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Body mass index and health-related quality of life in patients preparing for coronary angiography

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Abstract
There is evidence that body mass index (BMI) is related to some extent to the health related quality of life (HRQoL) in different populations. The purpose of our study was to investigate the relationship between the BMI and the HRQoL in patients awaiting coronary angiography. The sample consisted of 100 patients (68 males and 32 females) with symptomatology indicated for coronary angiography. For all of them BMI was calculated. They were also administered Duke Health profile questionnaire which measures adult self-reported functional health status. The findings reveal that BMI is related to some aspects of HRQoL. Considering this, health counseling directed at regulating body weight as part of the positive health behavior can benefit and improve some domains of the HRQoL and the QoL per se of the individuals having health problems.
Key words: body mass index, health-related quality of life, coronary angiography, health counseling, positive health behavior

1. Introduction

There is evidence that body mass index (BMI) is related to some extent to the health related quality of life (HRQoL) in different populations. The purpose of our study was to investigate the relationship between the BMI and the HRQoL in patients awaiting coronary angiography.

1.1. Body mass index

Body mass index is a calculation of a person's weight compared to his or her height. It is calculated by taking a person's weight (in kilograms) divided by the person's height squared (in meters). It is also known as the Quetelet index, named after its developer Adolphe Quetelet (Kolo, Dunbar, & Taarea, 2008). He was one of the first statisticians to apply the concept of a regular bell-shaped statistical distribution to physical and behavioral features (Davidson, 2008)
BMI is one of the best indirect indicators of degree of obesity (Ostir, 2007). It is a useful guide for assessing adiposity and is related positively with body fat content (Katz, 2003). BMI is a statistical calculation intended as an assessment tool. It can be applied to groups of people to determine trends or it can be applied to individuals. When applied to

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individuals, it is only one of overall assessments used to determine health risks related to being underweight, overweight or obese (Davidson, 2008). In 1998, the United States National Institutes of Health revised its weight definitions to bring them in line with the definitions used by the World Health Organization. All adults age 20 and older are evaluated on the same BMI scale as follows:

- BMI below 18.5: Underweight
- BMI 18.5–24.9: Normal weight
- BMI 25.0–29.9: Overweight
- BMI 30 and above: Obese

Flegal et al. (2005) suggest that the optimal BMI for longevity appears to fall between 20.5 and 24.9 kg/m^2 for men and women of all ages, although recent evidence suggests that the longevity advantage may extend to those who are moderately overweight.

The literature (Ferrera, ,2005: Seidel et al., 2003) indicates good agreement between BMI and indexes of quality of life, health and mortality. Adjusting for factors that can potentially confound this relationship, such as smoking status and underlying disease, reduces the strength of the BMI–mortality relationship but does not eliminate it. Epidemiological data show a consistent relationship between increasing BMI and a variety of chronic illnesses, including type 2 diabetes, hypertension, coronary artery disease (e.g., heart attack), high cholesterol, sleep apnea, degenerative joint disease and certain cancers. Increasing BMI has also been associated with depression, low self-esteem, physical disability, social discrimination, and unemployment (National Heart, Lung, and Blood Institute, 1998). In a large prospective study, Daviglus et al. (2003) reported that a higher BMI in middle age is associated with a poorer quality of life in older age.

1.2. Health related Quality of life

Humans strive to create meaning in their lives and they struggle to achieve happiness by pursuing the things they value (Diener et al., 2003). Speculation about how to achieve 'the good life' or 'good quality of life' is probably as old as humankind. According to Socrates: 'You should put the highest value, not on living, but on living well'. However, it is only in recent decades that there has been a growing interest in assessing QoL in healthcare (SAC, 2002) and conceptualizations of QoL in healthcare have been heavily influenced by earlier developments in the measurement of functional health status in medicine and the evolution of social indicators in the social sciences (Prutkin & Feinstein, 2002).

