UNIVERSITY OF NICOSIA

The impact of nutrition education and physical activity on weight management in primary care in Cyprus using the Nutrition Care Process with emphasis in mindful eating and behaviour

Christiana Philippou Charidemou

PhD (Doctor of Philosophy) in Nutrition and Dietetics

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Christiana
Philippou Charidemou

NICOSIA

PhD

2023

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Christiana Philippou Charidemou

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Abstract

INTRODUCTION: The study aimed to investigate the effectiveness of combining nutrition education, physical activity, mindful eating, and behavior modification, along with the Nutrition Care Process (NCP), in managing body weight and body fat composition. The increasing prevalence of obesity and overweight worldwide necessitates the need for effective treatment methods to be imparted to health professionals involved in weight management. The study highlights that a combination of these strategies is more successful in achieving and maintaining a healthy weight compared to calorie restriction and physical activity alone.

METHODS: The study used a quantitative, observational, and longitudinal design, and a representative sample of 300 Cypriot adults between the ages of 18 and 51 participated in a 38±2.5-week study. Participants were assessed for obesity and overweight using measurements such as weight, height, Body Mass Index, Waist Circumference, Neck Circumference, and Body Fat Composition, which were compared to standard values. Obesity and overweight were defined based on BMI. Participants' food intake history and physical activity habits were also assessed. The participants were then divided into a control group (diet only) and an intervention group (including nutrition and physical activity behavior changes program and the use of NCP). The intervention group received individualized nutrition education, diet plans, everyday physical activities, and behavioral change factors including mindful eating, which were assessed and evaluated every two weeks. The Mindful Eating Questionnaire (MEQ) and the International Physical Activity Questionnaire (IPAQ) were used for baseline assessment, and validated Worksheets for lifestyle changes were applied to the intervention group.

RESULTS: The results of the study showed that both male and female participants in the intervention group lost more weight than those in the control group. Specifically, males in the control group lost around 3-3.7 kg in 19 weeks, while males in the intervention group lost 9 and 10 kg in the 18-24 and 25-51 age groups respectively. Similarly, females in the control group lost around 3 kg in 19 weeks, while females in the intervention group lost 8.6 and 9.6 kg in the 18-24 and 25-51 age groups respectively. Additionally, the results of the worksheets for nutritional habits showed an improvement in eating habits for the intervention group, with a mean score of -35.01 at the beginning of the study, 43.02 at week 19, and 62.15 at week 38. The participants in the intervention group also reported that their busy schedule was the main factor that prevented them from engaging in physical activity, but despite this, they were able to improve their physical activity scores through lifestyle changes.

CONCLUSIONS: The conclusion of the study emphasizes that physical inactivity and poor diet are major contributors to the leading causes of death in developed countries including Cyprus. The current research work confirms that traditional methods of calorie restriction dieting are not effective in achieving and maintaining weight loss, and that instead, a combination of nutrition education, physical activity, and behavioral changes are more successful. Furthermore, it identifies that by using the Nutrition Care Process (NCP) in combination with a healthy lifestyle plan including nutrition education, physical activity, mindful eating, and behavioral modification, it was possible to effectively manage body weight and body fat composition. High mindful eating scoring appears to relate to normal BMI. Therefore, the study suggests that incorporating appropriate behavioral lifestyle changes using nutrition education with the NCP is an essential component of achieving and maintaining a healthy body weight.

Keywords: Weight management, mindful eating, weight loss, weight maintenance, eating habits, diet habits, physical activity, exercise habits, Nutrition Care Process (NCP), nutrition education, behavioural change

Dedication

I dedicate this thesis to my beloved father's memory, Michael Philippou, and my family for their support, my mother, Evdokia, my husband Charis, my sons, Andreas and Michael and my grandson Charidemos but especially to my daughter, Evelina, for her help throughout these years.

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I would also like to thank my supervisor, Dr Eleni Andreou, Associate Professor for her support and guidance. I would also like to thank Prof Demetris Papandreou and Prof Antonis Zampellas for their useful feedback.

Supervisors:

Dr. Eleni Andreou, Associate Professor (1st) Sign & Date…….

Prof. Demetrios Papandreou (2nd) Sign & Date…….

Prof. Antonis Zampelas (3rd) Sign & Date……

Internal Examiner

Sign &Date……..

External Examiner

Sign & Date……..

Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Nicosia. This thesis has been composed solely by myself except where stated otherwise by reference or acknowledgment. It has not been previously submitted, in whole or in part, to this or any other institution for a degree, diploma or other qualifications.

Signed …....…….. Date ……...……

Table of Contents

Abstract i
Dedication iii
Acknowledgements iv
Supervisors: v
Declaration v
1. CHAPTER 1 Introduction 1

1.1 Body Mass Classification 2

1.2 Mindful Eating 3
1.2.1 Benefits of Mindful Eating 4
1.2.2 Challenges of Mindful Eating 4

1.3 Nutrition Care Process 4

1.4 Innovation/Rationale, Purpose of the project 5

1.5 Research Questions 6

1.6 Conclusion 6
2. CHAPTER 2 Literature Review 7

2.1 Overweight and Obesity Epidemic 8

2.2 Behavioural Change 13

2.3 Effectiveness of Behavioural Change programs for Obesity and Overweight 15

2.4 Behaviour changes methods for weight control 15

2.5 Weight loss and nutrition behaviour programs 18

2.6 Weight loss, physical activity, and weight control 21

2.7 Physical activity guidelines 25

2.8 Nutrition Care Process 26

2.9 The relation of different nutrient/food composition of diets on weight loss 28

2.10 Mindful Eating 30

2.11 Conclusion 31
3. CHAPTER 3 Methodology and Methods 32

3.1 Volunteer Characteristics 33

3.2 Study Protocol 34

3.3 Study Duration 36

3.4 Anthropometrics/Somatometrics 36
3.4.1 Weight (kilograms) and Height 36
3.4.2 Neck Circumference 37
3.4.3 Waist Circumference 37
3.4.4 Body Fat 38
3.4.5 Body Mass Index 40

3.5 Diet record 41

3.6 Physical Activity guidelines 41

3.7 Evaluation of eating and physical activity habits 41

3.8 NCP process 41
3.8.1 Behavioural Change Methods 42

3.9 Tools Used for Nutrition and Physical Activity Assessment 43
3.9.1 Nutrition Assessment- Mindful Eating Questionnaire/ Nutritional habits 44
3.9.2 International Physical Activity Questionnaire (IPAQ) 44

3.10 Tools for Assessing Intervention 45
3.10.1 Worksheets 45

3.11 Statistics 45

3.12 Conclusion 45
4. CHAPTER 4 Results and Analysis 47

4.1 Demographics and Anthropometric Measurements 48

4.2 Nutrition Questionnaire/ Mindful Eating Questionnaire 49

4.3 Physical Activity (PA)/Exercise Questionnaire/IPAQ 53

4.4 Progress Charts 62

4.5 Analysis of Worksheets 89
4.5.1 Eating habits and behavioural modification results (Worksheet I) 89
4.5.2 Physical activity behavioural modification results (worksheet II) 91

4.6 Conclusion 122
5. CHAPTER 5 Discussion and Conclusions 123

5.1 Overweight, Obesity, Weight Management & Health related problems 124

5.2 Body Composition 124

5.3 Fulfilment of Goals and outcomes 125

5.4 Effectiveness of ME and behaviour, diet & exercise, on weight management 125

5.5 Recommendations for Evaluation 127

5.6 NCP and obesity 127

5.7 Successful Weight Management 130

5.8 Nutrition recommendations for weight management 130

5.9 Behaviour Modification Treatment for Eating and Exercise Habits 132

5.10 Treatment period 132

5.11 Maintenance period 132

5.12 Discussion of the Results 133

5.13 Physical Activity for weight management 133

5.14 Strengths 136

5.15 Weaknesses 136

5.16 Deliverables 137

References 138

Appendices 148

Appendix I – Mindful Eating Questionnaire 149

Appendix II- International physical activity questionnaire 174

Appendix III - Worksheet I - Identification of eating habits 186

Appendix IV – Worksheet II – Physical activity index and what influences physical activity 193

Appendix V – Consent form 197

Appendix VI – Viva Presentation 202

List of Tables

Table 1-1 BMI classification 3
Table 2-1 Obese Adults (%) worldwide 9
Table 2-2 Health advantages from 10 kg weight loss (NHLBI, NIH, 2000) 12
Table 2-3 Healthy Eating guidelines Adapted from Willett WC, Skerrett PJ, 2017 13
Table 2-4 Regular Physical Activity, Health Benefits by Vogel et al, 2009 14
Table 2-5 WHO's recommendations for Physical Activity 2020 14
Table 2-6 Elements of Behaviour change taken from Foreyt & Goodrick, 2004 17
Table 3-1 Inclusion/ Exclusion Criteria 34
Table 3-2 Control and Intervention group regimes. 35
Table 3-3 Waist circumference 38
Table 3-4 Ideal Body Fat Percentage: For Men 39
Table 3-5 Ideal Body Fat Percentage: For Women 40
Table 3-6 BMI categories 40
Table 3-7 The Usage of Worksheets and ABC 43
Table 3-8 Study Instruments 44
Table 4-1 Characteristics of study population completing the Mindful Eating Questionnaire 48
Table 4-2 Demographic characteristics, family status, income, and professional status 49
Table 4-3 Mindful eating questionnaire results 51
Table 4-4 Job related physical activities (days/week) 53
Table 4-5 Job related PA (minutes/day) 54
Table 4-6 Transportation PA (days/week) 55
Table 4-7 Transportation PA (minutes/day) 56
Table 4-8 Housework, house maintenance and caring for family (days/week) 57
Table 4-9 Housework, house maintenance and caring for family (minutes/day) 58
fTable 4-10 Recreation, sport, and leisure – time PA (days/week) 59
Table 4-11 Recreation, sports and leisure – time PA (minutes/day) 60
Table 4-12 Sitting on a weekend (min) 61
Table 4-13 Baseline Characteristics for Males 63
Table 4-14 Baseline Characteristics for Females 63
Table 4-15 Week 1-19 Males (Two Tailed T Test P <0.05) 65
Table 4-16 Week 1-19 Females (Two Tailed T Test P <0.05) 65
Table 4-17 Week 19-38 Males (Two Tailed T Test P <0.05) 67
Table 4-18 Week 19-38 Females (Two Tailed T Test P <0.05) 67
Table 4-19 Worksheet I - behavioural modification on eating habits for weeks 1, 19, 38 89
Table 4-20 Mean Scores of Worksheet I 90
Table 4-21 What influences PA 91
Table 4-22 Percentage participants unavailable to exercise 95
Table 4-23 No energy by sex (% Within week) 96
Table 4-24 I'm too tired by sex (% Within week) 97
Table 4-25 Lack of discipline to do PA 98
Table 4-26 Too hard... there's got to be an easier way 99
Table 4-27 Discouraging to do PA 100
Table 4-28 Not enjoyable to do PA 101
Table 4-29 Bad experience with delayed onset of muscle soreness 102
Table 4-30 Expense of equipment, clothes, membership 103
Table 4-31 Distance to PA 104
Table 4-32 Inconvenience for PA 105

Table 4-33 Boredom 106
Table 4-34 Lack of variety 107
Table 4-35 Injury health problems 108
Table 4-36 Chronic physical discomfort for not doing PA 109
Table 4-37 Embarrassment 110
Table 4-38 Social Discomfort 111
Table 4-39 Lack of understanding of the benefits of PA 112
Table 4-40 Low priority for not doing PA 113
Table 4-41 Do not care for PA 114
Table 4-42 Apathy for PA 115
Table 4-43 Weather conditions 116
Table 4-44 Barriers to PA 118
Table 4-45 Relation of BMI with ME (Q3-4 High; ME, 2-2.99 Medium ME, <2 Low ME) 121
Table 4-46 Multiple Comparisons (Post Hoc Tests) among ME subscales and BMI 121

List of Figures

Figure 2.1 Obesity among adults 2015 - (OECD) 10
Figure 2.2 The Nutrition Care Process Lacey & Pritchett 27
Figure 3.1 Outline of actions for Control Group (CG) 34
Figure 3.2 Outline of actions for Intervention Group (IG). 35
Figure 3.3 Process of major elements of the research and their link with the use of NCP 42
Figure 4.1Figure 4.1 Men aged 18-24 years old lost weight at 19 weeks of treatment 69
Figure 4.2 Men aged 18-24 years old decrease BMI at 19 weeks of treatment 70
Figure 4.3 Men aged 18-24 years old decreased waist to hip ratio at 19 weeks of treatment 71
Figure 4.4 Men aged 18-24 years old decreased neck circumference at 19 weeks of treatment. 72
Figure 4.5 Men aged 18-24 years old decreased % body fat at 19 weeks of treatment 73
Figure 4.6 Men aged 25-51 years old lose weight at 19 weeks of treatment. 74
Figure 4.7 Men aged 25-41 years old decreased BMI at 19 weeks of treatment 75
Figure 4.8 Men aged 25-51 years old decreased waist to hip ratio at 19 weeks of treatment 76
Figure 4.9 Men aged 25-51 years old decreased neck circumference at 19 weeks of treatment 77
Figure 4.10 Men aged 25-51 years old decreased % body fat at 19 weeks of treatment. 78
Figure 4.11 Female aged 18-24 years old lose weight at 19 weeks of treatment 79
Figure 4.12 Female aged 18-24 years old decreased BMI at 19 weeks of treatment 80
Figure 4.13 Female aged 18-24 years old decreased waist to hip ratio at 19 weeks of treatment 81
Figure 4.14 Female aged 18-24 years old decreased neck circumference at 19 weeks 82
Figure 4.15 Female aged 18-24 years old decreased % Body fat at 19 weeks of treatment. 83
Figure 4.16 Females aged 25-51 years old lose weight at 19 weeks of treatment 84
Figure 4.17 Females aged 25-51 years old decreased BMI at 19 weeks of treatment……87
Figure 4.18 Females aged 25-51 years old decreased waist to hip ratio at 19 weeks of treatment 86
Figure 4.19 Females aged 25-51 years old neck circumference at 19 weeks of treatment. 87
Figure 4.20 Females aged 25-51 years old % body fat at 19 weeks of treatment 88
Figure 4.21 Physical Activity index 91
Figure 5.1 Critical Path for the Nutritional Management of Obesity (NCP) 129

List of Appendices

Appendix I – Mindful Eating Questionnaire/ Nutritional Habits……149

Appendix II – International Physical Activity Questionnaire …….174

Appendix III – Worksheet I - Identification of eating habits…….186

Appendix IV –Worksheet II –Physical activity index and what influences physical activity. 193

Appendix V – Consent forms……...197

Abbreviation Index

ABC	Antecedents- Behaviour- Consequences
ACSM	American College of Sports Medicine
BWMP	Behavioural Weight Management Program
BF	Body Fat
BIA	Bioelectrical Impedance
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CHO	Carbohydrates
CHOL	Cholesterol
CG	Control Group
CM	Centimeter
COSI	Childhood Obesity Surveillance Initiative
CySS	Cyprus Population Statistics Services
CVD	Cardiovascular Disease
DE	Diet/Exercise
DRI	Dietary Reference Intake
DO	Diet Only
DQI-I	Diet Quality Index-International
FM	Fat Mass
FFM	Fat-free Mass
GI	Glycemic Index
HbAiC	Glycosylated Heamoglobin
KG	Kilograms
IBW	Ideal Body Weight
IG	Intervention Group

IOM	Institute of Medicine
IOTF	International Obesity Task Force
IPAQ	International Physical Activity Questionnaire
LBM	Lean Body Mass
LB	Long-bout Exercise
LCD	Low Calorie Diet
LDL	Low Density Lipoproteins
Min	Minutes
ME	Mindful Eating
mMEQ	Modified Mindful Eating Questionnaire
MUFA	Mono-Unsaturated Fatty Acids
NCP	Nutrition Care Process
NCPM	Nutrition Care Process Model
NCir	Neck Circumference
NG	Nutrition Group
NHANES	National Health and Nutrition Examination Survey
NHLBI	National Institutes of Health, National Heart, Lung, and Blood Institute
NIH	National Institute of Health
NHES	National Health Examination Surveys
NHLBI	National Heart, Lung, and Blood Institute
NIDDM	Non-Insulin-Dependent Diabetes Mellitus
NIH	National Institutes of Health
NTFPTO	National Task Force on the Prevention and Treatment of Obesity
NAQ	Nutritional Assessment Questionnaire
NWCR	National Weight Control Registry
OB	Obese
OECD	Organization for Economic Co-operation and Development

OW	Overweight
PA	Physical Activity
PUFA	Polyunsaturated Fatty Acids
PRO	Proteins
RCTs	Randomized Control Trials
RDA	Recommended Dietary Allowances
RDN	Registered Dietitian and Nutritionist
SFA	Saturated Fatty Acis
SB	Short-bout Exercise
SBEQ	Multiple short-bout Exercise with Home Exercise Equipment
SBT	Standard Behavioural Treatment
SD	Standard Deviation
TBFP	Total Body Fat Percentage
TBW	Total Body Water
TG	Triglycerides
TC	Total Serum Cholesterol
VLCDs	Very Low-Calorie Diets
UN	United Nations
WCir	Waist Circumference
WHO	World Health Organization
WHR	Waist to hip ratio
Wk	Week
Wt	Weight

1.CHAPTER 1 Introduction

Human weight reached high levels, which is out of range, creating internationally a warning for public health disease risks (WHO, 2018). The Covid-19 pandemic changed people's lifestyle and affected the body mass as obese people with Covid-19 less than 60 years of age had doubled the chances to be admitted to the health institutes treating Covid-19 patients (Chiapetta, 2020). Also, it was indicted that body mass related to Body Mass Index (BMI) greater than 40 kg / m^2 had the largest possibility (6 times more) to get admitted to the hospital. The higher BMI was correlated to the seriousness of the disease Covid-19 (Petrilli, 2020).
Useful methods of weight therapy are essential for the continuous education of dietitians and nutritionists and selected health professionals for the treatment of body mass problems. There is limited education and training for the management of obesity by health professionals. This is obvious on the lack of international medical and nutritional terminology on the checkups for dealing with body weight problems (Anderson 2008).

1.1 Body Mass Classification

The ways of treatment of body mass problems could be completed with nutrition intervention, exercise prescription, behaviour modification, pharmaceutical treatment and bariatric surgery. The dietitians' participation in the working team for weight management matters can be with the usage of Nutrition Care Process (NCP) (Hakel-Smith & Lewis, 2004; Memmer, 2013; Swan et al., 2017;).

Behaviour therapy methods are getting growing consideration in the management of obesity throughout the life span among dietitians and nutritionists (Hruby, 2015). Lifestyle changes pertain eating or physical activity habits, which are sustained over a period (Kumar 2002). The classification of obesity based on Body Mass Index (BMI) is illustrated in Table 1.1 (WHO, 2018).

Table 1-1 BMI classification

Classes of severity	**BMI**
Class I	30-34.9 kg/m²
Class II	35-39.9 kg/m²
Class III	≥ 40 kg/m²

World Health Organization, 2016

In a study done in Cyprus on the nutritional and physical activity habits for ages 18 years and above, showed the prevalence of overweight and obese males and females as 46.9% and 28.8% and 26% and 27%, respectively. Overweight and obese people were found to have statistically significant higher levels of Body Mass Index (BMI), Waist circumference (WCir), Total serum cholesterol (TC), Low density lipoprotein (LDL), Glucose and Triglycerides (TG) than subjects with normal body mass. In addition, overweight and obese people from the same study consumed less fruits and vegetables, exercised less time/day and smoked more cigarettes/day in comparison to normal weight people. Additionally, results presented those participants as 54.1% had very low activity level, 31,6% had low activity level, 7,7% had moderate and only 6,6% had high level physical activity (Andreou et al, 2012).

1.2 Mindful Eating

Mindful eating is a method that prioritizes how we eat over what we eat. This approach involves being fully present and aware of our thoughts and emotions when we eat. To practice mindful eating, individuals should eat at a slower pace, avoid distractions, pay attention to their body's hunger and fullness signals, eat foods that are both satisfying and nutritious, and be aware of how their body responds to different foods (Martin, Prichard, Hutchinson, & Wilson, 2013; Mathieu, 2009). People may overeat not only because they are hungry, but also because meals have become a social activity shared with others. Additionally, distractions such as televisions, computers, phones, and social media can also contribute to overeating by preventing individuals from being mindful of the amount of food they are consuming. By implementing mindful eating techniques, individuals can become more aware of their hunger and fullness

cues and the environmental distractions around them (Martin, Prichard, Hutchinson, & Wilson, 2013).

1.2.1 Benefits of Mindful Eating

Practicing mindful eating can lead to a healthier relationship with food, allowing for the selection of food that is both enjoyable and nutritious (Eating Disorders Foundation of Victoria Inc., 2014). Studies have shown that incorporating mindful eating techniques can result in benefits such as improved awareness of hunger and fullness, effective weight management, increased self-esteem, and a feeling of empowerment.

1.2.2 Challenges of Mindful Eating

Mindful eating can be difficult to implement in our busy lives due to various factors such as demanding work schedules, taking care of children, and fulfilling family obligations. Additionally, the abundance of fast food restaurants and the convenience of unhealthy snacks can make it tempting to prioritize speed and convenience over healthy eating habits. This is further compounded by the societal emphasis on productivity (Mathieu, 2009).

1.3 Nutrition Care Process

'Nutrition Care Process (NCP)' is a methodical and efficient process that nutritionist and dietitians apply to deliver nutrition support. The 'Nutrition Care Process Model (NCPM)' illustrates the NCP by showing the flow of work of the dietitians and nutritionists in varied nutrition care settings. Application of the NCPM includes the use of a shared framework for nutritional support and scientific investigation, development of critical thinking, attentive nutrition support reporting, heightened acknowledgment of the importance of nutrition care by other health care professional, and better claim of evidence-based procedures and policies.

