, 2014). Indeed, the SES of parents may have an impact on children's weight. Higher-income is expected to result in more money to be used to purchase high-quality food and a safe environment in which children can be physically active. Higher-income may also lead many parents to purchase excess calories of foods that may make children to be overweight (Morrissey, 2012; Morrissey, Dunifon & Kalil, 2010). Many parents may have different ideas about childhood overweight and may consider overweight to represent a healthy body type associated with economic success (Shrewsbury & Wardle, 2008). Similarly, low SES has been associated with less participation in physical activities or sports (Stamatakis, Primatesta, Chinn, Rona & Falascheti, 2005). It has been noticed that the physical education lessons are no more observed on the field in some schools and as such children are barred from some physical activities. Furthermore, previous study has revealed that child demographic and societal characteristics which include SES, maternal knowledge, mothers working hours, ethnicity, and physical environment are associated with childhood undesirable weights (Davison & Birch, 2006). These, acting together, probably make some children more susceptible to undesirable body weights. It is to this end that this study was carried out to determine the influence of maternal level of education and SES on maternal nutritional knowledge and children's bodyweights as well as the influence of maternal SES on maternal knowledge of physical activities and children's bodyweights.

Method

This study is a survey design of the influence of the maternal level of education and SES on maternal knowledge of nutrition, physical activity, and children's bodyweights. The population for this study included primary school pupils between the biological ages of 7 to 10 years from five primary schools in the 2018/2019 academic session in Oyo State, Nigeria. A total of two hundred and six (206) male and two hundred and six (206) female primary school pupils participated in this study. They were recruited using a proportionate random sampling technique. However, participants with any physical disability were excluded from the study.

A structured questionnaire was used to assess the maternal knowledge of nutrition and physical activities. All questions were scored on a scale from 1 to 4; with 4 representing the highest level of knowledge possible. That is, Highly Knowledgeable (HK)=4, Knowledgeable (K)=3, Not Knowledgeable (NK)=2, and Highly Not Knowledgeable (NHK)=1. The questionnaire was validated by three experts, one from measurement and evaluation and the other was an expert in home economics education, while the third was also an expert in human kinetics and sports science at the University of Benin, Benin City. The instrument was administered to twenty (20) mothers and their children's body-weights was determined to establish the reliability of the questionnaire. Also, maternal SES was measured using a socioeconomic

status questionnaire (SSQ). The SSQ was adopted from a previous study (Ware et al., 1995) as modified by Balogun et al. (1990) which has been validated by three different professionals; sport psychologist, sociologist and exercise physiologist and the total score of the items was calculated to be 60 which represents the highest level of SES possible. The fieldwork results were collected by calculating the BMI of the children by the ratio of weight to height square [weight (kg)/height (m^2)] of each child. Then, Cronbach Alpha was used to determine the reliability and the reliability coefficient of the instrument was 0.76. Equally, the maternal educational level was scored accordingly as follows: PhD=7, M.A/M.Ed/M.Sc=6, BA/B.Ed/BSc=5, OND/HND=4, NCE/TCI1=3, SSCE=2, Primary School=1 and None=0.

The standing heights of the participants were measured using Shorrboard Stadiometer (Model:ICA 420, USA, 2018) in centimeters. Also, the calibrated electronic auto-zeroing bathroom weighing scale (Escali USTT200, Amazon, 2018) was used to measure the bodyweights of the participants. Then, BMI was calculated using the formula: weight (kg)/height (m2). Then, the children were categorized into different classes of BMI based on the recommendation of Centers for Diseases Control and Prevention (2015), which is age and sex-specific for children and teens from two years old through 20 years.

