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# Weight-related quality of life in obese, pregnant women in South Africa

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**Objective:** The global obesity pandemic includes pregnant women. Obesity may negatively impact quality of life (QOL). A validated, obesity-specific, QOL assessment tool was used to assess the impact of obesity on five specific domains.

**Methods:** A prospective cohort study was performed at Tygerberg Academic Hospital in South Africa. Morbid obesity was defined as a body mass index (BMI) of 40–49.9 kg/m<sup>2</sup> and super-obesity as BMI > 50 kg/m<sup>2</sup>, using the first recorded weight during the pregnancy. Pregnant women with a BMI ≥ 40 were approached in the high-risk antenatal clinic where written informed consent was taken before recruitment. Using the QOL tool they answered statements about their current experiences.

**Results:** A total of 66 morbidly obese and 46 super-obese women were enrolled across an age range of 18–45 years. Physical function and self-esteem were the domains with the lowest QOL scores. When comparing morbid with super obesity, all scores were significantly lower in the latter group except for the domains of self-esteem and sexual life.

**Conclusion:** Morbid and super-obesity occur across the full spectrum of the adult reproductive period. Physical function and self-esteem are most affected while QOL is linked to the degree of obesity.

**Keywords:** obesity, pregnancy, quality of life, morbid obesity, super-obesity

## Introduction

There is little doubt that obesity is no longer considered an unfortunate problem in certain high-income countries, but is currently a global pandemic.<sup>1</sup> Indeed, according to the WHO obesity has now assumed the status of a worldwide major disease on a par with HIV and malnutrition.<sup>2</sup> In 2013 the global number of overweight and obese individuals was estimated at 2.1 billion.<sup>1</sup> As the absolute numbers of overweight and obese women increase so too do those in the highest body mass index (BMI) categories of morbid and super-obesity.<sup>3–5</sup> Many low- and middle-income countries (LMIC's) are undergoing epidemiological disease transition and in the process suffer the double burden of infectious diseases and under-nutrition, as well as the chronic disease risks associated with lifestyle diseases such as obesity. In this regard South Africa has not been spared. In 2002, it was reported that 57% of non-pregnant women were overweight or obese,<sup>6</sup> with this figure increasing to 69% of women aged ≥ 20 years in 2014.<sup>1</sup>

Obesity in pregnancy has been shown to be associated with many adverse clinical outcomes.<sup>7,8</sup> Apart from maternal and perinatal morbidity, obesity (BMI > 30 kg/m<sup>2</sup>) was noted in 57% of South African mothers who died of pulmonary embolism.<sup>9</sup> While the ideal period to address weight problems is before conception, pregnancy itself offers a unique opportunity to reconsider lifestyle choices. Much thought has gone into describing the correct amount of weight gain or even loss in overweight and categories of obese pregnant women.<sup>5,10</sup>

In modern society, there is mental manipulation that targets children and young adults through widespread and sometimes directly coercive advertising, in which the pleasures of a sedentary lifestyle and unhealthy foodstuffs are extolled. In this way insight is blunted and autonomous decision-making circumvented. Although studies are limited, obesity has still been shown to exert a significant negative impact on health, psychosocial well-being and quality of life,<sup>11</sup> with obese adults having persistently lower quality of life scores, specifically in the

physical domain.<sup>12</sup> In communities with poor socio-economic status many women are unaware of their actual weight, poorly informed about the risks associated with overweight and obesity, and may not perceive themselves as having a diminished quality of life,<sup>13</sup> or, if they do, they lack the means to effect improvement. Quality of life (QOL) may differ amongst different subsets of obese persons. The objective of this study was to assess the impact of obesity on five QOL domains of pregnant women using a validated, obesity-specific QOL assessment tool.

## Methods

This was a sub-study utilising the same women identified for a prospective cohort study examining pregnancy outcomes of morbidly obese women,<sup>3</sup> performed at Tygerberg Academic Hospital, a secondary and tertiary referral centre in the Western Cape Province of South Africa. This institution serves as a referral unit for morbidly obese, pregnant women. Morbid obesity was defined as a body mass index (BMI) of 40–49.9 kg/m<sup>2</sup> and super-obesity as BMI > 50 kg/m<sup>2</sup>, using the first recorded weight during the index pregnancy. Pregnant women with a BMI ≥ 40 were approached in the high-risk antenatal clinic where written informed consent was taken before recruitment, which was not continuous but subject to the availability of the investigator. Consenting women were asked to complete a validated, obesity-specific QOL assessment tool, the Impact of Weight on Quality of Life-Lite (IWQOL-Lite).<sup>15</sup> The IWQOL-Lite is a 31-item measure of weight-related quality of life. It has five domain scores (physical function, self-esteem, sexual life, public distress, and work) and a total score. The scores for all domains and the total score range from 0 to 100, with lower scores indicating greater impairment. The IWQOL-Lite has demonstrated excellent reliability and validity.<sup>15</sup>

A minimum of 50% domain answers and 75% for all items (total score) is prescribed to be included in the analysis. Quality of life was determined for the entire group, as well as the morbid and super-obese groups. Statistical analysis was performed using the Stata 14<sup>®</sup> program (StataCorp LLC, College Station, TX, USA).

