FACTORS ASSOCIATED WITH OBESITY IN SOUTH AFRICAN MOTHERS AND THEIR PRE-ADOLESCENT DAUGHTERS:

A cross-cultural validation and comparison study

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Why obesity??
The problem

- Overweight and obesity - global problems - affecting even the most vulnerable countries

Non-communicable diseases (with obesity as a major risk factor) are no longer diseases of the rich

Ono et al. (2005)
I was also inspired by
Prevalence of overweight and obesity in South Africans of all ages:

- Adult Women
- Adult Men
- Adolescent Girls
- Adolescent Boys
- School Girls
- School Boys

Data sources:
- Puoane et al., (Int J Obesity 2002)
- Reddy et al., (YRBS, 2002)
- Armstrong et al., (SAMJ, 2006)
It therefore seemed as if in SA there are factors that drive the problem of obesity in women than men.

For example,
There is substantiated evidence associating body image to affect women’s response to weight changes and attitudes towards weight control.
Adult women

In South Africa for example, women have less tendency to see themselves as overweight even if they are (Puoane et al., 2002 & 2005).

In their study Puoane and associates found that less South African women (22.1%) of all races perceived themselves as being overweight.

Whereas, in actuality 56.6% of women interviewed were classified as overweight and obese.

This distorted body image was affected by ethnicity.

Black women had high tolerance of bigger body size status than mixed ancestry and white counterparts.
Adolescent children

SA children are no exception in that black adolescent children are less dissatisfied with their body size and shape (Caradas et al., 2001)

Moreover, black girls are less likely to desire a smaller body size than mixed ancestry and white girls
Attributes of obesity

In this regard, it may appear as if the tolerance of a bigger body size status in South African urban black women of all age groups is the modifier of high self-esteem and positive body image.

Indeed, obesity is associated with health, wealth and attractiveness in the black culture.

(Mvo et al., 1999; Puoane et al., 2005; Matoti-Mvalo 2006)
Purpose of the research

Finding and adapting culturally-sensitive and age-appropriate instruments that elicited information regarding individual factors associated with obesity in South African women of all age groups
Target groups

- Adult women and primary-school-aged girls (pre-adolescents) of different ethnicities
Outline and structure of the research

Objective 1
- Mothers' Body Image
  - Questions vs silhouettes and BMI

Objective 2
- Bias in reporting food energy intake in Mothers EI:BMRest

Objective 3
- Physical Activity in Girls PAQ vs ACTIVITYGRAM and TV list

Objective 4
- Girls' Health Knowledge, Self-Efficacy, Social Support & Environmental Barriers Inter-item reliability

Objective 5
- Mother-daughter relationship
  - Family and ethnic group resemblance
To validate instruments measuring the body image of both mothers and their daughters.

- The hypothesis was that body image influences the body status of women.
**Definition of Body image (BI)**

**Multi-dimensional**
- Perceptual and Attitudinal

**Measured using:**
- Silhouettes for ‘Feel’
- Silhouettes for ‘Ideal’
- Feel-Ideal difference (FID) Index score

Feel: silhouette you look the most like
Ideal: silhouette you will want to look like

FID Index score = Feel-Index
example (Feel = 7 & Ideal = 2)

FID Index score = 7-2
= 5 (higher FID—further from 0, thus, more body size dissatisfaction)
Results

Indicated that the South African version of silhouettes, FID Index scores, “fat” belief constructs are age-appropriate, culturally sensitive and can be used in further intervention studies to understand BI in multi-ethnic South African girls and their mothers.

For example, we found...
Results

Perceptual BI

- Using our BI instruments we found a general recognition of a larger or a smaller body size by girls & their mothers of varying BMI levels

- Women of different ages could see bigger and smaller body size status in themselves i.e.
Results cont….

Attitudinal BI

– Using our BI instruments we found White girls were more dissatisfied about their body size status
– They also perceived that their family and friends were significantly more dissatisfied with their body size status,
  irrespective of whether or not they considered themselves to be “thin” or “fat”

– Further, all the three groups of mothers in this analysis were dissatisfied about their body size status, however there were no significant ethnic differences with regards to their satisfaction levels
– In addition, the three groups of mothers had similar perceptions of what their partners, friends and children thought about their body size
  irrespective of whether or not they considered themselves to be “thin” or “fat”
Fifth and last objective / study 5

We assessed family and ethnic group resemblance regarding BI attitudes and perceptions

- The hypothesis was that BI attitudes and perception resemblances existed between mothers and their pre-adolescent daughters
- Further, mothers influenced / modeled BI attitudes and perception to their daughters
Procedures

We matched mothers with their daughter’s data regarding:

- FID Index scores,
- ideal and perceptual silhouette scores,
- how these women perceive a thinner or a bigger body size status, as well as
- the feelings these women associate with different body size statuses

*Using 2-way (ANOVA)*
Results

We found that mothers and their daughters’ data matched

- On issues relating to perceptual & ideal body image, the recognition of thin, fat and beautiful figures, figures showing happiness and respect, as well as body image dissatisfaction

Moreover, in South Africa it became apparent that the family provides its children with BI issues, as well as behaviours of eating

- For example, white families were shown to have more dissatisfaction about body size statuses than black families
- On the other hand, black families were shown to have bigger body size ideals, and perceived a bigger body size as being beautiful, happy and respected than their mixed ancestry and white counterparts
- Despite the fact that matching the dietary intake data was not our primary objective, we also found that girls resembled their mothers regarding the consumption of fat, with black families consuming more fat than the other families
We examined factors associated with food energy intake under-reporting in women – implausible food EI reporting

