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Faculty of Graduate Studies

**The Effect of Short –Term Weight Management
Programs on the Quality of Life of the Dietetic
Center’s Attendees in Palestine**

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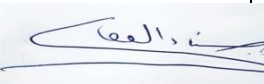
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Dedication

This thesis is wholeheartedly dedicated

To:

My mother, the strong and gentle soul who love, encouragement and prays
day and night makes me able to get such success.

The memory of my father, Ahmad Abu-ALwafa, for being my first
teacher who taught me to trust Allah and believe in hard work. I miss him
every day but, am glad to say he was the best father one could have.

My brothers, sisters, friends and my supervisors who shared their words of
advice and encouragement to finish my thesis

Acknowledgment

Every challenge will need self-effort as well as the guidance of Allah and others especially those who are very close to our heart. First and foremost, all praise belongs to Allah, the Lord of the Universe, whose mercy, guidance and blessings have enabled me to complete this study successfully.

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Finally, I would express my great thanks to my family for their support and encouragement that giving me the strength when thought of giving up.

الاقرار

انا الموقع ادناه مقدم الرسالة التي تحمل عنوان

The Effect of Short –Term Weight Management Programs on the Quality of Life of the Dietetic Center’s Attendees in Palestine

اقر بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص, باستثناء ما تم الإشارة اليه
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Declaration

**The work provided in this thesis, unless otherwise referenced,
is the researcher’s own work, and has not been submitted
elsewhere for and other degree or qualification.**

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List of Abbreviations

AQLQ	Asthma Quality of life Questionnaires
BIA	Bioelectronics impedance
BMI	Body mass index
EQ-5	European Quality of life 5 dimension
HRQOL	Health related quality of life
HLC	Healthy low carbohydrate
HLF	Healthy low fat Statistics
IBT	Intensive behavioral treatment
IWQOL	Impact of weight on Quality of Life
NAFLD	Non-alcoholic fatty liver disease
NCHS	National Center for Health
NHANES	National Health and Nutrition Examination Survey
QOL	Quality Of Life
SNPs	single nucleotide polymorphism
SWLS	Satisfaction with life scale
VAS	Visual analogue scale
VLCD	Very low carbohydrate diet
VLCK	Very low calorie ketogenic diet
USA	United State of America
WHO	World Health Organization
36-SF	36 short form

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Abstract

Obesity is a global burden that impairs an individual's Quality of life (QOL) psychologically, economically, physiologically, and socially. Nevertheless, QOL is a multi-dimensional term with no standard definition. Health related QOL (HRQOL) can be defined as " individual perception about social, physical, mental aspects of health, and how health affects the ability to function in life ". Many studies have addressed the negative association between excess weight and HRQOL. This study aimed to assess HRQOL and to assess the effect of weight loss among overweight/obese adults after attending short-term weight management programs on HRQOL and changes in HRQOL. Participants were recruited from adults referred to Nutri Health centers of (Ramallah, Nablus, Jenin, Hebron and Tulkarm) for weight management programs during the period between 1 of May 2019 to 30 November 2020. A total of 466 participants (81 males and 383 females) with a BMI (body mass index) more than 25 kg/m^2 were involved in the study. Body composition, anthropometric measurements, socio-demographic data, and HRQOL were determined at baseline and after 3 months of follow-up weight-management program. The results showed a

significant decline in the mean weight of participants from 93.9 ± 17.2 Kg to 83.9 ± 15.7 kg over three months; however, (48.7%) participants reported a reduction of less than 10% of their weight while (51.3%) participants had a reduction of more than 10% of their weight over 3 months. By using paired sample T-test participants reported significant improvement in all components of (36-SF) HRQOL after 3 months compared to baseline scores. At baseline, participants with higher BMI significantly reported lower scores in HRQOL subscales of *Physical functioning*, *Pain*, *Vitality*, and *General health*. while after 3 months, participants with $\geq 10\%$ loss of baseline weight had a greater improvement in the overall QOL scores by 14.6 ± 17.6 (mean \pm SD) compared to 9.7 ± 15.0 for those who lost $< 10\%$ baseline body weight. Moreover, the *Role limitation due to physical health* achieved the highest score after 3 months with mean \pm SD of 93.0 ± 20.7 compared to baseline score of 80.8 ± 32.2 . The highest improvement was reported in *Physical functioning* with 18.9 ± 27.3 and 10.9 ± 27.3 for participants lost $\geq 10\%$ and $< 10\%$, respectively. In conclusion, weight management programs seemed to be not only effective to induce weight loss but also, to improve HRQOL. Excess weight is considered a detrimental factor for HRQOL. Moreover, data have shown that overweight/obese women were more likely to have poorer HRQOL at baseline with less improvement in HRQOL after 3 months compared to men. Finally, the findings of this study have confirmed that the weight management is a holistic process that should consider the patients views and improvement in QOL after weight reduction.

Chapter I

Introduction

1.1. Background

Worldwide, obesity is a health-related issue, due to its complications and further economic and social impacts. By definition, obesity is an abnormal accumulation of excess fat that impairs health [1], however, according to World health organization overweight adult is defined as a person having body mass index (BMI) 25-25.99 kg /m² while BMI \geq 30kg/m² is classified as obese[2]. All over the world, the prevalence of obesity is increasing in an alarming way. Nowadays, about one-third of the world's population is classified as overweight or obese [1]. The prevalence of obesity among adult Palestinians is high compared to other neighboring developing countries with a rate of obesity around 30% among Palestinian adults until 2013[3]. Alterations in dietary habits, physical inactivity, and urbanization may be considered favoring factors for this rapid increase of obesity [4, 5].

Being obese or overweight or even underweight is not only considered as a predisposition factor for many chronic diseases but also has a major influence on Quality of life (QOL). QOL, a multidimensional concept, can't be expressed simply with terms like wellbeing, or life satisfaction. QOL is a reflection of social, emotional physical, mental, and environmental aspects of life[6]. however health related quality of life (HRQOL) is an individual perception about health and how health affects the ability to

function in life[7]. In general, excess weight could have a great influence on daily activity, emotional status, and acceptance of self –image[8]. This was well demonstrated in the literature, moreover, there is much evidence of the association between impairment of physical and mental aspects of QOL and elevated BMI [9,10]. On another hand, improvement in domains of HRQOL related to weight loss was established in many randomized controlled trials [11,12,13]. In addition, many lifestyle interventions for weight management such as dietary intervention accompanied with physical activity may help in the improvement of QOL of obese and overweight individuals [11,14,15].

In Palestine, as a result of urbanization and adopting a modern lifestyle, obesity rates among adults and adolescents have rapidly increased [4,5]. Also, the number of individuals attending dietetic centers seeking weight management has increased. Nevertheless, data about the quality of life of both obese and non-obese are scarce. Few reports have shown that QOL for the general population in Palestine was low compared to other countries [16], however, in viewing the literature, it is presumed that the quality of life of Palestinian obese is less than the general population[3,17].

For obese attending weight management programs, no data are available about their HRQOL and further changes in the QOL as a consequence of their weight management. This study aims to assess the effect of weight management programs applied in dietetic centers in West Bank on overweight/obese individuals' quality of life before and after weight loss.

1.2. Objectives

1.2.1. General Objective

The main aim of this study was to assess the effect of weight loss after joining weight management programs on HRQOL among overweight /obese adults and to determine the changes of quality of life and its relationship with percentage of weight loss after joining weight management programs among overweight/obese adults attending Nutri health dietetic centers of(Ramallah ,Nablus, Jenin, Hebron and Tulkarm) in West bank .

1.2.2. Specific Objectives

More specifically, the study will address the following objectives:

- i. Assess QOL of patients at baseline.
- ii. Asses QOL after 3 months of following weight management programs.
- iii. Determine the changes in QOL during the study period.
- iv. Find associations of changes in QOL with other confounders such as age, education, gender, and socio-demographic status.
- v. Determine the factors that affect the quality of life of obese and overweight individuals.

1.3. Conceptual Framework

The conceptual framework of the study is shown in Figure (1). The Independent variables that has a major influence on poor HRQOL is excess weight and elevated BMI. However, obesity outcomes are associated with impaired HRQOL particularly in physical functioning, social status,

psychological health, and general health. On another hand, it is assumed that weight loss is associated with improvement in HRQOL among obese individuals. Socio-demographic and socio-economical factors also have a great impact on HRQOL.

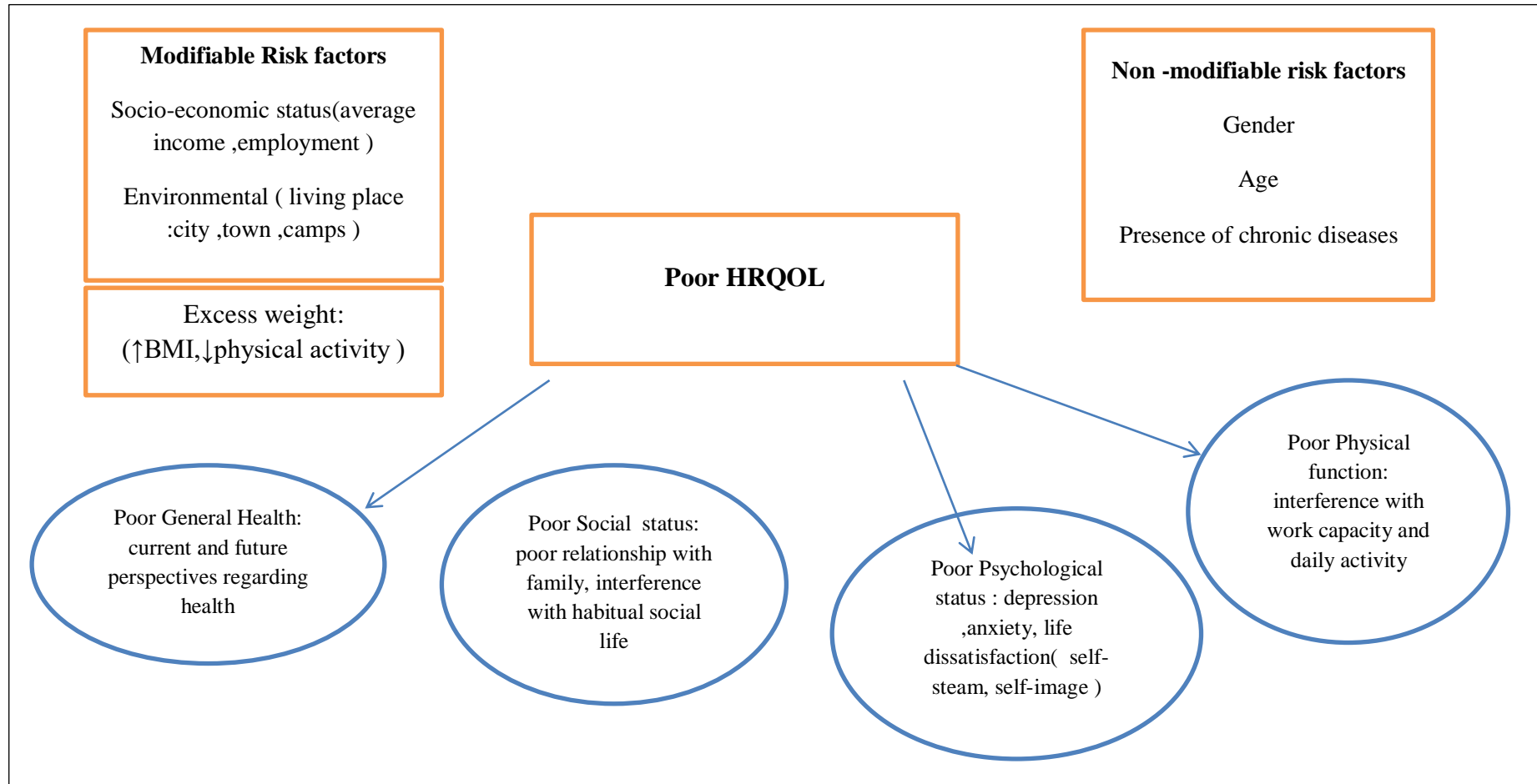


Figure 1.1 : Conceptual framework of the study

1.4 Research Hypothesis

The study hypothesis is summarized as the following:

- i- Excess weight(being overweight/obese) has a negative impact on HRQOL.
- ii- Weight loss after attending weight management programs even in short term is associated with improvement of HRQOL of obese and overweight individuals.
- iii- Many variables has influence in differences in HRQOL scores and improvement in HRQOL after weight reduction like variations in age, socio-demographic factors, and socio-economical variables.

1.5 Significance of The Research

The study provides comprehensive data about QOL among overweight and obese adults in the West Bank, in Palestine. In addition, it helps to identify factors associated with HRQOL among obese and overweight individuals. Finally, the study will highlight the importance of attending weight management programs and weight loss in improving the HRQOL of overweight and obese adults.

Chapter II

Literature Review

2.1 Obesity and related issues:

2.1.1 Prevalence and definition.

Obesity has become a global primary health issue. Globally, the prevalence rate of obesity has been tripled since 1975 according to World Health Organization (WHO) with more than 1.9 billion adults were classified as overweight in 2016, of these over 650 million adults were obese. In addition, more than 38.2 million children under the age of 5 years were obese in 2019 [1]. In another word, about one-third of the world's population is classified as obese or overweight [18]. According to national health and nutrition examination survey (NHANES) data, in the USA the prevalence of obesity was 42.4 % among adults in 2017-2018 [19]. Furthermore, a recent study has projected that the prevalence of adult obesity will continue to increase and by 2030 one out of two adults will have obesity and 1 out of 4 will have severe obesity in the USA [20].

By definition, obesity is an abnormal accumulation of excess fat that impaired health [19]. The most common measure used for clinical screening of obesity is body mass index (BMI). BMI is calculated by division of body weight in Kg by body height in meter squared (kg/m^2). The definition of obesity depends on the method used to determine presence of obesity (either waist circumference or BMI) [21]. According to WHO body mass index is commonly used to classify obesity and

overweight in adults, so for adults' overweight is defined as BMI equal or greater than 25 while an obese adult has a BMI higher than or equal 30. On another hand, age should be considered when defining obesity of children; children under the age of 5 years are overweight if their weights -for-height are greater than 2 standard deviations above WHO child growth standard median. Children will be considered obese if their weights for –height are greater than 3 standard deviations above the child growth standard median. Children aged between 5-19years old are classified as overweight or obese if their BMIs for –age are greater than 1 and 2 standard deviations above WHO growth reference median respectively [1].

Obesity is recognized as an illness and an aggravator of many other preventable chronic diseases such as cardiovascular diseases, certain types of cancer, diabetes type 2 and all-cause mortality. In addition, obesity is found to be associated with other diseases including: asthma , infertility, cataracts, sleep apnea, gallstones, and others [22-24].

2.1.2 Risk factors

Obesity is a multifactorial metabolic disorder where environmental factors and genetic predisposition interact to manifest its features and complexity. Energy imbalance is the fundamental cause of obesity. Many epidemiological studies have shown that recent alterations in diet and physical inactivity are promoting factors for positive energy balance and subsequently weight gain [25]. These factors including increase food consumption especially high calories dense food, urbanization, sedentary

lifestyle, and possibly novel factors such as endocrine disturbances, changes in the gastrointestinal micro biome and inadequate sleep. On the other hand, genetics plays a significant role in the development of obesity. Several genetic variants (known as single nucleotide polymorphisms, SNPs) involved in different biological pathways were identified as predisposing of human polygenic obesity and associated with weight and different anthropometric differences [26]. However, many forms of monogenic obesity have been identified such as the deficiency in leptin and melanocortin-4 receptors. Mutations in receptor gene are the common cause of monogenic severe obesity in children [27]. In addition, the interaction gene-diet deposition factor of obesity was studied in many cohort studies. Results have shown a potential association between DNA methylation and packaging and histone modification with adiposity [28].

2.1.3 Biological basis

Oxidative stress plays a crucial role in pathogenesis of obesity and its complications. Oxidative stress could trigger obesity due to stimulation in deposition of white adipose tissue and may change food intake. Oxidative stress can cause an increase in proliferation and differentiation of adipocyte. In addition, the reactive oxygen species could affect neurons in hypothalamus that control hunger and satiety [23].