The NCP includes four steps which are found in the scientific bibliography with the following terms: a) Nutrition Assessment and Reassessment, b) Nutrition Diagnosis, c) Nutrition Intervention, and d) Nutrition Monitoring and Evaluation (Swan et al., 2017; Memmer et al., 2013).

In a review, Ichimasa (2015) reported that interaction and continuous communication among health care professionals provide the best results to the patients. The NCP has enhanced efficiency and effectiveness as dietitians are writing diagnosis, and focused documentation with individual plans for intervention. It is suggested that the NCP is an efficient and effective instrument to deliver better nutrition care.

The study done by Williams et al (2019) determined the usefulness of personalized nutrition care for body mass control as implemented by dietitians in contrast to any diet therapy. Participants receiving the dietitians' intervention showed statistical significance as they lost additional 1.03 kg of weight and 0.43 kg/m^2 of BMI than those getting typical care comparing. The research was the initial one to determine the success of personalized nutrition care provided by dietetic professionals.

Presently there are not well-defined guidelines of which method is the most effective in body mass control for adults in Cyprus. So, it is essential to contact advance research for behaviour change through nutrition education and exercise for the Cypriot population with the use of NCP. Further, there is a need to develop guidelines to overcome body weight problems through life spam which is necessary to be in compliance with the European goals to battle the obesity epidemic.

1.4 Innovation/Rationale, Purpose of the project

The innovation and rationale of this project is the use of nutrition education and exercise including mindfulness and behaviour change with the use of NCP for the management of obesity epidemic. Based to the literature review there is limited research on the use of NCP for the management of obesity in conjunction with the behaviour change for adults.

Dietitians and nutritionists have the responsibility in the impediment and treatment for obesity for children and teenagers. Pfeifflé, (2019) identified the most popular recommendations for nutritional management of pediatric overweight and obesity, which includes behaviour techniques, to recommend a structured plan helping dietitians and nutritionists in making the correct decisions.

The current study targeted to identify barrier to eating health and exercising to create healthy lifestyle guidelines for behaviour change through nutrition education and exercise for dealing with body mass problems accustomed to the demands for the people in Cyprus with the use of

Nutrition Care Plan (NCP). Emphasis to the use and implementation of NCP for weight management will be given. This educational method includes the eating and physical activity behaviour and all the other factors linked to eating and physical activity patterns. The importance of this project is to emphasize weight management as a chronic health problem with a great deal of reverting.

This project intends to promote the development and usage of the NCP process for the management of body weight adapted to the lifestyle of people in Cyprus. The purpose is the decrease of the weight problem in Cyprus and furthermore in Europe.

1.5 Research Questions

1. What are the effects of nutrition education, mindful eating, exercise, and behaviour change with the implementation of NCP on weight management?
2. Is nutrition education for dietary lifestyle and exercise with NCP a more effective way for weight loss in the case of obesity/overweight?
3. Is there a major effect and impact of the dietary and exercise behaviour with the use of NCP on weight maintenance?

1.6 Conclusion

The current project at issue, studies the relation between nutrition education and physical activity on weight management in primary care in Cyprus using Nutrition Care Process with emphasis on nutrition education, including mindful eating and physical activity behaviour.

2. CHAPTER 2 Literature Review

This chapter outlines the literature review in relation to obesity and the Nutrition Care process and its significance to the treatment of obesity. In order to have a broad overview of the subject the literature review covers the last 20 years and in certain cases includes literature review that is considered important to the current project.

2.1 Overweight and Obesity Epidemic

Obesity is increasing worldwide. The World Health Organization (WHO, 1998) categorized obesity as an epidemic that is continuously increasing, and immediate actions should be taken (Caballero 2007). There are different definitions for obesity-based fat accumulation and BMI (Purnell, 2018).

Specifically, the International Obesity Task Force (IOTF) endorsed a classification for BMI for adult overweight and obesity: 35-29.9 kg/m^2 for obesity and 30 -24.9 kg/m^2 for overweight. Overweight (OW) and obesity (OB) increase the prevalence for chronic disorders, such as diabetes mellitus, heart problems, and various forms of cancer. Nowadays overweight and obesity are not only problems of the developed countries but also the underdeveloped (Bhurosy T. & Jeewon R., 2014; IOTF 2016).

The United Nations found obesity rising in all developing countries, as well as in nations where there is undernutrition. Some facts presented by WHO (2021) are as follows: OB has increased by 3 times within the decade of 1970's. Since 2016 it has been reported a rate of almost to 2 billion adults were OW whereas the 650 million were OB and 39% of adults were overweight and 13% were obese. It seems that more deaths are related to OB than to malnutrition worldwide. Furthermore, 39 million reported as OW in 2020. A very high rate of obesity is emerging among patients admitted to the intensive care unit for Covid-19, while the severity of the disease is enhanced by an increase in BMI (Petrilli, 2020). OB people with BMI> 40 kg / m² with Covid-19 have 2 times more chances to get hospitalized (Chiapetta, 2020). Table 2.1 illustrates the incidence of OB throughout the world (IOTF 2009) and Figure 2.1 shows the OB among adults, 2015 or nearest year.

Table 2-1 Obese Adults (%) worldwide

Country	Percentage of Obese Men	Percentage of Obese Women
Finland (2005)	14.4	19.3
Russia	10.8	27.9
England	17	20
Germany	17.2	19.3
Czech	16.3	20.2
Scotland	15.9	17.3
Belgium	12.1	18.4
Spain	11.5	15.2
Sweden	10	11.9
France	9.6	10.5
Denmark	10	9
Holland	8.4	8.3
Italy	6.5	6.3
Cyprus (1999 – 2000)	26.6	23.7
Cyprus (2009)	28.8	26.9
Greece (2003)	26	18.2
Australia	18	18
USA	31.1	33.2

International Obesity Task Force (IOTF) 2009
Andreou E., et al (2009)

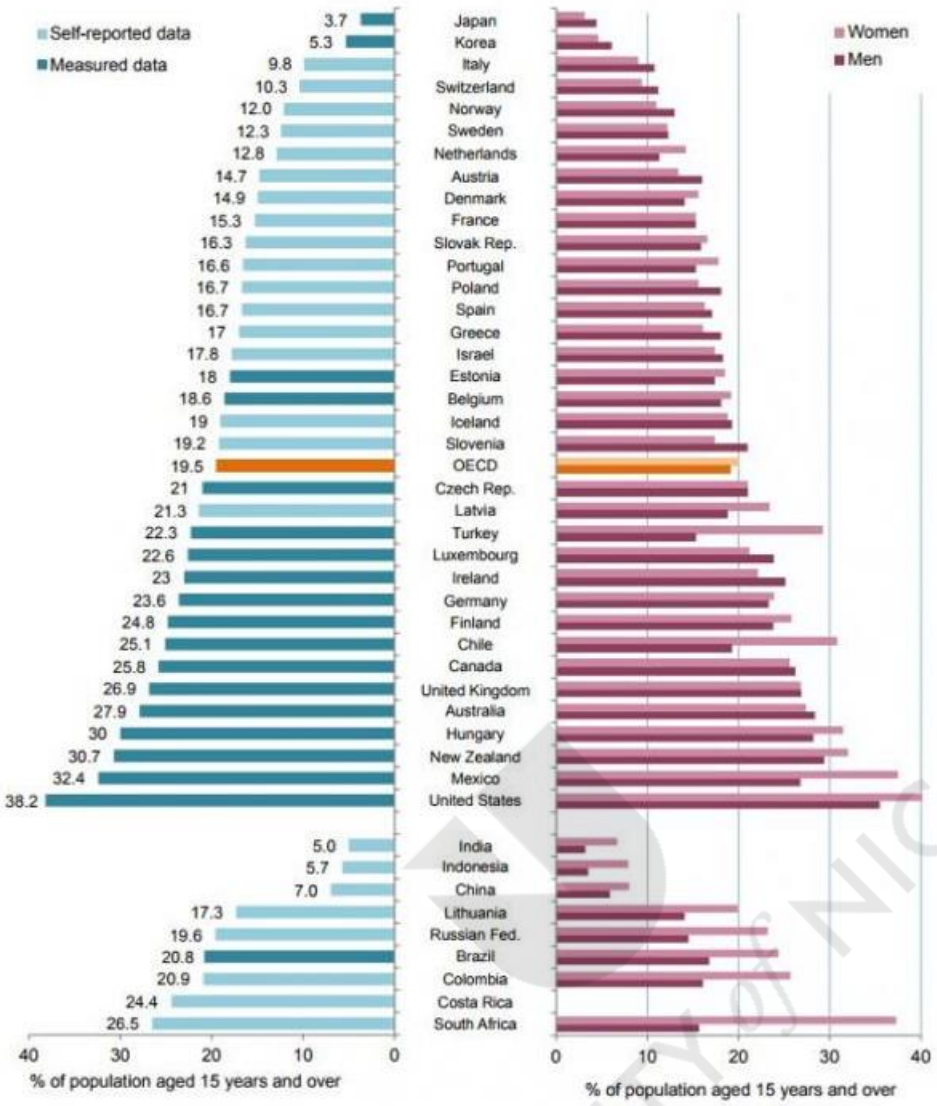


Figure 2.1 Obesity among adults 2015 Organization for Economic Co-operation and Development (OECD)

Based on the data from the National Health and Nutrition Examination Survey (NHANES) for adults, in 2013–2014, one in three were OW, two to three were OW and OB, one in three were perceived to be OB and finally one in thirteen to be morbid OB (Flegal, 2016).

In 1991 WHO reported that obese cypriot males were 19% and obese cypriot females were 24 percent. According to Loizou et al, in 2006 there were about 34 percent% overweight and 23% obese Cypriot adults. Also, in 2009 the Cyprus Dietetic Association showed that the overweight population in Cyprus were 36% and the obese were 27.8% (Andreou et al, 2012). Further research is needed to update the prevalence of overweight and obesity in Cyprus now a days.

Based on Kafatos et al (2003) the Mediterranean Diet has many health benefits and suggested that the changes in lifestyle have affected the changes in eating habits and physical activity. Mediterranean people eat more fast food and cough physical activity in their lives. The consequences of this change promoted an escalation in OW and OB in the Mediterranean countries and worldwide. So, epidemiologists consider obesity as an epidemic hurting millions of people. However, the traditional Mediterranean diet associated with decrease in OB and health related problems was district from the current diet in the Mediterranean area. In Crete, a Greek island, 33% of the children were OW and ≥ than 50% of the people over 18 years were OW or OB. In 2003 mean body weigh was 80 kg whereas in the 60s it was 63 kg. The avoidance of the Mediterranean diet with high consumption of animal sources led to increase in OW and OB in Crete.

Based on the Epidemiological study completed in Cyprus, the determination of the ratio of OB and OW was proven to be high. Further, the study showed that Cypriots eat unhealthily and don't exercise as they don't consider it as important. The results revealed that 63% of the Cypriot adults had a good idea of their weight status of being above the normal weight. This study's results showed that 76% for male and 53% for female were OW and OB. Overall, 36% were overweight and 27.8% obese (Andreou et al., 2009).

The Childhood Obesity Surveillance Initiative (COSI) reveal that in South Europe the OB in childhood is higher. In Cyprus, Greece, Italy, Malta, San Marino and Spain, nearly one in five boys were OB. Denmark, France, Ireland, Latvia and Norway had low rates of OB in childhood (WHO, 2018). Based on IOTF (2005) Cyprus was third in weight problems in Europe. Additionally, in another research done in Cyprus (Loizou, et al., 2006), OB was about 20% and OW about 35% of the adult population. The summary of the advantages of health of the 10kg weight loss is presented in Table 2.2.

Table 2-2 Health advantages from 10 kg weight loss (NHLBI, NIH, 2000)

Mortality:

- Decrease > 20% of total mortality
- Decrease > 30% of diabetes incidences
- Decrease > 40% of obesity and cancer

Blood Pressure:

- Decrease 10mm Hg systolic
- Decrease 20mm Hg diastolic

Diabetes:

- Decrease 50% of fasting blood glucose

Blood lipids:

- Decrease 10% in total cholesterol
- Decrease 15% in LDL
- Decrease 30% in triglycerides
- Increase 8% in HDL

Obese people should not only follow a diet with no exercise or exercise with no dieting to lose weight but in combination. Research showed that a combination of a diet low in calories, systematic physical activity, and behavioural change will lead to better results. Behaviour change therapy program should include lifestyle changes including food consumption, exercise, and ways of healthy lifestyle (Calle et al., 2003).

According to obesity and overweight screening, besides Body Mass Index (BMI), Waist Circumference (WCir), Waist to Hip Ratio (WHR), recent research suggests Neck ratio (NC) measurement another simple, convenient, inexpensive screening measure to identify overweight and obese participants. Overweight are considered men with NC ≥34.75 cm and women with NC ≥31.75 cm while obese are considered men with NC ≥35.25 cm and women with NC ≥34.25 cm (Qureshi et al, 2017; Valencia-Sosa, et al 2019).

2.2 Behavioural Change

Behaviour change is described as an attempt to decrease or increase a specific type of behaviour or response. Parentages use this to let their children understand what the right thing is to do and what is the wrong thing to avoid. Counsellors utilize it to encourage healthful behaviours.

The term "behaviour change" in the case of weight loss refers to reducing quantities of food, enhancing active lifestyle, and intensifying the dietary awareness, food habits and selections for a lifetime. Sometimes people can manage to lose weight on their own, but the goal should be to maintain it. Studies show that diet only or physical activity only or doing both are not so effective in long term as when behaviour therapy programs are also completed. Weight loss and maintenance are difficult to succeed because of genetics, environmental pressures, and lifelong changes (Wadden 2004; Martin 2007). Most studies (NHLBI, 1998) show that successful weight loss includes physical activity. The duration should be for 30 min/day for at least 4 days in a week. Frequent physical activity is correlated to better long - term results as far as weight long-term (Vogel et al., 2009). The advantages of healthy lifestyle are listed in table 2.3 and table 2.4. Recommendations for exercise are shown in table 2.5. In the Surgeon General of the United States a published statement on "*Physical Activity and Health*" (Booth el al, 2012; Welk et al, 2001). The best weight management is when health professionals combine healthy eating/diet, exercise, and behaviour change programs (NHLBI 2010).

Table 2-3 Healthy Eating guidelines Adapted from Willett WC, Skerrett PJ, 2017

Increase dietary fiber by eating more whole grain foods, legumes, fruits and vegetables.
Choose 'Good' Fat – Prefer monounsaturated fat such as olive oil and polyunsaturated fat such as vegetable oil and avoid trans fats (margarines), saturated fats (red meat, whole fat milk).
Choose foods high in protein and low in saturated fats.
Have at least 5 servings of fruits and vegetables.
Stay hydrated with water and avoid caffeinated drinks.

Table 2-4 Regular Physical Activity, Health Benefits by Vogel et al, 2009

Better fitness level
Stronger bones and joints
Increase endurance and build muscle mass
Weight control
Decrease risks for CVD, some types of cancer and diabetes type II
Regulate Blood pressure
Well-being and better self-esteem
Stress management

Table 2-5 WHO's recommendations for Physical Activity 2020

1. Adults aged 18-64 should engage in moderate-intensity aerobic physical activity for at least 150-300 minutes per week, or vigorous-intensity aerobic activity for at least 75-150 minutes per week, or a combination of both.
2. In addition, muscle-strengthening activities that involve all major muscle groups should be done at moderate or greater intensity for at least 2 days a week for additional health benefits.
3. Adults can increase moderate-intensity aerobic physical activity to more than 300 minutes or do more than 150 minutes of vigorous-intensity aerobic activity, or a combination of both, for added health benefits.
4. Adults should aim to limit the amount of time spent being sedentary and instead engage in physical activity of any intensity, including light intensity, to provide health benefits.
5. To help reduce negative effects of high levels of sedentary behavior on health, adults should strive to do more than the recommended levels of moderate to vigorous-intensity physical activity.

2.3 Effectiveness of Behavioural Change programs for Obesity and Overweight

Behavioural approaches for obesity treatment are dated back in the 1960's. (Wadden et al, 1994). The program for lifestyle changes improved health related risk factors such as CVD and Diabetes Mellitus (Venditi et al., 2007). This study lasted for a year and examined how much reduction of weight was necessary for the benefits regarding type II diabetic patients. Body mass reduction was correlated with progress in glycosylated haemoglobin (HbA1C) values after treatment. Participants with more than 5% decrease of body weight presented improvement in Hb1AC while the participants with less weight loss presented no improvement in their Hb1AC and those with weight gain intensify their health problem.

According to Wing et al, (1998) the effectiveness of lifestyle intervention was studied on weight management, heart diseases, and frequency of diabetes mellitus in OW patients. In the same research OW people (30-100% over IBW), had at least one of the parents diabetic and were randomly allocated to the treatment program for two years with dietary intervention (energy and fat control), physical activity (moderate activity), or a diet & exercise group or to a control group (without diet or exercise). In 180 days, the intervention group had better results related to eating, exercise, and fitness than the control group. Body weight reduction was linked to decreased cardiovascular problems. Weight loss lowered the risk of creating type II diabetes.

In a study done by Wing et al (2001) results suggested that self-monitoring of weight and food consumption and uniformity of food choices assisted in weight management. Patients that exercise less had mood swings and more stress presented, more attempts of skipping planed exercise and had greater weight gains.

Based on NHLBI (2002) recommendations, dietitians, and nutritionist as well as other health professionals can include different aspects of behavioural therapy for weight control. The first step is to offer a plan that includes attainable goals. Frequent patient interaction, at the first 6 months of nutrition intervention was promoted and goals were set until the following appointment. Interaction and communication are essential with all the health professionals.

2.4 Behaviour changes methods for weight control

Behavioural methods for weight management for obesity and overweight suggest that nutrition and physical activity actions are linked to body weight and that actions can be improved by

altering the backgrounds or/and signs in the environment, that come beforehand of the actions and lead to its happening, and the outcomes that arise afterwards (Wing et al., 1998). So, the first step is the need to evaluate the action and then modify the experiences and outcomes monitoring the actions of the behaviour. To manage the actions, it is needed to find a path to control the actions such as in planned body weight reduction regime, food consumption and exercising should be frequently personally checked. One way to do this is to have the patients keep a diary by writing all foods consumed and all physical activities done in a day or week (Litchman, et al., 1992). One limitation of this is that patients might not write down the exact quantities of food eaten but this procedure is very helpful as patients and health professionals can recognise specific problem for example the quantity of food consumed.

Jill (2018) suggested that offering behavioural interventions for losing weight in obese adults resulted in significant weight loss of about 5%. There is also indication of diminished cases of diabetes, but on the other hand it is less apparent for heart disease, hypertension and cholesterol. There is some indication that behavioural interventions support individuals sustain their weight loss for a long time. Concluding that today there is no evidence that these programs will cause any harm.

Lichtman et al (1992) suggested in older bibliography that OB patients can never achieve their weight goal even with the reduction calories. So, they studied the energy expenditure and the possibility of not reporting the actual quantities of food consumed. The subjects in first group reported less quantities of food consumed and more physical activity that actual done. Concluding, the reason subjects failed to lose weight was because they ate more than they actually reported and exercise less. Behavioural methods involved methods to alter physical, social, and cognitive signs. Another important factor of a behavioural programme was boosting strengthens for innovative, proper manners. People were trained to identify minimum encouraging variations in their manners and to compensate them with minimum substantial prizes for their improvement.

Programs that included nutrition plan, physical activity program, and cognitive behavioural tactics should be targeted to overweight/obesity including the families (Kelley et al., 2016). Behavioural treatment programs were used to assist obese people to achieve lasting modifications in their habits in conjunction to dietary plan and exercise. Studies suggested that longer periods of behavioural treatment programs have better results. Present recommendations for managing OW and OB suggested a programme of diet & exercise & lifestyle change for all

individuals having BMI of at least 30. Behavioural treatment required a methodology which enables someone to meet goals set for calorie intake and calorie expenditure. Fabricatore et al (2009) suggested that programs that are tailored to lifestyle changes must include cognitive change. The elements of behavioural change are presented in table 2.6.

Table 2-6 Elements of Behaviour change taken from Foreyt & Goodrick, 2004

Element	Description	Examples
Self-monitoring	Recording of target behaviours and factors associated with behaviours	Food and exercise records, moods and environment associated with overeating
Stimulus control	Restricting environmental factors associated with inappropriate behaviours	Keep away from high-fat foods; eat at specific times and places; set aside time and place for exercise
Contingency management	Rewarding appropriate behaviours	Give prizes for achieving exercise goals
Changing behaviour parameters	Directly altering target behaviour topology	Slow down eating; self-regulate exercise
Cognitive-behaviour modification	Changing thinking patterns related to target behaviours	Counter social pressure to be thin to reduce temptation to diet

Self-monitoring is very important factor of any weight loss program. In a systematic review by Burke et al (2011) on 22 studies between 1993 and 2009 the relation among personal checking and body weight reduction was studied and a great association among them was found. One significant limitations of the reviewed studies were reliance on self-report.

Stimulus control involves the alteration of indications leading to inappropriate nutrition or lack of exercise (Rodin et al, 2002). Studies of research on behavioural treatments indicated that self-control of food cues might improve self-control of eating because their presentation promoted biological changes (i.e., insulin) which led to binging (Wilfley 1998).

Immediate management was utilized to include the use of motivations for lifestyle changes of body mass reduction. Agreements were used to make official arrangements. Agreements emphasized on improving beneficial behaviours related with weight loss (Jeffery, 2011).

