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Nutritional knowledge amongst an adult South African sample of low socioeconomic status

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Abstract

The aim of this study was to determine the socioeconomic predictors of nutritional knowledge (NK) based on total household income, educational level and employment status. A secondary aim was to determine the relationship between NK and the body mass indexes (BMI) of children. Using a cross-sectional study, 39 participants enrolled in the Prospective Urban Rural Epidemiological (PURE) study were purposively sampled for data on their children's age, gender, height and weight. A semi-structured researcher-generated questionnaire was used to collect sociodemographic information and assess NK. Pearson correlation assessed the relationship between the parent's NK and their child's BMI. Linear regression analysis was used to test predictive relationships. The Alpha level was set at $p < 0.05$. Regression analysis showed that 2.5% of the variance ($R^2 = 0.25$) was based on NK and was significant ($p < 0.05$). Employment status was a significant predictor ($p = -0.038$) of NK, when controlling for total household income and education level. Parents of underweight children had the lowest NK. In conclusion, there was a positive correlation between the children's BMI and their parents NK, but this was not significant. Employment status was a significant predictor of NK. Public health practitioners should develop interventions based on NK, which might benefit black parents, especially those of low socioeconomic status.

Keywords: Nutritional knowledge, socioeconomic status, South Africa, educational level, employment status.

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Introduction

Malnutrition is the root cause of more than one-third of all child deaths globally (Bain et al., 2013). Poverty has been recognized as a major factor attributing to this statistic (Bain et al., 2013). Childhood obesity has been cited as one of the most serious, public health challenges globally (Birch, Perry, Penfold, Beynon & Hamilton-Shield, 2016). Recent data shows that in South Africa (SA), only a negligible improvement in children's nutritional status has occurred since the

early 1990s (Hendriks, 2014; Devereux & Waidler, 2017). Furthermore, child-stunting rates have increased since 1994. A lack of parental nutritional knowledge (NK) has been implicated as one of the contributory factors influencing the nutritional status of children (Heshmat et al., 2016). NK is dependent on various socioeconomic factors, and an association between socioeconomic status (SES) and NK has been established (Beydoun & Wang, 2008). Education level and employment status are common indicators of SES. Amongst pregnant women, it has been reported that formal education is inversely related to NK (Lane et al., 2013). In the same study, when adjusted for the confounding effect of material disadvantage (as assessed by deprivation status), low formal education remained predictive of a lower NK score (Lane et al., 2013). Unemployment has been related especially to food insecurity and hunger in SA (Oxfam, 2014). One of the major factors that influence children's eating behaviours, nutritional status and health is their parent's NK (Zarnowiecki, Sinn, Petkov & Dollman, 2012). NK often plays a critical role in the development of childhood obesity, since parents must have a good nutritional knowledge in order to make healthy food choices when shopping and preparing food in order to prevent overweight and obesity (Cluss et al., 2013). Children of educated mothers have been found to eat a variety of healthy foods, including fruits and vegetables, and score high on healthy eating attitudes (Yabanci et al., 2014). Body mass index (BMI) has been widely used as a marker of health status (Birch et al., 2016) and in children who suffer from malnutrition (Cole, Flegal, Nicholls, & Jackson, 2007). The aim of this study was to determine the socioeconomic predictors of NK based on total household income, education level and employment status. A secondary aim was to determine the relationship between parental NK and their children's body mass indexes (BMI).

Methodology

Design

This was a cross-sectional study to determine the predictive power of total household income and education level on NK, and to determine the relationship between NK and the BMI of children under the age of 13 years.

Setting

The study was undertaken in Langa, a peri-urban township of Cape Town, South Africa. Langa is one of the townships in South Afria that were designated for Black Africans before the apartheid era. It is typically a low-income community. Langa Township was purposely selected, because of an existing cohort study in this community, entitled the Prospective Urban Rural Epidemiological (PURE) study that is undertaken by the School of Public Health at the University of the Western Cape.

Sampling procedure

Participants in the study were purposely selected among the Prospective Urban Rural Epidemiological (PURE) study. Parents in the PURE study with children aged 2 to 13 years were invited to participate in the study. A total of 39 participants from the PURE study were eligible to participate in this study.