2.1.4 Pathophysiological feature of obesity

a. Anatomical effect

The prolonged positive energy balance is leading to excess adiposity and excess lipids in form of triglycerides that are spread in many body compartments. Subcutaneous adipose tissue is the main storage site where visceral adipose tissue is a smaller storage compartment. Obesity is accompanied with an increased level of immune cells particularly macrophages. In the adipose tissue, with response to cell apoptosis, the immune cells start to secrete pro-inflammatory cytokines that may contribute to the development of insulin resistance and metabolic syndrome [29]. On the other hand, visceral adipose tissue around vital organs like kidney may contribute to the development of hypertension. In addition, obesity leads to an increase in pharyngeal soft tissue that leads to obstruction and narrowing of airways during sleep causing an obstructive sleep apnea [30]. Moreover, obesity contributes to mechanical load on joints and knees causing osteoarthritis.

b. Physiological and metabolic effects

Adipocyte secretes hormones and protein signaling molecules like adipokines. Excessive secretion of pro-inflammatory adipokines by macrophages and adipocytes within the adipose tissue leads to low grade inflammatory state in obese patient. In addition, free fatty acids in the plasma are elevated in obese subjects. Also, lipids are found in liposomes organelles within the cell in case of excess adiposity. These liposomes in

liver cell for example may leads to increase in size (steatosis) and forming vacuoles which are responsible of many pathological conditions for example cirrhosis, non –alcoholic fatty liver disease (NAFLD)and the more sever non-alcoholic steatohepatitis (NASH).

Moreover, lipid intermediates (like cermides), inflammatory cytokines and free fatty acid in non-adipose tissue will impair insulin signaling within the cell and contribute to the development of insulin resistance [25].

c. Psychological effects

Obesity and mental illness are associated, however, the mechanism of linkage is not clear. There are two directions for such association; the first direction is that many mentally-ill patients have a higher risk (2 - 3 folds increased risk) of being obese while the second direction is the increased risk of mental disease in obese subjects. Obesity is associated with many psychiatric diseases such as anxiety, depression, mood disorders, binge eating disorder, attention deficit and hyperactivity disorder (ADHD), and schizophrenia. Among the suggested mechanisms was the role of inflammation, inflammatory markers and changes in the hypothalamic pituitary adrenal axis. Nevertheless, some medications used in treatment of anxiety, depression and other psychotic disorders have many side effects like changes in sleep and appetite and subsequently weight gain [31].

2.1.5 Obesity managements

The main treatment options are lifestyle intervention, pharmacotherapy and bariatric surgery. Lifestyle intervention is based on behavioral eating and

physical activity modifications [34]. Behavioral therapy is the core of lifestyle intervention which can provide patients with technique to adopt the dietary and physical activity recommendations [32]. The medical advice ‘eat less and exercise more ‘ is not sufficient to achieve successful weight loss for most of obese patients so the guidelines recommend patients to attend counseling sessions with at least 14 sessions over 6 months and follow up over one year[33]. An average of 8% weight loss of initial weight is expected. Many dietary approaches with evidence of weight loss efficacy are based on a dietary pattern or elimination of one or more macronutrients or food groups. Whatever the dietary approach reduction of total caloric intake is the main component of any weight-loss interventions[35]. Surely, there is no magic diet for weight loss, also no superiority for one diet type over other dietary patterns in terms of loss and maintenance of body weight. Regardless of which diet type is chosen, there are many ways to successful weight loss, therefore the predictor of success is the dietary adherence over a period of time[37]. In other words, providers should recommend diets according to patient preference to achieve successful weight-loss and reduce caloric intake. This does not mean that the composition of the diet is not important but the secret is to induce an initial negative energy balance to promote weight loss[35].

Physical activity is another important component of lifestyle intervention to manage weight. The general recommendations to increase aerobic physical activity to greater than 150 minutes weekly. The American college of sport and medicine recommends 200-300 minutes per week for long term weight

loss and 150-250 minutes per week to be effective in prevention of further weight gain [33]. Table (1) Summary of lifestyle therapy from recommendations and guidelines of American Association of clinical Endocrinologists and American College of Endocrinology for medical care of patients with obesity[34].

Table 2.1: Summary of lifestyle therapy according to recommendations of American Association of Clinical Endocrinologists and American College of Endocrinology guidelines for medical care of patients with obesity .

Meal plan	Physical activity	Behavior
<p>Reduce calorie healthy meal plane</p> <p>500-750 Kcal daily deficit</p> <p>Individualize based in personal preference and culture</p> <p>Meal plans can include: Mediterranean ,DASH(dietary approaches to stop hypertension), low-carb, low fat, volumetric, high protein and vegetarian.</p> <p>Meal replacement</p> <p>Avery low –calorie diet an option in selected patients and need medical care supervision</p>	<p>Voluntary aerobic physical activity>150mints /week performed on 3-5 separate day/weeks</p> <p>Resistant exercise: single set repetitions involves major muscle 2-3/week</p> <p>Reduce sedentary behavior</p> <p>Individualized based on limitation and preference</p>	<p>Intervention package includes:</p> <ul style="list-style-type: none"> -Self-monitoring(food intake, exercise and weight . -Goal setting -Education(face to face meeting, group sessions and remote technology) -Problem solving -Behavioral contacting -Stress reduction -Psychological evaluation, counseling and treatment when needed -Cognitive restricting -Motivational interview -Mobilization of social support structures

2.1.5.1. Dietary management

In the literature, there is no superiority for any dietary approach by its nutrients, food group, or dietary pattern over other dietary patterns in weight loss or maintenance of weight loss. However, any dietary approach is effective for weight loss as long as it enhances energy deficit and induce energy intake manipulation [35]. In other words, the key factor in weight reduction is ‘energy reduction’. A variety of energy approaches induced significant weight loss mainly by energy reduction. The main dietary approaches in weight management emphasize on modification of macronutrients composition of diet, energy manipulation, addition or elimination of specific food group or adoption of a dietary pattern [36].

1. Dietary approaches based on alteration of carbohydrates, fat and protein contribution in the diet

A low-fat diet, low carbohydrate, moderate or even high protein diets are well-known to be effective dietary approaches based on target macronutrients in weight management [37]. Whatever the target macronutrient is, energy deficit must be established in order for weight loss to occur. Low carbohydrates or very low carbohydrates diets induce satiety and suppress hunger. The National Lipid Association has defined very low carbohydrate diet (VLCD) as; less than 10 % of total daily energy from carbohydrate based on 2000 kcal while diet between 10-25% of energy from carbohydrate is considered as low carbohydrate diet ,on another hand, regarding to weight management a meta-analysis has shown that low carbohydrate diet specially very low carbohydrate diet(<20-50g per day) was associated with decrease weight and fat mass in many clinical

trials [38] in contrast, many trials have shown that there was no further beneficial or superiority of low carbohydrate diets over other isocaloric diets in long term weight loss [39]. In some clinical trials, high protein intake during weight loss (around 1.38g/kg body weight) also was associated with higher weight loss compared to standard protein diet (0.8g/kg body weight) with the same energy content [40]. Moreover, after 9-month dietary intervention the high protein low carbohydrate hypo caloric diet (contained 34% protein) has shown a significant higher weight loss than standard hypo caloric diet (contained 20% protein [41]. In contrast, clinical trials showed no further beneficial effect on weight loss and waist circumference [42,43].

2. Energy intake manipulation

Intermittent fasting (IF) refers to a repeated dietary approach based on restriction of energy intake for a short period, mainly few days, then energy is provided with excess than requirements. Many studies have suggested that IF is an efficacious dietary approach. An example of this approach is alternate day fasting [50]. However, many studies and meta-analysis showed no additional beneficial effect on weight loss or fat mass compared to continuous energy restricted diets such as VLCD. The results of comparison between IF and VLCD have shown that there was no significant difference of mean body weight or fat mass, moreover, 0.88 kg loss of weight in VLCD than alternate day fasting was reported [44, 45].

3. Dietary pattern for weight loss

Recent knowledge about the complex synergistic interaction between nutrients and other food components has led to increase interest in whole

dietary patterns. However, dietary pattern that takes food as a whole is preferred over macronutrients restriction for either health issues or long term adherence in weight management [46]. The most popular dietary patterns are plant based dietary pattern (such as vegetarian and vegan) and traditional derived diet such as Mediterranean pattern which is intensively studied in weight management, Mediterranean dietary pattern based on whole grains, high consumption of fruits and vegetables , olive oil as a core composition of daily diets, nuts, plant protein and wine also it characterized by moderate intake of dairy products, poultry and sea food with low consumption of red meat [46]. A meta-analysis showed that Mediterranean diet was effective in the reduction of weight and glycemic control than control diets in diabetic patients [47]. Moreover a 3-month intensive dietary intervention based on Mediterranean diets showed durable and more weight loss (6.8 kg) than conventional intervention [48]. On another hand, plant-based dietary pattern like vegetarian diet showed a significant reduction in body weight, a meta-analysis showed that participants assigned to non –vegetarian diets for at least 3.5 month showed 2.0 kg less weight loss compared to those assigned to vegetarian diet [49].

Summary of some clinical trials of various dietary intervention on body weight is shown in Table (2).

Table 2.2: Clinical trials of different dietary intervention for weight loss

Author	Study design	Subjects	Intervention	Main Finding	Ref.
Chi et al.(2019)	RCT	For 12 week 271 (NAFLD) patients subjected randomly to alternate day fasting , time restricted feeding or control group	Alternate day fasting	After 4 weeks ,significant reduction in weight 4.3kg in group of alternate fasting and 3.6kg in group of time –restricted feeding compared to control group and higher reduction after 12 weeks, after 12 weeks significant reduction in fat mass and serum triglyceride	50
Moreno et al.(2014)	RCT	Very low-calorie ketogenic diet or low-calorie stander diet for 12 months	Very low-calorie ketogenic diet or low-calorie stander diet for 12 months	After 12 months participants with very low-calorie ketogenic diet has a significant higher weight loss of (19.9±2.3kg)compared of those in low calorie stander diet (7±5.6kg) and 88% of participants with VLCK loss more than 10% of their initial weight, lean mass not affected	51
Trepanowski et al.(2017)	RCT	100 obese participants for one year dietary intervention	Alternate day fasting(25% of energy need on fast days and 125%of energy needs on feast days) or daily calorie restriction(75% of energy need every day) compared to control no dietary changes	Alternate fasting had highest dropout rate, weight loss are similar for those with alternate fasting and daily energy restriction after 6,12 months with mean loss of about 6.8% for alternate fasting and 6.8% for the second group after 6 months , alternate fasting had no superior effect on weight loss compared with daily restricted energy	52
Gardner et	RCT	609 over weight	Healthy low fat diet vs.	No significant difference in weight loss	53

Author	Study design	Subjects	Intervention	Main Finding	Ref.
al.(2018)		adults for 12 months	healthy low carbohydrate diet	after one year (-5.3 kg for HLF compared with 6kg for HLC)	
Haywood et al.(2017)	RCT	Total 117 participants older obese	36participants on exercise with healthy diet advice ,40on exercise with hypo caloric diet and 41 on exercise with very low caloric diet for 12 months	Weight reduced by 3.7% in group 1 ,5% in group 2 and 11% in group 3 , very low caloric diet had significant highest reduction in weight and fat	54
Bruci et al.(2020)	Observational prospective study	92 participants 38of them had mild renal function impaired the rest had no renal condition	Very low calorie ketogenic diet for 3months	Average weight loss was 20% of initial weight and significant reduction in fat mass ,improvements in metabolic parameters and 27% of patients with mild renal failure reported normalized glomerular filtration after dietary intervention	55
Cunha et al.(2020)	Open – randomized controlled prospective pilot study	39 patients	20 participants on very low caloric ketogenic diet and 19 participants on stander low calorie diet	Significant higher weight reduction was $9.59\pm2.87\%$ in VLCKD vs. $1.87\pm2.4\%$ in LC diet ,significant reduction in visceral adipose tissue and liver fat in VLCKD group after 2 months	56

Abbreviations: NAFLD: non-alcoholic fatty liver disease, VLCK: very low calorie ketogenic diet, LO: low calorie, HLF: healthy low fat, HLC: healthy low calorie.

2.2 Quality of Life (QOL)

2.2.1 Quality of life concept

QOL is, relatively, a new concept introduced in the early of 1970s as an outcome measure and evaluation of health care. The progress in medical innovation has reduced mortality due to infectious diseases and brought a significant improvement in life expectancy. Such changes make it too important to measure how people live these extra or additional years [58]. QOL can be defined according to world health organization as individuals' perception of their position in life in the context of culture and values system in which they live and in relation to their goals, standards, expectations and concerns [57]. However, there is no standard definition of QOL. Many approaches do exist to define the concept of QOL. Some of these approaches are based on human needs ,others are based on expectations, subjective well-being, preference satisfaction, objective lists and life satisfaction [6]. An example of other definition of QOL is” An overall general well-being that comprises objective descriptors and subjective evaluation of physical, mental, emotional and social wellbeing together with extent of personal development and purposeful activity, all of them weighted by set of values” [58]. In the literature, health and QOL are definitely distinct concepts therefor health is just one dimension of QOL, while QOL is a multi –dimensional term [59]. On the hand, Health related quality of life (HRQOL) is a subset referring to health domain of life and it can be defined as “individual's perception about physical ,social and mental aspect of health and how

health impacts on individual ability to function in life “ which can be measured objectively or subjectively [60]. However, HRQOL is considered a reflection of impacts of disease or treatment on daily activity and disability [7]. HRQOL is widely used when relating to a particular influence of an illness, health care policy or medical treatment on individual's QOL.

2.2.2 Quality of Life measurement

Quality of life is not a biological entity. As it is a complex concept many different instruments were used to assess QOL most of them were developed based on empirical considerations not on conceptual models [61]. In the literature, subjective individuals experience expressed through an essential set of dimensions (physical, social and psychological functioning) under each broad dimensions a group of sub-dimensions well be found [62]. HRQOL instruments can be classified into three categories according to the type of report, scores and population [63]. However, reported information can be obtained from participants themselves or by others (self –reported Vs. proxy report); scores may be (single indicator, profile or battery approach) and according to the population they classified into (generic or condition specific). In general, HRQOL measuring instruments are divided into generic or condition-specific questionnaires. Condition-specific instruments are focused on study quality of life among a certain population with regard to specific diseases or symptoms. This type of questionnaires also allows evaluating certain treatment effects, while, generic questionnaires, in contrast,

measure QOL across a health condition. Both types have weaknesses and strengths and sometimes it is more appreciated to use both to get clearer information. Compared to general or generic instruments, condition-specific instruments may give sufficient details with appreciated validation. On another hand, generic instruments allow comparison among different groups or studies. Several criteria should be met in any HRQOL instruments so it must be valid, appropriate, responsive, reliable, simple and reasonably short to be completed [64]. The choices of instrument depend on the aim of a study and the study population .

The most commonly used generic instruments for adults are :36- short-form health survey (36-SF), EuroQOL-5 dimension (EQ-5), WHOQOL-BREF, 12-SHoRt form (12-SF), Cantrill's ladder and satisfaction with life scale (SWLS). While the most commonly used disease-specific instruments are: EORTC QLQ C-30, gastrointestinal index QOL (GIQLI), Asthma quality of life questionnaire(AQLQ), Stork specific QOL scale[6,63]. In fact, most HRQOL questionnaires have been classified as measures of self-perceived health, describe health by using wellbeing and functioning, and do little about QOL as QOL is a more wider term.

2.2.2.1. 36-items short-form health survey (36-SF)

36-SF is one of the most common generic self-administrated questionnaire, it contains 36 items covering eight health dimensions. These 8 items reflect physical and mental health quality of life. Briefly, these are *physical functioning* (grade in which any health problem could affect the daily

physical activities like self-care activity, walking and lifting weight, *role limitation* due to physical health problems that can interfere with work activity, *bodily pain* (intensity and tolerance of pain and how it affects work), *vitality* (energy feeling Vs. fatigue and exhausting), *social functioning* (how health can interfere with habitual social life), *general health* (subjective perception or belief about current health and future perspectives about health), *role limitation* due to emotional health problems and mental health (general mental health covering depression, anxiety emotional and general positive effects) [65]. Scores of each dimension are coded, summed and converted into scale from 0-100 where higher score defining more favorable health status [66]. SF-36 version II is based on the original and widely used 36-SF however it has more improvement in words, layout of questions and response options. These changes improve the precision, reduce floor –ceiling effect (change response from dichotomous scales to five points response categories that substantially produce a smaller standard deviation) and make the new version's dimensions more reliable than original one [67]. On another hand, recently RAND-36 is the most widely used HRQOL instrument. This generic profile measure is equivalent to 36-SF and measure functioning and well-being [68]. It is composed of 36 items to assess eight health concepts: *Physical functioning* (10 items), *Role limitation due to physical function* (4 items), *Emotional wellbeing* (5 items), *Role limitation due to emotional health* (3 items), *Social functioning* (2 items), *Pain* (2 items), *Energy/Fatigue* (4 items) and *General Health* (5 items with additional item

about perceived health changes during the last 12 months) and two other scales which derived from the eight scales score (mental and physical health) [69].