**Table 1:** Descriptive data (n = 107)

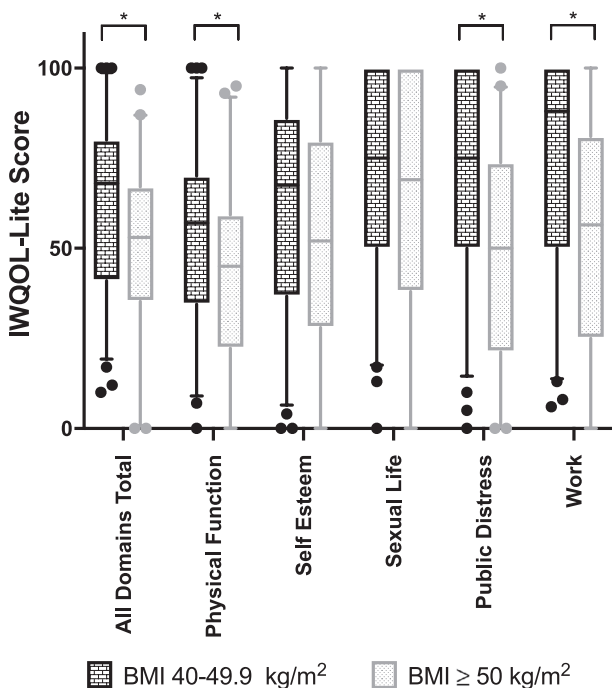
Factor	All BMI $\geq$ 40 kg/m <sup>2</sup> (n = 107)	BMI 40–49.9 kg/m <sup>2</sup> (n = 65)	BMI $\geq$ 50 kg/m <sup>2</sup> (n = 42)	p-value
Age (years)	32 (18–45)	32 (18–42)	33 (19–45)	0.43
Gravity	3 (1–6)	3 (1–6)	3 (1–10)	0.19
Parity	2 (0–4)	1 (0–4)	2 (0–9)	0.19
Gestational age at enrolment (weeks)	29 (9–40)	28 (9–40)	29 (10–40)	0.69
Weight (kg)	124 (89–193)	114 (89–144)	135 (111–193)	< 0.01

Notes: Results given as median (range). Two groups (BMI 40–49.9 and BMI  $\geq$  50) were compared by Mann–Whitney U-test at  $\alpha = 0.05$ .

Normality was determined both qualitatively and quantitatively while simple descriptive statistics applied most often. When required Student's t-test, Wilcoxon rank sum (Mann–Whitney) and simple linear regression tests for appropriate parametric and non-parametric data were used. Continuous data were summarised using medians and range, mean and standard deviation (SD) and sample as n (%). A probability value (p-value) of < 0.05 was regarded as significant. The study was approved and registered with the Human Research and Ethics Committee of Stellenbosch University (N11–03-097).

## Results

The study was conducted from September 12, 2011 to February 26, 2013, during which time a total of 66 morbidly obese and 46 super-obese women were enrolled. All of the women who were approached gave consent, but not all women provided the prescribed minimum number of responses for analysis, leaving 65 and 42 (total 107) women in the morbid and super-obese groups respectively. The descriptive characteristics of the combined group and sub-groups are given in Table 1. The raw QOL domain scores were converted to the familiar 0 (worst) to



**Figure 1:** IWQOL-Lite scores by BMI category. Box and Whisker plot showing 5% and 95% confidence intervals (whiskers), 25% and 75% confidence intervals (boxes), and median scores.

\*p < 0.05 by two-tailed Wilcoxon matched-pairs signed-rank test.

**Table 2:** Total modified scores for quality of life per domain

Domain	All BMI $\geq$ 40 kg/m <sup>2</sup>	BMI 40–49.9 kg/m <sup>2</sup>	BMI $\geq$ 50 kg/m <sup>2</sup>	p-value
All domains	60.8 (39;78)	68.5 (44;80)	52.9 (35;67)	0.01
Physical function	52.3 (32;68)	56.8 (35;70)	45.5 (23;57)	0.02
Self-esteem	60.7 (32;86)	66.7 (36;86)	52.1 (29;79)	0.11
Sexual life	75.0 (50;100)	75.0 (50;100)	68.8 (38;100)	0.69
Public distress	65.0 (40;90)	75.0 (50;100)	50.0 (20;70)	<0.01
Work	75.0 (38;100)	87.5 (50;100)	56.3 (25;81)	<0.01

Note: Results given as median (quartiles) on a scale of 0 (worst) to 100 (best).