The study received ethical approval from the Research Ethics Committee of the University of Benin, Nigeria to conduct this study and the participants were then recruited consecutively. An informed consent form was issued to each of the respondents and then the objectives of the study were explained to them. The measurement of the pupil's heights and body weights as well as the administration of the questionnaire were done with the help of two trained research assistants. These assistants were chosen to be able to help in the administration of the questionnaire and also help in recording of the illiterate mother's answers on the questionnaires. The mother's questionnaire was taken to them in their houses with the help of the assistant researchers with the researcher. The questionnaire forms were retrieved immediately after being completed to avoid misplacement and the rate of retrieval was 100%. Aggregate scores were compiled as total points possible. The scores from those questions that address each specific area of the maternal knowledge (nutrition and physical activities) were then averaged together, for a final score within each area measured. However, the field testing involved measurements of the standing heights and bodyweights of the pupils were carried out at their schools.

The anthropometric profile of the pupils was summarized using frequency counts and percentages. The differences in maternal educational qualification and children's bodyweights were analyzed using the independent sample t-test. However, the influence of maternal SES on the maternal knowledge of nutrition, physical activities, and children's body weights were analyzed using ANOVA. Statistical significance was accepted for the p-value of <0.05. All the analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 20.0.

Results

The results are presented in tables 1 and 2.

Table 1. Descriptive statistics and independent sample t–test for maternal educational qualification and children's bodyweights.

Bodyweight Categories	Frequency	Percent	Valid percent	Cumulative percent
Underweight	145	35.2	35.2	35.2
Normal (Desirable)	166	40.3	40.3	75.5
Overweight	89	21.6	21.6	97.1
Obesity	12	2.9	2.9	100.0
	F	T	Df	Sig. (2-tailed)
Equal variances assumed	40.839	-80.713	822	.000
Equal variances not assumed		-80.713	635.385	.000

From the Table 1, the percentage bodyweight categories of the primary school children in Oyo State for underweight, normal (desirable), overweight and obesity are 35.2%, 40.3%, 21.6%, and 2.9% respectively. The majority of the children were found to have desirable bodyweights (40.3%) while those

that were obese have the lowest percentage (2.9%). The independent sample t-test conducted to determine the significance of the difference in the educational qualification of mothers and children's bodyweights is also showed in the Table 1. It was observed that the educational qualification of mothers significantly ($p<0.05$) influenced the children's bodyweights. This implies that the mothers' level of educational can substantially influence the children's bodyweights.

Table 2. ANOVA summary for differences in the study variables

	Maternal SES * Maternal Nutritional Knowledge * Children's Bodyweights				
	SS	Df	MS	F	Sig.
Between Groups	304064.269	2	152032.134	1012.862	.000
Within Groups	185075.186	1233	150.102		
Total	489139.455	1235			

SS=Sum of Squares, MS=Mean Square, df=degree of freedom

Table 2 (continued). ANOVA summary for differences in the study variables (continued)

	Maternal SES * Maternal Knowledge of Physical Activities * Children's Bodyweights				
	SS	Df	MS	F	Sig.
Between Groups	285979.435	2	142989.718	834.213	.000
Within Groups	211344.451	1233	171.407		
Total	497323.886	1235			

The ANOVA conducted to determine the significance of the difference in maternal SES, maternal nutritional knowledge, and children's bodyweights is presented in the Table 2. The F-value of 1012.862 with 2 and 1235 degrees of freedom was observed to be statistically significant at 0.05 ($p<0.05$). It, therefore, implies that the maternal SES can determine the maternal nutritional knowledge and the children's bodyweights. The ANOVA conducted to determine the significance of the difference in maternal SES, maternal knowledge of physical activities and children's bodyweights is also reflected in the Table 2. The F-value of 834.213 with 2 and 1235 degrees of freedom was also observed to be statistically significant at 0.05 ($p<0.05$). Thus, it means that the maternal SES can substantially influence the maternal knowledge of physical activities and the children's bodyweights

Discussion

This study evaluated the influence of maternal level of education and SES on maternal knowledge of nutrition, physical activity, and children's bodyweights. Most children involved in this study were having normal bodyweights (40.3%) while the least of them were obese (2.9%). This outcome might not be unconnected to the studied population (children) because the age of 9-12 years is a vital age of higher activity level and this could explain why most children were within the normal (desirable) bodyweight category. This could however be that engagement of children in farming (which is the main source of survival in Nigeria) is a form of physical activity that could ensure energy balance thereby resulting in desirable bodyweights seen in most of these children.