A randomized controlled trial studied of 88 patients with morbid obesity treated with Cognitive Behavioural Treatment and achieved a mean weight loss of 15% for one year, with no propensity to take back any weight between 6-12 months. The effectiveness of therapy was also endorsed by the results of a study evaluating the impacts of group Cognitive Behavioural Treatment for obese carried out in a real-world clinical establishment, where77 patients with morbid obesity who finished the therapy attained 9.9% weight loss following 18 months. These encouraging findings indicated that Cognitive Behavioural Treatment for obesity had the capability to be more successful than conventional weight-loss lifestyle-modification programs (Grave et al, 2011; Gave & Galugi, 2020).

Studies conducted in Cyprus and Greece on OB and OW stated that there was an important requirement for investigations linked to behavioural change for diet and exercise (Philippou et al, 2012; Savva et al, 2005; Manios et al, 2006; Trichopoulou, et al, 2005).

Philippou et al (2012) investigated the outcomes of body mass reduction with or without physical activity on body fat percentage (BF%) and other somatometrics in OW and OB people in Cyprus over 18 years of age. The findings revealed no alteration in either group. Throughout the treatment, weight, BMI and WCir diminished substantially only in the people that followed a weight reduction diet. In addition, BF was found to be considerably decreased for the diet & exercise group in relation to the diet group. Regardless of the lessened effects of diet alone on body weight having both a diet and exercise for weight management its important as it improved BF levels which may have vital benefits on several diseases long term.

2.5 Weight loss and nutrition behaviour programs

Most behavioural programmes underline diet changes such as decreasing calories consumed and limiting fat intake. Usually at some weight loss programmes the goal is to reduce the calories consumed by decreasing 300 kcal per day in order to lose about half a kg per week. In the early 1980's very low-calorie diets (VLCD) usually lower than 900 kcal/day, have being especially used. In 2003 the NTFPTO reported data on how safe, reliable, and effective were VLCDs and delivered reasonable suggestions. VLCDs leaded to about 20 kg weight loss after 3-4 months whereas standard low-calorie diets 1200 kcal/d, leaded to only 6 to 8 kg for 3-4

months. The most common side effect of VLCDs is cholelithiasis. VLCDs were recommended only under medical supervision to obese patients and were helpful in promoting substantial short-term weight loss. When exercise and behavioural change programme were added to VLCD therapy regimes appeared to make better sustainability of body mass. Unfortunately, when the VLCD stopped, weight regain was usual. Several studies intended to investigate the combination of VLCD and behaviour modification. The blend of behaviour change regimes with VLCD was discovered to give better results comparing to VLCD only. Better results were also observed when behaviour modification was combined with LCD than with VLCD (Wing et al., 1991). In studies with behavioural programs that also limited fat intake and energy had shown to be even more successful than limiting fat only or minimising energy only (Pascale et al., 1995).

Schlundt (1993) examined the effectiveness of a low fat with a high carbohydrate diet for weight loss. Participants were randomized to low fat, high carbohydrate diet or low fat with low-calorie behaviour modification treatments for 4-5 months duration programme. Both groups were exercising for five sessions per week. The low-calorie group lost significantly more weight (males about 12 kg and females about 8kg) than the group with limited fat intake (men about 8kg and women about 4kg). The low-calorie group had lost more body fat. Both groups demonstrated improvements in eating habits.

Another study indicated that a diet high in carbohydrate without limiting calories leaded to lose weight and fat in adults in both sexes. They compared energy control to energy and fat control in OB diabetic individuals or having diabetes in their families. The research involved OB females with Type II Diabetes (total 44) and OB females with a Type II Diabetes (total 46) in their families. The participants were assigned to energy control group or to energy and fat control group. The research was 16-week duration with behavioural weight loss programme including nutrition guidelines, exercise plan, and behaviour change programme. The energy control group was provided an energy control diet plan only and they self-monitored their energy intake. The energy and fat control group was provided with the same energy control diet as the other group and a diet with 20% less energy intake from fat. Among the participants with Type II diabetes, body mass loss of energy and fat control group (7.7 kg weight loss) was significantly more than participants in the energy control group (4.6 kg weight loss). At 12 months follow up the energy and fat control group keep the weight loss of about 5 kg better than the energy control group (only one kilo weight maintained). After 16 weeks of treatment both groups had significant declines in glucose, LDL, and total cholesterol (Hays et al, 2006).

In a study done by Wing and Hill (2001), they characterized effective body mass loss and maintenance of at least 10% of initial body weight when the weight was maintained for one year. Results showed that if the participants that lost weight maintained it for 2-5 years, the possibilities of longer maintenance significantly rise. These participants indicated that they stayed on an energy and fat control dietary intake.

Many behavioural regimes on body weight control are successful at short-term and often relapses occur at long-term. In a study done by Lawlor et al (2020), they compared cognitive and behavioural strategies among people who either regain body mass or maintain it. The results showed that differences in strategies were that participants that maintained their weight loss continued to care about their dietary intake, expected and prepared for possible failures in difficult circumstances, and handled pressures applying diversion methods. Participants that regain their body mass did not describe creating strategies, did not take seriously their food intake, found diversion methods to be useless and seemed to have trouble controlling food intake in social interactions.

In another study by Metz et al 2000, participants in behavioural weight loss programmes were encouraged to choose foods that offered the greatest nutritional value with the minimum calories and the target was also to decrease the total fat intake. Participants were instructed to replace lower calorie foods with higher calorie options, to limit use of fat in cooking, and to alter beloved high fat recipes with less fat. Moreover, offering improved structure healthy eating was part of behavioural modification. Offering structure to participants on what and when they should eat, and healthy recipes, may possibly be very helpful in promoting eating obedience.

In a recent study, Mason & colleagues (2019) assessed the impact of dietary habits on body mass loss program adherence and the intervention adherence on eating behaviours amongst OW and OB postmenopausal women. To do so, they performed a 12-month randomised trial where women were on 1) a dietary body weight loss program with an aim of 10% weight loss; 2) about 4 hours per week aerobic exercise program; 3) integrated diet and exercise program; or 4) no change in diet or exercise (control group). The dietary habits assessed by questionnaire as well as the mean change in weight were assessed at starting point and 12 months after the intervention programs of food intake and physical activity. The study reported a significant reduction in gorge consumption of food, no control in food consumption and disturbing eating

and significant increase in controlled eating in women that were on a dietary intervention compared to the control. In addition, the diet and exercise intervention group reported a decrease in eating without control, disturbing eating, and increased controlled eating in comparing to the control group. However, the exercise alone group did not report any significant change in their eating behaviours. Mason et al (2019), concluded that a dietary weight loss intervention can positively modify the eating behaviours of women, however further studies are needed to characterise the optimal behavioural weight loss intervention for obese women but also women with disordered eating.

Varkevisser et al (2018) emphasized that understanding the factors that affect weight loss and maintenance is vital in the development of future interventions and guidelines concerning overweight and obesity. The results of this study suggested that demographic aspects did not predict body mass loss and maintenance. Behavioural and thinking factors which encouraged decrease in energy consumption, a rise in energy spending and checking this equilibrium were prognostic factors.

2.6 Weight loss, physical activity, and weight control

In most physical activity intervention programs body mass loss is often low. Caudwell et al (2009) studied how monitored exercise affect appetite and body weight. OB participants (total 58) were given an exercise program to follow for 12 weeks, 5 times/week. The exercise program aimed to utilize 500 kcal per session. The results showed a decrease in body mass of about 3.2 kg. Those participants who failed to lose weight had increase calories consumption. The results of this study suggested that even when obese people exercise and utilize a lot of energy, still there is a need to follow a diet to lose weight.

In the following study they investigated how physical activity affected the management of OW and OB among adults. The effects of a 4-month energy control diet plan and high level of physical activity on body composition were assessed. Men (total 60) with average age of 43 years old and mean body weight of 94 kilos were randomly allocated to a calorie-controlled diet of 1000-1500 kcal/day (Wing et al., 2001; Tate et al., 2001). Every group was also randomly allocated to a low-moderate intensity physical activity programme or high-level physical activity programme for three 30 minutes meetings per week. High level physical activity increased O_2max by approximately 24% with no substantial variations in body mass,

composition, and fat percentage. When calories were decreased there was a decrease in all the following: about 10 kilos in body mass, 2.5 kilos in LBM, 7.7 kilos in fat, 0.03 waist to hip ratio, and the sum of 6 skinfolds of 26.9 mm ($P < 0.001$). The results showed that energy restriction without high level physical activity had significant decreases in BMI, LBM, and FM. The group with the high level of physical activityy had also decreased in FM dissemination or body composition.

Jakicic et al (1999) evaluated the impacts of different types of physical activities in losing weight. OW sedentary men (total 148) enrolled in a weight control programme. The participants were assigned in 3 groups: long-bout exercise (LB), multiple short-bout exercise (SB), or multiple short-bout exercise with home exercise equipment (SBEQ) using a treadmill. At 18 months, mean weight loss was significantly greater in the SBEQ group in relation to the SB group (-7.4 kg vs -3.7 kg; $P<0.05$). Mean weight loss for the LB group (-5.8 kg) was not significantly different than for participants in the SB group or SBEQ group. All participants revealed an increase in fitness level, without any difference among groups. In participants who exercised for more than 3 hours and 20 minutes per week the mean weight mass lost at 18 months was considerably larger in relation to the participants who exercised for 2.5 – 3 hours per week.

Based on Grave (2011) participation in behavioural weight loss programmes is supported to improve their physical activity slowly and prevent harm. Overweight or obese participants are taught to slowly increase their movement until they reach a point of at least 1000 calories per week. Participants selected the type of physical activity but usually they preferred walking. Walking for one mile burns about 150 kcal (the heavier the participants the more calories they used). Usually overweight or obese participants were offered a target of attaining minimum of 150 minutes every week of physical activity, utilizing quick walking or other similar activities.

In a systematic review the findings revealed that an average weight mass reduction of 5 to 9 kilos was detected throughout the first 180 days for the interventions group including an energy restricted diet plan with or without medication for weight mass reduction. In studies lasted for 2 years, a mean weight loss of 3-6 kilos was sustained with no one gaining back the lost weight. When participants had counselling only or physical activity only the weight loss was at minimum levels. Weight loss programs with added medication showed enhanced maintenance of weight loss (Franz et al, 2007).

Usually, the weight loss programs with behavioural change include endurance exercise. Wadden et al (1998) examined anaerobic exercise and the combination of anaerobic and aerobic/endurance exercise. Th results showed no difference in the amount of weight lost with the different kinds of training. The importance of physical activity for weight loss and maintenance was studied by Klem et al (1997). The data showed that 91% of participants revealed that physical activity was one of the main reasons for maintenance of weight loss. Also, data suggested that participants that were successful in losing weight were exercising for more than an hour a day.

In the following study Johns et al (2014) studied the usefulness of blended behavioural weight management programs (BWMPs) aiming weight mass reduction in relation to programs that included only energy reduction or only exercise. Collective findings revealed no substantial variation in weight mass loss from the beginning of the program or at 3 to 6 months among the two groups. Though, a considerably more weight mass loss was observed in the BWMPs group at one year. Weight mass loss was about the same in the short-term for only energy restricted regimes and combined BWMPs but in the longer-term weight mass loss was increased when energy restricted regime and exercise were combined. Programs centered only on exercise were not as successful as programs that included BWMPs.

Research reported that about 27% of OW and OB people over 18-year-old that took part in a behavioural weight-loss program achieved 10% weight loss at 2 years (Jakicic et al 2008). This verified how difficult was to accomplish and sustain weight mass loss for a long time.

People participated in behavioural programs were asked to keep track and record all daily physical actions. They were usually taught to keep track of the physical activity sessions that last at least 10 minutes. Participants in behavioural weight loss programs were driven to recognize activities and to plan practices, for example park their car away from their offices and walk to work, walking up the stairways instead of using the elevator, walking to stores that are not far from them. Such daily life events were studied for long-term organised physical activity session. The major obstacle to exercising was reported as ‘no time in my busy schedule’. Participants reported that it was better to do physical activity for several 10 min periods instead of a forty-minute session. Researchers examined the consequences of physical activity in a 40 min session per day for five days per week and four ten-minute sessions for five days in a week. Everything else was the same for both groups. The four ten-minute sessions per day had better preliminary obedience and similar long-term alterations in weight and

cardiac fitness levels to the 40 min session for five days per week. Consequently, training in short sessions of ten minute, four times a day might be a beneficial alternative for some overweight and obese people (Jakicic et al., 1995; 1999).

Studies done on children showed that reducing the amount of time (hours) per week of sedentary activities (watching television, playing pc games) could be an efficient and valuable method for controlling weight. Epstein et al (1995) assessed the impacts of increasing exercise, diminishing inactive behaviour, and doing both for overweight children (8–12-year-olds). The children who reduced inactive time had improved long-term weight management result and improved physical fitness levels. So, this indicated when children diminished inactive behaviours, they embraced further physically active actions. Maintenance of exercising was the most important aspect for long-term weight loss (Wing et al., 1999), even though it was inspiring for children to maintain an active lifestyle long-term. Behavioural programmes educate children to deal with frequent obstacles to exercise, for example training in bad weather conditions. The best motivational approach for physical activity was to encourage people to choose activities that they like.

Robinson (1999) studied the correlation among tv watching and children and adolescent overweight and obesity. So, they assessed the impacts of decreasing television, video watching and video game playing to body fat levels, physical activity frequency and diet habits. A randomized controlled school-based trial was done in two elementary schools among 8- and 9-year-old students. In the intervention group the students had 180 days educational program in class to lessen watching tv and decrease time playing. The intervention group had substantial decrease in BMI, BF, WCir and WHR. In conclusion decreasing tv and movie watching, and video game playing might prevent childhood obesity.

In a study where emphasis was given to physical activity only without decreasing energy intake, it was not determined whether the loss of weight was due to physical activity only or whether the subjects changed their energy consumption since they were participated in a physical activity program. Vigorous exercise training affected much more weight losses once calorie intake was kept steady (Wing et al., 1999).

When exercise program was added to dietary plan this could altered the composition of weight loss. Ballor et al (1994) suggested that almost 75% of weight loss by dieting (lowering calories) was from body fat loss. Garrow et al, (1995) announced that physical activity could decrease the loss of fat free mass (FFM). The results showed that the participants with an average loss

10 kg and frequent physical activity reduced the percentage of the lost weight as FFM, from roughly 28 to 13 percent in men and from 24 to 11 percent in women.

2.7 Physical activity guidelines

Based on NHLBI (2000) the guidelines for adults for physical activity program must encourage an expenditure of about 300-500 kcal per training session and 1,000- 2,000 kcal per week. For the OB people the recommendation deferred at the beginning of the program to start with a moderate level of physical activity of 30 - 45 min duration for 3-5 days per week. This could be attained by starting slowly and increasing the frequency to most days of the week (Mitchell 2006).

The American College of Sports Medicine (ACSM) is widely considered as the primary authority for creating exercise programs, despite the existence of other guidelines for physical activity. In the late 1970s, the ACSM recommended that individuals perform aerobic exercise 3-5 times a week for 15-60 minutes, with the goal of burning 300 calories per session. In 1990, the guidelines were updated to include the addition of strength training, and the importance of personalized exercise plans was emphasized. In 2006, the ACSM collaborated with the Centers for Disease Control and Prevention (CDC) to update the guidelines further. The recommendations for aerobic activity were increased to a minimum of 30 minutes of moderate intensity physical activity on most days of the week. Additionally, the ACSM suggested that short bouts of exercise, such as 10-minute sessions (3 times a day), could provide similar health benefits as a 30-minute session (Mitchell et al., 2006; Ferguson 2018).

The Institute of Medicine recommends 60 minutes of moderate intensity physical activity daily, while the President's Council on Physical Fitness and Sports suggests 20 minutes of vigorous activity at least three times a week. The American Heart Association suggests 30-60 minutes of physical activity to be done 5-7 days per week (Brooks 2004).

The ACSM has provided exercise guidelines for weight loss and overall health. They suggest engaging in 30-60 minutes of moderate-intensity aerobic activity at least 5 times a week, or 20-60 minutes of vigorous aerobic activity at least 3 times a week. Additionally, they recommend performing resistance training 2-3 times per week and flexibility exercises for all muscle

groups, including both static and dynamic stretching, at least 2-3 times a week. These recommendations are based on recent scientific research and can be used by healthcare professionals to advise patients on weight loss and maintaining good health. (ACSM, 2018). Exercise improves fitness level and overall health and feeling well. It is well known that physical activity can minimize the probability of generating numerous illnesses as diabetes mellitus type II, some forms of cancer and heart related disease. Regular exercise/physical activity can decrease anxiety and nervousness, improve chemicals and hormones related to happiness, improve self-confidence, decrease memory problems and improve muscle mass and skeletal health. Physical activity offers short- and long-term health benefits improving the quality of life. The recommendation is at least of 30 minutes every day (Abou, 2016).

2.8 Nutrition Care Process

Providing outstanding nutrition care means getting the simplest option at the right time, within the most appropriate way, for the proper person, and attaining the most effective outcomes. Findings from research studies indicate that, when a regulated procedure was implemented, not such a lot of variety but instead more uniformity concerning outcomes occurred. The same Nutrition Care Process successfully supports the dietetics specialists who is the only nutrition provider of nutrition care when it is consistently used as a scientific technique to assume essentially and decide on choices to relinquish secure and convincing nutrition care. The NCP is illustrated in figure 2.2 (Lacey and Pritchett, 2003).

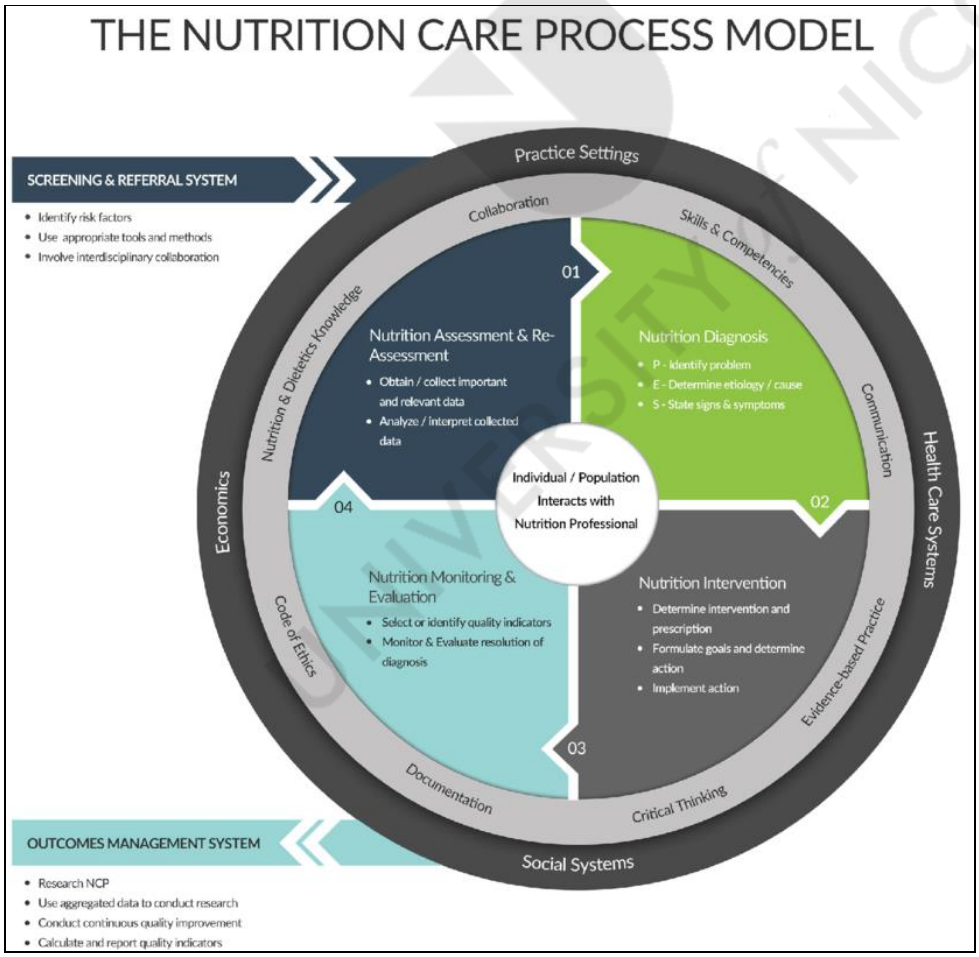
- Nutrition Assessment and Reassessment: The RDN collects and documents evidence, for instance, food or nutrition associated record; biochemical info, clinical tests and anthropometric measurements, nutrition results and patient's history

- Nutrition Diagnosis: Data collected during the nutrition assessment directs the RDN in determination of the proper nutrition diagnosis(es) (i.e., naming explicit issues) terms.

- Nutrition Intervention: The RDN at that point chooses the nutrition intervention(s) that will be coordinated to the underlying aetiology and additionally pointed toward mitigating the signs and symptoms of each diagnosis.

- Nutrition Monitoring/Evaluation: The last advance of the process is monitoring and evaluating, which the RDN uses to decide whether the patient has accomplished, or is gaining ground toward, the planned goals.

Figure 2.2 The Nutrition Care Process Lacey & Pritchett



The four distinct but interellated and connected steps of the Nutrition Care Process and Model

The study by Yeong et al. (2020) aimed to examine the effects of a nutrition care process (NCP) intervention on severely obese children and adolescents in Korea. The participants, with an average age of 11 and a weight record (BMI) above the 97th percentile, were divided into two groups: a usual care group (UG) and a nutrition group (NG). Both groups received nutrition education, but the NG also had specific goals related to healthy eating. The study found that the NG group decreased their intake of unhealthy, low-nutrient foods ($P < .05$) and improved their Diet Quality Index-International (DQI-I) score for sodium ($P < .001$). After 24 weeks, the NG group also had a reduction in their BMI-z-score from 2.27 to 2.19 ($P < .05$), and a negative correlation was found between BMI-z-score and self-perception of health ($\beta = - 0.03$, $P < .019$). The results suggest that NCP-based intervention may be beneficial in addressing dietary issues and improving self-perception of health and BMI-z-score in severely obese children and adolescents.