Data collection

Data was collected through face-to-face interviews using a short researcher-generated questionnaire that obtained data on the sociodemographic characteristics of the participants and NK as well. Key socioeconomic factors included total household income, education level and employment status. Questions on NK were based on the South African food based dietary guidelines (Vorster, Badham & Venter, 2013). Anthropometric data (i.e., weight and height) were taken from all children using standard equipment and protocols.

Measurements

Nutritional knowledge

To assess NK, a total of 7 questions were selected in the researcher-generated questionnaire. Each question was based on the participant's knowledge of (a) proteins (b) carbohydrates (c) salt (d) fruits and vegetables, and (e) fibre. Two open-ended questions on healthy and unhealthy foods were also included. Specifically, the following questions were used to assess NK: 1) Which foods do you think are high in protein? 2) Which foods do you think are starchy foods? 3) Which foods do you think are high in fibre/roughage? 4) How many servings of fruit and vegetables do you eat a day? 5) Which foods do you think are high in salt? 6) What foods should you eat less in order to keep you healthy? 7) What foods should you eat more in order to keep you healthy? The maximum score for NK was 19 points (maximum score = 19; minimum score = 0). Participants who scored 0-6 points were categorised as having poor NK, those with 7-12 points, as having average NK, and those with more than 13 points, as having good NK.

Child BMI

The Centers for Disease Control and Prevention (CDC) BMI percentile calculator for children and teens aged 2 to 19 years was used to calculate the children's BMI (CDC, 2015). The calculator provides BMI and the corresponding BMI-for-age percentile on a CDC BMI-for-age growth chart.

Data analysis

Data was analysed using the Statistical Package for Social Science (SPSS) version 25 (IBM, New York, USA). Means and standard deviations were calculated. Data was checked for normality using Shapiro-Wilk's test. Results showed that for BMI, p = 0.051, and for parental NK, p = 0.203. Therefore, normality was assumed for this data set, since the p for BMI and for NK were not significant. Pearson product-moment correlation coefficient was computed to assess the relationship between parental NK and the children's BMI. Linear regression analysis was used to test predictive relationships. An alpha level of $p < 0.05$ was used to indicate statistical significance.

Results

Sociodemographic characteristics of the adults (parents)

A total of 39 adults participated in the study. Of these, 87.2% were female and 12.8% were male. The mean age of the adults was 41.31 (11.55) years. Most of the adults never married (43.6%), and most of them (76.3%) had a total household income of between R 5 001 - R 10 000 per month. Most of the participants (56.4%) attended vocational/trade school, 41.0% were employed full time, 35.9% were employed part time, 20.5% were self-employed and 2.6% were unemployed.

Gender, age and physical characteristics of the children

Most of the children (53.8%) were female and 46.2% were male. The results for age, height, weight and BMI of the children are shown in Table 1.

Table 1: Physical characteristics of the children (n = 39)

Variable	Mean (SD)
Age (years)	6.28 (±3.96)
Height (cm)	99.60 (±29. 57)
Weight (kg)	18.90 (±4.74)
BMI (kg/m^2)	17.66 (±4.38)

Regression analysis

Table 2 shows the results of total household income, education level and employment status on parental NK. The model explained 2.5% of the variance (R^2 = 0.25) on parental NK and tested significantly ($p < 0.05$). Employment status was a significant predictor of NK (p = -0.038), when controlling for total household income and education level. Every 1.04 decrease in employment status resulted in a 0.36 decrease in NK.

Table 2: Regression analysis of socioeconomic variables on parental nutritional knowledge.

Model	Predictors	Outcome	R^2	B
	Total household income	NK	.025*	0.31
	Education level			0.22
	Employment status			-0.36*

*p<0.05

NK= nutritional knowledge; Total household income was coded as follows: 1=less than R2 000/month, 2=R2 000-R5 000/month, 3=R5 001-R10 000/month, 4=R10 001-R15 000/month, 5=above R15 000/month. Education level was coded as follows: 1=none, 2=primary (Grades 1-7), 3=secondary (Grades 8-12), 4=vocational/trade school, 5=tertiary, 6=other. Employment status was coded as follows: 1=full time, 2=part time, 3=self-employed, 4=unemployed, 5=retired, 6=other.