100 (best) scores. The median cumulative (all domains) score for all study patients was 60.8 (0–100). The domain scores for the whole and two sub-groups are given in Table 2 and depicted in Figure 1 to illustrate the distribution of the scores.

When the BMI was examined as a continuous variable, no overall significant association was found between BMI and the total (all domains) QOL score ( $p = 0.08$ ), although there was a clear trend indicating that as BMI increases, average QOL decreases. In contrast to the total score, there were significant continuous associations in two individual domains. As BMI increased public distress ( $p < 0.001$ ) and work QOL ( $p = 0.01$ ) decreased significantly. When age was examined as a continuous independent variable, no overall significant association was found between it and the total QOL score ( $p = 0.26$ ), or any individual domain.

## Discussion

Morbid and super-obesity impact quality of life during pregnancy with physical function and self-esteem affected most. This moderately sized study performed on extreme types of obesity, namely morbid and super-obesity, in pregnancy, revealed a positive overall QOL score for the entire group. Despite the levels of obesity, the 'work' and 'sexual life' domains scored high, while 'physical function' had the lowest score. The negative impact of increasing BMI was most clearly demonstrated in the 'work' and 'public distress' domains.

The causes of the rapid increase in obesity are controversial. Although genetic factors have been implicated,<sup>16</sup> the speed of the changes also points to environmental and lifestyle changes that incorporate diet and physical activity.<sup>17</sup> Obesity has recently been linked to low socio-economic status, with the most vulnerable persons said to be living in an 'obesogenic' environment.<sup>18</sup>

The population served by the hospital in the index study comprised mainly persons from a low socio-economic background. In this regard, it was interesting to note that teenagers were the youngest pregnant women in both BMI categories of this study.

Obesity is associated with a wide range of adverse pregnancy and neonatal outcomes.<sup>3,8</sup> The QOL of non-pregnant obese patients has been investigated, with Kolotkin *et al.* stating in an overview that greater impairments are associated with greater degrees of obesity.<sup>14</sup> These authors also called for further research amongst subsets of obese persons. In the opinion of the current authors, pregnant obese women represent a common, important and under-investigated subset. Within the general population,

physical activity has a positive impact on well-being and quality of life.<sup>19</sup> In similar fashion, physically active, obese pregnant women in Sweden experienced fewer depressive symptoms in late pregnancy and an improved quality of life when compared with physically inactive obese pregnant women.<sup>20</sup> In the index study the QOL score for physical function was the lowest of the domain scores. Many women become less active when pregnant, and the addition of a physical pregnancy to extreme obesity creates physical challenges that lower QOL.

A substantial body of research has demonstrated that overweight and obese individuals in the general population experience more psychological and emotional distress, including stigmatisation, depressive and anxiety disorders, negative body image and lower self-esteem, than individuals with healthy weights.<sup>21</sup> With the increased body size during pregnancy QOL might worsen. However, the opposite effect might occur because most women experience pregnancy and the anticipated joy of childbirth as deeply meaningful and valuable. Pregnant women are esteemed by the community and pregnancy provides an experience of personal development and altruism.<sup>22</sup> In addition, weight gain in late pregnancy is socially acceptable as it is perceived as externally driven and caring for the developing baby.<sup>23</sup>

In the index study the domain scores for 'sexual life, public distress and self-esteem' of the combined group were surprisingly positive, with only public distress deteriorating significantly with increasing BMI. While a lower QOL has been reported in obese pregnant women from early pregnancy,<sup>24</sup> obesity also affects pregnancy through the impact of associated complications.<sup>24,25</sup> Extreme types of obesity increase these complications, but at the time of the interviews during the index study the women were largely uncomplicated attendees, early in the third trimester of pregnancy at the 'high-risk' clinic. Ultimately, multiple factors such as baseline body weight, weight gain, and complications during the pregnancy will affect the QOL.<sup>24</sup>

This study has some limitations. The QOL tool utilised is not designed specifically for pregnancy, which may wield various influences as discussed above. The results apply only to extreme classes of obesity. That these pregnant women were mostly already in the third trimester might be regarded as a strength, but there still remained enough time in the pregnancies to experience complications that would influence the QOL.

Obesity is currently a global pandemic that occurs across the full spectrum of the adult reproductive period. This study showed that the quality of life of extreme types of obesity in pregnant women was still positive, but was linked to the degree of obesity. Finally, while this manuscript has addressed specific QOL issues, there is growing evidence that the intra-uterine environment present in an obese mother influences the metabolic programming of her foetus, predisposing the future child to obesity.<sup>26</sup> There are thus environmental, genetic and epigenetic factors that influence metabolism and adiposity. It is the responsibility of all physicians to work against this vicious cycle.

**Conflict of interest** – The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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**Author contribution** – J.L. Van der Merwe and D.R. Hall were involved in the initial design and planning of the original study. M.A. Tisane, J.L. van der Merwe led the data collection of this sub-study. All authors were all involved in the data analysis, manuscript construction, critical revision and approval of the final manuscript.

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