Another study by Chen et al. (2018) suggested that mobile apps could improve the efficiency of the NCP. The study aimed to provide guidance for dietitians on incorporating mobile apps into the NCP to enhance patient education and counselling. The study reviewed the current evidence-base for mobile health (mHealth) apps and identified ways in which apps can be used by dietitians throughout the four steps of the NCP. The use of apps for nutrition assessment can allow dietitians to spend more time on education and counselling, and dietitians can also recommend apps to educate patients on nutrition skills for behavior change. Additionally, apps can be used for monitoring patient progress and for effective patient-dietitian communication. The "Mobile Nutrition Care Process Grid" was also created to guide dietitians in the use of apps. The study concludes that the use of high-quality apps can enhance the success of nutrition care and counselling provided by dietitians.

2.9 The relation of different nutrient/food composition of diets on weight loss

Cultures in which people consumed less fat had the tendency to have smaller levels of OB. A diet with less fat content didn’t necessarily imply normal body mass (Knopp et al, 1997). Even though South African people had relatively low-fat diet, 60% of them were overweight. Food high in energy and fat must be reduced from the diets. These food consist of meats, poultry skins, fried foods, butter, whole fat cheese, whole fat milk, and generally fast foods. Nuts, seeds, vegetable oils, nuts and avocados should be used in moderation, even though these foods

are very healthy, they are still high in calories. A healthy diet should be based on fruit, vegetables, whole grains, and non-fat dairy products (Willett et al,1998).

Research suggested that people who effectively lost weight (Duncan et al., 1983) followed a low-fat and high protein diet. They also had less snacks of low nutritional quality and got more of their calories from healthy food. (Anderson & Peter, 2008).

Dietary fiber is considered vital for people that need to reduce their body mass. Fiber comprises from bulk and tend to generate a feeling of satiety, leading people to eat less food. In a research on the effect of fiber intake on weight loss, showed that adding a high fiber source in their diet there was an increase in weight mass loss in people who were following an energy restricted (Miketinas et al, 2019). However, Hylander et al (1983) suggested that increasing fiber consumption in one's diet had no impact on body mass. There are various types of dietary fiber accessible, and the suggested quantity differs according to the type.

Based on Muls et al., 1995 as people are going on and off on diets every time it gets more difficult to lose weight as their BMR reduces and it turns to be easier to regain the weight and more difficult to lose it again. Diet changes must be for a lifetime to be successful on weight management.

Food high in carbohydrate content is occasionally assessed on a scale known as the Glycemic Index (GI). The GI is a numerical value given to a specific food based on its ability to elevate and maintain blood glucose levels. Consuming foods high in GI stimulate a quicker return of hunger and rises consequent consumption of calories related to eating similar foods with a lower GI (Roberts 2001). It is recommended to substitute food with lower GI for higher GI processed foods as this might benefit someone to feel satiety and prevent body mass increase.

Based on Wadden & Stunkard (2004) there were some lifestyle changes known to be useful for weight loss, such as weight loss pills, a pep talk, and a leaflet about diet and physical activity, but with only minor weight loss. When overweight people participate in behavioural group meetings designed at altering nutrition and physical activity habits, maintain daily records of food intake and physical activity and have low-calorie diet, the outcome was far more effective. Group sessions where participants were given evidence and got help on how to make lifestyle changes seem to enhance the possibilities of losing weight and maintaining it. Such modifications may consist of making a shopping from a list before going to the

supermarket, storing foods away and not readily accessible, maintaining portion sizes under control, and avoiding fast food.

People who go through “weight cycling” for example repetitive weight loss and regain, or the yo-yo syndrome effect) have a tendency for binge eating, according to a review of numerous studies focusing on weight loss (NTFPTO, 2000). Findings also discovered an association between weight cycling and depression or weak body image. A combination of moderate caloric restriction, moderate physical activity and behaviour modification are considered the most effective weight-loss programmes because they limit weight cycling and depression. Obesity involves long-term management analogous to that of diabetes and hypertension. The use of long-term management approaches for chronic diseases is not recognized as treatment failure. Additionally, treatment is not considered ineffective when a patient has trouble following to the interventions. Instead, during the broad survey of the literature we recognize that many health care problems require long-term management and a focus on enhancing obedience to treatment. Obesity is a chronic disease and requires continuous treatment. As obesity is considered a chronic disease, treatment should no longer anticipate substantial weight losses. Modest, prolonged weight losses (5-10% of initial body weight) have been shown to positively alter several co-morbid disease risk factors.

2.10 Mindful Eating

Kabat-Zinn (1991) defines “Mindfulness” as "the awareness that arises through focusing on the present moment, and an emphasis on accepting things as they are, without judging or changing them".

Mindfulness as it relates to eating behaviour can be called mindful eating (ME). Taking into account the technique of "meditation", the process of "mindful eating" requires full concentration and dedication to the process of nutrition.

In the field of nutrition, mindful eating can be used to define the perception and awareness of physical and emotional sensations during eating as it recognizes the body's sensations by focusing on the present experience of eating. For example, the skill of ME can help the person recognize the feeling of satiety as they develop the skills of responding to inappropriate food cues including the environment, psychological state, and advertising (Framson et al 2009).

The training of the ME skill develops awareness in the person's consumption and can be characterized as a useful skill for the process of weight loss and maintenance. Attention is focused on the process of eating food, regardless of the type of food being eaten, reconnecting the innate intuition of hunger and satiety (The center for Mindful Eating, 2020).

It is not a rule-based nutritional approach. It is a technique-perception where it seems to help self-control nutritional intake and eating habits. Some scientists argue that "unconscious" eating may be the reason most weight loss interventions fail in the long term (Winkens, 2018).

Albers (2008) identified three key steps that are important to Conscious Consumption. The first step involves observing all the senses, tastes, smells, and recommendations in the food being eaten. The second step recognizes repetitive eating habits, such as multitasking while eating, without awareness of quantity and type. The third step is identifying what triggers food consumption and what stops it.

Most people experience either chaotic or rigid thinking and behavior towards food. With the practice of mindful eating, we focus our attention on the descriptive qualities associated with the sensory experiences of food and we consider the process of eating, chewing, observing the changes in intensity, quality, texture, touch, smells, and perceive the sensations of the body related to the process.

Mindfulness in eating is becoming a recommended way of retraining eating behaviours for those struggling with weight management (Ashley, Mason et al. 2015).

2.11 Conclusion

Patients and health care professionals such as dietitians/nutritionist should concentrate on achieving lifestyle changes that aim to lifestyle changes to control body weight. The reason of the innate complexities in handling obesity, dietitians and other related health professionals should aim to generate long lasting care programmes highlighting life changes (eating and physical activity behaviours). People that give emphasis on behaviour changes approaches will have more chances of being successful long-term as far as maintaining a healthy weight (NHLBI, 2000). There is further necessity to investigate the most effective way to lose weight and maintain it. It is essential to study how mindful eating and behavioural change techniques with nutrition education and exercise lead to successful lifestyle changes.

3. CHAPTER 3 Methodology and Methods

The aim of this study was the effective and successful body weight management through the use of the NCP, including nutrition education, physical activity and mindful eating and behavioural methods. The methodology was designed following a comprehensive review of the existing literature, sample assortment, reliability and validity tests, information gathering and analysis. A quantitative, observational, and longitudinal study was designed. A validated questionnaire and worksheets were used as the main research tools. The worksheets were used as part of the behavioural change procedure for eating, physical activity, and diet models in obesity management, involving stimulus control, reaction overview, encouraging, positive support, influencing, emergency developing, and maintenance approaches through the use of the NCP. Volunteers were recruited from the use of different social media platforms, including google forms specific for the study and announcements through the Cyprus Dietetic and Nutrition Association (CyDNA) social media and website and its active members. The final stakeholder of the study is the CyDNA. The Cyprus Bioethics Committee granted their approval for the research with the number ΕΕΒΚΕΠ2020.01.66.

3.1 Volunteer Characteristics

Demographics (Population distribution and Age)

The sample size was 300 adults (150 CG and 150 IG), 51% women and 49 % men. It comprised of overweight and obese people aged from 18 to 51 year. According to WHO (2020) and National Research Council for the Recommended Dietary Allowances - RDA (NRC, 1989), the guidelines for physical activity and nutritional intakes respectively, are made for different age groups. For the purposes of this research the age groups studied were between the age of 18-24 and 25-51 for adults. The population allocation of the sample examined reflected the population level of the Cyprus Population Statistic Services (CySS 2019). Demographic information was obtained based on sexual characteristics, age, origin, marital status, education, and occupation. The statistical error was 5.5% which is within the recommended limits for the sample size based on the information given for the prevalence of obesity in Cyprus. The obesity and overweight percentages for men was 28.8%/28% and for female was 26%/26.9%, respectively (Andreou et al, 2009).

The inclusion and exclusion criteria

The inclusion and exclusion criteria of the study are presented in table 3.1.

Table 3-1 Inclusion/ Exclusion Criteria

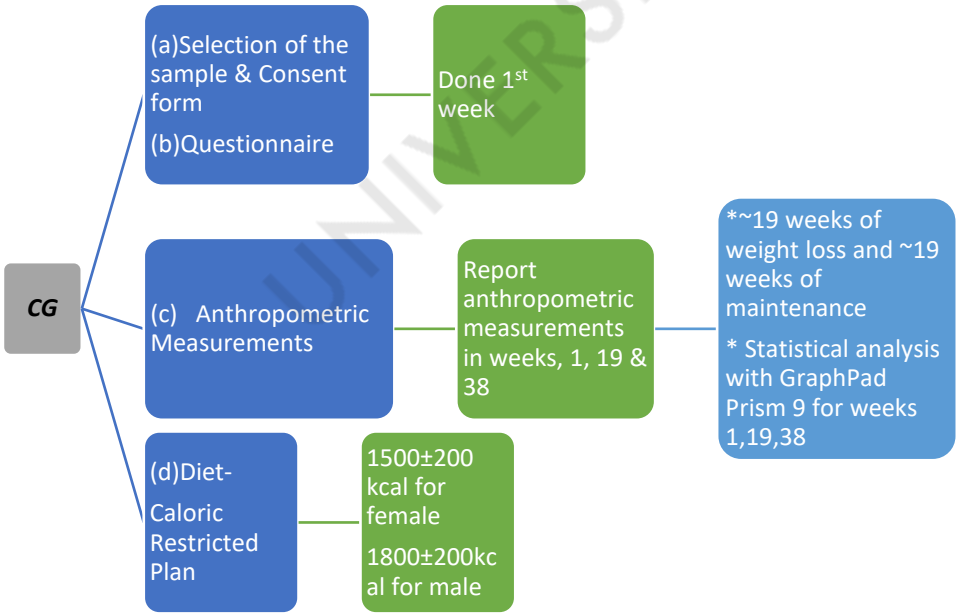
Inclusion Criteria	Exclusion Criteria
Age 18-51* years	Age less than 18 or over than 51*
BMI over 25	BMI below 25
Overweight & obese adults without comorbidities**	Overweight & obese adults with comorbidities**

*Legal age; based on the DRI-Dietary Reference Intake Levels of BMI (2015)
**The presence or absences of comorbidities were self-reported

3.2 Study Protocol

For the needs of this project a control and an intervention group were created. **Control Group (CG)–** this group followed a calorie control diet program only (Figure 3.1). The control Group followed an energy restricted diet only (1500 ± 200 kcal/day for females, 1800 ± 200 kcal/day for males).

Figure 3.1 Outline of actions for Control Group (CG)



Intervention Group (IG)– this group had the same calorie control diet as the Control Group and at same time they followed an appropriate nutrition intervention plan with standardized procedures for nutrition, physical activity, and behaviour modification guidelines with the use of the NCP (Figure 3.2). The intervention group followed an energy restricted diet (1500 ± 200 kcal/day for females, 1800 ± 200 kcal/day for males), nutrition education and exercise guidelines through the use of NCP. A summary of the programs followed by each group is presented in table 3.2.

Figure 3.2 Outline of actions for Intervention Group (IG).

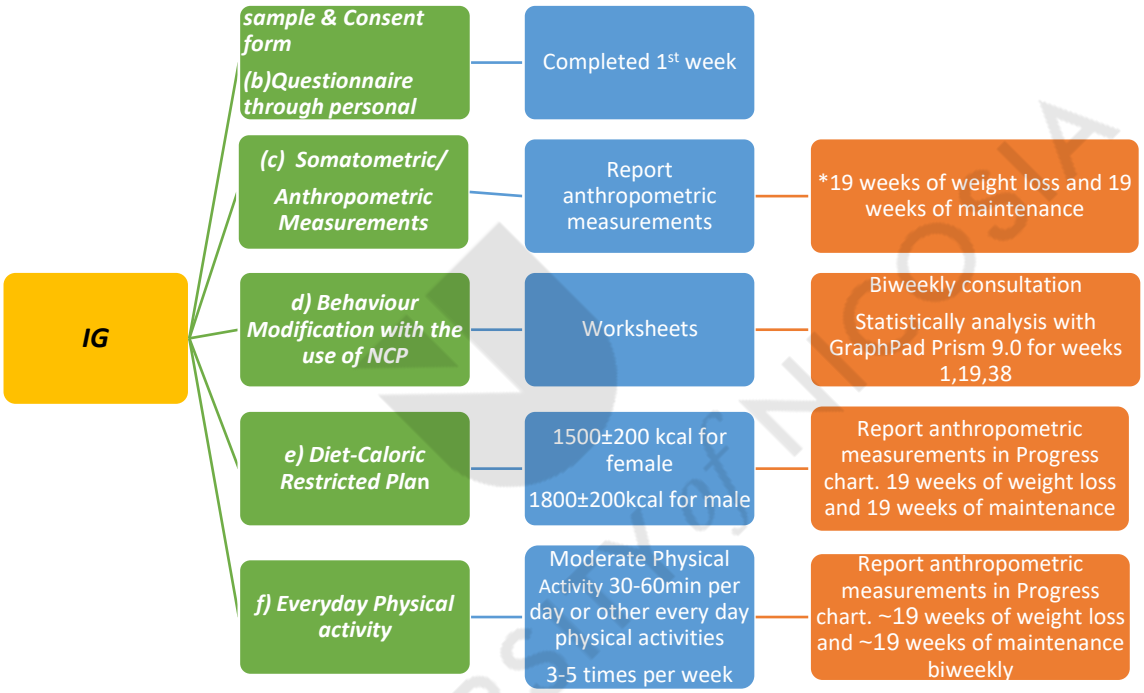


Table 3-2 Control and Intervention group regimes.

Control Group	Intervention Group
1500 ± 200 kcal/day for women, 1800 ± 200 kcal/day for men	1500 ± 200 kcal/day for women, 1800 ± 200 kcal/day for men
No exercise	moderate intensity activity level (i.e. walking for 30-45 minutes
one-week cycle diet without any modification at any time	One week cycle diet modified every two weeks
No behavioural changes sessions	Behavioural change sessions including ME for diet and exercise
No physical activity sessions	Consultation 20-30 minutes and other everyday physical activities every two weeks

3.3 Study Duration

Both CG and IG followed a caloric restricted program for 19±2.5 weeks, and the maintenance for 19±2.5 weeks. The control group were evaluated in weeks 1, 19, 38±2.5. The intervention group met every two weeks for behaviour change session including nutrition and physical activity guidelines. Both groups obtained an energy-restricted diet (1500 ± 200 kcal/day for women, 1800 ± 200 kcal/day for men). For the IG the diet plan was changed every two weeks.

3.4 Anthropometrics/Somatometrics

Measuring and studying of human body is call anthropometry. Anthropometrical measurements are used in the NCP process in the first step of assessments. The ones that are used to evaluate normal, overweight, and obese individuals incorporate height, WCir, BF, BMI, WHR, and Neck circumference. These measurements were then correlated to standard values to evaluate the body weight and the danger for numerous illnesses. Anthropometrical measurements need accurate methods to be useable (Mony et al., 2016). During the initial interview by dietitians, anthropometric measurements were taken. The measurements included:

3.4.1 Weight (kilograms) and Height

The weight was measured with the scale Charder MA801 with accuracy of ± 0.1 kg, with the highest capacity of weight being 300 kilograms. Participants had to fast prior to breakfast, wear light clothing and no shoes. Also, they had to empty their urinary bladder. The measurement of weight was done to the closest 10th of a kilogram. The height was assessed using a stadiometer with the person standing, with no shoes. The stadiometer contained of a ruler and a sliding parallel headpiece which was fixed above the head. The measurement was produced to the nearest 19th of a cm.

3.4.2 Neck Circumference

Neck circumference (NCir)is a potentially useful initial screening tool for overweight/obesity. A neck circumference > or = 35.5 cm in men and > or = 32 cm in women should be considered the cut-off point for overweight/obesity. The NCir was assessed with a tape measure in the middle of the neck, between collarbone and chin.

3.4.3 Waist Circumference

Waist circumference (WCir) above normal levels is correlated with an increased risk for many diseases such as diabetes, high blood pressure, abnormal lipid profile and cardiovascular disease (Ross et al, 2020). The WCir measurement reflects a change in abdominal fat, which surrounds important organs. An increased WCir indicates increased risk of the abovementioned diseases as more fat is surrounding the liver, heart and more. In addition, the WCir can be used as a useful tool that complements the BMI, especially for normal and overweight but more importantly for athletes. Athletes have a bigger muscle mass that weighs more than fat and the BMI gives wrong indication of overweight or obesity while the WCir gives a precise indication of overweight and obesity in athletes. The WCir was assessed with a tape measure in the point of the smaller area of waist.

Waist circumference was measured when participants were standing at the point on the torso between the lower costal margin (lower part of the lower ribs) and the iliac crest, and the feet are approximately 27 cm at a distance. The person that performed the measurement was close to the participant and adhered the tape, without constricting any essential soft tissue. At the end of the normal exhalation the circumference was measured to the nearest 0.5 cm. The waist circumference with the highest relative risk is displayed in the table 3.3.

Table 3-3 Waist circumference

Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks (NIH, U.S. Department of Health & Human Services, 2022)

			Disease Risk* Relative to Normal Weight and Waist Circumference	
	BMI (kg/m^2)	**Obesity Class**	**Men 102 cm (40 in) or less Women 88 cm (35 in) or less**	**Men > 102 cm (40 in) Women > 88 cm (35 in)**
Underweight	< 18.5		-	-
Normal	18.5–24.9		-	-
Overweight	25.0–29.9		Increased	High
Obesity	30.0–34.9	I	High	Very High
	35.0–39.9	II	Very High	Very High
Extreme Obesity	40.0 +	III	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.
+ Increased waist circumference also can be a marker for increased risk, even in persons of normal weight.

When the measurement for men for WCir is more than or equal to 94cm and women for WCir is more than or equal to 80cm, individuals pose higher possibility for health problems.

3.4.4 Body Fat

The fat body composition was assessed by Bioelectrical impedance analysis (BIA). BIA is a universal technique applied for assessing body makeup. During the mid-1980's the first commercial device was used and since then it has turn out to be widespread due to its simplicity of usage, manageability of the device and its low cost in relation to several other techniques of body composition analysis. BIA was used to determine the electrical impedance by measuring the resistance to the movement of an electric current via body tissues to calculate an approximation of total body water (TBW) which is used to measure body fat and fat-free mass (Khalil et al, 2014). The accepted Body fat percentage for men is 14-28% and for women is 15-29% (WHO, 2020). Previous studies have shown that BIA was very contradictory, and it was not considered a precise measure. Today technical improvements have designed a new reliable BIA and consequently more useable among scientists. Even though BIA is simple to apply and use, thorough consideration to the company directives must be given. There are some small BIA devices for house use that are thought not to be precise comparing to those used

among health professionals. In tables 3.4 and 3.5 the ideal body fat percentage for men and women is presented (ACSM, 2008).

The required processes applied prior to using the BIA (Charder MA801) were the following:

- No food and drink before for 2-3 hours before testing
- No exercise for 12 hours prior to testing
- No caffeine for at least 3 hours prior to testing
- Before testing must empty bladder for at least 30 min before
- No alcohol for 24 hours prior to testing

BIA provided the following results:

- Body Fat %
- Kilograms in Fat
- % Lean Body Mass (LBM)
- Kilograms in LBM
- % Water
- Water in litres
- Basal Metabolic Rate in Kcal

Table 3-4 Ideal Body Fat Percentage: For Men

Male	AGE				
Fitness Category	20-29	30-39	40-49	50-59	60+
Essential Fat	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5
Excellent	7.1 - 9.3	11.3 - 13.8	13.6 - 16.2	15.3 - 17.8	15.3 - 18.3
Good	9.4 - 14	13.9 - 17.4	16.3 - 19.5	17.9 - 21.2	18.4 - 21.9
Average	14.1 - 17.5	17.5 - 20.4	19.6 - 22.4	21.3 - 24	22 - 25
Below Average	17.4 - 22.5	20.5 - 24.1	22.5 - 26	24.1 - 27.4	25 - 28.4
Poor	>22.4	>24.2	>26.1	>27.5	>28.5

ACSM'S Health-Related Physical Fitness Assessment Manual, 2ndEd. 2008.

Table 3-5 Ideal Body Fat Percentage: For Women

Female	AGE				
Fitness Category	20-29	30-39	40-49	50-59	60+
Essential Fat	10 - 13	10 - 13	10 - 13	10 - 13	10 - 13
Excellent	14.5 - 17	15.5 - 17.9	18.5 - 21.2	21.6 - 24.9	21.1 - 25
Good	17.1 - 20.5	18 - 21.5	21.3 - 24.8	25 - 28.4	25.1 - 29.2
Average	20.6 - 23.6	21.6 - 24.8	24.9 - 28	28.5 - 31.5	29.3 - 32.4
Below Average	23.7 - 27.6	24.9 - 29.2	28.1 - 32	31.6 - 35.5	32.5 - 36.5
Poor	>27.7	>29.3	>32.1	>35.6	>36.6

ACSM'S Health-Related Physical Fitness Assessment Manual, 2ndEd. 2008.