In order to provide a comprehensive assessment of the benefits and costs of a treatment, a broader range of measures, such as QoL instruments, was proposed (Wood-Dauphinee, 1999). Patient QoL is increasingly measured as an adjunct to more traditional clinical outcomes and 'quality of life' has been a key term in MEDLINE. This reflects an increasing acceptance of a holistic approach to health that is more in keeping with a biopsychosocial model than the traditional biomedical model of disease (Engel, 1977). This change is due, in part, to the ageing of populations with a resulting increase in the prevalence of chronic and degenerative diseases.

However, it is clear that 'QoL' means different things to different people, and takes on different meanings according to the area of application. To distinguish between QoL in its more general sense and the requirements of clinical medicine and clinical trials, the term *health-related quality of life* is frequently used in order to remove ambiguity (Fayers & Machin, 2007).

Health-related QoL is still a loose definition. It is generally agreed that the relevant aspects may vary from study to study but can include general health, physical functioning, physical symptoms and toxicity, emotional functioning, cognitive functioning, role functioning, social well-being and functioning, sexual functioning and existential issues. In the absence of any agreed formal definition of QoL, most investigators circumvent the issues by describing what *they* mean by QoL, and then letting the items (questions) in their questionnaire speak for themselves. Thus some questionnaires focus upon the relatively objective signs such as reports, and in effect define the relevant aspects of QoL as being, for their purposes, limited to treatment of the difficulties. Other investigators argue that what matters most is the impact of the difficulties, and therefore their questionnaires place greater emphasis upon psychological aspects, such as anxiety and depression. Yet others try to allow for spiritual issues, ability to cope with illness, and satisfaction with life.

2. Methodology:

The sample consisted of 100 patients (68 males and 32 females, mean age: 59ys) with symptomatology indicative for coronary angiography. The patients' data were collected at the very day, prior to the procedure itself. It is an outpatient setting within the Diagnostic center of the hospital where we meet patients on a regular daily basis implementing a psychoeducational program. Health counseling and psychotherapy are also offered to the patients and their families. For all of them BMI was calculated using the standard formula: $BMI = kg/m^2$.

They were also administered Duke Health profile questionnaire (DUKE). DUKE is intended as a brief and practical measure to evaluate patient reported functional health status in primary care settings. The DUKE is a 17-item generic health status profile from which six scales measure function: physical, mental and social health, general health, perceived health, and self-esteem. Five scales measure dysfunction: anxiety, depression, pain and disability, plus an anxiety-depression scale that combines items from the anxiety and depression subscales. The questionnaire is self completed; the time frame refers to the present or to the past week (Parkerson, Broadhead & Tse, 1990). The items of the questionnaire itself were used as a tool to introduce the patients in the counseling process.

3. Results:

The distribution of the patients according to their BMI is shown in Table 1. As can be seen, over 50% of them are overweight and 34% are obese. In this sample, there are no patients who are underweight. In the range of normal weight belong only 13 % of the patients.

Table 1. . Distribution of patients according to their BMI

BMI Scale	Percentage
BMI below 18.5: Underweight	0 pts (0%)
BMI 18.5–24.9: Normal weight	13 pts (13%)
BMI 25.0–29.9: Overweight	53 pts (53%)
BMI 30 and above: Obese	34 pts (34%)

The mean BMI for the whole group is 28.91 kg/m^2 and SD is 4.3. When group was tested against 24.9 kg/m^2 (as upper limit of normal weight) performing One-Sample T test, result showed that the mean of the whole group significantly differs from this value (p<0.01). Results are shown in Table 2.

Table 2. One-Sample T Test of the group

	Test Value = 24.9		
	t	df	Sig. (2-tailed)
BMI	9,327	99	,000

Then, patients were divided in two groups of 50 where cut-off point was the BMI median value (28.35 kg/m^2). Independent variable was BMI and dependent variable was HRQoL operationalized by the scores obtained on DUKE scales. An Independent Samples T test was performed and results are shown in Table 3.