2.3 Quality of Life and Obesity

Obesity as a primary health issue impairs individual's quality of life physiologically, economically and psychologically due to its associated complications and further social and economic impacts. Moreover, many studies have shown that higher body mass index is related to reduced (HRQOL), especially physical and mental aspects of HRQOL [2, 11]. However, the reduction in QOL has been established even in absence of chronic diseases [70]. On other hand, gender may play a significant difference in the deteriorating effect of obesity on quality of life with obese women have more adversely effect on QOL than obese men [71, 72, 73]. Moreover, that the negative effect of excess weight on dimensions of HRQL had a great difference among age groups where obese elderly have reported the most negative effect in the dimensions of mobility and pain/discomfort HRQL [74]. Not only obese adults had declined QOL but also, obese children have reported a poorer QOL compared to other healthy or chronically ill children [75, 76, 77]. A study with a meta-analysis has reported significant reductions in overall , psychological and physical HRQL among obese children and adolescents [78]. In a cross sectional study, the degree of obesity has negatively affected the scores of QOL in children and adolescents who reported increased sleep difficulties and depression [79]. In addition, the interaction between gender , social class,

educational level and BMI also has a great impacts on reduction of HRQOL [80].

Obesity and its complications have great deterioration effects on quality of life. The clinical impacts of obesity resulted in mental and emotional problems that impaired the social life of obese patients and resulted in lowering self-esteem. Moreover obesity has great negative impacts in functionality and mobility and will interfere with most of the physical activities [8]. All of these can explain the link between obesity and poor QOL. Some clinical trials showing the impacts of obesity and excess weight on QOL, are shown in Table (3).

Table 2.3: Summary of clinical trials showing impact of obesity on QOL

Authors	Study design	Assessment tool	Subjects	Country	Main finding	Ref.
Serango-Aguilar et al.(2009)		EuroQOL-5D questionnaire	4110 people aged >16 years old	Spain	Obese participants showed lower scores compared with normal weight participants in EQ-5D index (.65 Vs.87) obesity have a negative impacts on HRQOL even in absence of chronic diseases	81
Oliva-Moreno et al.(2013)	Drawn data from survey	EQ-5D	9226 observations from ESCA (health survey)	Spain	Excess weight had negative effect on HRQOL Dimensions of mobility and pain were the strongest negatively affected	74
Yang et al.(2016)	Cross-sectional	EQ-5D	6217 men and 8243 women classified according to BMI and metabolic abnormalities into 4 categories aged >30	Korea	Metabolic abnormal but normal weight men have the worst condition in all domains where in women metabolic abnormal obese women have the worst scores Obesity is strongly associated with impairment in HRQL in women	71
Busutil et al.(2017)	Longitudinal population – based survey	EuroQol-5D-5L(EQ-5D-5L)and VAS(visual analogue scale	18682 adults	Spain	Self –prevised problems in EQ-5 dimension were increased along the BMI specially pain /discomfort dimension and mobility	70

Authors	Study design	Assessment tool	Subjects	Country	Main finding	Ref.
					No association between obesity and mental health Obesity reduce HRQOL significantly in women and elderly over 64 years old	
Baile et al.(2020)	Descriptive – cross sectional study	Kids screen instrument ,health behavior school age children questionnaire and Cantril scale to evaluate life satisfaction	1197 school age children with mean age 14 years old , 50% girls	Spain	Boys have higher HRQOL than girls Obese boys showed a significant lower scores in HRQOL and life satisfaction than normal weight group	82
Zhang et al.(2019)	Cross sectional study	EQ-5D and VAS	27257 adults >18 years old	China	Men had higher(EQ-5D)utility value than women In women obesity is associated with negatively and significantly HRQOL according to BMI is differ by gender	73
You et al.(2018)	Cross sectional study	EQ-5d and VAS	10257 elderly >60 years old classified according to BMI	China	Underweight elderly and overweight women were more likely suffer of lower HRQOL	83

Abbreviations: BMI: body mass index, ESCA: health survey of Catalonia, EQ-5D: European quality of life 5-dimension, HRQOL: health related quality of life, 5L: 5-level, VAS: visual analogue scale

2.4 Effect of weight loss and various weight loss interventions on Quality of life

Health recommendations that recognize the obesity as chronic disease emphasize on weight management to decrease its complications and improve QOL. Recently, a huge advance has been established in the main three modalities to manage obesity :life style intervention, pharmacotherapy and weight loss operations including bariatric surgery [34]. Reduction in weight, particularly more than 5% of body weight, is related to decreased risk of incidence of obesity-comorbidities and have been established to improve health of obese patients, however, this finding is not significantly clear according to quality of life of obese. According to a study with meta-analysis, bariatric and non-bariatric weight loss is associated with improvement in HRQOL ,moreover, losses of more than 5 % weight is associated with improvement of some scales of HRQOL significantly in physical domain and physical functioning. The means difference of 2.83, 6.81 points were reported in physical component and physical functioning, respectively [11,12]. In contrast, a cohort prospective study showed that to achieve minimal clinical importance difference in HRQOL of severely obese patients the weight reduction of at least 20% was needed [84].

There was a consistency in the literature that higher BMI was associated with lower QOL, however, evidence that weight loss due to lifestyle modification was associated with improvements in HRQOL was not consistently demonstrated in some clinical trials may due to variation of

intervention methods or poor reporting. However, many studies reported an association between weight or BMI changes and improvement in HRQOL [11,12,13] especially after bariatric surgery weight loss intervention [85,90]. However, all of these studies showing significant improvements in HRQOL after bariatric and the greatest improvement were in physical –wellbeing rather than mental aspect of QOL furthermore, results of long term psychological QOL of patients following bariatric did not improve despite of major improvement in weight and physical aspect of QOL [86]. Moreover, in a retrospective analysis of 2137 patients after gastric bypass showed that a higher% of total weight loss is positively related to HRQOL scores after 15 and 24 months follow up compared to preoperative scores however, total scores and subscales of 36-RAND and (IWQOL) is significantly improved at the two points of follow up, in addition, physical health scores(PHS) of 36-RAND was negatively related to BMI at baseline and after 15,24 months where mental health scores (MHS) of RAND is negatively associated with higher BMI after 24 months so in general, higher BMI was associated with lower scores of both subtotal 36-RAND and (IWQOL) before and after surgery [90]. The reason may explain this clear improvement in surgical intervention but not in all other non-surgical intervention is the average weight loss in surgical intervention is larger than the weight loss in other types of non- surgical intervention.

Most trials have shown improvement in physical but not mental or social HRQOL following weight loss resulted from life style intervention. In general, greater weight loss was associated with improved HRQOL

following long term weight loss intervention typically 6-9 months with a mean average of weight loss of about 5-10% of initial body weight. Some findings were lack for evidence that improvement in QOL was due to weight loss or not [87, 88]. Moreover, results from two cohorts US women have shown losses of about 15 lbs (~ 7.5 kg) or more were associated with 0.89 point improvement in physical component scores [89]. On another hand, results from clinical studies were variable according to the type of life intervention (dietary, behavioral or physical activity). In a clinical study using very low calorie ketogenic diet (consists of energy reduction of less than 800Kcal/day at the beginning of the study) the intervention for 4 months among 20 obese aged from 18-58 years has resulted in a decrease of 7 units in BMI with mean of 18kg fat mass lost at the end of the intervention, such a decrease was associated with significant improvement in all domains except the social and anxiety domains of (IWQOL-lite) questionnaire, while the greatest improvements were in physical functioning and self-esteem during ketosis phase, moreover, all participants reported lower baseline scores in domains of (IWQOL) compared to other points of the intervention [91]. Similarly, after a 6-month calorie reduction in two protein levels, 67 obese elderly subjects with frailty have shown a significant improvement in physical functioning composite after 3 and 6 months follow up and the mental health improved significantly after 3 months only. In this clinical trial the participants assigned randomly to either high protein or control protein level with energy deficit of 500 Kcal/day for both groups with a goal of 10% weight

loss, participants showed significant weight loss (mean of 8.4 kg) at the end of 6 months, component domains of physical QOL that showed significant improvement were physical functioning, role limitation and pain where vitality and social functioning significantly improved after 3 months only [92]. Same trends were found with 137 obese adults who enrolled a 14-weeks of intensive lifestyle intervention with low calorie diet programs (90 mins group lifestyle modification session weekly and 1000-1200 kcal/day diet) who had lost more than 5% of initial weight then randomly assigned to lorcaserin (which is approved for chronic weight management) or placebo for additional 52 weeks for weight loss maintenance. Participants have shown improvement in all outcomes (weight specific HRQOL and related psychological outcomes) except weight-related public distress. Moreover, significant improvement was achieved in weight related QOL even a moderate weight loss has been reported, however, the greater improvements in physical, sexual and self-esteem and total score of (IWQOL) were in participants who lost 10% of their initial weight compared with those lost <5%. In addition, improvements in (IWQOL) was sustained during 52 weeks of weight loss maintenance [94]. Not only dietary modification was associated with improvements but also behavioral counseling accompanied with life style modification has improved HRQOL in physical, pain interference, social satisfaction role, depression and fatigue domains of PROMIS-29 items, (patients report outcome measure information system), in rural women with obesity ages >40 years, in addition, women with more than 10% weight loss reported

lower depression, less pain and higher physical functioning than those lost less than 5% or gained weight [14]. Moreover, intensive behavioral intervention alone or in combination with pharmacotherapy, like Liraglutide an FDA approved drug to manage weight, to enhance weight loss was reported to improve QOL greater if greater weight loss has occurred independently to the type of treatment, in this clinical trial 150 obese participants were randomized into three intervention groups: 50 obese had intensive behavioral therapy alone(21 sessions), 50 had combination of intensive behavioral therapy plus 3mg/day Liraglutide and 50 obese had intensive behavioral therapy plus Liraglutide accompanied with 12 weeks portion control diet), participants in these 3 groups of intervention lost 6.1%, 11.5%, 11.8% of their weight respectively [93]. On another hand, addition of aerobic or resistance training to caloric restricted diet have shown significant improvement in HRQOL mainly in physical functioning and social outcomes in older adults with obesity, this finding has shown a superior effect of caloric resection accompanied with physical activity over caloric restriction alone for both weight loss and improvement of QOL [95]. In this clinical trial the comparison of effect of dietary weight loss alone or in combination with aerobic/resistance training on HRQOL has demonstrated when 249 overweight and obese older adults were assigned randomly into three intervention groups for 18 weeks of intensive treatment and follow up, in addition, all participants engaged a weekly behavioral weight loss sessions with a goal of 7-10% weight reduction. However, with regard to the exercise component participants in

those dietary weight intervention plus aerobic exercise or on dietary weight intervention plus resistance training had a 4 sessions of exercise of 45 mins per a week. The results show a statistically higher scores on the SF-12 and better satisfaction with physical function in participants of the both exercise combined groups than those in dietary weight intervention alone [95].

Table 4 Summary of some clinical trials showing association between weight loss intervention and quality of life among obese and overweight subjects.

Table 2.4: association between weight loss and QOL via various intervention methods in clinical studies

Author	Study design	Assessment tools	Intervention method	Subjects	Main finding	Ref.
Monpellier et al.(2017)	Retrospective analysis	36-RAND and impact of weight on quality of life (IWQOL- lite)	Gastric bypass	2137 patients	Scores of RAND-36 and (IWQOL) is significantly improved after 15 and 24 months ,patients with higher weight loss had a higher improvement in QOL scores	90
Castro et al.(2018)	Nutrition intervention study	(IWQOL-lite)	Very low caloric ketogenic diet intervention for 4 months	20 obese (12 females +8 males)	7unit decrease in BMI at end of intervention , lower (IWQOL-Lite) scores at baseline compared to other point of intervention all domains are significantly improved except social anxiety domains, significant improvement were in physical functioning and self-esteem during ketosis phase	91
Payne et al.(2018)	Combined – group analysis of secondary variables from RCT	36-SF Satisfaction with life scale (SWLS)	Six months of reduced calorie diet at two protein levels	67 obese elderly >60	Significant improvements in physical functioning composite QOL after 3,6 months of intervention and bidirectional association between weight loss and mental health	92

Author	Study design	Assessment tools	Intervention method	Subjects	Main finding	Ref.
Chao et al.(2019)	RCT	SF-36 and weight –related QOL assessed by (IWQOL)	3 different groups of intervention : intensive behavioral therapy for obesity alone ,intensive behavioral therapy plus 3mg/day liraglutide and Liraglutide with IBT and 12 weeks portion controlled diet	150 obese ,50 participant in each intervention group	Weight loss were 6.1(IBT),11.5(IBT plus liraglutide) and11.8 in the third category . independent of treatment group with greater weight loss is associated with greater improvement in QOL	93
Pearl et al. (2018)	RCT	IWQOL-lite , PHQ-9	60weeks :14 weeks intensive life style intervention with low calorie diet program then additional 52 weeks for weight maintenance in Lorcaserin or placebo randomly	137 adults with obesity	After 14 weeks significant improvement in all outcomes(weight specific HRQOL and related psychological outcomes) except weight related –public distress scale of (IWQOL), improvement in physical functioning ,self-esteem and sexual life were greater in participants lose 10% of initial weight than those lost 5% , improvement in weight related QOL achieved with moderate weight loss and sustained during weight maintenance	94
Hageman	Randomized	PROMIS-29	Life style modification	216 ruler women	Change in weight is associated	14

Author	Study design	Assessment tools	Intervention method	Subjects	Main finding	Ref.
et al.(2019)	interventional clinical trial	items (patients report outcome measure information system)	for initial weight loss(6 months) then other six months guided weight loss by using Web-based life style intervention	ages >40 years old	with improvements in HRQOL domains :in physical domain ,pain interference, depression ,fatigue and satisfaction in social role , women with more than 10% weight loss had a higher improvement than women who gain or lost 5% of their weight	
Fanning et al.(2018)	RCT	SF-12 P, satisfaction with physical functioning	Three intervention groups for 18 months : dietary intervention alone to weight loss, dietary +aerobic exercise training for 4daysper week and dietary +resistant training 4days /week	249 obese and overweight older adults with metabolic syndrome or cardiovascular disease	Addition of aerobic or resistance training to caloric restriction resulted in greater weight loss and significant improvement in physical functioning HRQOL and satisfaction with physical functioning ,participants with aerobic or resistance training reported better QOL than those with caloric restricted diet alone	95

Abbreviations: IWQOL-impact of weight on quality of life ,IBT: intensive behavioral treatment ,SWLS: satisfaction with life scale, QOL: quality of life, HRQOL: health related quality of life, BMI: body mass index, PROMIS-29:patient –reported outcomes measurement information system-29items, PHQ-9:patient health questionnaire .

Chapter III

Methodology

3.1 Study Design

3.1.1 General Design

The current study has followed a quasi-experimental study design and was conducted to determine the impacts of weight loss on quality of life by using a validated and reliable questionnaire. The study was conducted among adult participants who attending Nutri Health, a specialized dietetic center located in the West Bank. The participants enrolled in weight management programs. Participants were eligible to enroll in the study if their ages were over 18 year-old and if their BMI was $>25 \text{ kg/m}^2$, as verified by an objective measurement taken by trained dieticians in registered centers. The study was conducted between 1st of May 2019 and 30th of November 2020. All eligible participants who visited Nutri Health centers during the period of the study were invited to take part. The study included all participants who met the eligible criteria, completed assessment and had complete data required for analysis at baseline and after 3-month follow up. Trained data collection dieticians assisted participants in completing the quality of life questionnaire properly, and conducted all assessments of nutritional status at baseline and after 3 months. Respondents were informed that the participation is voluntary and the information would be treated confidentially.

Quality of life Questionnaires were administrated to the participants at baseline and at the end of 3 months follow-up assessment.

3.1.2 Study sitting

This study was conducted in the West Bank Nutri Health centers (special dietetic outpatient clinics) of Ramallah, Jenin, Tulkarm, Nablus and Hebron, to cover the 3 geographical areas; the north, the center and the south.