3.4.5 Body Mass Index

Body Mass Index was determined with weight in kilograms, divided the height, in metres squared. Following WHO categorical guidelines on BMI as shown in Table 3.4, People with additional weight were considered as overweight having BMI from 25 -29.9kg/m² and/or 20%. Obese people had BMI more than 30 kg/m. BMI categories are displayed in Table 3.6.

Table 3-6 BMI categories

Category	BMI (kg/m²)
Underweight (Severe thinness)	< 16.0
Underweight (Moderate thinness)	16.0 – 16.9
Underweight (Mild thinness)	17.0 – 18.4
Normal range	18.5 – 24.9
Overweight (Pre-obese)	25.0 – 29.9
Obese (Class I)	30.0 – 34.9
Obese (Class II)	35.0 – 39.9
Obese (Class III)	≥ 40.0

Taken from WHO/Europe (2020) | Nutrition - Body mass index – BMI

3.5 Diet record

A food log and nutrition worksheets (2) were reported by each participant every two weeks. Statistical assessment was completed and evaluated for the 1st, 19th and 38th week.

3.6 Physical Activity guidelines

A physical activity worksheet was completed by each participant every 2 weeks. The recommendations regarding physical activity were made by the researcher based on the guidelines of WHO (2020), ACSM (2018) and Piercy et al. (2018) for physical activity for healthy adults. Physical activity recommendations for healthy adults aged 18-65 years include a moderate aerobic activity such as walking for 30-45 min on 5 days a week and exercise to maintain muscle mass at least twice per week. Also, everyday physical activities were recommended such as going for a walk, bike, or run. Doing household chores. Taking the stairs instead of the elevator. Playing at the park. Behaviour change session were provided only to the intervention group. The counselling session duration was about one hour long and the follow up sessions were about 20-30 minutes each.

3.7 Evaluation of eating and physical activity habits

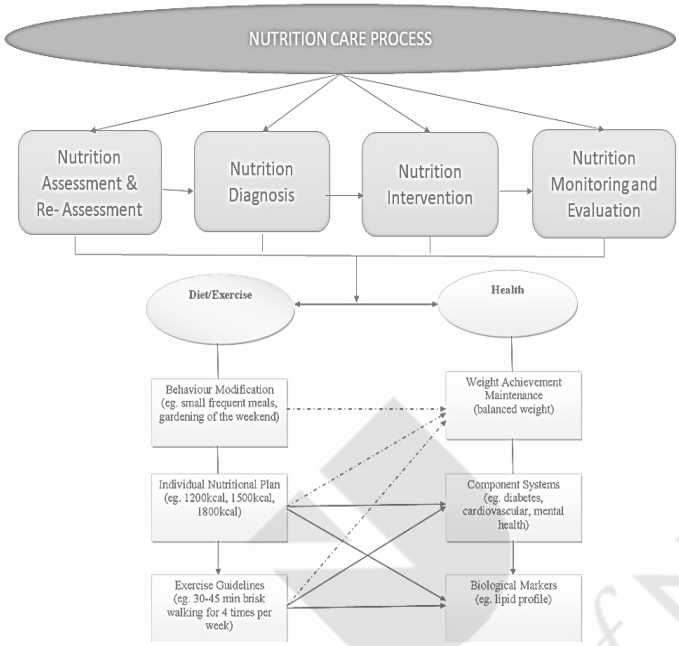
The eating and physical activity behaviours of obese and overweight participants were assessed with the use of interviews, worksheets, and diet logs. The assessment of their improvements was performed with the use of, Neck Circumference (NCir), Waist Circumference (WCir), Total Body Fat Percentage (TBFP), and Body Mass Index (BMI).

3.8 NCP process

The NCP has various components such as 1) Nutritional assessment 2) Nutrition Diagnosis, 3) Nutrition intervention and 4) Nutrition Monitoring and Evaluation. All four components contribute to a healthy lifestyle. Moreover, all components are interrelated. For example, diet and physical activity are made up of three steps, with each one correlating to the health components. The way of correlation is shown in Figure 3.3. The arrows indicate the typically examined associations, and the dotted arrows specify the relationship that will be investigated.

The diagram below signifies the entire and the components of diet, physical activity and health for weight management with the use of NCP. Beginning from the top as a total, with the four distinct elements of NCP to diet, physical activity, and health (Figure 3.3). the behavioural modification method used in this study followed the ABC model (Table 3.7).

Figure 3.3 A process of the major elements of the research project & their link with the use of NCP



3.8.1 Behavioural Change Methods

ABC Method

Two worksheets were used in order to monitor and assess the behaviour concerning eating and physical activity using the ABC (Antecedents- Behaviour- Consequences-) functional behavioural assessment method. Behaviour change was achieved via practical observation to determine methods to enhance behaviour, for example altering a person's behaviours and reactions to incitements across positive and negative support (Martin 2007). The table 3.7 indicates how the worksheets were used in the intervention procedure with the use of NCP.

Table 3-7 The Usage of Worksheets and ABC

	Antecedents	Behaviour	Consequences
Worksheet I – Identify eating habits	Eat very often red meat in large quantities, fried foods and avoid beans and vegetables.	Eat beans and salads more often accompanied with fish and olive oil in the normal quantities	Consume low amounts of meat-derived fat
Worksheet II - What influences the Physical Activity?	Long distance to the gym	Use every day physical activities such as walking in the park	Raise metabolic rate
Total outcome	Unhealthy eating and physical activity habits	Improved behaviour towards a healthier lifestyle	Achieve and maintain a healthy weight

Adapted from Andreou E & Philippou C (2011)

3.9 Tools Used for Nutrition and Physical Activity Assessment

Personal diet plans, physical activity, and behavioural change constraints with the use of NCP were assessed and evaluated with the use of a questionnaire for the assessment and the worksheets for the intervention part of the study. The official questionnaires for Physical Activity/ IPAQ (2005) and a modified version of Mindful Eating questionnaire/ Nutritional habits (Framson et al, 2009) were used for the initial assessment. The modified MEQ (mMEQ) was validated in SPSS-26. Every two weeks the intervention group completed the two behavioural change worksheets. Table 3.8 gives the study instruments utilized. For this study the worksheets in table 3.8 were used which they were validated (Andreou E, Philippou C, 2011).

Table 3-8 Study Instruments

Tools used for initial assessment	**Tools used for implementation using NCP**
Nutrition Assessment (Mindful Eating Questionnaire/Nutritional habits	Worksheet I – Identifying the eating habits
IPAQ, 2005	Worksheet II – What influences the Physical Activity

3.9.1 Nutrition Assessment- Mindful Eating Questionnaire/ Nutritional habits

The written questionnaire was used to investigate the application of mindful eating and nutrition behaviour among Cypriot adults using the mMEQ. The questionnaire was anonymous, and a code was assigned to every participant of this study. The questionnaire was completed by the researcher with the participant at a private interview duration of about 45 min.

Each question was replied according to each participant's eating habits. The responses were recorded and according to the final score the initial nutrition status of each participant was determined. Participants that wished to participate in this research project signed a consent form and reference number was given in order to retain their anonymity (Appendix VI).

3.9.2 International Physical Activity Questionnaire (IPAQ)

IPAQ included four fields of physical activity: work-related, transportation, housework/gardening and leisure-time activity and questions about sedentary behaviour. Every part of the questionnaire included the number of days/week and time/day devoted in moderate and/or vigorous activities.

3.10 Tools for Assessing Intervention

Worksheets and progress charts were used to assess the progress of the intervention.

3.10.1 Worksheets

For this current study worksheets were used as diagnostic tools for the intervention group. This was done to evaluate the successful and effective management of the body weight problems through the use of nutrition education, physical activity, mindful eating and behavioural consultation.

3.11 Statistics

Data were analysed and visualised using GraphPad (GraphPad Prism 9.0; GraphPad Software, San Diego, CA, USA). All data are expressed as means ± the standard error of the mean (SEM). In GraphPad, two-way analysis of variance (ANOVA) was performed to determine significant differences between control and intervention groups. For two-way ANOVA, Tukey's post-hoc multiple comparison test was used. Differences between intervention groups were considered to be statistically significant when $p \leq 0.05$.

3.12 Conclusion

Summary of the methodology steps are listed below:

1. Appraisal of current procedures for weight management regimes and techniques
2. Develop new and advanced guidelines to deal with body weight problems with the use of NCP
3. Observation, longitudinal study
4. The patients/clients BMI was above 25
5. Include two groups: control and intervention
6. Random sampling for IG and CG
7. Duration 38$\pm$2.5 weeks (1-19$\pm$2.5 weight loss period and $19 - 38 \pm 2.5$ maintenance)

8. Quantitative analysis using questionnaires (mMEQ and IPAQ), somatometric/anthropometric measurements
9. Quantitative analysis for worksheets and progress charts
10. The IG was assessed (weight, body fat, neck measurement and waist circumference) and counselled every 2 weeks, while the CG was measured at the beginning of the study, at the 19th week and at the end of the study and had no counselling sessions
11. Data coding and input
12. Nutritional analysis and Energy expenditure using Food works
13. The questionnaire, worksheets, progress chart were analyzed using the GraphPad Prism 9.0 and SPSS-26

4. CHAPTER 4 Results and Analysis

4.1 Demographics and Anthropometric Measurements

The sample studied was 18-51 years of age. A consent form was completed by the sample, and it was saved at the supervisor's office at the University of Nicosia. The questionnaires/Worksheets used were all coded to maintain the anonymity of the participants. Due to COVID-19, some of the Worksheets were send in a stamped envelope via postage.

The control group (CG) and the intervention group (IG) were equally distributed (315 people in both groups to exclude the 5% non- respond participants with final number of 300 sample size). However, the initial assessment was performed for all the participants (315 sample size) in the exact same way. Following the initial assessment, the participants were randomly allocated in the CG and IG (150 people for each group), 51% women and 49 % men (Table 4.1 & 4.2).

Table 4-1 Characteristics of study population completing the Mindful Eating Questionnaire

(n= 315)	N	%
Sex		
Male	146	48.7
Female	154	51.3
Age (y)		
18-24	135	45
25-51	165	55
Nationality		
Cypriot	271	90.5
Greek	14	4.7
Missing	15	4.8
Based		
Nicosia	213	70.9
Limassol	19	6.4
Larnaca	21	6.8
Paphos	4	1.8
Famagusta	3	1.1
Other (including suburbs)	40	13.4
Education		
Primary (Primary school)	1	0.4
Secondary (Gymnasium and/or Lyceum)	14	4.9
Higher (University/College)	285	94.7

Table 4-2 Demographic characteristics, family status, income, and professional status

Family status	N	%
Unmarried/Single	135	45.8
Married/Symbiosis/Relationship	153	50.6
Divorced/Separated	11	3.2
Widower	1	0.4
Occupational status		
Student	114	37.9
Unemployed for the whole year	3	0.8
Unemployed for part of the year	4	1.5
Worker	163	54.6
Retired	4	1.5
Other	12	3.9
Net monthly income		
I don't have/I don't answer	106	35.2
<1000	81	26.9
1001-2000	69	23.1
2001-3000	27	9.1
>3000	17	5.7

4.2 Nutrition Questionnaire/ Mindful Eating Questionnaire

The results of mMEQ are presented in Table 4.3. Considering the sleep levels of the participants, 37.8% (119) of the participants completed 6-7 hours of sleep per night, while 36.1% (114) 7-8 hours, 16.8% (53) 8-10 hours, 1.3% (4) more than 10 hours/ at night, while 8% (25) state less than 6 hours of sleep.

In the question about frequency of meal consumption, most of the participants 72.8% (230) consumed 3 main meals per day, 21.8% (66) consumed 2 main meals/day, 2.9% (10) consumed 1 or less meal per day, and 0, 8% (3) consumed 4, 5, and 6 or more meals/day respectively.

While for snack consumption per day 46.4% (147) of participants consumed 2 snacks daily, 23.4% (75) 3 snacks, 22.6% (72) 1 or less, 6.3% (20) 4 snacks daily and 1.3% (1) 5 snacks per day. A large percentage of the participants reported consumption of vegetables 2 servings per day with the percentage amounting to 36.7% (116), 30.4% (96) with 1 serving/day, 21.7% (68) with 3 or more servings/day and 10.8% (35) <1 or fewer servings per day. A significant percentage of the participants 40 % (126) consumed 2 servings of fruits per day, 12.5% (40) 3

or more servings/day, 34.6% (109) 1 serving/day, and 12.5 % (40) with <1 serving of serving of fruit/ day. Also, for the weekly consumption of red meat, most of the participants declared consumption 2-4 times per week percentage amounting to 50.8% (160) while 28.3% (89) declared <1 per week, 5.8% (19) 5-6 times per week, and 3.3% (11) consume 7 or more servings of red meat per week. Of the participants 5% (16) declared vegetarians and 6.3% (20) were fasting. The 53% (167) of the participants declared consumption of legumes 2 times a week, while 19% (60) 3 or more times/week, 18.2% (57) 1 time/week, while 3.4% (11) did not consume any legumes and 6.4% (20) consumed less than once a week. Evaluating the frequency of fish consumption weekly, 44.8% (141) consumed 1 time/week, 25.9% (81) 2 times/week, 18% (57) less than once a week, 6.3% (20) 3 or more times per week while 5% (16) of participants did not consume any fish. As far as olive oil consumption, most of the participants declared that they consume 2-3 Tablespoons/day with a rate of 51.5% (162), while 13.8% (44) of the population uses 4 or more Tablespoons/day, and 34.7% (109) declares 1 or fewer tablespoons per day. For the consumption of low-fat dairy products most of the participants 78.7% (247) consumed low-fat dairy products and 21.3% (68) did not consume low-fat dairy products. The consumption of wine per week showed 45.4% (143) of the participants to consumed less than once per week, 17.1% (54) consumed 2-6 times a week, 1.7% (5) consumed 7-14 times/week (1-2 glasses a day), 0.8% (2) consumed >14 times/week (more than 2 glasses per day), while 35% (111) of participants did not consume any wine at all. The consumption of soft liquids, soft drinks (lemonade, coca cola) were less than once a week 23.7% (75), once per week 20.9% (66) , more than once per week 13.8% (43) and 41.6% (131) did not consume any soft drinks. A significant percentage of participants 47.1% (148) state that they consumed 1-2 liters (4-8 glasses) of water per day, 20.8% (66) 2 liters (8 glasses), and 30.4% (96) of the participants consumed <1 liter per day of water and 1.7% (5) other drinks. From the participants 19.2% (61) consumed once a week sweet, 22.9% (72) consumed

2 times per week sweets, 20.4% (64) 3 times per week, 21.7% (68) 4 times per week, 10.4% (33) less than once a week and 5.4% (17) did not consumed any sweets.

Table 4-3 Mindful eating questionnaire results

Time of Sleep	N	%
Less than 6 hours/night	25	8,0
6-7 hours/night	119	37.8
7-8 hours/night	114	36,1
8-10 hours/night	53	16.8
More than 10 hours/night	4	1.3
Meals per day		
1 or less	10	2.9
2	66	21.8
3	230	72.8
4	3	.8
5	3	.8
6 or more	3	.8
Snacks per day		
1 or less	72	22.6
2	147	46.4
3	75	23.4
4	20	6.3
5	1	1.3
Vegetables per day		
<1	35	10.8
1	96	30.4
2	116	36.7
3 or more	68	21.7
Fruits per day		
< 1	40	12.5
1	109	34.6
2	126	40.0
3 or more	40	12.5
Red Meat per week		
<1	89	28.3
2-4	160	50.8
5-6	19	5.8
7 or more	11	3.3
I don't eat meat, I'm a vegetarian	16	5.0
I don't eat meat, fasting period	20	6.3
Wine per week		
<1 (Occasional)	143	45.4
2-6	54	17.1

7-14 (1-2 glasses per day)	5	1.7
>14 (More than 2 glasses per day)	2	.4
Not at all	111	35.2
Sweet liquids, soft drinks (lemonades, coca cola)		
<1	75	23.7
1	66	20.9
>1	43	13.8
None	131	41.6
Legumes per week		
<1	20	6.4
1	57	18.2
2	167	53.0
3 or more	60	19
None	11	3.4
Fish per week		
<1	57	18.0
1	141	44.8
2	81	25.9
3 or more	20	6.3
None	16	5.0
Olive oil per day		
1 or less	109	34.7
2-3	162	51.5
4 or more	44	13.8
Sweets per week		
<1	33	10.4
1	61	19.2
2	22	22.9
3	64	20.4
4 or more	69	21.7
None	17	5.4
Water		
<1 litre (4 glasses)	96	30.4
1-2 litres (4-8 glasses)	148	47.1
2 litres (8 glasses)	66	20.8
Other	5	1.7
Low fat Dairy products		
Yes	247	78.7
No	68	21.3

4.3 Physical Activity (PA)/Exercise Questionnaire/IPAQ

PART 1: Job related PA

In the IPAQ questionnaire was used to assess the daily activities of the participants. The assessment included the hours and types of PA during a week. Part 1 – Job related PA

The job-related PA (days and minutes) results are presented in tables 4.4 and 4.5.

Table 4-4 Job related physical activities (days/week)

Vigorous			**Moderate**		***Sedentary***	
No DAYS	**Frequency of Sample**	**Valid %**	**Frequency of Sample**	**Valid %**	**Frequency of Sample**	**Valid %**
0	129	41	155	49,2	21	6,7
1	155	49,2	80	25,4	109	34,6
2	14	4,4	34	10,8	56	49,5
3	7	2,2	28	8,9	10	3,2
4	5	1,6	5	1,6	6	1,9
5	1	0,3	6	1,9	8	2,5
6	4	1,3	0,6	0,6	2	0,8
7	0	0	5	1,6	3	1,0
Total	315	100	315	100	315	100

Table 4-5 Job related PA (minutes/day)

Vigorous			Moderate		*Sedentary*	
MIN	**Frequency of Sample**	**Valid %**	**Frequency of Sample**	**Valid %**	**Frequency of Sample**	**Valid %**
0	129	41,0	140	44,4	126	40
10	2	0,6	0	0	2	0,6
30	4	1,3	0	0	1	0,3
60	130	41,3	94	29,8	120	38,1
70	2	0,6	0	0	15	4,8
75	0	0	0	0	2	0,6
90	14	4,4	0	0	6	1,9
120	17	5,4	58	18,4	21	6,7
130	0	0	0	0	1	0,3
140	0	0	0	0	1	0,3
150	1	0,3	0	0		
180	11	3,5	20	6,3	13	4,1
210	3	1,0	0	0		
240	1	0,3	2	0,6	1	0,3
250	0	0	0	0	1	0,3
300	0	0	0	0	2	0,6
360	0		1	0,3	3	1,0
480	1	0,3	0	0	0	
Total	315	100	315	100	315	100

PART 2: Transportation PA

Tables 4.6 and 4.7 present the transportation PA results. Participants indicated the daily transportation activities for one week.

Table 4-6 Transportation PA (days/week)

Travel in a motor vehicle			**Use the bicycle**		**Walk for atleast 10 min**	
No DAYS	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0	4	1,30	275	88	114	36,20
1	7	2,20	24	7,60	26	8,30
2	145	46,0	9	2,80	152	48,30
3	4	1,30	5	1,50	10	3,20
4	3	1,0	2	0,60	2	0,60
5	77	24,40	0	0	3	1,0
6	0	0	0	0	0	0
7	75	23,80	0	0	8	2,50
Total	315	100	315	100	315	100

Table 4-7 Transportation PA (minutes/day)

Travel in a motor vehicle			**Use the bicycle**		**Walk for atleast 10 min**	
MIN	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0	8	2,50	310	98,40	108	34,30
10	1	0,30	0	0	32	10,20
15	1	0,30	1	0,30	29	9,20
30	31	9,80	0	0	12	3,80
40	2	0,60	0	0	0	0
45	1	0,30	0	0	0	0
60	136	43,20	1	0,30	98	31,10
70	0	0	0	0	2	0
75	1	0,30	0	0	0	0
90	1	0,30	0	0	0	0
105	0	0	0	0	1	0,30
120	65	20,60	1	0,60	22	7,0
130	0	0	0	0	0	0
140	0	0	0	0	0	0
150	1	0,30	0	0	0	0
165	1	0,30	0	0	0	0
180	65	20,60	1	0,30	3	1,0
420	1	0,30	0	0	0	0
480	0	0	0	0	0	0
Total	315	100	315	100	315	100

PART 3: Housework, house maintenance and caring for family

The tables 4.8 and 4.9 represents the physical activities performed in the house and in the garden.