Table 3. Independent Samples T Test of DUKE Scales

DUKE Scales	BMI Median cut-off	Mean (SD)	t	Sig (2-tailed)
Physical health	>= 28,4	48.40 (28.88)	0.875	0.384
	< 28,4	53.00 (23.41)		
Mental Health	>= 28,4	63.40 (21.25)	-2.819	0.006*
	< 28,4	73.60 (14.25)		
Social Health	>= 28,4	64.20 (15.66)	-1.116	0.267
	< 28,4	67.60 (14.77)		
General Health	>= 28,4	58.66 (16.65)	-2.112	0.038*
	< 28,4	64.72 (11.58)		
Perceived Health	>= 28,4	47.00 (35.58)	-2.707	0.008*
	< 28,4	65.00 (30.72)		
Self-Esteem	>= 28,4	78.00 (19.17)	-1.376	0.172
	< 28,4	82.80 (15.52)		
Anxiety	>= 28,4	36.40 (18.17)	2.321	0.022*
	< 28,4	28.82 (14.24)		
Depression	>= 28,4	39.80 (22.36)	2.706	0.008*
	< 28,4	29.40 (15.44)		
Anxiety-Depression	>= 28,4	38.06 (19.56)	2.941	0.004*
	< 28,4	28.00 (14.23)		
Pain	>= 28,4	38.00 (41.11)	0.257	0.797
	< 28,4	40.00 (36.42)		
Disability	>= 28,4	42.00 (40.86)	0.374	0.710
	< 28,4	45.0 (39.45)		

*Significant at a level 0.05 (p<0.05)

4. Conclusions and Recommendations:

The findings reveal that BMI is related to some aspects of HRQoL. The fact that 87% of the group is overweight or obese is single important factor that these people are at a greater risk of developing many diseases since the connection between BMI and ill health is well established. As we can see from our data, patients with lower BMI tend to show better mental and general health functioning and perceive their health in more positive manner compared to those with higher BMI. Furthermore, patients with lower BMI tend to be less anxious and depressed indicating better mood compared to those with higher BMI. No differences were found in physical and social health, self-esteem, pain and disability. This is inconsistent with some other studies and further analysis is needed for a possible explanation which is out of scope of this paper.

Considering this and combining it with many other findings, the department of psychology and psychotherapy practices health counseling with patients admitted for different diagnostic procedures on a regular daily basis. Since their health has already been compromised in some way, actions directed at behavior modification are always welcome. While waiting for their turn for a coronary angiography, we utilize that free time to establish a counseling contact and try to involve the concept of healthy habits as primary and most important factors in reduction of potential risks. Among other things, it is directed at regulating body weight as part of the positive health behavior which can benefit and improve some domains of the HRQoL and the QoL per se of the individuals having health problems. Eating habits and regular physical exercise are the leading behavioral aspects closely related to body weight. We are satisfied if we achieve to raise the awareness of a patient at least a little step forward encouraging him/her towards active self care which will inevitably reflect the whole health status. If necessary, some patients may enter psychotherapeutic individual or group work since it is a long process that requires closure of an old pattern and opening a new, prosperous one. The team approach with the physicians involved has proven to be the best choice.

The Department of psychology and psychotherapy within the hospital has been implementing various programs for nearly ten years. It is the only private hospital in the country where three psychologists are employed full time. A

variety of approaches are practiced including preparatory psychoeducation prior to different diagnostic procedures as well as psychoeducational preparation prior to minor or major surgeries. The patients and the families are receiving psychological support during their entire stay in the hospital, as well. When needed, integrative psychotherapeutic approaches are also applied.

The findings from this study which emerge from our daily practice also imply the essential need to promote the health concept among Macedonian citizens who live in a transitional period for many years and the active self-care has been forgotten – replaced – by the struggle for economic survival and satisfaction of the basic human needs. It is this motivation that the Special hospital for surgery diseases "Filip II" has founded this Department in an attempt to fulfill a part of this gap. In this sense, this research can be considered as an initiative for further deeper exploration of this complex problem of health and quality of life.

Acknowledgement

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