3.2 Data collection

Data were collected when participants have attended Nutri –Health centers for dietary weight management at the their first visit during the period of study. A well-trained registered nutritionist has filled the questionnaires and conducted the body measurements at baseline and after 3 months of weight loss programs. The questionnaire consisted of 3 parts: the first part was about socio-demographic data and includes questions about age, gender, marital status, education, living place, occupation and average monthly income. The second part was about nutritional status of participants including health status, anthropometric measurement and body composition. The third part was to assess participants QOL by using the short form 36 (SF-36) health survey. 36-SF HRQOL translated and valid version to Arabic was used (Appendix 1) [96] . This instrument is easy to administer, not time consuming. available in many different languages and valid and reliable on different population Although other tools may be more sensitive but the validity is still a main concern. All eligible

participants were given a booklet containing all data and assessments required for the study. participants interviewed to collect socio-demographic data by using the first part of the questionnaires.

Having completed socio-demographic information, the participants were made ready to complete the second section regarding the anthropometric and nutritional assessment. Anthropometric and body composition measurements were taken by well-trained nutritionists in the registered centers. Participants then were asked to complete QOL assessment.

3.3 Ethical considerations

The study protocol was approved by Internal Review Board for Research Ethics at An-Najah National University on 31th March 2019. In addition the eligible participants were asked to sign a consent form before the onset of the study .

3.4. Subjects Selection

Participants were selected from Palestinian adults who attending Nutri Health centers at the period of study to participate in weight management programs and to receive dietary weight reduction plans. Participants must be adults with BMI > 25kg/m².

3.5 Sample size calculation

The sample size was calculated using the following formula (Chan 2003):

$$n= 2+ (C/\delta^2)$$

$$\delta= \mu_2-\mu_1/ \sigma$$

$\mu_1 - \mu_2$ = mean difference between the baseline and the follow up variables

σ = the standard deviation of mean after the follow up=

C is a constant = 10.5 (90% power, $\alpha = 0.05$)

The means and standard deviations were taken from a similar study conducted by Imayama et al. (2011) [15] which has determined the improvement of Quality of life of adults after weight management program using WHO HRQOL. The changes in the QOL mean score before and after the intervention was 2.7, and the standard deviation was 17.2. Ninety% power and 0.05 level of confidence were assumed to calculate the sample size.

Therefore:

$$n = 2 + 10 / (2.7 / 17.2)^2$$

$$n = 2 + 437, n = 439 \text{ participants}$$

3.6 Subjects Characteristics

3.6.1 Study population

All eligible participants who attending the centers at the period of data collection accepted the participation invitation and completed the required assessment at baseline and after three months of joining weight reduction programs.

3.6.2 Exclusion criteria

Participants were excluded if they:

- i. Had a positive history of any medical or psychiatric disorders
- ii. Refuse to participate at baseline or after 3 months follow-up.

- iii. Pregnant women
- iv. Had undergone bariatric surgery <2 years ago
- v. Didn't have weight loss or even had weight gain instead after three months of follow-up.

3.6.3 Inclusion criteria

The inclusion criteria including adult participants > 18 years old with BMI > 25kg/m² and completed baseline and three months follow up required assessment and data for analysis.

3.7. Nutritional status assessment

The nutritional status assessment was carried out using anthropometric measurement and body composition. At baseline and after 3 months.

3.7.1. Anthropometric measurement

Weight and height measurements were recorded at baseline and after three months. The measurement was done according to the standard anthropometric techniques. Prior to the measurement, all equipment was calibrated. The anthropometric measurements were performed wearing light clothing without shoes. The measurements were repeated twice to obtain an average reading. Body weight was measured to nearest 0.1 kg by using electronic scale while, height was determined to the nearest 0.5 cm at the head level by using a tape measure fixed to the wall. The participant was in light clothing without shoes and in a standing position looking straight ahead. The shoulder and buttocks were against the wall with joined feet while arms were hanging on both sides. Each subject was asked to take off all belongings/jewelries and accessories (wallet, watch, shoes,

mobile phones, keys, belt, bracelet, changes, etc.) that might contribute to weight. Body mass index was calculated as body weight in kilogram divided by height squared in meter (kg/m^2). BMI was classified according to WHO classification: less than 18.5=underweight, 18.5-24.99=normal weight, 25-29.99=overweight, 30-34.99=obese class I, 35-39.99 =obese class II and ≥ 40 as obese class III [2].

3.7.2 Body composition

The body composition was done by using bioelectronics impedance (BIA), Korean brand model of Mediagate BOCA X1® as in Figure (2). The subjects were asked to take off their shoes and socks and belongings as mentioned above. The subjects were asked to stand up as shown in the figure (2) in posture position and were asked to stand with both bare feet parallel on the electrodes upright with full face while other two electrodes were fixed to hands. Fat mass, fat percentage, fat-free mass, soft lean mass, skeletal lean mass, and basal metabolic rate were recorded. Anthropometric and body composition were repeated twice and then averaged.



Figure 3.1: BIA model of Mediagate BOCA X1® [photo from mediagate.koreasme.com]

3.8 Quality of Life assessment

The Arabic version of self-administered 36-SF health questionnaire was used to assess participants HRQOL [96]. The 36-SF HRQOL is considered a superior and relatively simple instrument to assess QOL and can be used to a general or specific population. The validity and reliability of this questionnaire were established in the past [96,97,98]. It is composed of 36 items that assess the following eight HRQOL domains or scales. Physical functioning, General health, Role limitation due to physical health, Energy/Fatigue, Body pain, Emotional wellbeing, Role limitation due to emotional problems and Social functioning. Response to each question within the domain were added up to achieve scores ranging from 0-100, where 0 indicates the worst health status and 100 indicates the best health status. A global health transition question was asked to rate the participant's general health compared to one year ago [66, 67]. Scoring of 36-SF included two steps the first step was recoding the numeric value of each item in a new score ranging from 0-100, in the second step the items in the same scale were averaged to get the score corresponding to each domain [99].

3.9 Weight management programs

All participants were subjected to three-month intensive weight-reducing programs. The dietary plans and physical activity instructions were tailored according to the participants preference and obesity degree. All participants were in good physical health to perform a regular physical activity of 45minutes a day for 4 days a week. They have received a dietary

plan of 4 meals per day: breakfast, lunch, snack, and dinner. The caloric restriction diet contained 800-1500 Kcal /day and 1000-1800 Kcal/day for females and males, respectively. Total energy requirement was calculated by using the Harris-Benedict equation for each participant. Participant was subjected to iso-caloric dietary plans throughout three months.

Harris –Benedict equation for estimation of BEE (kcal/ day) the following equation was used as following [100]:

$$\text{BEE}(\text{male}) = 66.47 + (13.75 \times \text{weight}) + (5.003 \times \text{height}) - (6.775 \times \text{age})$$

$$\text{BEE}(\text{female}) = 655.09 + (9.563 \times \text{weight}) + (1.85 \times \text{height}) - (4.676 \times \text{age})$$

Weight in kg, Height in cm and Age in years .

3.10 Statistical analysis

Statistical package for social science (SPSS) for windows version 20 for statistical analysis was used. All statistical values were considered significant at P value <0.05. The data were cleaned, before the analysis, from missing data of primary outcomes like weight, height and quality of life data at baseline and after 3-month follow up. Participants who had missed data of primary outcomes were excluded from the final analysis. Variables of quality of life domains at baseline and after three months were calculated, then the descriptive statistics such as mean and standard deviation was calculated. By using means, standard deviations analysis, one-way ANOVA and independent sample T-test, the socio-demographic variables were compared with different SF-36 domains at baseline and after 3 months. Changes of each domain score were calculated by the mean difference between scores of domains after 3 months and scores at baseline.

Furthermore, paired sample t-test was used to test the significance of changes in various QOL parameters (as individual domain scores and total QOL score) from baseline to the end of 3-month follow up. Mean change scores of weight and QOL scores were calculated from baseline to 3-month follow up. Moreover, analysis of changes in QOL after 3 months related to changes in weight was conducted by independent sample T-test after categorizing the participants according to their percentage of weight loss into two main groups (participants lost less than 10% of their initial weight and participants $\geq 10\%$ of their initial weight).

Chapter IV

Results

4.1Participants Recruitment

Participants were recruited from adults attending Nutri Health (a specialized dietetic center located in the West Bank) to participate in weight management programs. Six hundred and ten subjects were invited to participate in the study while 516 subjects completed the assessment. Thirty two subjects were excluded from the final analysis due to missing data in the primary outcome (QOL data and weight changes) and 18 participants also were excluded due to they didn't have weight loss or had weight gain instead after three months . Thus the data of a total of 466 participants were included in the final analysis. The flowchart of participant recruitment is shown in Figure (3).

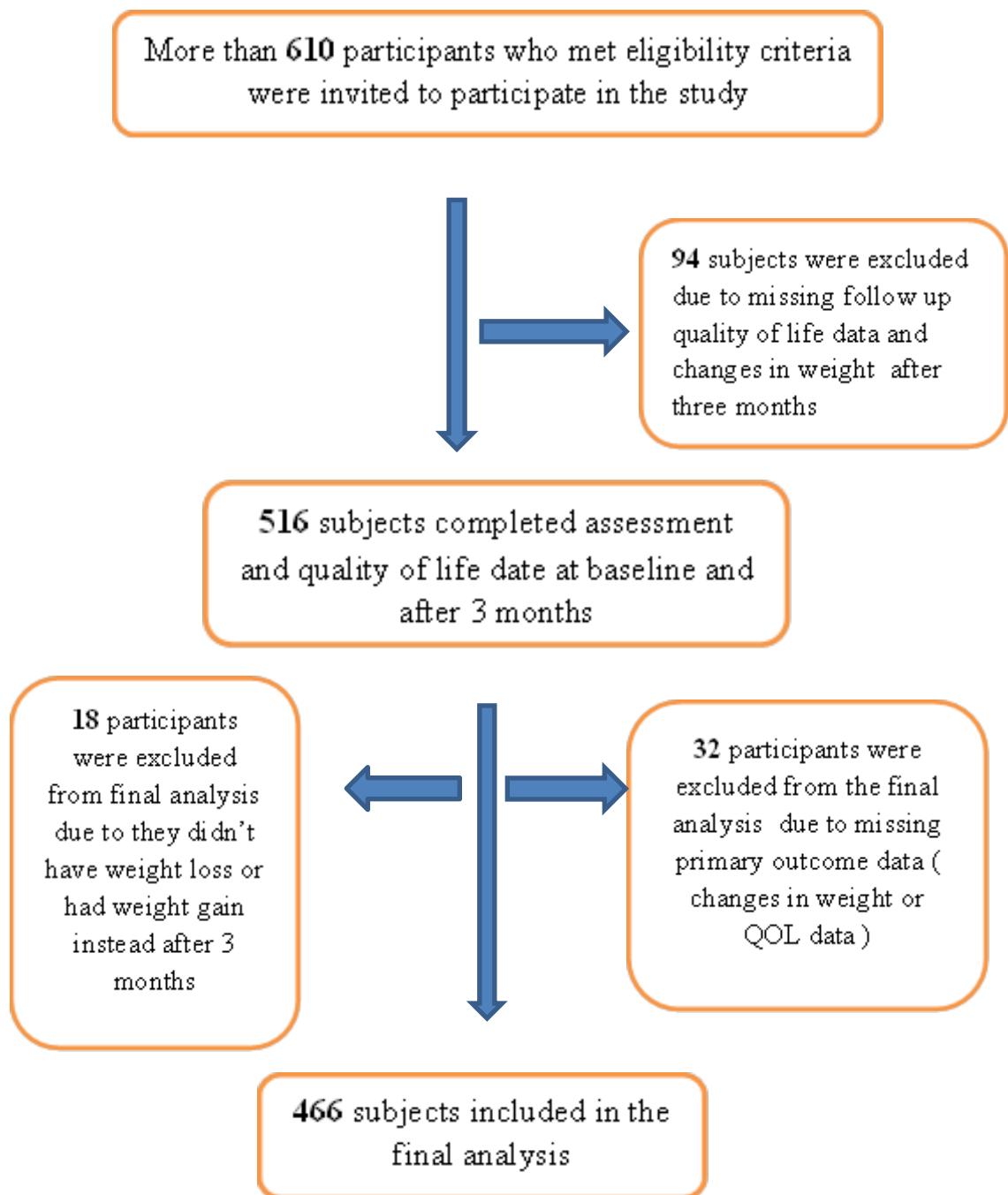


Figure 4.1: Recruitment process and exclusion of participants for final data analysis.

4.1.2 Participants Characteristics

4.1.2.1 Socio-demographic characteristics

A total of 466 participants were involved in the study. The mean age was 33 ± 10 years, ranged from 18-68 years old. The distribution of participants in different age categories is shown in Figure (4). As shown in Table (5) the majority of participants were females (82.6%), married (63.5%), with bachelor degree (57.5%), unemployed (59%) and living in the city (55.6%). Above quarter of the participants had a monthly average income between 1500-3000 ILS (Israeli shekel).

Table 4.1: Socio-demographic characteristics of participants, presented as number and %.

	Parameter	N	%
Gender	Male	81	17.4
	Female	385	82.6
Material status	Single	157	33.7
	Married	296	63.5
	Other	13	2.8
Current employment status	Employed	191	41
	Unemployed	275	59
Education level	Primary school (less than 10 years)	27	5.8
	Secondary school	156	33.5
	Bachelor or equivalent	268	57.5
	Higher education (Master or doctoral)	15	3.2
Area of living	Town	186	39.9

	Parameter	N	%
	City	259	55.6
	Camps	21	4.5
Monthly average income	Less than 1500	101	21.7
	1500-3000	130	27.9
	3000-5000	80	17.2
	>5000	39	8.4
	No data	116	24.9

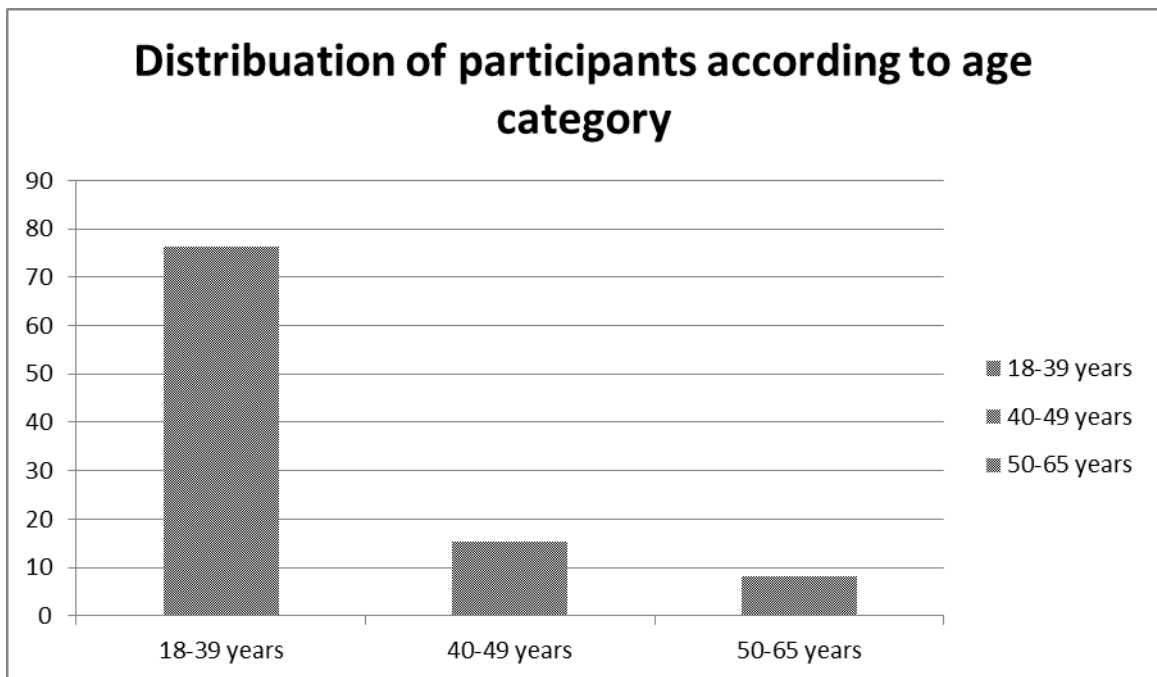


Figure 4.2: Distribution of participants according to their age categories.

4.1.2.2 Nutritional status

At baseline, the sample had a mean \pm (SD) weight of 93.9 \pm 17.2 kg, and BMI of 35.4 \pm 5.7kg/m². BMI was ranged from 25.02 to 58.87kg/m². As Figure (5) shows about 76 participants (16.3%) were overweight and the rest were obese.