Table 4-8 Housework, house maintenance and caring for family (days/week)

Vigorous			**Moderate in the yard**		**Moderate inside the home**	
No DAYS	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0	229	72,60	225	71.40	165	52.40
1	60	19.0	36	11.40	60	19.0
2	19	6.0	25	7.90	71	22.50
3	5	1.60	7	5.40	12	3.8
4	2	0.60	7	2.20	4	1.3
5	0	0	3	1,0	3	1.0
6	0	0	0	0	0	0
7	0	0	2	0,6	0	0
Total	315	100	315	100	315	100

Table 4-9 Housework, house maintenance and caring for family (minutes/ day)

Vigorous			Moderate in the yard		Moderate inside the home	
MIN	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0	206	65.40	190	60.30	104	33.0
1	8	2.50	1	0.30	3	1.0
2	1	0.30	0	0	0	0
3	0	0	1	0.30	0	0
10	1	0.40	2	0.60	2	0.60
30	0	0	4	1.30	4	1.30
60	60	19	69	21.90	97	30.80
61	0	0	0	0	2	0.60
70	1	0.30	4	1.30	1	0.30
90	0	0	2	0.60	2	0.60
120	28	8.90	22	7.0	45	14.30
121	2	0.60	0	0	0	0
122	1	0.30	0	0	0	0
130	0	0	4	1.30	1	0.30
150	0	0	0	0	3	0.60
180	3	1.0	7	2.20	45	14.30
181	0	0	0	0	1	0.30
210	0	0	0	0	1	0.30
240	4	1.30	2	0.60	3	1.0
250	0	0	2	0.60	0	0
300	0	0	2	0.60	0	0
360	0	0	2	0.60	0	0
480	0	0	0	0	1	0.30
Total	315	100	315	100	315	100

PART 4: Recreation, sport and leisure – time PA

This part represents the PA done for pleasure and exercising which are shown in tables 4.10 and 4.11.

Table 4-10 Recreation, sport, and leisure – time PA (days/week)

Walk in leisure time			**Vigorous activity in leisure time**		**Moderate PA**	
No DAYS	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0	113	35.90	181	57.50	182	57.70
1	84	26.70	47	14.90	107	34.0
2	42	13.30	75	23.80	26	8.30
3	72	22.90	3	1.0	0	0
4	0	0	6	1.90	0	0
5	3	1.0	2	0.60	0	0
6	0	0	1	0.30	0	0
7	1	0.30	0	00	0	0
Total	315	100	315	100	315	100

Table 4-11 Recreation, sports and leisure – time PA (minutes/day)

Walk in leisure time			**Vigorous activity in leisure time**		**Moderate PA**	
MIN	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0 – 10	106	33.60	143	45.40	165	52.30
11 – 20	2	0.60	1	0.30	0	0
30 – 40	7	2.40	1	0.30	14	4.40
41 – 50	0	0	1	0	0	0
51 – 60	72	22.90	126	40.0	17	5.40
70 – 80	5	1.50	1	0.30	0	0
81 – 90	1	0.30	1	0.30	3	1.0
91 -100	1	0.30	0	0	0	0
101-110	0	0	1	0.30	0	0
111-120	85	27.0	31	9.80	14	4.40
121 - 130	1	0.30	0	0	0	0
141-150	1	0.30	0	0	0	0
181-190	31	9.80	9	2.90	10	3.20
240-250	0	0	0	0	1	0.30
300 - 310	2	0.60	0	0	8	2.50
330	0	0	0	0	1	0.30
360	0	0	0	0	7	2.20
420	0	0	0	0	2	0.60
480	0	0	0	0	4	1.30
501-600	0	0	0	0	49	17,6
601-700	0	0	0	0	23	7.30
801-900	0	0	0	0	2	0.60
Total	315	100	315	100	315	100

PART 5: TIME SPENT SITTING

Lastly the participants had to report the time and type of their sedentary lifestyle (Table 4.12).

Table 4-12 Sitting on a weekend (min)

Sitting on a weekend		
No min.	Frequency of Sample	Valid %
0	100	3.70
120	3	1.0
180	13	4.10
240	4	1.30
300	10	3.20
330	2	0.60
360	40	12.70
420	34	10.80
450	45	14.30
540	23	7.30
570	2	0.60
600	11	3.50
720	27	8.60
Total	315	100

4.4 Progress Charts

Table 4.13 represents the baseline characteristics of all the males that participated in the study. In brief, the mean age for the 18-24 age group was 22.00 and 22.59 years old for the control and intervention group, respectively. The mean age for the 25-51 age group was 30.84- and 35.14-years control and intervention group, respectively. Table 4.14 shows the baseline characteristics of all the females that took part in the study. The mean age for women in the 18-24 age group was 22.34 and 22.35 years old for the control and intervention group, respectively. For the 25-51 age group for women, the average age was 30.61 and 42.08 years old for the control and intervention group, respectively. Height, Weight, Waist and Neck Circumference measurements were taken at the baseline for both males and females (Week 1). From these measurements, the BMI and Waist to Hip ratio were calculated. In addition, body fat percentage was measured using the US Navy Method as well as the BMI Method (Table 4.13 and 4.14).

Table 4-13 Baseline Characteristics for Males

	Control				Intervention			
	18-24 (n= 17)		25-51 (n= 57)		18-24 (n= 29)		25-51 (n= 43)	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Age	22.00	1.80	30.84	8.25	22.59	1.30	35.14	10.88
Height (cm)	179.06	5.91	176.19	4.51	174.06	7.03	177.67	8.52
Weight (Kg)	97.99	9.80	89.96	7.46	89.33	10.61	92.64	12.83
BMI	30.40	1.47	28.96	1.86	29.42	2.32	29.26	2.66
Waist circumference (cm)	108.56	4.58	104.50	3.13	105.16	4.54	105.71	4.71
Hip circumference (cm)	109.88	5.24	107.60	2.83	107.53	2.37	107.50	2.10
Neck Circumference (cm)	43.50	1.94	42.86	1.26	42.78	1.32	42.93	1.44
Waist to Hip Ratio	0.99	0.03	0.97	0.01	0.98	0.03	0.98	0.03
Body Fat (%) BMI method	25.34	2.07	26.12	2.85	24.30	2.81	26.99	3.74

Table 4-14 Baseline Characteristics for Females

	Control				Intervention			
	18-24 (n= 35)		25-51 (n= 41)		18-24 (n= 54)		25-51 (n= 24)	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Age	22.34	1.35	30.61	6.94	22.35	1.51	42.08	4.45
Height (cm)	163.49	6.53	162.80	5.52	163.06	6.56	163.54	7.21
Weight (Kg)	81.89	6.10	82.70	10.52	81.59	5.36	86.17	12.41
BMI	30.61	1.81	31.18	3.13	30.74	2.02	32.19	3.46
Waist circumference (cm)	103.06	4.70	103.10	6.56	102.50	5.21	102.33	5.46
Hip circumference (cm)	112.14	5.84	111.93	6.37	111.93	6.84	112.08	6.08
Neck Circumference (cm)	38.20	1.05	38.34	1.29	38.30	0.98	38.88	1.14
Waist to Hip Ratio	0.92	0.02	0.92	0.03	0.92	0.02	0.91	0.01
Body Fat (%) BMI method	36.48	2.29	39.06	4.33	36.63	2.40	42.91	4.47

Tables 4.15 and 4.16 show the progress charts from week 1 to week 19 for males and females, respectively.

As shown in table 4.15, males in both age groups in the control lost around 3-3.7 kg in 19 weeks while men in the intervention group lost 9 and 10 Kg in the 18-24 and 25-51 age groups, respectively. The waste, hip and neck circumference were significantly decreased more in the intervention group for both age groups. Therefore, the calculated BMI and waste-to-hip ratio were also significantly decreased in the intervention compared to control for both age groups. Body fat percentage (calculated with Navy and BMI method) was significantly decreased more in the intervention group with 2.5-3.5% and 2.80-3.9% for the 18-24 and 25-51 age groups, respectively (Table 4.15).

As reflected from table 4.16, females also followed similar trends to males. Females in both age groups in the control lost around 3 kg in 19 weeks while females in the intervention group lost 8.6 and 9.6 Kg in the 18-24 and 25-51 age groups, respectively. The waist, hip and neck circumference were significantly decreased more in the intervention group for both age groups. Therefore, the calculated BMI and waste-to-hip ratio were also significantly decreased in the intervention compared to control for both age groups. Body fat percentage (BMI method) was significantly decreased more in the intervention group with 3.8% and 4.2% for the 18-24 and 25-51 age groups, respectively (Table 4.15).

Table 4-15 Week 1-19 Males (Two Tailed T Test P <0.05)

	Control						Intervention						Statistical Significance	
	18-24 (n= 17)		25-51 (n= 57)				18-24 (n= 29)		25-51 (n= 43)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	94.88	8.45	86.19	7.36	-3.11	-3.77	80.38	9.11	82.29	11.13	-8.95	-10.36	**0.00**	**0.02**
BMI	29.53	1.20	27.74	2.06	-0.87	-1.22	26.49	2.14	26.01	2.57	-2.93	-3.24	**0.00**	**0.00**
Waist circumference (cm)	108.25	4.47	103.90	3.71	-0.31	-0.60	98.63	6.74	98.50	7.33	-6.53	-7.21	**0.00**	**0.00**
Hip circumference (cm)	109.69	4.97	106.74	3.45	-0.19	-0.86	102.84	3.95	103.14	4.06	-4.69	-4.36	**0.00**	**0.00**
Neck Circumference (cm)	43.38	1.65	42.21	2.10	-0.13	-0.64	39.97	3.16	40.14	3.42	-2.81	-2.79	**0.00**	**0.00**
Waist to Hip Ratio	0.99	0.03	0.97	0.02	0.00	0.00	0.96	0.04	0.95	0.04	-0.02	-0.03	**0.01**	**0.00**
Body Fat (%) BMI method	24.30	1.81	24.67	3.01	-1.05	-1.46	20.79	2.65	23.10	3.67	-3.51	-3.89	**0.00**	**0.04**

Table 4-16 Week 1-19 Females (Two Tailed T Test P <0.05)

	Control						Intervention						Statistical Significance	
	18-24 (n= 35)		25-51 (n= 41)				18-24 (n= 54)		25-51 (n= 24)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. Dev	Mean	Std. dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	78.77	5.83	79.73	9.23	-3.12	-2.97	73.04	4.69	76.58	8.36	-8.55	-9.59	**0.00**	0.18
BMI	29.50	1.93	30.08	2.93	-1.11	-1.10	27.53	1.99	28.65	2.52	-3.21	-3.54	**0.00**	**0.05**
Waist circumference (cm)	98.96	6.75	96.32	8.74	-4.10	-3.70	90.15	7.70	99	6.78	-12.35	-3.33	**0.00**	0.21
Hip circumference (cm)	112.09	5.89	105.87	8.52	-0.06	-0.07	99.83	7.69	112	6.13	-12.09	-0.08	**0.00**	**0.00**
Neck Circumference (cm)	38.20	1.05	38.34	1.29	0.00	0.00	36.67	2.96	36.81	0.90	-1.63	-2.06	**0.00**	**0.00**
Waist to Hip Ratio	0.88	0.03	0.91	0.05	-0.04	-0.03	0.90	0.03	0.88	0.03	-0.01	-0.03	**0.00**	**0.01**
Body Fat (%) BMI method	35.15	2.44	37.74	4.02	-1.33	-1.32	32.78	2.35	38.66	3.47	-3.85	-4.25	**0.00**	0.36

Tables 4.17 and 4.18 show the progress charts from week 19 to week 38 for males and females, respectively.

As shown in table 4.17, males in both the control and intervention group maintain their body weight loss within the next 18 weeks. The average body weight loss was around 1 kg for both age groups in the intervention. The waist, hip and neck circumference loss were also maintained in the intervention group for both age groups. Therefore, the calculated BMI and waste-to-hip ratio were also significantly maintained in the intervention compared to control for both ge groups. Body fat percentage (BMI method) was also significantly decreased more in the intervention group with 0.6% and 0.5% for the 18-24 and 25-51 age groups, respectively (Table 4.17).

As reflected from table 4.18, females also followed similar trends to males during their maintenance period. Females in both control and intervention maintain their weight loss. The waste, hip and neck circumference loss were also maintained more in the intervention group for both age groups. Therefore, the calculated BMI and waste-to-hip ratio were also significantly maintained in the intervention compared to control for both age groups. Body fat percentage (BMI method) loss was also maintained in the intervention group for the 18-24 and 25-51 age groups, respectively (Table 4.18).

Table 4-17 Week 19-38 Males (Two Tailed T Test P <0.05)

	Control						Intervention							
	18-24 (n= 17)		25-51 (n= 57)				18-24 (n= 17)		25-51 (n= 57)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	94.88	8.45	86.19	7.36	-1.38	-0.14	78.75	8.33	80.93	10.26	-1.63	-1.36	**0.00**	**0.02**
BMI	29.53	1.20	27.74	2.06	-0.36	-0.05	25.97	2.03	25.60	2.42	-0.52	-0.41	**0.00**	**0.00**
Waist circumference (cm)	108.25	4.47	103.90	3.71	-0.19	-0.05	98.06	7.55	98.07	7.87	-0.56	-0.43	**0.00**	**0.00**
Hip circumference (cm)	109.69	4.97	106.74	3.45	0.00	-0.07	102.28	4.54	102.71	4.48	-0.56	-0.43	**0.00**	**0.00**
Neck Circumference (cm)	43.38	1.65	42.21	2.10	0.31	0.10	39.63	3.67	39.79	3.88	-0.34	-0.36	**0.00**	**0.00**
Waist to Hip Ratio	0.99	0.03	0.97	0.02	0.00	0.00	0.96	0.04	0.95	0.04	0.00	0.00	**0.01**	**0.00**
Body Fat (%) BMI method	24.30	1.81	24.67	3.01	-0.43	-0.06	20.16	2.48	22.61	3.53	-0.62	-0.49	**0.00**	**0.04**

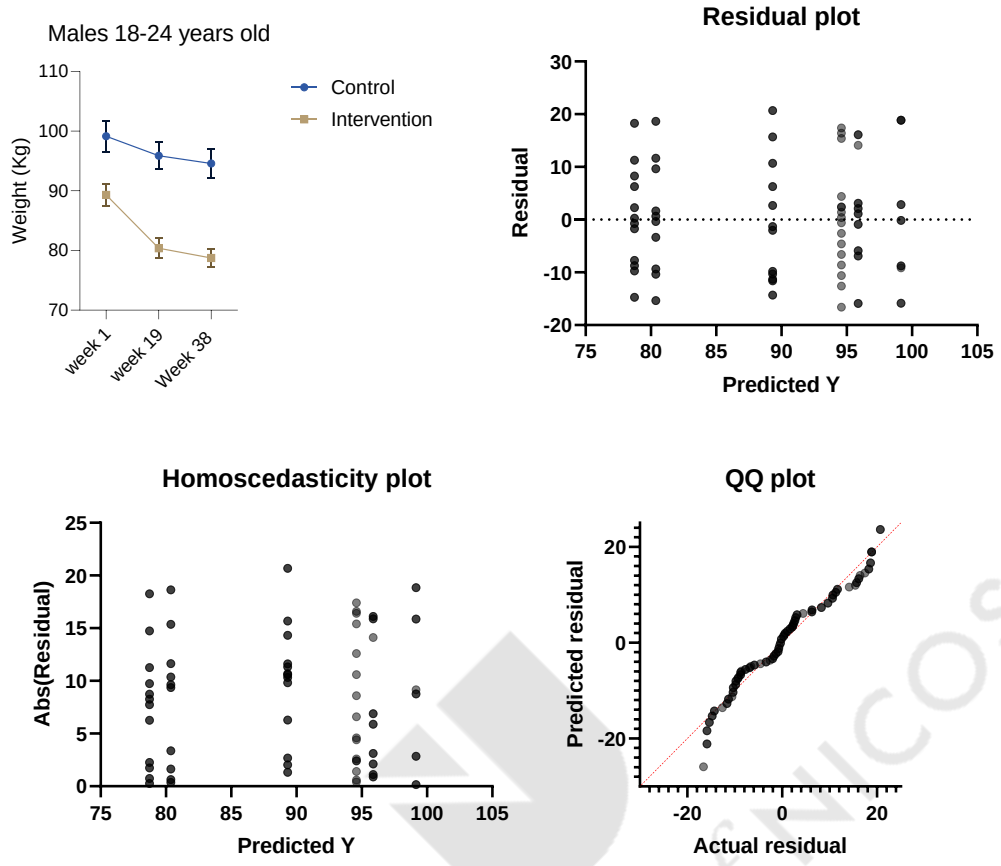
Table 4-18 Week 19-38 Females (Two Tailed T Test P <0.05)

	Control						Intervention							
	18-24 (n= 35)		25-51 (n= 41)				18-24 (n= 54)		25-51 (n= 24)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. dev	Mean	Std. dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. dev	Mean	Std. dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	78.69	5.84	79.76	9.23	-0.09	0.02	72.07	4.57	77.54	13.01	-0.96	0.96	**0.00**	0.43
BMI	29.47	1.96	30.09	2.94	-0.03	0.01	27.17	2.04	28.95	3.69	-0.36	0.30	**0.00**	0.18
Waist circumference (cm)	98.96	6.75	95.79	9.16	-0.03	-0.54	89.78	8.04	99.00	6.79	-0.37	0.00	**0.00**	0.15
Hip circumference (cm)	112.09	5.89	105.41	8.79	-0.20	-0.46	99.48	7.96	112.00	6.13	-0.35	0.00	**0.00**	**0.00**
Neck Circumference (cm)	38.20	1.05	38.34	1.29	-0.20	-0.22	36.31	3.16	36.65	1.18	-0.35	-0.17	**0.01**	**0.00**
Waist to Hip Ratio	0.88	0.03	0.91	0.05	0.00	0.00	0.90	0.03	0.88	0.03	0.00	0.00	**0.01**	**0.02**
Body Fat (%) BMI method	35.10	2.48	37.75	4.03	-0.04	0.01	32.35	2.40	39.02	4.64	-0.43	0.36	**0.00**	0.26

Overall, for both men and women and age groups, the intervention group had a sharp significant decrease in weight, BMI, waist-to-hip ratio, neck circumference and percentage of body fat during the first 19 weeks of their treatment. Followed by a plateau during the next 19 weeks of maintenance. While the control group did not follow the same trend as both young and adult men and women did face a decrease in their body measurements.

In more detail, men aged 18-24 years old had a significant decrease in their body weight ($p<0.0001$; Figure 4.1), BMI ($p=0.01$; figure 4.2), waist-to-hip ration ($p=0.08$; figure 4.3), neck circumference ($p=0.0001$; figure 4.4) and body fat ($p<0.0001$; figure 4.5) during the first 19 weeks of treatment.

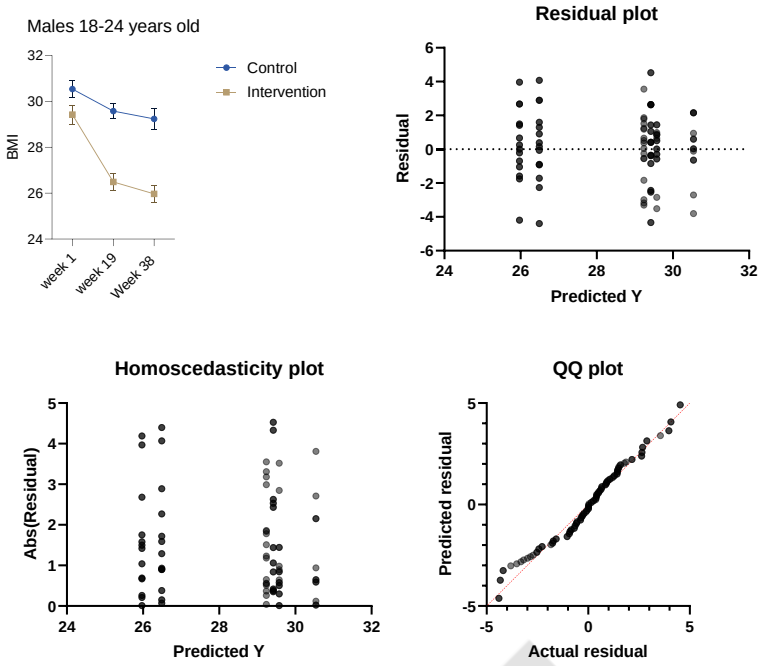
Figure 4.1 Men aged 18-24 years old lost weight at 19 weeks of treatment



Tukey's multiple comparisons tes	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
week 1 vs. week 19	3.282	-4.623 to 11.19	No	ns	0.5885
week 1 vs. Week 38	4.576	-3.329 to 12.48	No	ns	0.3588
week 19 vs. Week 38	1.294	-6.612 to 9.200	No	ns	0.9205
Intervention					
week 1 vs. week 19	8.950	3.188 to 14.71	Yes	***	0.0010
week 1 vs. Week 38	10.58	4.813 to 16.34	Yes	****	<0.0001
week 19 vs. Week 38	1.625	-4.137 to 7.387	No	ns	0.7824

Figure 4.1 Men aged 18-24 years old lost weight at 19 weeks of treatment. A) line graph comparing weight measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

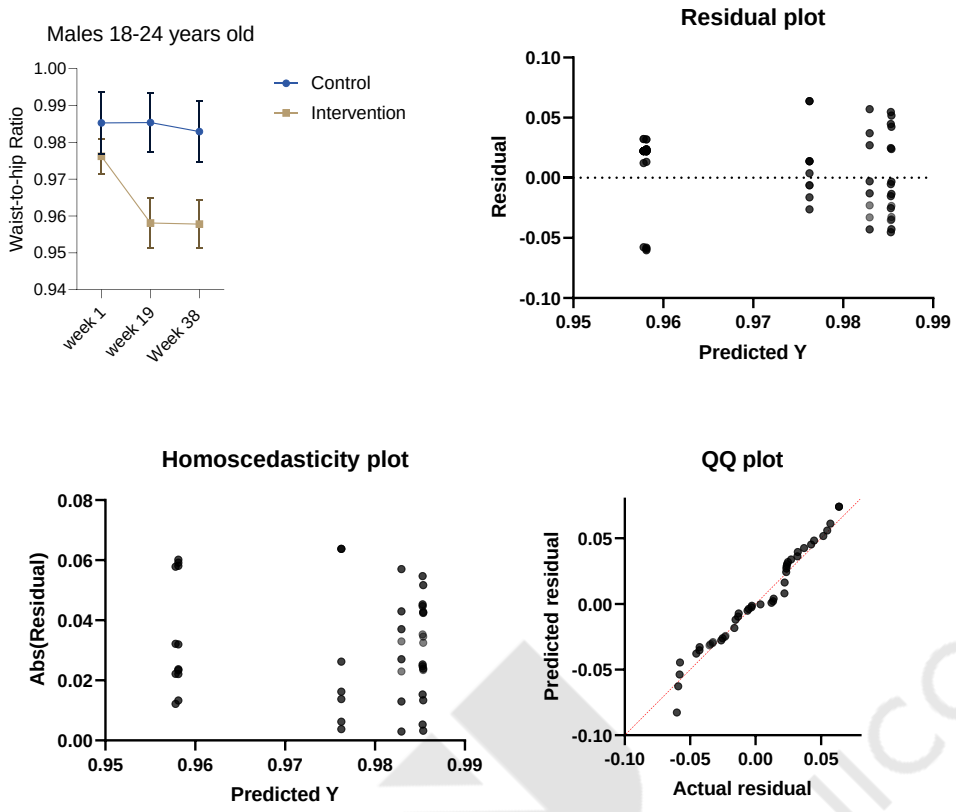
Figure 4.2 Men aged 18-24 years old decrease BMI at 19 weeks of treatment