- The hypothesis was that body size status (obesity), body image (dissatisfaction) and SES (low SES) influence women to under-report their food energy intake
Procedures

**Body composition**
BMI and % body fat were

**Body image**
BSQ (Cooper et al., 1987)
and FID index scores (Mciza et al., 2005)

**FID Index**
Women had to choose the silhouettes (Stunkard et al., 1983)
representing her “Feel” and her “Ideal”
FID index score = “Feel” - “Ideal”

**Dietary intake**
QFFQ (MacIntyre et al., 2000)
used to estimate EI and Macronutrient Intake
EI in relation to BMRest calculated and compared with cut-off values of
<1.05 for UR,
1.05-2.28 for AR,
and >2.28 for OR

**Socio-economic status**
SES assessed by HD and AI
Results

26% of women under-reported (UR, gave implausible food EI reporting), 64% adequately-reported (AR) and 10% over-reported (OR) their EI.

Black women UR EI to a greater extent than mixed ancestry and white women (45% vs. 31% and 24%, P<0.01, respectively).

However, there were no ethnic differences in OR.
The majority [83% (n=19)] of black women who UR their EI were obese
The majority [63% (n=10)] of mixed ancestry women who UR their EI were overweight
Majority [50% (n=6)] of white women who UR their EI were within the normal range of BMI
Moreover, under-reporters biased their macro- and micro-nutrient intake than the adequate- and over-reporters:

- *e.g. under-reporters tended to report less dietary fat and higher dietary protein intake*

Despite these differences, underreporting was not influenced by either socio-economic status or body image, which was somewhat surprising.
We validated an instrument to measure physical activity (PAQ) in South African children.

- The hypothesis was that physical activity influences body size status of children.
Validation procedures

- **Body Composition**
  - BMI and % body fat

- **Television List**
  - Consisting of a list of TV programs mainly watched by SA children

- **Energy expenditure / Hours of Inactivity**
  - Measured using PAQ derived from EPAQ2 by Wareham et al., 2002
  - (Activities at school, at gym and play sports)

- **ACTIVITYGRAM**
  - To measure PDPAR EE by Welk et al., 2004
Results

Despite the relatively weak associations between the PAQ-derived EE and inactivity, against EE derived from the ACTIVITYGRAM and television time, the PAQ was useful in characterizing the physical activity levels and patterns of South African children of varying socioeconomic background.

Further, the PAQ highlighted health benefits associated with adoption of physical activity, such as reduced body fatness and BMI levels.

It also distinguished between the intensity levels of the activity, such that it identified moderate and vigorous EE in South African school girls.

It also enabled us to quantify and distinguish EE generated using different domains of activities such as activities performed at school, out of school, formal and informal.

Further, it quantified time spent on sedentary behaviours such as watching television, using computers, relying on motorized vehicles for transport.

Moreover, pre-adolescent children were able to recall structured school sports well than the other unstructured sports done at school or at home.
We assessed health knowledge, self-efficacy, social support and environmental barriers that influenced SA children to eat healthily and exercise.

- The hypothesis was that the afore-mentioned factors influence children to eat healthily and partake in physical activity.
Results

- We found that the 9-item self-efficacy, the 6-item self-perception, and the 12-item social support and barrier constructs were valid in this group of girls.
  - They yielded Cronbach’s α values of 0.74, 0.71 and 0.94 for self-efficacy, self-perception and environmental factor constructs respectively.

- These results implied that self-efficacy, self-perception and environmental (social support and barrier) constructs were understood by South African pre-adolescent children and gave valid information regarding psychosocial factors influencing children to eat healthily and exercise.

- However, the 7-item cultural identity construct and the 16-item health knowledge construct showed less reliability (their Cronbach’s α values were 0.35 and 0.55).
  - In this regard, we recommend that the cultural identity and health knowledge constructs be improved before they are used in obesity research.
Results cont…

- Those girls who scored higher on the social support scale (i.e. got more support from friends and family) reported consuming more fruits and vegetables ($r=0.19$, $P<0.001$)

- Further, those girls who reported walking to and from school reported having lower environmental barriers (such as crime and longer distance from school) than those who relied on motorized vehicles for transport ($4.0 \pm 2.3$ vs $9.8 \pm 3.2$, $P<0.001$)

  - The above relationships were not affected by the girls’ ethnicity
Researchers and health service providers are therefore encouraged to use these measures when investigating determinants of obesity in South Africa, as they might provide them with very insightful information regarding the development of obesity in women.
For those instruments that have not produced good reliability

- Work has been undertaken to improve them
- Examples are the Health Knowledge construct and the Cultural Identity construct
- More questions have been added to the Health Knowledge construct and it is currently used in the HealthKick Project of the MRC
  - This construct has also been highly cited in a number of public health projects

- However, more questions have been adopted from the Multi Ethnic Identity Measure [MEIM, developed by Phinney (1992) and used to measure ethnic identity of children internationally] to better the reliability of the Cultural Identity construct, however, its validity has still to be tested
Hope

• I have not lost and bored you
• The presentation was music to your ears
• You did not have time to sleep
• The presentation was informative
• Most of all, I inspired more young researchers and scientists to consider stealing some research questions from my work