Mean fat mass was 39.5 ± 12.4 kg for men and 37.9 ± 9.7 for women taken for a subgroup of 246 participants.

4.1.2.3 Quality of life at baseline

In general, participants reported a mean \pm SD score of total QOL of (66 ± 18), however, the maximum score achieved in *Role limitation due to physical health* domain with a score of (81 ± 32) while *vitality* domain reported the lowest score with a mean of (51 ± 19).

4.1.2.3.1 QOL according to gender at baseline

The total score of quality of life and scores of different eight domains of the 36-SF Health Survey at baseline according to gender are shown in Table (6). In general, males had a higher scores in all concepts of QOL than females. Moreover, there was a significant difference between male and female in overall quality of life score, and other three health concepts scales (*Emotional well-being*, *Pain* and *Role limitation due to emotional problems*) $P < 0.05$. In addition, males had a mean score of (70 ± 17) in total QOL score where the highest score was reported in *Role limitation due to physical health* problems with a mean \pm (SD) of (83 ± 27) and the lowest score was in *Vitality(Energy/Fatigue)* with a mean \pm SD of (55 ± 21). On other hand, compared to males, females had a mean score of total QOL of (65 ± 18) with a highest and lowest scores of a mean of (80 ± 33) and (51 ± 18) in *Role limitation due to physical health* and *Vitality* concepts respectively.

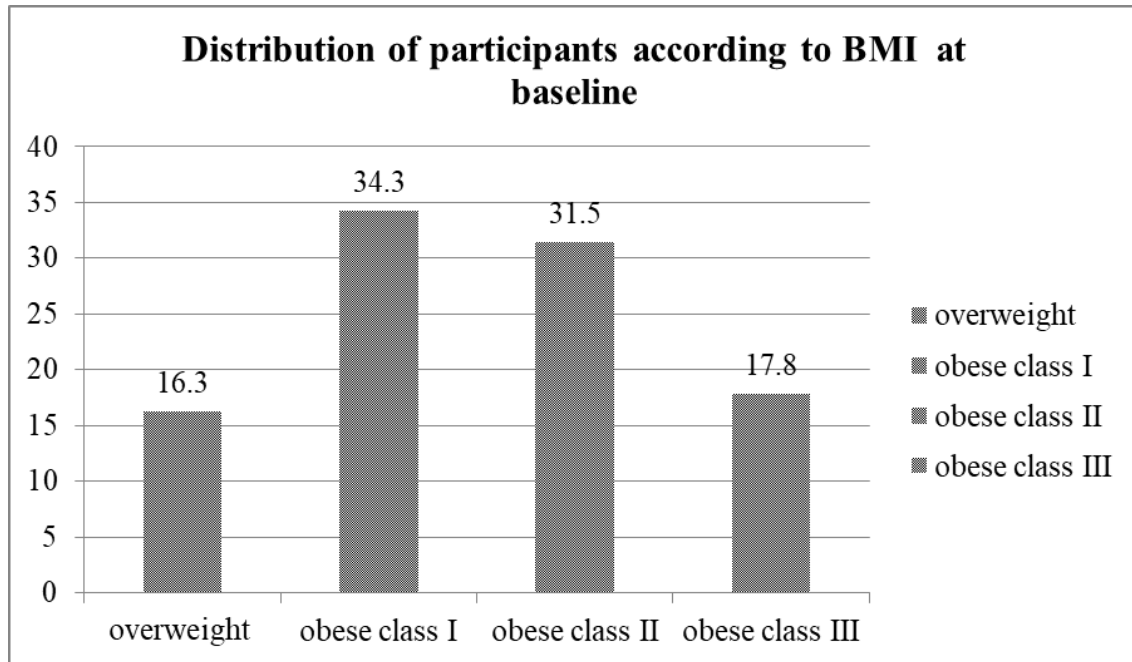


Figure 4.3: Classification of participants according to BMI categories at baseline

Table 4.2: Quality of Life of participants according to gender at baseline

QOL	Total 466	Male 81	Female 385	P-value
Physical functioning	71±28	71±27	71±28	.93
Role limitation due to physical health	81±32	83±27	80±33	.44
Role limitation due to emotional problems	65±44	75±41	62±44	.015*
Energy/fatigue	51±19	55±21	51±18	.063
Emotional well –being	56±20	63±23	55±19	.001**
Social functioning	70±23	73±23	69±23	.146
Pain	65±26	71±24	64±26	.022*
General health	65±21	68±21	64±20	.123
Total QOL	66±18	70±17	65±18	.013*

Significant at p value <0.05, *:p<.05, **:p<.01 by using the independent samples T-test.

4.1.2.3.2 QOL according to age at baseline

As shown in Table (7), there was a significant difference between participants with different age categories in means of scores of total QOL, *Physical functioning*, *Role limitation due to physical health*, *Pain* and *General health* ($P < 0.05$). In general, the highest scores in these *Physical functioning*, *Role limitation due to physical health*, *Pain* and *General health* domains were for participants who were less than 40 years old, while the lowest scores were for older participants with age of >50 years. Moreover. The highest score domain was reported to participants with age less than 40 years old in the concept of *Role limitation due to physical health* with a mean \pm SD of (83 ± 30) , while the lowest score was reported to participants with the age of more than 50 years old in *Vitality (Energy/Fatigue)* with mean \pm SD of (46 ± 21) .

Table 4.3: QOL of participants at baseline according to their age categories

QOL	18-39 years	40-50 years	50-51 years	P- value
Physical functioning	75 \pm 26	58 \pm 28	57 \pm 25	.000**
Role limitation due to physical health	83 \pm 30	75 \pm 35	76 \pm 37	.014*
Role limitation due to emotional problems	65 \pm 43	61 \pm 44	70 \pm 46	.624
Energy/fatigue	53 \pm 19	49 \pm 15	46 \pm 21	.054
Emotional well –being	56 \pm 20	59 \pm 19	56 \pm 20	.793
Social functioning	70 \pm 27	70 \pm 21	68 \pm 23	.969
Pain	68 \pm 25	61 \pm 23	52 \pm 30	.001**

QOL	18-39 years	40-50 years	50-51 years	P- value
General health	67±20	60±21	55±20	.000**
Total QOL	67±18	61±17	60±18	.008**

Significant at $p < 0.05$, *: $p < .05$, **: $p < .01$ by using one way ANOVA

4.1.2.3.3 QOL according to socio-demographic factors at baseline

Tables (8,9) show the QOL of participants according to their socio-demographic status. As shown in Table (8) according to marital status single participants had significantly higher scores in overall QOL score and scores in *Physical functioning*, *Energy /Fatigue*, *Pain* and *General health* among other participants while the lowest scores were for widowed or separated participants. In general, single participants reported the highest scores in all domains with a mean (\pm SD) 69 ± 16 for total QOL compared to divorced, separated, or widowed participants who had score mean (\pm SD) 58 ± 20 for total QOL. According to living locations, cities had a significant highest score in the mean of total QOL score compared with camps or towns.

According to Table (9), employed participants had significantly higher scores than unemployed participants in total score of QOL and scores of three domains (*Role limitation due to physical health*, *Emotional well-being* and *General health*) ($P < 0.05$). With regard to employment status, participants who earned an average monthly income over 5000 ILS had a significant higher score in the *Emotional well-being* domain, compared to other participants who earned less. According to the educational level, participants who attained higher education had significantly higher scores in domains of *Physical functioning*, *Social*, *Pain* and *General health* with ($P < 0.05$).

Table 4.4: QOL and socio-demographic status of participants at baseline (1)

	Marital status				Living place			
QOL/socio-demographic factor	Single (157)	Married (296)	Others (13)	P-value	Town (186)	City (259)	Camps (21)	P-Value
Physical functioning	78±24	67±29	65±28	.000**	69±27	73±28	61±32	.124
Role limitation due to physical health	84±30	79±33	71±39	.180	76±36	84±29	85±27	.050*
Role limitation due to emotional problems	62±44	66±44	56±44	.497	62±44	66±43	71±43	.484
Energy/fatigue	55±18	50±18	40±19	.001**	49±18	53±19	51±18	.099
Emotional well –being	57±21	56±19	52±27	.752	55±20	58±20	50±21	.081
Social functioning	71±24	69±23	66±25	.709	68±23	71±23	67±26	.291
Pain	72±23	63±26	49±28	.000**	62±26	68±25	63±31	.096
General health	68±19	63±21	60±20	.029*	62±22	67±19	64±22	.095
Total QOL	69±16	64±18	58±20	.011*	63±19	67±17	64±18	.033*

Significant at $P < 0.05$, *: $p < .05$, **: $p < .01$ by using one -way ANOVA test.

Table 4.5: QOL and socio-demographic status at baseline(2)

	Employment status			Average monthly income				
QOL	Employed (191)	Unemployed (275)	P value	<1500 ILS (101)	1500_3000ILS (130)	3000-5000 (80)	>5000 (39)	P-value
Physical functioning	74±26	69±29	.098	69±29	75±26	67±28	75±27	.143
Role limitation due to physical health	85±27	78±35	.014* ¹	82±32	84±28	79±32	83±33	.717
Role limitation due to emotional problems	67±43	63±44	.408	62±45	63±43	70±44	68±46	.592
Energy/fatigue	53±18	50±19	.124	51±19	55±18	50±19	53±21	.327
Emotional well –being	59±21	54±19	.013* ¹	52±19	57±19	59±20	63±22	.021* ²
Total QOL	68±16	64±19	.014* ¹	65±16	67±16	65±19	69±19	.439
Social functioning	71±22	69±24	.195	68±23	72±22	69±26	74±20	.451
Pain	67±25	64±27	.141	67±25	66±25	62±27	71±25	.337
General health	67±20	63±21	.050* ¹	65±18	65±19	66±20	68±25	.870

Significant at P<0.05, *:p<05,¹:by using independent samples T-test,,²:by using one-way ANOVA.

4.1.2.3.4 QOL according to BMI at baseline

Table (10) shows the mean and SD of scores of QOL according to BMI at baseline. Participants with higher BMI significantly have reported lower scores in total QOL compared to other classes. Similarly, significant differences among different BMI classes were in *Physical functioning*, *Fatigue /Energy*, *Pain*, and *General health* with $P < 0.05$.

Table 4.6: QOL according to BMI at baseline

QOL domains	Overweight	Obese class I	Obese class II	Obese class III	P-value
N	76	160	147	83	
Physical functioning	80±26	75±27	67±29	63±27	.00**
Role limitation due to physical health	84±30	81±32	82±32	75±34	.331
Role limitation due to emotional problems	65±44	65±42	66±44	60±46	.73
Energy/fatigue	55±17	53±18	51±20	46±19	.017*
Emotional well –being	61±20	57±19	55±20	53±22	.127
Social functioning	68±26	68±23	72±23	69±21	.373
Pain	70±24	69±24	65±26	55±27	.000**
General health	69±18	65±21	64±20	60±21	.040*
Total QOL	69±18	67±17	65±18	60±19	.012*

Significant at $P < 0.05$, *: $p < .05$, **: $p < .01$ by using one- way ANOVA test

4.1.3 Effect of weight management intervention

4.1.3.1 Body Weight and BMI

After 3 months of weight management programs, the mean \pm (SD) of weight was 83.9 ± 15.7 kg and BMI was 31.6 ± 5.4 kg/m². BMI ranged from 20.7 ± 5.4 to 50.4 ± 5.4 kg/m². Figure (6) shows the distribution of participants on different BMI categories. Thirty-four participants (7%) were normal weight, 166 (35.6%) were overweight and the rest were obese. The mean fat mass 29.4 ± 11.7 and 32.1 ± 10.0 kg for men and women, respectively.

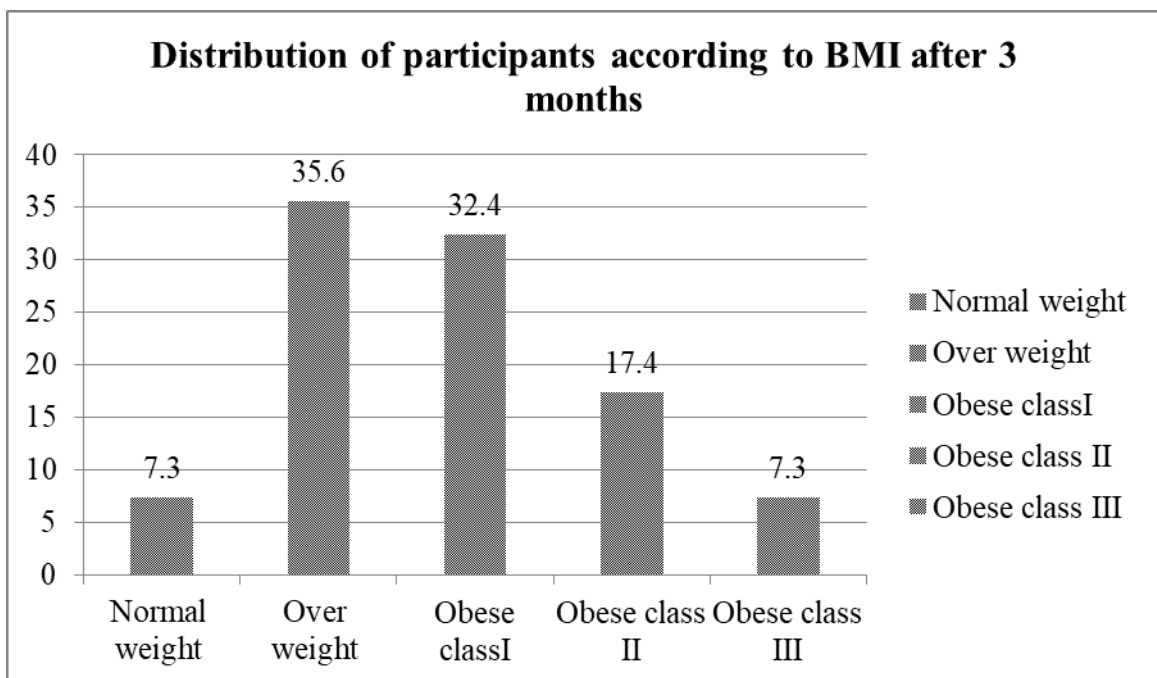


Figure 4.4: Distribution of participants according to BMI after 3 months weight management.

4.1.3.2 Quality of life

Table (11) shows the total score of QOL and the scores of eight domains after 3 months weight management intervention. The overall quality of life score increased to mean \pm SD of 77 ± 13 as a total for all participants; 84 ± 11 for males and 76 ± 13 for females. *Role limitation due to physical problems* concept achieved the highest score in quality of life for all participants regardless of their gender with a mean and SD of (93 ± 21). In contrast, *Vitality* which measures *Energy /Fatigue* level had the worst score for them with a mean \pm SD of (64 ± 18). Obviously, males had a higher scores in all QOL concepts than females also there was a significant difference between males and females in all of the quality of life concepts ($P<0.05$) except domains of *Role limitation due to physical health problems*.

Table 4.7: QOL for participants after three months

QOL	Total 466	Male 81	Female 385	P-value
Physical functioning	86 ± 22	92 ± 14	84 ± 24	.007**
Role limitation due to physical health	93 ± 21	95 ± 16	92 ± 21	.25
Role limitation due to emotional problems	80 ± 37	89 ± 28	78 ± 38	.015*
Energy/fatigue	64 ± 18	72 ± 17	62 ± 18	.0001**
Emotional well –being	64 ± 19	72 ± 19	62 ± 18	.0001**
Social functioning	78 ± 19	83 ± 16	77 ± 19	.006**
Pain	77 ± 16	84 ± 18	76 ± 20	.002**
General health	77 ± 16	82 ± 15	76 ± 17	.003**
Total QOL	77 ± 13	84 ± 11	76 ± 13	.0001**

Significant at $P<0.05$, *: $p<.05$, **: $p<.01$ by using independent samples T-test

4.1.4 Primary outcomes

4.1.4.1 Changes in weight

The mean of body weight declined significantly after three months compared to baseline weight. Participants reported a decline of mean \pm SD of weight from 93.9 ± 17.2 kg to 83.9 ± 15.7 kg over three months. Two hundred and twenty seven participants (48.7%) had a reduction $< 10\%$ of their weight while 229 subjects (51.3%) had a reduction $\geq 10\%$ of their weight after 3 months. Moreover, BMI declined as a mean and SD from 35.38 ± 5.7 to 31.6 ± 5.4 . Figure (7) shows changes in BMI categories after three months of joining the weight management programs.