Tukey's multiple comparisons tes	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
week 1 vs. week 19	0.9612	-0.6857 to 2.608	No	ns	0.3528
week 1 vs. Week 38	1.299	-0.3475 to 2.946	No	ns	0.1515
week 19 vs. Week 38	0.3382	-1.309 to 1.985	No	ns	0.8778
Intervention					
week 1 vs. week 19	2.932	1.731 to 4.132	Yes	****	<0.0001
week 1 vs. Week 38	3.450	2.250 to 4.651	Yes	****	<0.0001
week 19 vs. Week 38	0.5188	-0.6816 to 1.719	No	ns	0.5632

Figure 4.2 Men aged 18-24 years old decrease BMI at 19 weeks of treatment. A) line graph comparing BMI measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

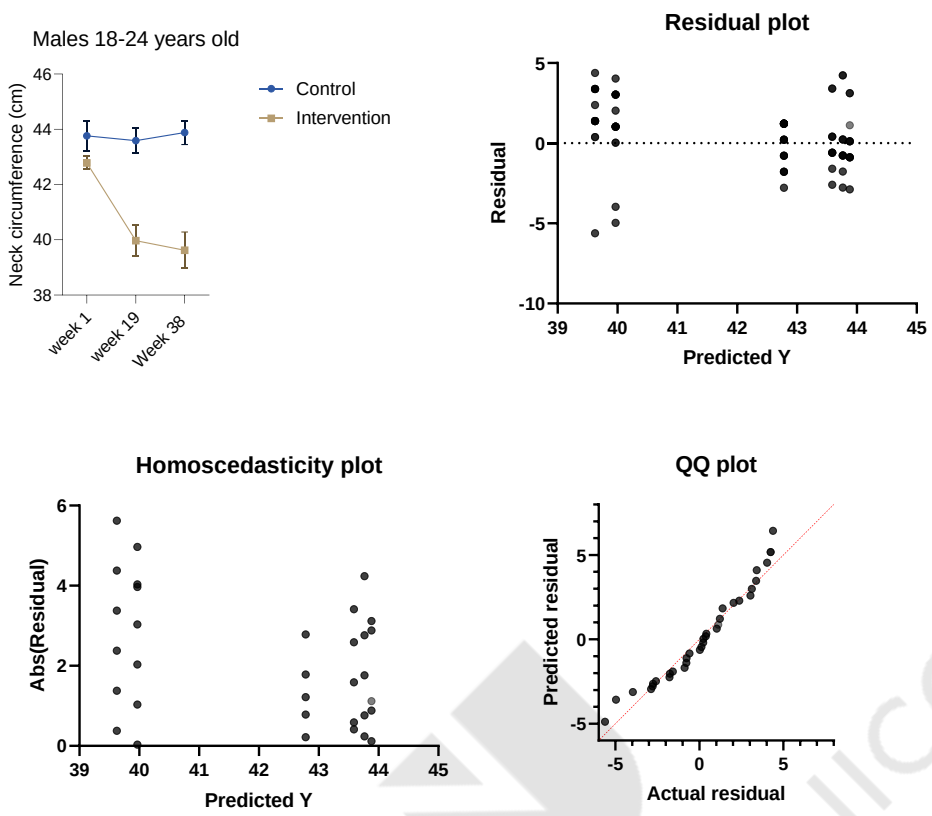
Figure 4.3 Men aged 18-24 years old decreased waist to hip ratio at 19 weeks of treatment



Tukey's multiple comparisons tes	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
week 1 vs. week 19	-6.382e-005	-0.02779 to 0.02766	No	ns	>0.9999
week 1 vs. Week 38	0.002353	-0.02537 to 0.03008	No	ns	0.9780
week 19 vs. Week 38	0.002417	-0.02531 to 0.03014	No	ns	0.9768
Intervention					
week 1 vs. week 19	0.01812	-0.002088 to 0.03833	No	ns	0.0886
week 1 vs. Week 38	0.01844	-0.001770 to 0.03865	No	ns	0.0815
week 19 vs. Week 38	0.0003171	-0.01989 to 0.02053	No	ns	0.9992

Figure 4.3 Men aged 18-24 years old decreased waist to hip ratio at 19 weeks of treatment. A) line graph comparing waist-to-hip ratio measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

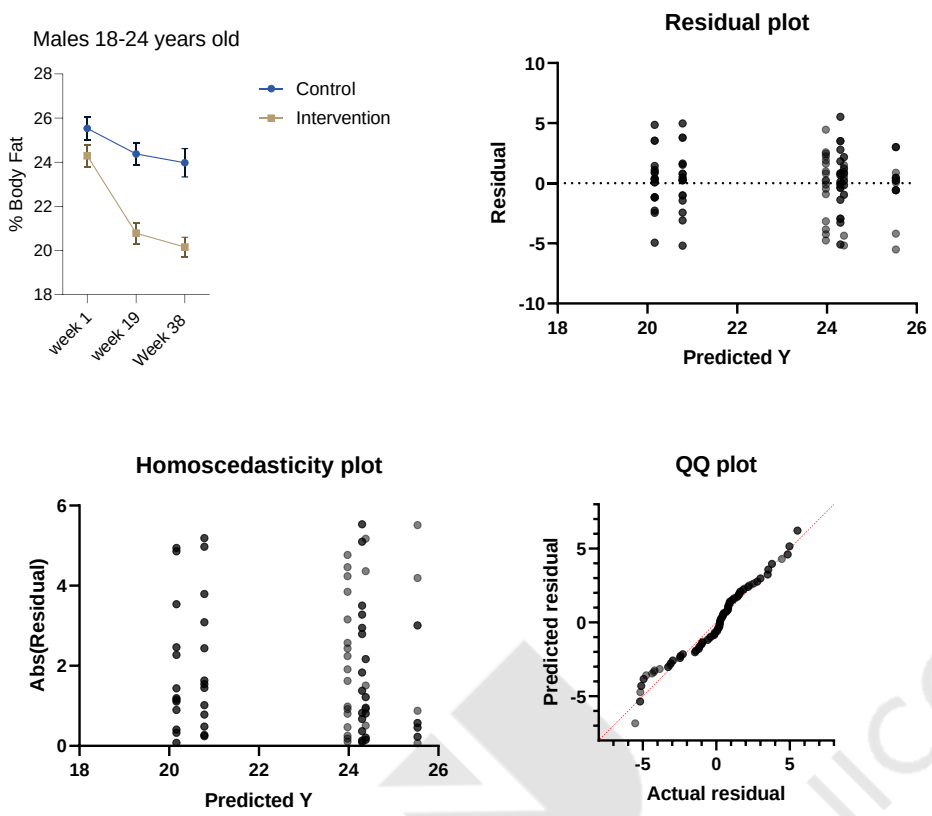
Figure 4.4 Men aged 18-24 years old decreased neck circumference at 19 weeks of treatment.



Tukey's multiple comparisons tes	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
week 1 vs. week 19	0.1765	-1.980 to 2.332	No	ns	0.9795
week 1 vs. Week 38	-0.1176	-2.274 to 2.038	No	ns	0.9908
week 19 vs. Week 38	-0.2941	-2.450 to 1.862	No	ns	0.9441
Intervention					
week 1 vs. week 19	2.813	1.241 to 4.384	Yes	***	0.0001
week 1 vs. Week 38	3.156	1.585 to 4.728	Yes	****	<0.0001
week 19 vs. Week 38	0.3438	-1.228 to 1.915	No	ns	0.8626

Figure 4.4 Men aged 18-24 years old decreased neck circumference at 19 weeks of treatment. A) line graph comparing neck circumference measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

Figure 4.5 Men aged 18-24 years old decreased % body fat at 19 weeks of treatment

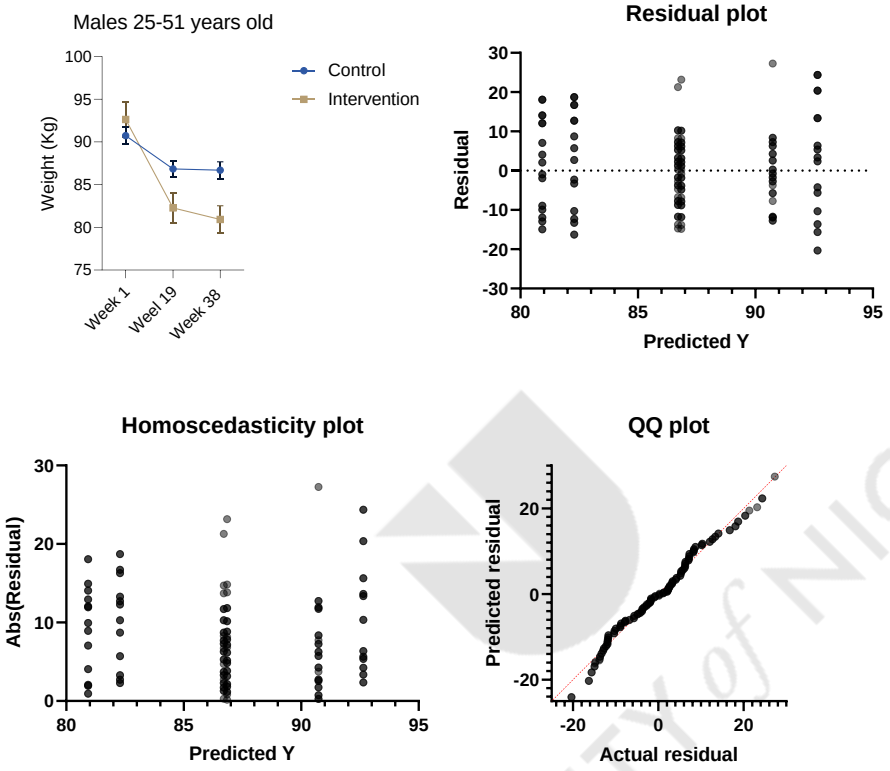


Tukey's multiple comparisons tes	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
week 1 vs. week 19	1.152	-0.9332 to 3.238	No	ns	0.3927
week 1 vs. Week 38	1.559	-0.5268 to 3.644	No	ns	0.1833
week 19 vs. Week 38	0.4065	-1.679 to 2.492	No	ns	0.8893
Intervention					
week 1 vs. week 19	3.513	1.993 to 5.033	Yes	****	<0.0001
week 1 vs. Week 38	4.137	2.617 to 5.657	Yes	****	<0.0001
week 19 vs. Week 38	0.6241	-0.8961 to 2.144	No	ns	0.5955

Figure 4.5 Men aged 18-24 years old decreased % body fat at 19 weeks of treatment. A) line graph comparing body fat measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

Furthermore, men aged 25-51years old had a significant decrease in their body weight (p<0.0001; Figure 4.6), BMI (p<0.0001; figure 4.7), waist-to-hip ration (p<0.0001; figure 4.8), neck circumference (p<0.0001; figure 4.9) and body fat (p<0.0001; figure 4.10) during the first 19 weeks of treatment.

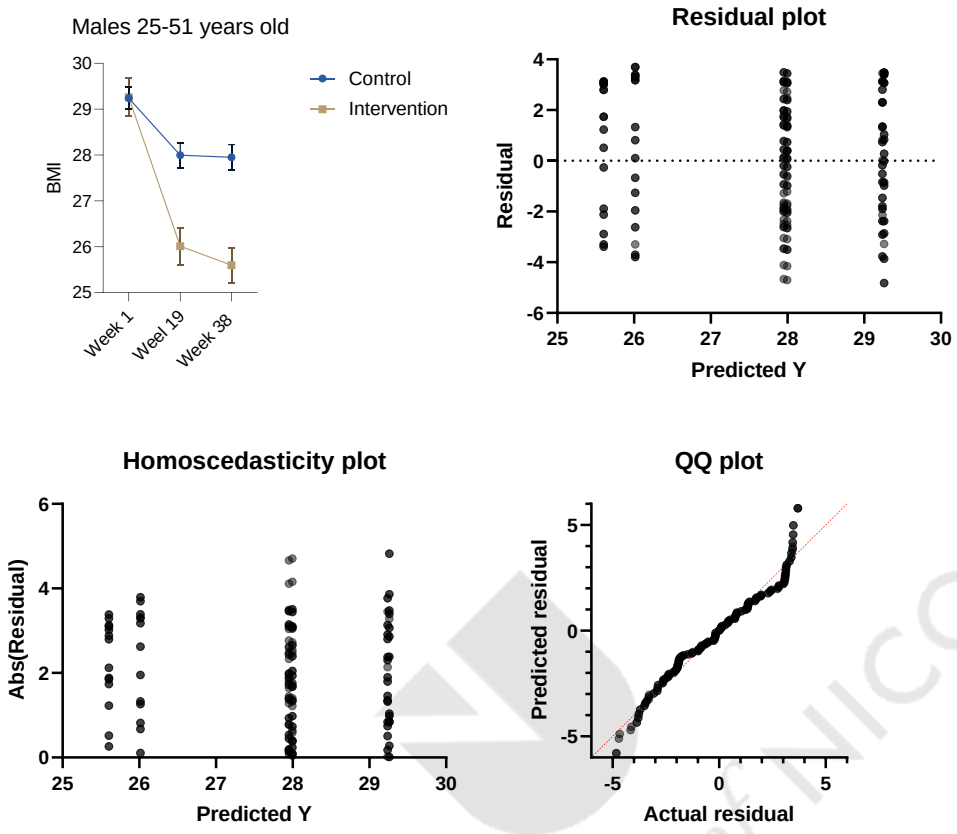
Figure 4.6 Men aged 25-51 years old lose weight at 19 weeks of treatment.



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Weel 19	3.895	-0.2655 to 8.055	No	ns	0.0719
Week 1 vs. Week 38	4.035	-0.1252 to 8.195	No	ns	0.0595
Weel 19 vs. Week 38	0.1404	-4.020 to 4.301	No	ns	0.9965
Intervention					
Week 1 vs. Weel 19	10.36	5.511 to 15.20	Yes	****	<0.0001
Week 1 vs. Week 38	11.71	6.868 to 16.56	Yes	****	<0.0001
Weel 19 vs. Week 38	1.357	-3.489 to 6.204	No	ns	0.7870

Figure 4.6 Men aged 25-51 years old lose weight at 19 weeks of treatment. A) line graph comparing weight measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; p<0.05, *; p<0.01, **; p<0.001, ***; p<0.0001, ***

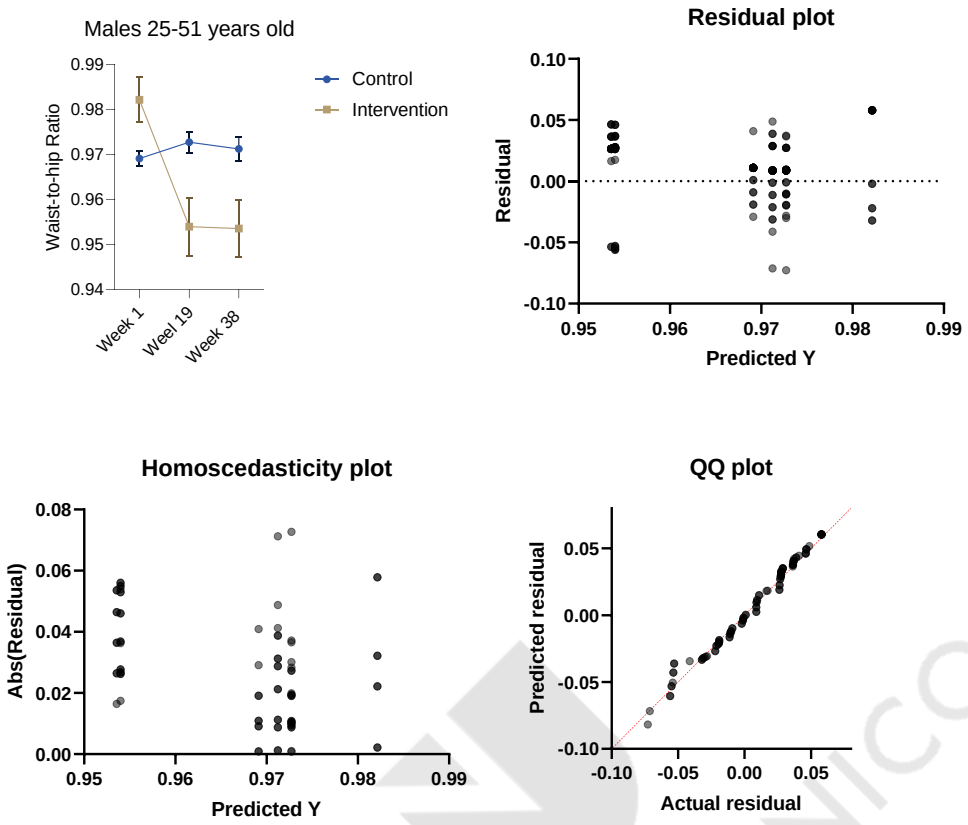
Figure 4.7 Men aged 25-41 years old decreased BMI at 19 weeks of treatment



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Weel 19	1.242	0.2390 to 2.245	Yes	*	0.0106
Week 1 vs. Week 38	1.287	0.2837 to 2.290	Yes	**	0.0077
Weel 19 vs. Week 38	0.04474	-0.9584 to 1.048	No	ns	0.9939
Intervention					
Week 1 vs. Weel 19	3.246	2.078 to 4.415	Yes	****	<0.0001
Week 1 vs. Week 38	3.657	2.488 to 4.825	Yes	****	<0.0001
Weel 19 vs. Week 38	0.4107	-0.7579 to 1.579	No	ns	0.6860

Figure 4.7 Men aged 25-41 years old decreased BMI at 19 weeks of treatment. A) line graph comparing BMI measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

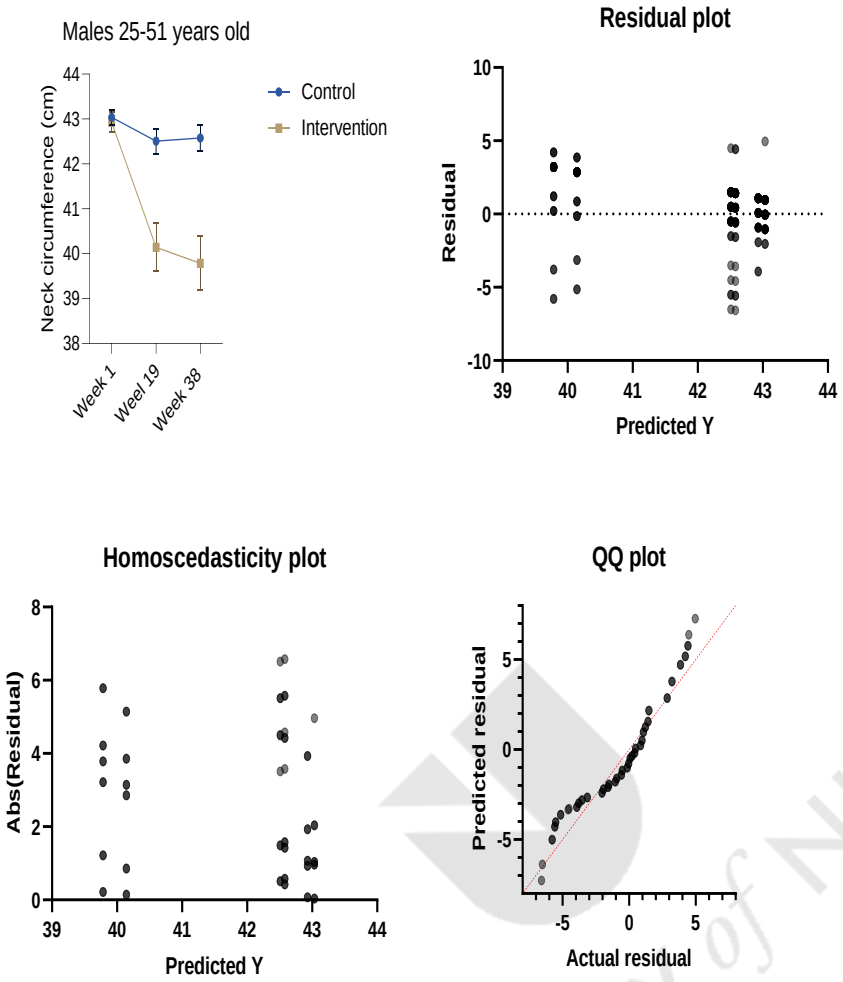
Figure 4.8 Men aged 25-51 years old decreased waist to hip ratio at 19 weeks of treatment



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Weel 19	-0.003594	-0.01601 to 0.008826	No	ns	0.7743
Week 1 vs. Week 38	-0.002105	-0.01453 to 0.01031	No	ns	0.9159
Weel 19 vs. Week 38	0.001489	-0.01093 to 0.01391	No	ns	0.9570
Intervention					
Week 1 vs. Weel 19	0.02816	0.01369 to 0.04263	Yes	****	<0.0001
Week 1 vs. Week 38	0.02857	0.01410 to 0.04304	Yes	****	<0.0001
Weel 19 vs. Week 38	0.0004102	-0.01406 to 0.01488	No	ns	0.9975

Figure 4.8 Men aged 25-51 years old decreased waist to hip ratio at 19 weeks of treatment. A) line graph comparing waist-to-hip measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; p<0.05, *; p<0.01, **; p<0.001, ***; p<0.0001, ****.