This study also revealed that the maternal educational qualification had a significant influence on the children's bodyweights. Previous studies have reported similar findings that maternal educational qualification had substantial influence on the children's bodyweights (Hesketh et al., 2007; Vereecken et al., 2004; Adnun & Mimiandy, 2012). However, the finding of this study is not in agreement with the studies of Shrewsbury and Wardle (2008) and Lazzeri et al. (2011). This disagreement could be a result of differences in the study methodology including subject characteristics of being black individuals and from developing country (Nigeria), differences in measuring instruments of the maternal level of education, and the like. This could also be that mothers with the higher educational attainment may ostensibly make healthier decisions on behalf of their children related to food purchases and the

encouragement of physical activity and other positive health behaviors. One plausible explanation for this finding is the importance of literacy skills in health outcomes. Maternal literacy, particularly in health-related matters such as children's bodyweights, type (choice of food), and timing of nutrition, have been shown to have a positive effect on child health outcomes (Carol & Judith, 2009). Furthermore, this may be because maternal education is a more stable indicator of SES over time than household income or household class. Maternal education is likely to influence factors including literacy as well as knowledge of healthy versus unhealthy behaviors which impact on weight status. For example, parents who frequently read with their children are more likely to possess the health literacy skills needed to internalize and apply information conducive to child health production than parents who engage in less frequent reading with their children because of their low level of education. Although reading together may not directly have any effect on metabolic expenditures, it nevertheless reduced children's risk of becoming obese. As a higher level of education appears protective against child undesirable bodyweights, this suggests that education may be crucial in tackling the obesity epidemic. In overall, variations in odds of obesity by each indicator of SES suggest that household class, household income, and maternal education may all influence different behaviors and choices that impact weight gain.

The present study also revealed that the maternal SES had a substantial influence on the maternal knowledge of nutrition and children's bodyweights. This finding suggests the significant influence of SES on maternal knowledge of nutrition and children's bodyweights, and specifically indicating that low maternal SES is associated with poor maternal knowledge of nutrition and children's bodyweights as earlier reported in previous studies elsewhere (Anderson, 2011; Chia, 2008; Fertig et al., 2009; Singh et al., 2008; Morrissey et al., 2010; Phipps et al., 2006; Ruhm, 2008; Shrewsbury & Wardle, 2008; Vereecken & Maes, 2006). In contrast, Hawkin et al. (2008), Morrissey (2012), Brown et al. (2010), Taveras et al. (2010) and Lioret et al. (2007) reported an insignificant influence of maternal SES on maternal knowledge of nutrition and children's bodyweights. This disagreement might not be unconnected to variation in the study methodology including subject characteristics, differences in measuring instruments of maternal knowledge of nutrition and children's bodyweights, and the like. However, the implication of this finding is viewed from two different perspectives, first poor maternal SES as the root of an initial episode of low maternal knowledge of nutrition and undesirable bodyweights among children and second undesirable bodyweights are due to low maternal SES. Moreover, the influence of maternal SES on overweight and obesity in children is relatively complex. Indeed, low SES may lead to risky behaviors (poor diet, lack of physical activity, and sedentary lifestyle) and can result in obesity and overweight. Conversely, children living in relatively wealthy households are more likely to receive attention or special care from parents who offer a variety of physical and cultural activities and educate their children on the virtues of a healthy diet. This study therefore, submitted that the maternal level of education and SES do influence maternal knowledge of nutrition and physical activity as well as children's bodyweights

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