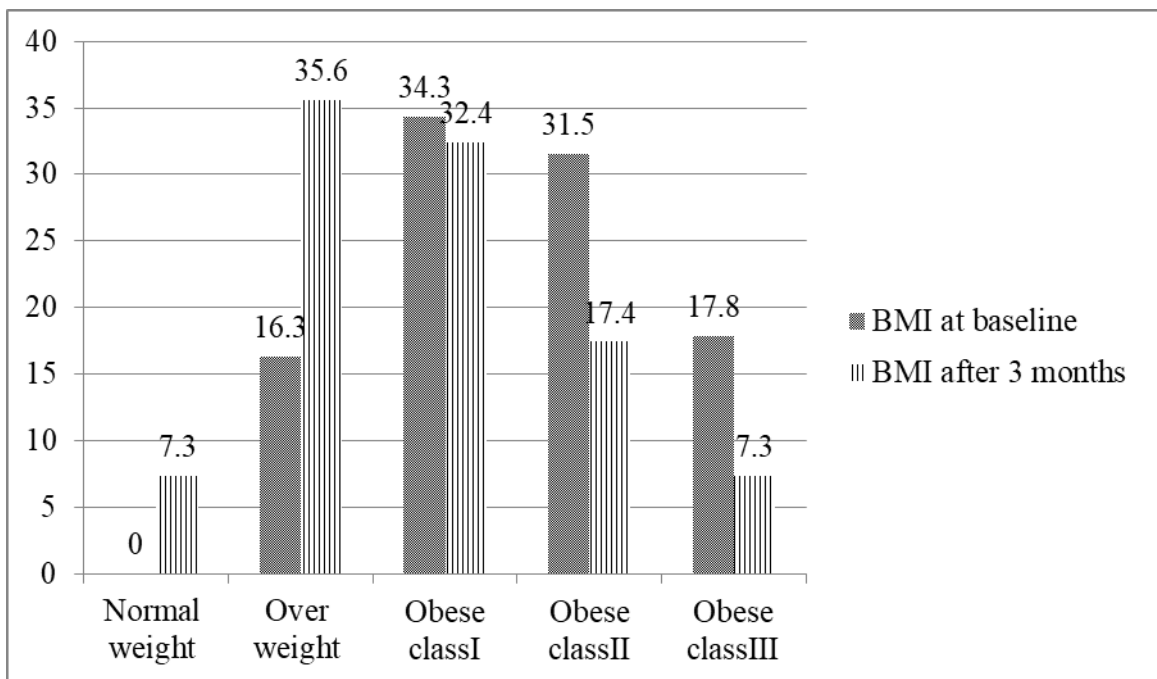


Figure 4.5: Changes of BMI after 3 months of joining weight management programs

4.1.4.2 Changes in Quality of Life:

Participants reported a significant improvement in mean scores of all quality of life components after 3 months of joining weight management programs compared to baseline scores ($P < 0.05$). Table (12) summarized the mean scores of all components of QOL scales and overall quality of life score.

Table 4.8: Changes in QOL at baseline and after three months presented as mean \pm SD

Quality of life domain	At baseline	After 3 months	P-value
Total QOL	66 \pm 18	77 \pm 13	.000**
Physical functioning	71 \pm 28	86 \pm 22	.000**
Role limitation due to physical health	81 \pm 32	93 \pm 21	.000**
Role limitation due to emotional problems	65 \pm 44	80 \pm 37	.000**
Energy/fatigue	51 \pm 19	64 \pm 18	.000**
Emotional well –being	56 \pm 20	64 \pm 19	.000**
Social functioning	70 \pm 23	78 \pm 19	.000**
Pain	65 \pm 26	77 \pm 20	.000**
General health	65 \pm 21	77 \pm 16	.000**

Significant at $P < 0.05$, **: $p < .001$ by using paired samples T-test

4.1.4.3 Effect of changes in weight on quality of life

Table (13) shows the higher percent of weight loss is associated with significantly greater improvements in total quality of life and all quality of life subscales after 3 months ($P < 0.05$) with exception in *Role limitation due*

to physical health, Role limitations due to emotional problems and Pain scales . Participants who lost more than 10% percent of their weight had a greater improvement in overall quality of life and all of its scales with mean \pm SD of 14.6 \pm 17.6 in overall quality of life score. The highest number of change or improvement was in *Physical functioning* in group 2 (participants who lost more than 10% of their weight) with a mean of 18.9 \pm 27.3 compared with participants who lost less than 10% of their weight with a mean of 10.9 \pm 23.8.

Table 4.9: Relationship between reduction in weight and changes in quality of life

scale change	Group 1 (< 10%weight reduction	Group 2(\geq 10%weight reduction	P-value
Change in Physical functioning	10.9 \pm 23.8	18.9 \pm 27.3	.001**
Change in Role limitation due to physical health	10.4 \pm 28.9	14.7 \pm 35.5	.158
Change in Role limitation due to emotional problem	14.3 \pm 39.6	18.5 \pm 43.3	.293
Change Energy/fatigue	9.2 \pm 18.4	15.8 \pm 21.3	.000**
Change in emotional	6.4 \pm 14.5	9.3 \pm 16.3	.050*
Change in Social function	6.3 \pm 20.1	10.1 \pm 20.8	.047*
Change in Pain	10.8 \pm 23.7	14.4 \pm 25.6	.109
Change in General health	9.3 \pm 18.3	15.4 \pm 20.2	.001**
Change in Total QOL	9.7 \pm 15.0	14.6 \pm 17.4	.002**

Significant at P<0.05, *: P<.05,**:P<.01 based on independent samples T-test.

4.1.5 Secondary outcomes

4.1.5.1 Effect of socio-demographic factors on changes in Quality of Life

As shown in Tables (14, 15, 16,17,18), in general, according to table (14) males had greater improvements in several QOL scales after intervention than females with an exception in changes in *Role of limitation due to the emotional problems* scale. *Physical functioning* and *Energy/Fatigue* significantly have improved in males more than females (with $p=0.014$, 0.040 respectively). On the other hand, according to marital status significantly the greatest number of improvement in QOL was in participants who were widowed or separated, so according to the marital status of participants the significant improvement in the number of QOL scales was in overall QOL, *Social*, and *Pain* QOL subscales ($P<0.05$) with mean \pm SD of 16.8 ± 22.7 , 15.4 ± 24 and 26.9 ± 31.7 respectively.

In addition, as shown in table(15) there was a significant improvement in QOL in *Role limitation due to physical health* and *general health* subscales according to the employment status of participants with($P<0.05$). Unemployed participants had a greater improvement in the number of QOL scores that was significantly ($P<0.05$) in *Role limitation due to physical health* and *General health* subscales than employed participants. Moreover, according to table(16) participants who earned an average monthly income between 3000-5000 had a significantly ($p = 0.047$) greater improvement in *Physical functioning* than other participants.

Moreover, as shown in table (17) Participants who live in towns had significantly ($p=0.041$) greater improvements in the total QOL and *Role limitations due to physical health* than others who live in cities or camps. Finally, according to table (18) improvement in *the Emotional* concept of QOL were significantly higher among participants who had primary education with ($P=0.032$) than others.

Table 4.10: Effect of socio-demographic factors on changes in QOL.

	Gender			Marital status			
	Male	Female	P-value	Single	Married	Other	P-value
Change in Physical functioning	21.0±24.5	13.3±25.8	.014* ¹	10.8±21.1	16.7±27.8	15.4±24.1	.069
Change in Role physical	21.0±24.1	12.1±33.9	.993	10.7±28.6	12.8±33.7	11.5±44	.810
Change in Role emotional	14.0±36.9	15.0±43.5	.696	14.4±4.9	16.1±41.7	20.5±53.6	.847
Change Energy/fatigue	16.6±20.1	11.6±19.8	.040* ¹	9.9±18.9	13.5±20.4	20.4±22.9	.068
Change in emotional	8.7±17.1	7.5±15.0	.497	5.7±14.4	8.6±15.7	9.2±20.1	.157
Change in Social	10.0±18.9	7.8±20.7	.378	4.9±18.9	9.7±20.9	15.4±24.0	.025* ²
Change in Pain	12.4±23.7	12.1±25.0	.930	8.4±20.4	13.5±25.6	26.9±31.7	.010* ²
Change in General health	13.8±20.1	11.8±19.3	.397	10.2±18.6	13.0±19.6	15.4±23.2	.276
Change in Total QOL	13.6±16.8	11.5±16.8	.297	9.1±14.7	13.0±16.9	16.8±22.7	.032* ²

Significant at P<0.05, *:p<.05,**P<.01, by using ¹:independant samples T-test,²:one- way ANOVA .

Table 4.11: Effect of socio-demographic factors on changes in QOL (2).

	Employment		
	Employed	Unemployed	P
Change in Physical Functioning	14.8±22.5	14.6±27.8	.937
Change in Role physical	8.5±27.8	14.6±35.0	.047*
Change in Role emotional	12.6±40.4	17.8±43.7	.189
Change Energy/fatigue	11.7±18.9	13.0±0.9	.490
Change in emotional	6.9±14.7	8.2±15.9	.356
Change in Social	7.1±18.4	8.9±21.7	.345
Change in Pain	11.6±24.2	12.5±25.1	.713
Change in General health	9.9±19.1	13.6±19.5	.040*
Change in Total QOL	10.4±14.9	12.9±17.4	.122

Significant at $P < 0.05$, *: $p < .05$, ** $P < .01$, by using independent samples T-test,

Table 4.12: Effect of socio-demographic factors on changes in QOL (3).

	Average monthly income				
	<1500	1500-3000	3000-5000	>5000	p
Change in Physical. F	12.5±23.8	12.5±24.2	21.5±26.3	15.5±23.9	.047*
Change in Role physical	7.9±36.0	9.2±26.9	14.3±.5	12.2±36.7	.539
Change in Role emotional	12.5±45.9	17.9±45.1	11.7±34.8	7.7±33.7	.498
Change Energy/fatigue	13.9±19.9	9.8±18.7	14.7±20.4	10.9±21.2	.0258
Change in emotional	10.1±17.4	7.0±14.6	7.9±18.0	2.8±9.0	.095
Change in Social	6.8±21.5	6.9±20.2	8.9±20.2	6.7±19.0	.891
Change in Pain	11.5±25.6	9.4±23.3	12.6±26.4	11.6±24.2	.813
Change in General health	12.2±19.5	11.3±17.7	12.8±20.0	8.7±22.6	.736
Change in Total QOL	10.9±17.3	10.5±14.4	13.0±16.9	9.5±17.0	.636

Significant at P<0.05, *:p<.05,**P<.01, by using one- way ANOVA

Table 4.13: Effect of socio-demographic factors on changes in QOL (4)

	Living place			
	Town	City	Camps	P
Change in Physical functioning	17.2±8.5	12.6±26.3	19.5±28.9	.143
Change in Role physical	16.7±34.4	8.8±31.0	10.7±25.7	.041*
Change in Role emotional	19.0±42.0	12.7±43.0	22.2±37.0	.237
Change Energy/fatigue	14.3±17.2	10.9±20.1	14.3±17.2	.213
Change in emotional	8.3±14.3	6.9±16.3	10.3±13.6	.484
Change in Social	9.1±21.1	4.0±19.7	14.9±22.9	.182
Change in Pain	14.9±24.2	10.2±25.2	12.9±24.8	.143
Change in General health	13.8±20.3	10.9±18.7	10.7±20.1	.298
Change in Total QOL	14.1±16.9	10.0±16.1	11.8±16.4	.025*

Significant if $P < 0.05$, *: $p < .05$, ** $p < .01$ according to one -way ANOVA.

Table 4.14: Effect of socio-demographic factors on changes in QOL (5).

	Education level				
	Primary	Secondary	Bachelor	higher	p
Change in Physical. F	11.5±32.4	16.3±29.6	14.1±22.8	13.3±19.1	.759
Change in Role physical	22.2±35.6	11.2±32.9	11.8±32.2	6.7±17.6	.363
Change in Role emotional	18.5±36.2	16.2±46.4	16.1±41.3	4.4±17.2	.313
Change Energy/fatigue	12.9±23.6	12.9±20.3	12.4±19.7	8.3±7.7	.865
Change in emotional	12.9±19.7	6.9±15.9	8.1±14.8	1.3±7.7	.032*
Change in Social	5.1±25.1	7.8±20.9	9.0±19.9	5.0±16.9	.701
Change in Pain	23.4±27.7	10.6±26.5	12.1±23.6	9.3±15.8	.095
Change in General health	13.7±19.7	12.3±22.2	12.0±17.6	9.3±18.7	.917
Change in Total QOL	15.0±17.1	11.9±16.9	11.8±16.4	5.8±9.1	.384

Significant if $P < 0.05$, *: $p < .05$, ** $p < .01$ according to one -way ANOVA.

4.1.5.2 Relationship between BMI and QOL

As shown in Table(19) changes in QOL scales according to BMI category after three months. There was a significant difference in changes of QOL according to BMI categories in concepts of *Physical Functioning*, *social functioning* and *General health* scales ($P<.05$). Participants who were obese class III had the highest changes in *Physical functioning* concept after three months with mean changes \pm SD of 24.7 ± 29.5 while participants who became normal weight after three months had the highest changes and improvements in *Social functioning* and *General health* concepts with ($P=0.02, 0.03$) respectively. In general, improvement in quality of life became more obvious if participants were either normal weight or obese class III.

Table 4.15: Changes in QOL according to BMI categories after weight reduction

Change QOL domains	Normal eight 34	Overweight 166	Obese class I 151	Obese class II 81	Obese class III 34	P vale
Change in Total QOL	17.4±21.0	10.8±15.0	11.6±16.0	10.5±17.4	16.2±17.5	.123
Change in Physical functioning	18.4±25.5	14.5±22.9	14.7±26.4	9.3±27.5	24.7±29.5	.050*
Change Role limitation due to physical health	17.4±41.7	9.7±28.7	10.8±32.4	13.6±35.1	20.3±32.0	.381
Change Role limitation due to emotional problems	21.6±58.0	14.3±40.1	13.5±40.0	18.9±43.8	18.6±43.6	.757
Change Energy/fatigue	14.6±18.7	11.9±20.1	13.0±20.7	11.2±20.2	3.7±19.0	.901
Change in Emotional well –being	10.0±12.5	5.8±14.2	10.1±17.8	5.9±13.9	7.9±14.6	.084
Chang in Social functioning	17.3±23.4	8.1±17.6	8.9±22.5	3.4±19.0	8.1±21.5	.022*
Change in Pain	17.9±23.3	11.0±23.5	10.1±25.1	13.4±27.5	17.9±23.3	.266
Change in General health	18.5±19.1	10.8±19.1	13.0±19.5	8.2±18.7	17.2±20.8	.032*

Significant at $P < 0.05$, *: $p < .05$ according to one-way ANOVA test.

Chapter V

Discussion

The current study was conducted to evaluate the impact of weight reduction programs on HRQOL among overweight/obese adults after 3 months of weight management. At baseline subjects with higher BMI have reported lower scores in QOL.

In general, participants reported a significant decline in weight after 3 months of joining weight management programs. Moreover, half of the study participants has lost about 10kg during the program with BMI has declined by about 3.78.

Participants showed a significant improvement in mean scores of all QOL components compared to baseline scores however, a higher percentage of weight loss was associated with a significantly greater level of improvements and changes in QOL and QOL subscales after 3 months of weight management programs. Particularly participants who lost more than 10% percent of their weight had a greater improvement in overall quality of life and all of its subscales with mean \pm SD of 14.6 \pm 17.6 in overall quality of life score. The domain that demonstrated the greatest improvements was *Physical functioning* subscale of QOL among participants who lost more than 10% of their initial weight. In general, for every level decreased in BMI there was an improvement by 3.86 point in the QOL.