Child BMI

In terms of the children's BMIs, 28.21% were underweight, 30.77% were normal/healthy weight, 5.13% were overweight and 35.9% were obese. Parents of the children who were underweight had the lowest NK. Parents of the children with a normal/healthy weight, overweight or obese had the same level of NK. Table 3 shows the children's BMI and selected physical and sociodemographic variables.

Table 3: Children's BMIs and selected physical and sociodemographic variables (n = 39)

Category	n = 39	Weight (kg) Mean(SD)	Height (cm) Mean(SD)	Age (y) Mean(SD)	BMI (kg/m2) Mean(SD)	BMI (kg/m2) (min-max)	NK Mean(SD)	Education level	Employment Status	Total household income
Underweight	11	17.48 (1.36)	108.55 (32.93)	6.82 (4.47)	12.69 (0.88)	11.1-13.7	8.91 (2.63)	Most (63.6%) attended up to vocational/trade school.	Most (36.4%) were employed full time or part time.	Most (72.7%) earned between R5001-R10000/month.
Normal/Healthy weight	12	20.19 (7.92)	108.95 (19.19)	7.92 (3.85)	16.63 (1.33)	15.1-19.7	9.00 (2.37)	Most (41.7%) attended up to vocational/trade school.	Most (50%) were employed part-time.	Most (75%) earned between R5001-R10000/month.
Overweight	2	18.50 (1.41)	98.15 (10.54)	8.00 (4.24)	19.40 (2.69)	17.5-21.3	9.00 (2.83)	50% had no formal education and 50% attended up to vocational/trade school.	50% were employed full time and 50% part time.	Most (50%) earned between R2000-R5000/month.
Obese	14	18.95 (2.77)	84.76 (31.87)	4.21 (2.97)	22.19 (3.01)	18.8-31.4	900 (2.49)	Most (64.3%) attended up to vocational/trade school.	Most (57.1%) were employed full time.	Most (78.6%) earned between R5001-R10000/month.

BMI=body mass index; NK= nutritional knowledge; scoring for NK (maximum score = 19; minimum score = 0).

Nutritional knowledge

The mean NK was 9.00 (SD = 2.00) out of a maximum of 19. Table 4 shows the scores for parental NK based on the seven nutrition questions.

Table 4: Scores for parental nutritional knowledge based on the seven nutrition questions (n = 39).

Question		Maximum possible score	Actual score	Actual number of people (n)	Percentage
1.	Proteins	3	1	24	61.5
			2	13	33.3
			3	2	5.1
2.	Carbohydrates	3	0	1	2.6
			1	23	59.0
			2	13	33.3
			3	2	5.1
3.	Fiber/roughage	4	1	22	56.4
			2	14	36.0
			3	2	5.1
			4	1	3.0
4.	Fruits and vegetables	4	0	2	5.1
			1	21	54.0
			2	7	18.0
			3	9	23.1
5.	Salt	3	0	1	3.0
			1	17	44.0
			2	17	44.0
			3	4	10.3
6.	Unhealthy food	1	0	12	31.0
			1	27	69.2
7.	Healthy food	1	0	10	25.6
			1	29	74.4

Maximum possible score for NK was 19 points (max = 19; min = 0); Questions: 1) Which foods do you think are high in protein? 2) Which foods do you think are starchy foods? 3) Which foods do you think are high in fibre/roughage? 4) How many servings of fruit and vegetables do you eat a day? 5) Which foods do you think are high in salt? 6) What foods should you eat less in order to keep you healthy? 7) What foods should you eat more in order to keep you healthy?

Table 4 shows that NK for parents was poor, since only 5.1% could name the foods that were high in protein and carbohydrates, and only 3.0% got the highest possible score on knowledge related to fibre. For fruit and vegetable related NK, the majority of the participants (54.0%) got a score of 1 out of 4. For salt-related NK, only 10.3% of the participants could name all the foods high in salt. Participants, overall, scored below 50% on most of the individual NK questions. However, participants had a general idea what was unhealthy food (69.2%) and what was healthy food (74.4%).

Relationship between parental nutritional knowledge and children's BMI

There was a positive correlation between the children's BMIs and parental NK ($r = 0.058$), but it was not significant ($p = 0.723$). Overall, there was a weak positive correlation between the children's BMIs and parental NK.