5.1 Weight changes after three months of attending weight management programs

The results showed a decline in weight after three months of dietary management however more than 51.3% of participants had a reduction of more than 10% of their initial body weight with a mean loss of about 10Kg during three months. Compared to a previous study of weight management programs based on a combination of dietary management and physical activity, weight reduction recommendations showed no superiority of any dietary approaches by its nutrient, food group or dietary pattern to be more effective in a mean loss of weight. However, “energy deficit “must be established in order to show a significant weight reduction [37]. In a previous study a baseline to 6 month-weight loss was about 9.4% in participants who completed intensive lifestyle approaches which have included low caloric eating and 30 mints of daily walking [101]. The current finding is in line with another study that showed a mean weight loss of about 9.3% of initial body weight after 14 weeks of a low caloric diet program combined with physical activity [94]. Also, most obese participants have a mean loss of 5-10% of their initial body weight after 12-18 months of lifestyle modification [14,95]. Moreover, a modest weight loss of about 6-7% was achieved either by calorie-restricted diet or increased physical activity in obese postmenopausal women after 16 weeks of intervention [102]. In contrast, an average weight loss was 20% of initial body weight and a significant reduction in fat mass was in 63.7% of ninety two participants following 3 months of a very-low-calorie

ketogenic diet with more than 24.2% of participants reached a weight loss of more than 20% of initial body weight [55]. An explanation to why participants may differ in their weight loss degree was the adherence. Many studies showed an association between weight loss and adherence regardless of dietary intervention however, many participants find it difficult to adhere to a weight loss diet due to limitation of food intake [103]. Additionally, adherence to daily calorie restriction declined after about 4weeks (one month) and continue to decrease [104].

5.2 Changes of QOL related to weight

5.2.1 QOL at baseline

Concerning HRQOL at baseline participants with higher BMI showed lower scores in 36-SF concepts. Especially, in physical and emotional domains. Many previous studies showed the similar trends of the negative association between BMI and QOL however, participants with higher BMI had significantly reduced physical Quality of Life and there was an inverse linear relationship (as the level of BMI became higher the scores in physical component became lower) across different BMI categories even in absence of chronic diseases [9,11,13,78]. Impairment in QOL was particularly in the physical aspect, pain and vitality (energy/fatigue) where the lowest score was in obese class III participants. This is in agreement with previous studies showed that dimensions of mobility and pain are the largest components negatively affected by obesity [70,74], while physical functioning and vitality were the lowest scores in male outpatient with

BMI>35 [105]. Regarding to the mental aspect of quality of life some studies showed a weak association between BMI and the mental aspect of QOL, in contrast, a meta-analysis has shown that impairment was mainly in obese class III participants and that was less obvious in other classes [9]. This finding is not surprising as obesity and its complications result in numerous emotional and mental problems that interfere with social life and relationship with others, in addition to a decrease in the self-esteem. However, many biological studies explained this result by bi-directional causal-relationship of mental condition such as anxiety, depression and mood disorders [31]. An explanation of the lack of significant association of BMI and emotional well-being among different BMI categories may be because the current study used a population of participants who were seeking treatment of obesity and they were likely to have a homogenous level of emotional problems. With regard to pain and physical functioning impairment, increasing in weight and BMI have contributed negatively to the mechanical load on joints and have shown an impact on physical functioning of obese interfering with their daily activities. Many obese have recognized that obesity was a great limitation in their physical performance [8]. Nevertheless, to address the relationship between obesity and impairment in HRQOL few studies have investigated the underlining mechanism. The general explanation was that obesity will lead to low-grade inflammation that underlines the biological, physiological and psychological etiology of impaired HRQOL [22].

5.2.2 QOL after three months of weight reduction

Subjects have reported significant improvements in QOL after 3 months of weight reduction in all aspects of QOL. This finding is consistent with many previous studies that showed a linear relationship between weight change and HRQOL [11,12,13,106]. Moreover, current findings showed that higher percentage of weight loss was associated with significantly greater numbers of improvement and changes in the quality of life and all QOL subscales after 3 months. Greater improvement with exceptions in *Role limitation due to physical health*, *Role limitations due to emotional problems* and *Pain* scales, was reported with subjects lost more than 10% of their initial weight compared to those lost less than 10% of their weight. Such results are consistent in many studies [14,87,88,94,107] in which a greater acute weight loss intervention with a mean loss of an average weight loss of 10% was associated with improved HRQOL. The highest improvement in QOL in our study was in *Physical functioning* domain after three months of weight reducing-program and this was consistent with previous results from a study showed that loss of about 15 lbs (~7.5 kg) or more was associated with 0.89 point improvement in Physical component score [89] also after 3 and 6 months of reduced caloric diet [92]. In addition, most of the previous studies reported improvement in the physical aspect of 36-SF more frequently than mental /psychological or emotional aspect [12]. However, the results of other clinical studies varied according to the type of intervention and QOL measurement tools but, most of them demonstrated greater improvement in QOL within the group of

greater weight loss independently of the type of intervention[90,93]. In addition, according to the current study changes in QOL were greatly and more clear related to BMI if participants were normal weight or obese class III mainly in *Physical functioning* subscale more than other classes .

One potential explanation of the improvement in *Physical functioning*, *Social and Vitality (Energy/Fatigue)* subscales after weight loss is that adiposity induces inflammation, hypertension and insulin resistance which in turn impair cardiac, atrial and skeletal muscle elasticity and functioning leading to a decrease in physical functioning and performance [108].

5.3. Socio-demographic factors associated with changes in Quality of Life after weight reduction

5.3.1 changes in QOL according to gender

At baseline males had higher scores in all over QOL subscales which were significantly higher than females in *Emotional wellbeing*, *Pain* and *Role limitation due to emotional problems*. This was consistent with other previous studies that reported that association between weight and QOL may differ according to gender with women had lower scores than men [109]. Others showed a gender difference in the impact of obesity in QOL. Overweight or obese women showed significantly lower scores and a negative association between BMI and HRQOL [72,110]. Also, overweight and obese men reported better scores in *Vitality*, *Social functioning* and *Mental health* than women and obese women who showed a greater deficit in *Physical functioning* and *Emotional* [111]. Nevertheless, obese men had

lower scores than normal-weight men [105]. According to this study, levels of improvement in QOL were greater in males than females after weight reduction except in *Role of limitation due to emotional problems* subscale however, this was not statistically significant. Improvement in QOL was significantly greater in men than women in *Physical functioning* and *Vitality*. In addition, women had the highest improvement in *Role emotional* subscale.

This can be explained in two directions firstly, biophysical problem of obesity among women is higher as they reported poorer emotional health and greater severity and duration of pain as a consequence of obesity than men [112]. In general, obese are more prone to have daily pain as a study has shown that an association of obesity and lower back pain was significantly higher among obese women [113]. Moreover, obese women reported a decreased emotional health particularly with those having chronic conditions [114]. Secondly, the psychological and sociocultural context of women in the societies may cause them to experience poor psychological health and dissatisfaction with their body image and shape [115]. On the other hand, stigmatized obese women make them more likely to feel bad about their body shape and to be more susceptible to distress [116]. Women, in general, are more likely to have depressive symptoms than men and some men don't consider obesity as a health risk. Moreover, the concept of beauty may also play a significant role in the psychological differences among gender.

According to changes in QOL related to gender after weight reduction the same finding was observed with men have reported the highest improvements in all levels of HRQOL subscales with an exception to changes in *Role limitation due to emotional problems*, however, the significant differences were reported only in *Physical functioning and Vitality* subscales. The previous two-direction explanation can be used. In addition, improvement in *Role emotional* in women after weight reduction could be due to improvement in satisfactions of body shape after weight loss and subsequent improvement in the social life of obese women. Moreover, many studies confirmed that women had a higher probability of worse HRQOL than men independently of their obesity degree. This can be mainly explained due to socio-demographic and socioeconomic status. Disparity between men and women in Palestine especially in average income and marital status were the most contributors of gender differences [117,118].

5.3.2.QOL and age of participants

At baseline, the findings showed a significant difference between participants with different age categories in means of scores of total quality of life, *Physical functioning*, *Role limitation due to physical health*, *Pain* and *General health*. However, as participants became older their scores in different domains became less with exception of *Role limitation due to emotional problems* subscale. This finding, is in agreement with other studies that showed that obese elderly reported a poor HRQL with the most negative HRQOL in dimensions of *Pain* and *Physical*

functioning [74,119]. It was reported that consequence of increasing age with respect to the weight of obese participants has a negative impact on HRQOL [120]. Moreover, it was shown that the worst QOL aspect as age and BMI increased, was *Physical functioning*. In another study, obesity was a predictor of poorer QOL in older obese adults >55 years, in addition to other factors such as advanced age, presence of chronic conditions, fewer years of education and lower annual income [121]. In contrast, another recent study found no relationship between HRQOL scores and age among different obesity categories [122].

An explanation is that, being an overweight or obese can worsen the age-related decline in physical functioning and can induce other clinical adverse outcomes like arthritis and frailty which also have negative impacts on HRQOL [123,124]. In general, the decline in scores of HRQOL with age was due to physiological aging and a decrease in physical activity.

5.3.3 QOL related to other socio-demographic factors

According to the marital status of participants, single showed the highest scores in QOL which was statistically significant in concepts of *Physical functioning, Vitality, Pain* and *General health*. While widowed or separated participants reported the lowest QOL scores. Participants who lived in cities had a significantly higher total HRQOL particularly in *Role limitation due to physical problems* concept compared to those living in camps or towns, in addition, employed participants had a higher HRQOL

than unemployed participants which significantly was reported in 3 domains (*Role limitation due to physical health, Emotional well-being and General health*). Moreover, participants who earned an average monthly income of more than 5000 ILS had a significant highest score in *Emotional well-being* concept of QOL among other participants who earned less. In addition, those who had a higher education reported significantly the highest scores in domains of *Physical functioning, Social, Pain and General health*. In another word, single, employed, living in cities, earned an average income of more than 5000 ILS and had a higher educational level participants have reported higher HRQOL. This finding is in agreement with a previous study that showed a significant lower HRQOL was reported in un-employed, low income, less educated and had chronic conditions participants [125]. Other study showed that marital status, economical status and educational attainment were significantly associated with HRQOL scores [126]. Moreover, other studies showed that lower educational level and lower income were major contributors for lower scores in HRQOL [117,127]. A recent study has shown that low socioeconomic status was significantly associated with low HRQOL [128]. In contrast marital status was found to variable as some studies showed that married and widowed individuals when compared to single participants have recorded better scores in social and emotional roles [129,130].

Many studies have shown a direct association between BMI and socioeconomic status. The association between obesity and lower QOL may due to social stigmatization of obese subjects and environmental

reaction to obesity [131,133,134]. Moreover, understanding the relationship between HRQOL and socioeconomic status is a complicated process due to the fact that different aspects of socioeconomic status affect the health and HRQOL either separately or by overlapping at different levels of life [128,132,135,136,137]. For example, education is linked to health through its effect on improving income and through knowledge about healthy behavior and accessing sources about healthy lifestyle. Furthermore, income and education together were the most associated contributors to variation in HRQOL scores. Those with the lowest education and income groups have the worst HRQOL scores.

With regard to employment, the worst HRQOL was found among unemployed obese participants compared to employed persons this was due to the fact that being obese and homebound will, further, result in social and emotional deteriorations [125]. Moreover, obese women or men are less likely to be recommended to an employment due to negative stereotyped view about obese abilities by their societies. In general, there was an association between socioeconomic status and HRQOL. People with low socio-economic status were more likely to have unhealthy habits, higher socioeconomic pressure and low quality and quantity of health care services. Furthermore, socioeconomic status affects people's psychological status and views to the environment around them and has a great influence on how they behave [128].

Chapter VI

Conclusions, Limitations And Recommendations

6.1 Conclusion

In conclusion:

- The implementation of various weight reducing programs included a combination of moderate exercise and a caloric restriction diet, has been proven to induce weight loss.
- HRQOL has significantly improved as body weight reduced after 3 months of weight management.
- Moreover, the levels of HRQOL improvement were positively associated with level of weight loss. With physical functioning being the most improved subscale.
- In addition, elevated BMI was an important determinant factor of HRQOL with participants having higher basal BMI were reported to have lower scores of HRQOL.
- Men performed better than women with regard to HRQOL at baseline and after 3 months of weight management.
- Women were more vulnerable to have lower HRQOL associated with obesity than men.
- Socio-demographic factors played a major role in HRQOL at baseline and the level of improvement after three months.

6.2 Limitations

The current study has some limitations related to the nature of the methodology, participants and recruitment procedure:

Methodology: using the 36-SF instruments to assess the HRQOL has some limitations as this generic measure may be less sensitive than an obesity-specific questionnaire to measure the HRQOL of obese participants like (IWQOL) and it is recommended to use both generic and specific questionnaires.

Recruitment procedure: taking into account the relatively short duration of follow-up (3 months) may not enough to have significant changes in HRQOL and weight of all participants.

Participants: there was some referral bias as the study used subjects who were seeking treatment for their obesity and attending weight reducing programs, so they were more aware about the impairment of their HRQOL and daily activity as a consequence of obesity.

6.3 Recommendations

The results of this study highlighted the importance of weight reducing programs in achieving weight loss and improve the QOL of obese adults. Recommendations for obese and general public to adopt a healthy lifestyle contains alteration in diet and physical activity in order to have less impairment in physical and emotional aspects of QOL. Moreover, recommendations for health authorities alike organizations to promote the use and accessibility of community-based obesity reduction programs with

free or low cost for obese individuals. Moreover, conducting educational sessions and motivational interviews to educate obese and general public how to have an effective weight management and promote weight loss and how this will improve their QOL on the short and long terms.

6.3.1 Recommendations for Further Research

In order to build upon these results, the study recommends long term follow-up studies to assess QOL among obese participants and to use both generic and obesity-specific measures to evaluate HRQOL before and after various weight reducing programs. Also, further studies are required to explore more factors associated with impairment in QOL among obese participants such as eating behaviour, environmental factors and presence of chronic diseases. Moreover, further interventional studies with a larger obese population with more comorbidities and obesity-related health problems are also needed to verify whether the improvement in QOL is related to weight loss or not.

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Appendix I

Booklet of socio-demographic information questionnaire and Arabic
version of 36_short form Health-related Quality of life

An-Najah national University



تأثير برامج ادارة الوزن قصيرة المدى على جودة الحياة لرواد مراكز الحميات في فلسطين
عزيزي المشترك:

نضع بين يديك هذا الاستبيان لإنجاز الدراسة المذكورة اعلاه نتأمل تعاونك معنا في الاجابة
عن الاسئلة بدقة وموضوعية ويمكن الاستفسار من الباحث عن أي جزئية او أي سؤال غير
واضح في الاستبيان, ونعلمك بان جميع المعلومات سيتم جمعها لأغراض البحث العلمي
وستعامل بسرية تامة ولن تستخدم لأغراض اخرى

فريق البحث

البيانات الديموغرافية والاجتماعية				
الاسم \ الرقم				
العمر				
الجنس		ذكر - 1	2- انثى	
الحالة الاجتماعية		اعزب - 1	2-متزوج	
المستوى التعليمي		1-تعليم ابتدائي) اقل من 10 سنوات (مدرسة)		
		2-تعليم ثانوي		
		3-شهادة جامعية او دبلوم		
		3-دراسات عليا) ماجستير او دكتوراه		
الوظيفة		1-اعمل	2-لا اعمل	
نوع الوظيفة				
مستوى الدخل		1-<1500	2-1500-3000	3-3000-5000
4->5000				
مكان السكن		1-قرية	2-مدينة	3-مخيم
الحالة الصحية وتحليل الجسم				
الوزن				
الطول				
مقياس محيط العضد				
محيط الخصر				
محيط الارداغ				
محيط الصدر				
الكتلة العضلية				
الكتلة الدهنية				
نسبة الكتلة العضلية				
نسبة الكتلة الدهنية				

النسخة العربية من استبيان جودة الحياة

1	بشكل عام مقياس الصحة لديك : 1-ممتاز 2-جيد جدا 3-جيد 4-مقبول 5-ضعيف
2	مستوى تقدم صحتك مع الزمن ماهو تقييمك لوضعك الصحي مقارنة بالسنوات الماضية : 1-افضل بكثير مقارنة بالسنة الماضية 2-الصحة افضل من السنة الماضية الى حد ما 3-الوضع مشابه للسنة الماضية 4- اسوا من السنة الماضية الى حد ما 5- اسوأ بكثير من السنة الماضية
3	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات العنيفة مثل الركض وحمل الاثقال وممارسة تمارين قوية الخ 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
4	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات المتوسطة مثل اراحة طاولة او دفع المكنسة الكهربائية او لعب البولينج او لعب الجولف 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
5	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات البسيطة مثل حمل اغراض البقالة 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
6	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(صعود العديد من صفوف الدرجات) 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
7	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(صعود صف واحد من الدرجات) 1--نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
8	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(الانحناء او الركوع) 1--نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
9	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(المشي مسافة ميل او اكثر) 1--نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
10	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(المشي عدة شوارع) 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
11	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(المشي مسافة شارع) 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
12	هل وضعك الصحي الان يحد من ادائك لهذه النشاطات(الاستحمام او ارتداء

	الملايس) 1-نعم يحدها بشكل كبير 2-نعم بشكل قليل 3-لا لا يحدها
13	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة حركية (اقتطاع او تقليل اوقات العمل او النشاط اليومي) 1-نعم 2-لا
14	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة حركية(انجاز اقل من المتوقع منك انجازه) 1-نعم 2-لا
15	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة حركية(التقليل او الحد من نوعية العمل) 1-نعم 2-لا
16	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة حركية(زيادة المجهود المبذول لنفس العمل او زيادة في وقت انجازه مقارنة بالمعتاد) 1-نعم 2-لا
17	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة عاطفية او نفسية (الشعور بالإحباط والتوتر) 1-نعم 2-لا
18	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة عاطفية او نفسية(الانجاز اقل من المعتاد) 1-نعم 2-لا
19	خلال الاربعة اسابيع الماضية, هل واجهت مشاكل في العمل او النشاط اليومي بسبب مشكلة عاطفية او نفسية(لم تعد تهتم بإنجاز العمل بانتباه كالمعتاد) 1-نعم 2-لا
20	هل مشاكلك النفسية والعاطفية تتداخل مع نشاطاتك الاجتماعية مع العائلة او الاصدقاء او الجماعات 1-ليس دائما 2- بشكل خفيف 3-بشكل متوسط 4-بشكل شديد 5-بشكل شديد جدا
21	ما مدى شدة الالم الجسماني الذي تعانيه خلال الاسابيع الاربعة الماضية 1-لا يوجد 2-معتدل 3-معتدل جدا 4-منوسط 5-شديد 6-شديد جدا
22	ما مدى تأثير الالم الجسماني الذي تعانيه على عملك او واجباتك المنزلية خلال الاربعة اسابيع الماضية 1-ليس كثيرا 2-قليل جدا 3-متوسط 4-درجة شديدة 5-كثيرا
23	هل تشعر بالحيوية والطاقة 1-دائما 2-في اغلب الاوقات 3-قليل من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا

24	هل انت شخص عصبي ومتوتر 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
25	هل تشعر باليأس وبان لا شيء يسعدك 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
26	هل تشعر بالهدوء والسلام 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
27	هل تشعر بان لديك كثير من الطاقة 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
28	هل تشعر بالكآبة 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
29	هل تشعر بانك مرهق 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
30	هل تشعر بانك شخص سعيد 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
31	هل تشعر بالتعب 1-دائما 2-في اغلب الاوقات 3-قليلا من الوقت 4-بعض الاوقات 5-قليل جدا 6-لا اطلاقا
32	خلال الاربعة اسابيع الماضية هل اثرت مشاكلك الحركية او العاطفية على حياتك الاجتماعية (مثل زيارة الاقارب او الاصدقاء 1-دائما 2-في اغلب الاوقات 3-بعض الاوقات 4-قليل جدا 5-لا اطلاقا
33	اشعر بانني اتعرض للمرض بشكل اسهل من الناس 1-نعم مما لا شك فيه 2-نعم في اغلب الاحيان 3-لا اعرف 4-لا في اغلب الاوقات 5-لا اطلاقا
34	اشعر بانني سليم وصحي مثل بقية الناس الذين اعرفهم 1-نعم مما لا شك فيه 2-نعم في اغلب الاحيان 3-لا اعرف 4-لا في اغلب الاوقات 5-لا اطلاقا
35	اتوقع بان حالتي الصحية ستصبح اسوء مما انا عليه الان 1-نعم مما لا شك فيه 2-نعم في اغلب الاحيان 3-لا اعرف 4-لا في اغلب الاوقات 5-لا اطلاقا

36	<p>أشعر بأن حالتي الصحية ممتازة</p> <p>1-نعم مما لا شك فيه 2-نعم في أغلب الأحيان 3-لا أعرف 4-لا في أغلب الاوقات 5-لا إطلاقا</p>
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Booklet number :

Socio-demographic data				
Name / number :				
Age:				
Gender :	1-Male	2- Female		
Marital status	1-Single	2-Married	3- others (separated, widowed)	
Education level	1-primary school (less than 10years)	2- Secondary	3-University bachelor or equivalent	4-Higher education (master or doctoral)
Employment	1-Employed	2-Un-employed		
Average monthly income	1-<1500	2-1500-3000	3-3000-5000	4->5000
Health status and body composition				
Health status and body composition				
Weight (Kg)				
Height (m)				
Lean mass				
Fat mass				
Lean mass %				
Fat mass %				

English version of (36_SF) HRQOL:

Items	
1	<p>In general, would you say your health is</p> <p>1-Excellent 2-Very good 3-Good 4-Fair 5-Poor</p>
2	<p>Compared to one year ago how would you rate your health in general now</p> <p>1-Much better now than one year ago 2-Somewhat better now than one year ago 3-About the same 4-Somewhat worse now than one year ago 5- Much worse now than one year ago</p>
<p>The following items are about activities you might do during a typical day, Does your health now limit you in these activities?</p>	
3	<p>Vigorous activities such as running, lifting heavy objects, participating in strenuous</p> <p>1-Yes, limited a lot 2-Yes, limited a little 3-No, not limited at all</p>
4	<p>Moderate activities such as moving the table, pushing a vacuum cleaner, bowling, or playing golf</p> <p>1-Yes, limited a lot 2-Yes, limited a little 3-No, not limited at all</p>

5	<p>Lifting or caring groceries</p> <p>1-Yes, limited a lot</p> <p>2-Yes, limited a little</p> <p>3-No, not limited at all</p>
6	<p>Climbing several flights of stairs</p> <p>1-Yes, limited a lot</p> <p>2-Yes, limited a little</p> <p>3-No, not limited at all</p>
7	<p>Climbing one flight of stairs</p> <p>1-Yes, limited a lot</p> <p>2-Yes, limited a little</p> <p>3-No, not limited at all</p>
8	<p>Bending ,kneeling ,or stooping</p> <p>1-Yes ,limited a lot</p> <p>2-Yes ,limited a little</p> <p>3-No,not limited at all</p>
9	<p>Walking more than a mile</p> <p>1-Yes, limited a lot</p> <p>2-Yes, limited a little</p> <p>3-No, not limited at all</p>
10	<p>Walking several blocks</p> <p>1-Yes, limited a lot</p> <p>2-Yes, limited a little</p> <p>3-No, not limited at all</p>

11	Walking one block 1-Yes, limited a lot 2-Yes, limited a little 3-No, not limited at all
12	Bathing or dressing yourself 1-Yes, limited a lot 2-Yes, limited a little 3-No, not limited at all
During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health	
13	Cut down the amount of time you spent on work or other activities 1-Yes 2-No
14	Accomplished less than you would like 1-Yes 2-No
15	Were limited in the kind of work or other activities 1-Yes 2-No
16	Had difficulty performing the work or other activities (for example it took extra effort) 1-Yes 2-No
During the past 4 weeks have you had any of the following problems with your work or other regular activities as a result of any emotional problem such as feeling depressed or anxious	

17	<p>Cut down the amount of time you spent on work or other activities</p> <p>1-Yes</p> <p>2-No</p>
18	<p>Accomplished less than you would like</p> <p>1-Yes</p> <p>2-No</p>
19	<p>Didn't do work or other activities as carefully as usual</p> <p>1-Yes</p> <p>2-No</p>
20	<p>To what extent has your physical health or emotional problems interfered with your normal social activities with family, neighbors, or groups</p> <p>1-Not at all</p> <p>2-Slightly</p> <p>3-Moderately</p> <p>4-Quite a bit</p> <p>5-Extremely</p>
21	<p>How much bodily pain have you had during the past 4 weeks</p> <p>1-None</p> <p>2-Very mild</p> <p>3-Mild</p> <p>4-Moderate</p> <p>5-Severe</p> <p>6-Very severe</p>
22	<p>During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)</p> <p>1-Not at all</p> <p>2-A little bit</p>

	3-Moderately 4-Quite a bit 5-Extremely
How much of the time during the past 4 weeks	
23	Did you feel full of pep 1-All of the time 2-Most of the time 3-A good bit of the time 4-Some of the time 5-A little bit of the time 6- None of the time
24	Have you been a nervous person 1-All of the time 2-Most of the time 3-A good bit of the time 4-Some of the time 5-A little bit of the time 6- None of the time
25	Have you felt so down in the dumps that nothing could cheer you up 1-All of the time 2-Most of the time 3-A good bit of the time 4-Some of the time 5-A little bit of the time 6- None of the time
26	Have you felt calm and peaceful 1-All of the time 2-Most of the time

	<p>3-A good bit of the time</p> <p>4-Some of the time</p> <p>5-A little bit of the time</p> <p>6- None of the time</p>
27	<p>Did you have a lot of energy</p> <p>1-All of the time</p> <p>2-Most of the time</p> <p>3-A good bit of the time</p> <p>4-Some of the time</p> <p>5-A little bit of the time</p> <p>6- None of the time</p>
28	<p>Have you felt downhearted and blue</p> <p>1-All of the time</p> <p>2-Most of the time</p> <p>3-A good bit of the time</p> <p>4-Some of the time</p> <p>5-A little bit of the time</p> <p>6- None of the time</p>
29	<p>Did you feel worn out</p> <p>1-All of the time</p> <p>2-Most of the time</p> <p>3-A good bit of the time</p> <p>4-Some of the time</p> <p>5-A little bit of the time</p> <p>6- None of the time</p>
30	<p>Have you been a happy person</p> <p>1-All of the time</p>

	<p>2-Most of the time</p> <p>3-A good bit of the time</p> <p>4-Some of the time</p> <p>5-A little bit of the time</p> <p>6- None of the time</p>
31	<p>Did you feel tired</p> <p>1-All of the time</p> <p>2-Most of the time</p> <p>3-A good bit of the time</p> <p>4-Some of the time</p> <p>5-A little bit of the time</p> <p>6- None of the time</p>
32	<p>During the past 4weeks, how much time has your physical health or emotional problems interfered with your social activities like visiting friends, relatives</p> <p>1-All of the time</p> <p>2-Most of the time</p> <p>3-Some of the time</p> <p>4-A little of the time</p> <p>5- None of the time</p>
33	<p>I seem to get sick easier than other people</p> <p>1-Definitely true</p> <p>2-Mostly true</p> <p>3-Don't know</p> <p>4-Mostly false</p> <p>5-Definitely false</p>

34	<p>I am healthy as anybody I know</p> <p>1-Definitely true 2-Mostly true 3-Don't know 4-Mostly false 5-Definitely false</p>
35	<p>I expect my health to get worse</p> <p>1-Definitely true 2-Mostly true 3-Don't know 4-Mostly false 5-Definitely false</p>
36	<p>My health is excellent</p> <p>1-Definitely true 2-Mostly true 3-Don't know 4-Mostly false 5-Definitely false</p>

Appendix II

Ethical approval

An-Najah National University
Faculty of medicine Sciences Health
Institutional Review Board



جامعة النجاح الوطنية
كلية الطب وعلوم الصحة
لجنة الأخلاقيات للبحث العلمي

IRB Approval Letter

Study Title: "Impact of weight management on the quality of life of adults attending dietetic centres in Palestine"

Submitted By:
Muhammad Altamimi, Manal Badrasawi, Alma Ishtaid

Date Reviewed:
28th March 2019

Date Approved:
31st March 2019

Your Study titled "Impact of weight management on the quality of life of adults attending dietetic centres in Palestine" with received number (9) March 2019 was reviewed by An-Najah National University IRB committee and was approved on 31st March 2019.

Hasan Fittan, MD

IRB Committee Chairman
An-Najah National University

جامعة النجاح الوطنية

كلية الدراسات العليا

تأثير برامج ادارة الوزن قصيرة المدى على جودة الحياة لرواد مراكز الحميات في فلسطين

اعداد

اميمة احمد ابو الوفا

اشراف

د. محمد التميمي

د. منال بدرساوي

قدمت هذه الأطروحة استكمالا لمتطلبات الحصول على درجة الماجستير في التغذية وتكنولوجيا الغذاء بكلية الدراسات العليا في جامعة النجاح الوطنية، نابلس-فلسطين.

2021

ب

تأثير برامج ادارة الوزن قصيرة المدى على جودة الحياة لرواد مراكز الحميات في فلسطين

اعداد

اميمة ابو الوفا

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الملخص

تشكل السمنة عبأ عالميا يؤثر سلبا على جودة حياة الفرد نفسيا واقتصاديا واجتماعيا وفسولوجيا. ومع ذلك، فان مصطلح جودة الحياة هو مصطلح متعدد الابعاد بلا تعريف محدد لكن يمكننا تعريف جودة الحياة المتعلقة بالصحة على انه " تصور فردي حول الجوانب الاجتماعية والعقلية والجسدية للصحة، وكيف تؤثر الصحة على القدرة على العمل في الحياة ". تناولت كثير من الدراسات العلاقة السلبية بين الوزن الزائد وجودة الحياة المتعلقة بالصحة، علاوة على ذلك، فقد هدفت هذه الدراسة الى تقييم جودة الحياة والتغيرات في جودة الحياة المتعلقة بفقدان الوزن لدى البالغين الذين يعانون من زيادة الوزن والسمنة المفرطة بعد المشاركة في برامج ادارة الوزن في فلسطين. تم اختيار المشاركين من الفلسطينيين الذين تم تحويلهم الى مراكز نيوتري هيلث للمشاركة في برامج ادارة الوزن المختلفة خلال الفترة الواقعة بين ايار 2019 وايلول 2020، وقد شارك في الدراسة ما مجموعه 466 مشاركا بالغاً (81ذكرا و383 انثى) لديهم مؤشر كتلة الجسم اعلى من 25 كغم/م². تم قياس تكوين الجسم والقياسات الجسمية والبيانات الاجتماعية والديموغرافية وجودة الحياة لكل مشارك في البداية وبعد ثلاث اشهر من الانضمام لبرامج ادارة الوزن. اما النتائج فقد اظهرت انخفاضاً كبيراً في متوسط وزن المشاركين بعد ثلاث اشهر من المشاركة في برامج ادارة الوزن كما ان 229 مشاركا أي ما يقارب نصف المشاركين فقدوا اكثر من 10% من اوزانهم الاولى خلال الثلاثة اشهر. وباستخدام التحليل الاحصائي وباستخدام اختبار العينة

المزدوجة اظهر المشاركون تحسنا ملحوظ وكبيرا في جميع مجالات ومكونات استبيان جودة الحياة المتعلقة بالصحة المختصر الذي يحوي 36 عنصرا بعد ثلاثة اشهر علاوة على ذلك فقد كان التحسن الابرز في مكون مقياس جودة الحياة المتعلق بالقيود المتعلقة بالصحة البدنية بمتوسط مقداره 20.7 ± 93.0 بعد 3 اشهر مقارنة بمتوسط مقداره 32.2 ± 80.8 عند البداية . بالإضافة الى ذلك فان المشاركين الذين كان لديهم مؤشر كتلة الجسم اعلى سجلوا درجات اقل بكثير في مقياس جودة الحياة الفرعية للأداء البدني والحيوية والالم والصحة العامة ومع ذلك فان المشاركين الذين فقدوا $\leq 10\%$ من وزن خط البداية لديهم تحسن اكبر في الدرجات الاجمالية لمقياس جودة الحياة بمقدار (17.6 ± 14.6) مقارنة بـ (15.0 ± 9.7) لأولئك الذين فقدوا اقل من 10% من اوزانهم وقد تم الابلاغ عن اعلى تحسن في الاداء البدني مع (27.3 ± 18.9) و (27.3 ± 10.9) للمشاركين الذين فقدوا اكثر من 10% او اقل من 10 من اوزانهم على التوالي. وفي الختام يبدو ان برامج ادارة الوزن فعالة في انقاص الوزن وتحسين جودة الحياة للأشخاص الذين يعانون من السمنة المفرطة حتى على المدى القصير و الى جانب ذلك يمكن ايضا الاستخلاص ان الوزن الزائد يشكل عاملا ضارا لجودة الحياة وان النساء البدنيات هن اكثر عرضة لتسجيل مقياس جودة حياة اسوء مع تحسن وتغيرات اقل في جودة الحياة بعد ثلاثة اشهر مقارنة بالرجال اخيرا اكدت نتائج هذه الدراسة ان ادارة الوزن هي عملية شاملة يجب ان تأخذ بعين الاعتبار اراء المرضى والتحسين في جودة الحياة .