Discussion

The study found that out of a total of 39 children, most (64%) had weight problems and were either underweight (28%) or obese (36%). Parents of the underweight children had the lowest NK. In contrast, children with higher BMIs had parents with higher NK. A complicating factor is that the possible reasons for the current findings maybe that, parents may have good NK, however if their neighboured environment has little or limited access to healthy food, their child's healthy eating habits will be compromised. This study was conducted in Langa Township, a low-income community, characterised as being an obesogenic environment. For example, female adolescents in a South African township were reported to prefer locally prepared convenience (obesogenic) foods, over home-prepared food (Sedibe et al., 2014). They purchased high caloric, deep-fried dough balls ("fat" cakes) from local vendors before school, because of its affordability (low-cost) and immediate influence on satiety (appetite-depressant). Furthermore, these individuals were reported to engage in minimal amounts of daily PA (Sedibe et al., 2014). In South Africa, peri-urban Townships are low-income communities, characterised by concerns about safety and high rates of crime , a lack of civil amenities and municipal facilities, all of which act as barriers to promoting participation in regular physical activity (Sedibe et al., 2014; Mabweazara, Leach & Ley, 2017). Socioeconomic factors, such as lack of access to healthy foods and various barriers to PA impact negatively on public health and wellbeing (Braveman & Gottlieb, 2014). PA especially, might be a good intervention to resolve the issue of overweight and obesity, especially among the children, since these adverse health conditions track linearly into adulthood (Pandita et al., 2016).

The current findings on the relationship between NK and the children's BMIs indicates that higher knowledge levels do not always translate into healthy practices, particularly when individuals are confronted by negative environmental and other societal influences (Kinyua, 2013). Hakli et al. (2016) stated that NK is of significance only when it stimulates healthy choices and practices. Some researchers reported that NK is related significantly to nutritional behaviour (Hendrie, Coveney & Cox, 2008; Barzegari, Ebrahimi, Azizi & Ranjbar, 2011; Masuku & Lan, 2014; Geaney et al., 2015). When translated into practice, this might mean that parents who advocate healthy food choices and dietary practices are more inclined to raise children with healthy/normal BMIs. However, NK alone is not a sufficient resource to put into

practice, especially when other influencing factors, such as low socioeconomic status (SES), tradition and culture, unemployment, food security and access to healthy food act against health practices (Hakli et al., 2016). With regard to employment status, similar findings to our study were reported in a study conducted in Turkey with 1062 participants, where employed participants scored highest on NK (Hakli et al., 2016). Similarly, a study conducted in Swaziland found that employment status was significantly associated with nutritional practices (Masuku & Lan, 2014). Ciltik (2009) reported that the NK of employed individuals was good, while that of unemployed individuals was average. This finding could be attributed to the fact that employed individuals have higher amounts of and access to nutritional information compared to unemployed individuals (Ugur, 2001). Another possible explanation could be that employed individuals are more likely to be educated. Education has been found to cause behaviour change by building an awareness of healthy living (Hakli et al., 2016). An increase in education level leads to an increase in desirable practices and habits relating to health and nutrition (Nocon, Keil & Willich, 2007). Community interventions seeking to address nutritional problems should increase NK and take the employment status of the individuals into consideration.

Strengths of the study

This study is one of a few that focus on the predictive power of socioeconomic factors and NK amongst South Africans living in a peri-urban Township in South Africa. As such, the study has the potential of adding to the limited literature currently available. Also, the study can aid in the development of NK based interventions that aim to encourage good nutritional behaviours in parents and, ultimately, improve the health of their children.

Limitations of the study

Although the study provides information on the socioeconomic predictors of NK and the relationship between the parent's NK and children's BMIs, the small study sample size and convenience sampling technique used means that the current findings are limited to the participants in the present study and should not be generalised. Another limitation of the study is that NK data was collected using a researcher-generated questionnaire. The validity and reliability of this questionnaire is unknown, we hope to test these in our follow-up studies with larger samples.

Conclusion

This study found that there was a relationship between the parents' NK and the children's BMIs, but this was not significant. However, employment status was a significant predictor of NK. Public health practitioners should develop interventions that could provide NK as a means of addressing the various causes of nutritional problems, particularly in communities of low SES. This might especially benefit communities of low socioeconomic status where unemployment is rife and low educational levels invariably prevail.

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