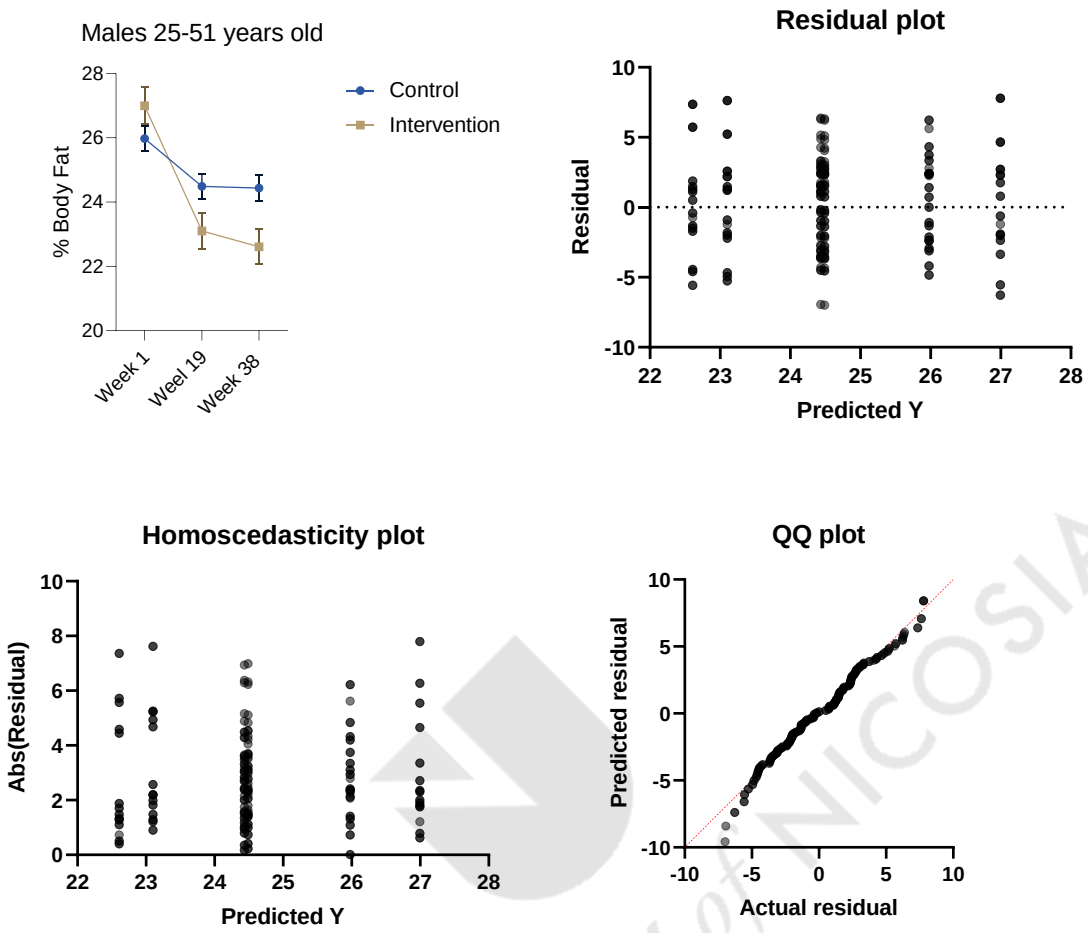
Figure 4.9 Men aged 25-51 years old decreased neck circumference at 19 weeks of treatment



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Weel 19	0.5263	-0.5782 to 1.631	No	ns	0.5009
Week 1 vs. Week 38	0.4561	-0.6484 to 1.561	No	ns	0.5946
Weel 19 vs. Week 38	-0.07018	-1.175 to 1.034	No	ns	0.9877
Intervention					
Week 1 vs. Weel 19	2.786	1.499 to 4.072	Yes	****	<0.0001
Week 1 vs. Week 38	3.143	1.856 to 4.430	Yes	****	<0.0001
Weel 19 vs. Week 38	0.3571	-0.9296 to 1.644	No	ns	0.7903

Figure 4.9 Men aged 25-51 years old decreased neck circumference at 19 weeks of treatment. A) line graph comparing neck circumference measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

Figure 4.10 Men aged 25-51 years old decreased % body fat at 19 weeks of treatment.

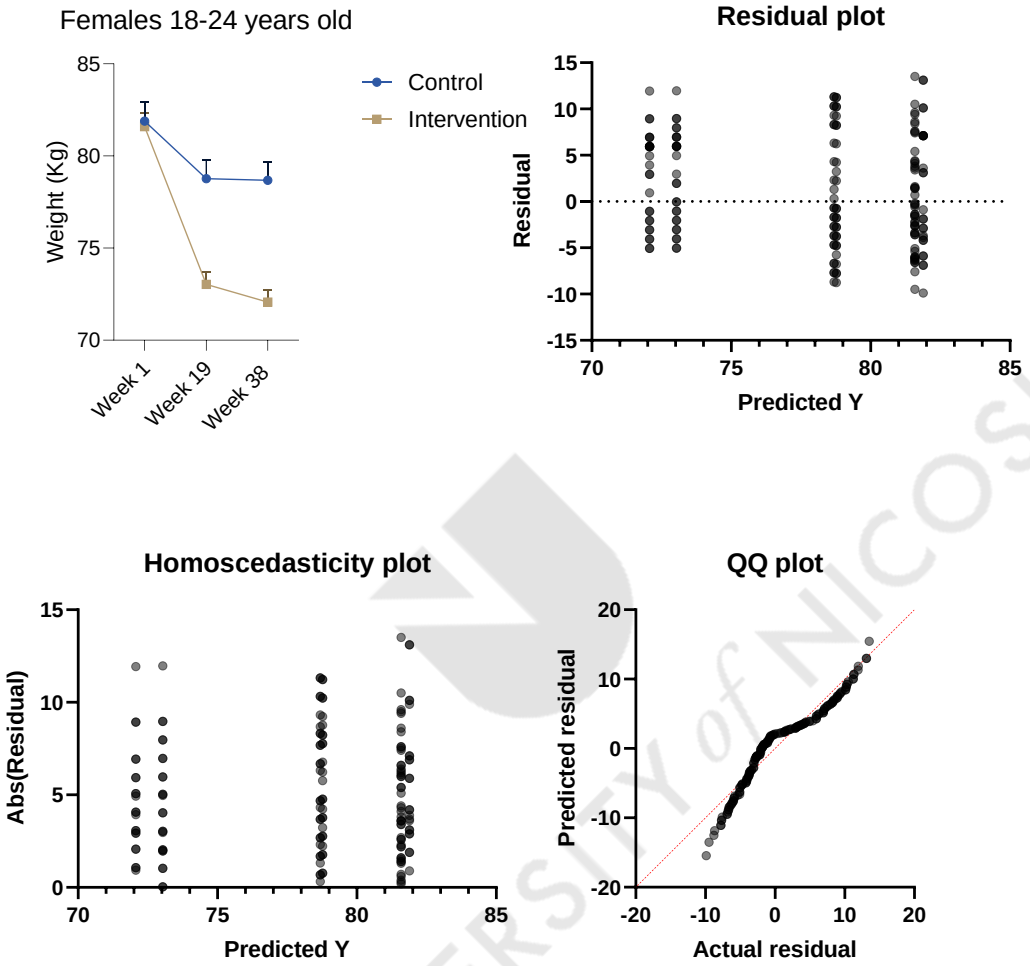


Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Weel 19	1.489	0.03447 to 2.943	Yes	*	0.0434
Week 1 vs. Week 38	1.543	0.08816 to 2.997	Yes	*	0.0347
Weel 19 vs. Week 38	0.05368	-1.401 to 1.508	No	ns	0.9958
Intervention					
Week 1 vs. Weel 19	3.893	2.198 to 5.587	Yes	****	<0.0001
Week 1 vs. Week 38	4.386	2.692 to 6.081	Yes	****	<0.0001
Weel 19 vs. Week 38	0.4936	-1.201 to 2.188	No	ns	0.7717

Figure 4.10 Men aged 25-51 years old decreased % body fat at 19 weeks of treatment. A) line graph comparing body fat measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

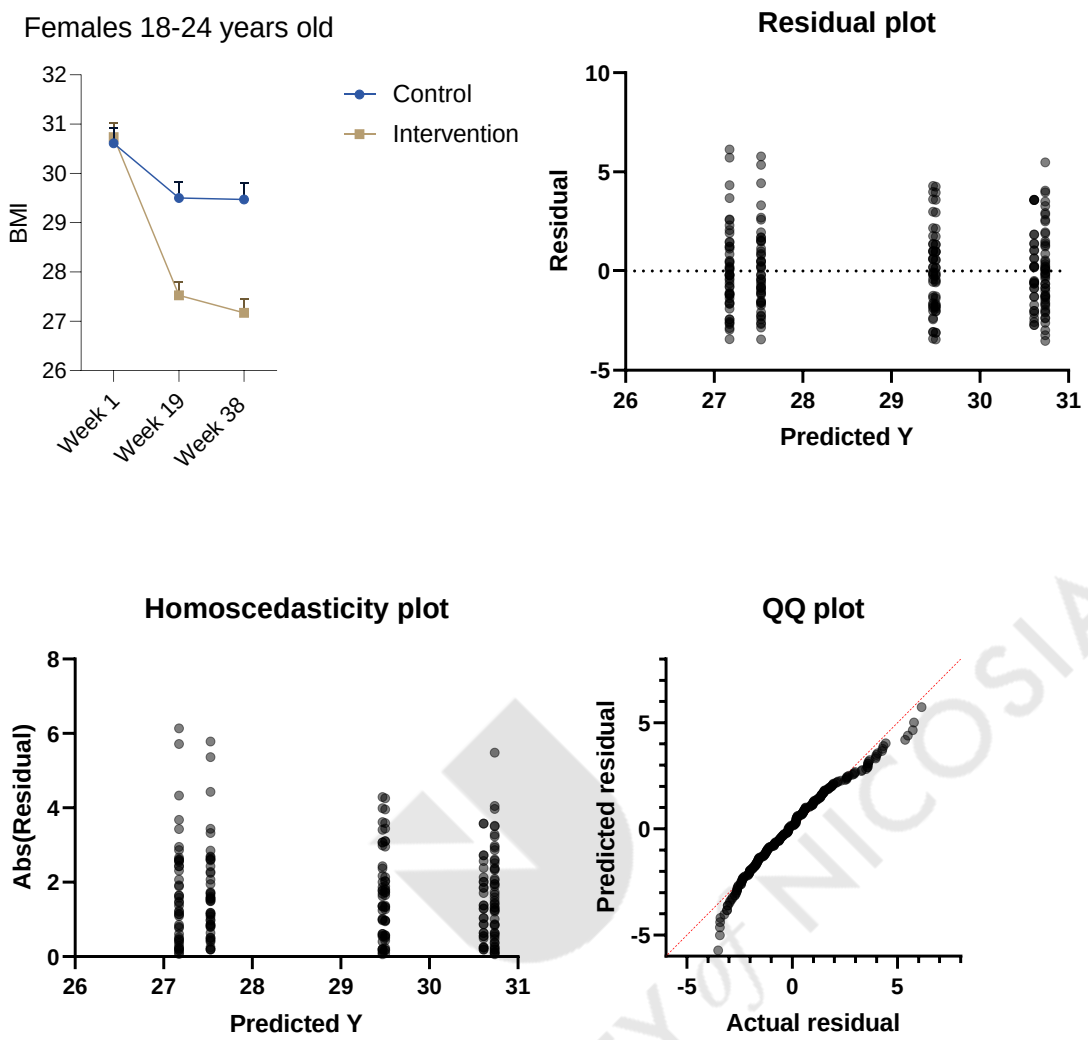
In addition, women aged 18-24 years old had a significant decrease in their body weight (p<0.0001; Figure 4.11), BMI (p<0.0001; figure 4.12), waist-to-hip ration (p=0.009; figure 4.13), neck circumference (p=0.0004; figure 4.14) and body fat (p<0.0001; figure 4.15) during the first 19 weeks of treatment.

Figure 4.11 Female aged 18-24 years old lose weight at 19 weeks of treatment



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	3.117	0.08517 to 6.149	Yes	*	0.0423
Week 1 vs. Week 38	3.203	0.1709 to 6.235	Yes	*	0.0356
Week 19 vs. Week 38	0.08571	-2.946 to 3.118	No	ns	0.9976
Intervention					
Week 1 vs. Week 19	8.554	6.113 to 10.99	Yes	****	<0.0001
Week 1 vs. Week 38	9.517	7.076 to 11.96	Yes	****	<0.0001
Week 19 vs. Week 38	0.9630	-1.478 to 3.404	No	ns	0.6219

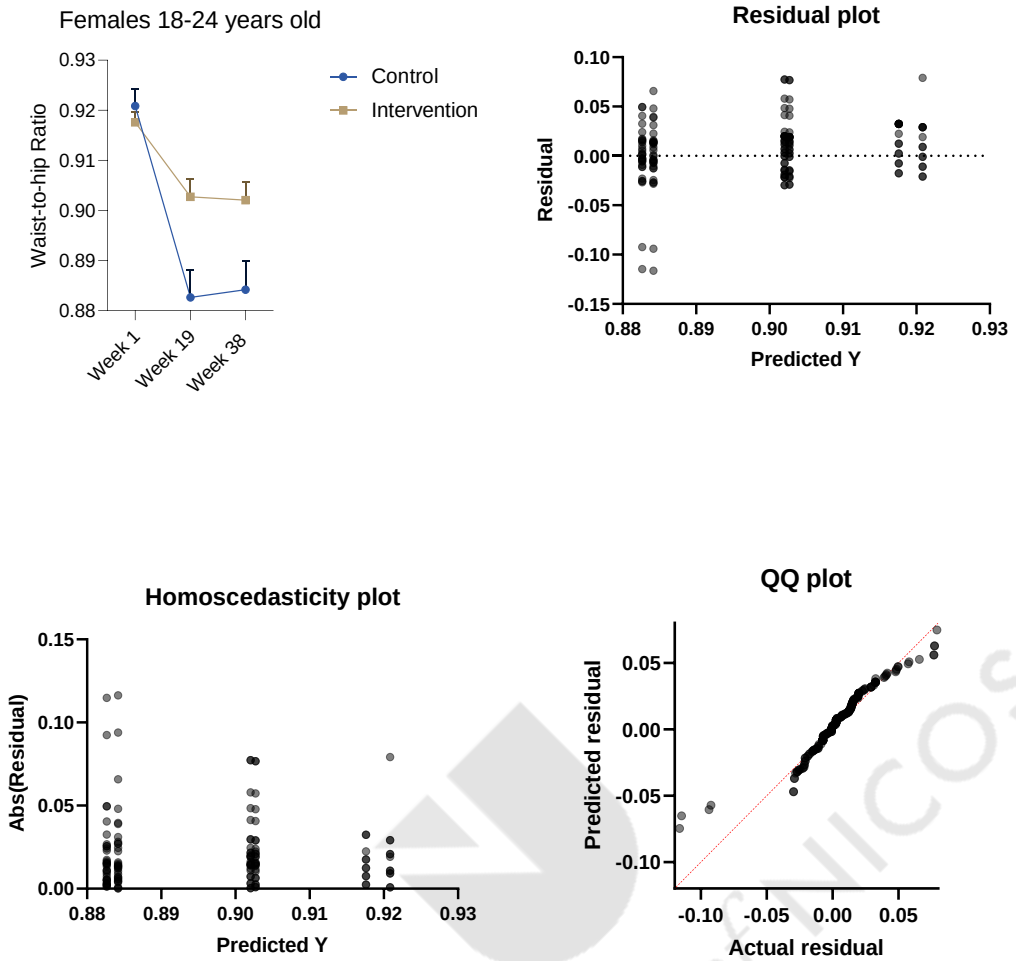
Figure 4.11 Female aged 18-24 years old lose weight at 19 weeks of treatment. A) line graph comparing weight measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; p<0.05, *; p<0.01, **; p<0.001, ***; p<0.0001, ****.



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	1.110	-0.01405 to 2.233	No	ns	0.0538
Week 1 vs. Week 38	1.141	0.01681 to 2.264	Yes	*	0.0458
Week 19 vs. Week 38	0.03086	-1.093 to 1.155	No	ns	0.9977
Intervention					
Week 1 vs. Week 19	3.208	2.303 to 4.112	Yes	****	<0.0001
Week 1 vs. Week 38	3.564	2.660 to 4.469	Yes	****	<0.0001
Week 19 vs. Week 38	0.3567	-0.5480 to 1.261	No	ns	0.6223

Figure 4.12 Female aged 18-24 years old decreased BMI at 19 weeks of treatment. A) line graph comparing BMI measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

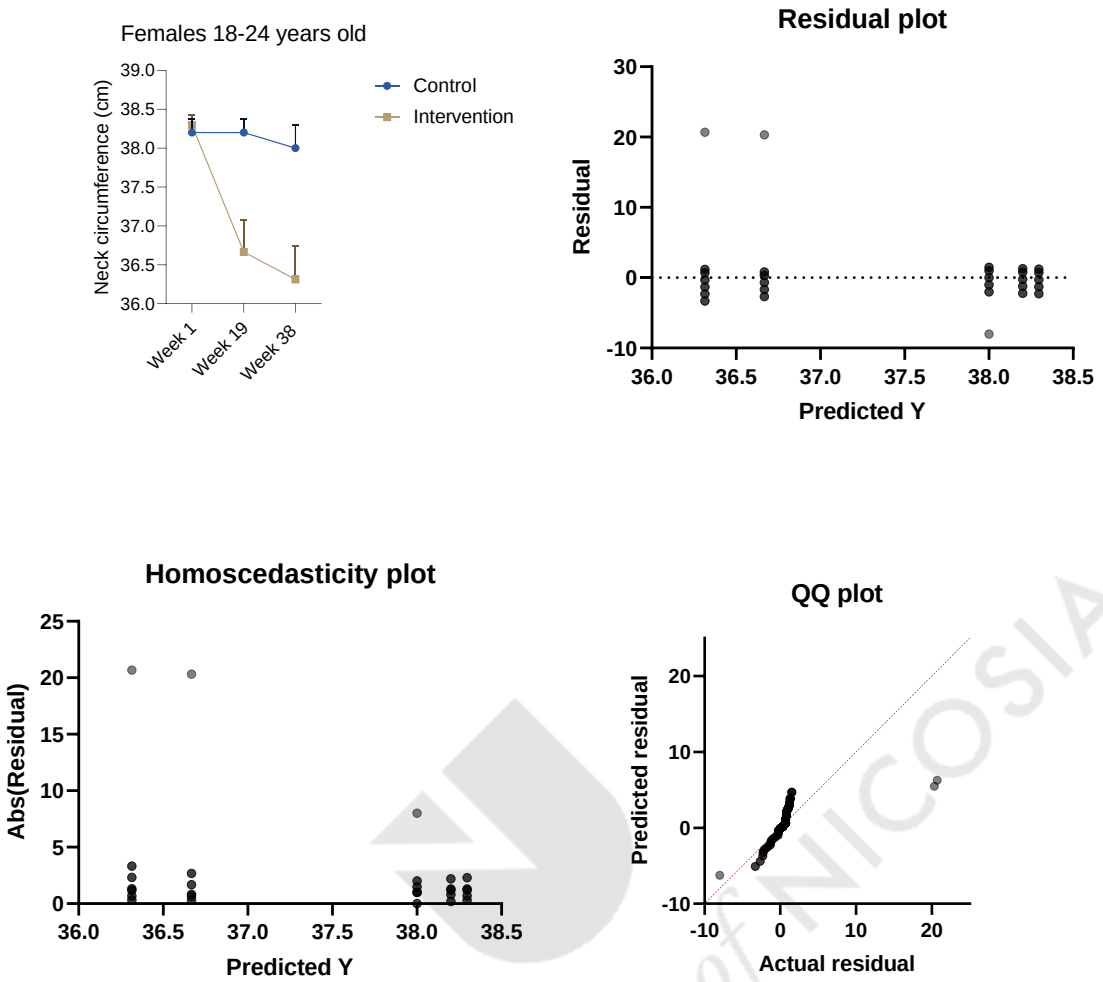
Figure 4.13 Female aged 18-24 years old decreased waist to hip ratio at 19 weeks of treatment.



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	0.03821	0.02356 to 0.05287	Yes	****	<0.0001
Week 1 vs. Week 38	0.03668	0.02203 to 0.05133	Yes	****	<0.0001
Week 19 vs. Week 38	-0.001534	-0.01619 to 0.01312	No	ns	0.9670
Intervention					
Week 1 vs. Week 19	0.01488	0.003085 to 0.02668	Yes	**	0.0090
Week 1 vs. Week 38	0.01554	0.003742 to 0.02734	Yes	**	0.0060
Week 19 vs. Week 38	0.0006561	-0.01114 to 0.01245	No	ns	0.9906

Figure 4.13 Female aged 18-24 years old decreased waist to hip ratio at 19 weeks of treatment. A) line graph comparing waist-to-hip ratio measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; p<0.05, *; p<0.01, **; p<0.001, ***; p<0.0001, ****.

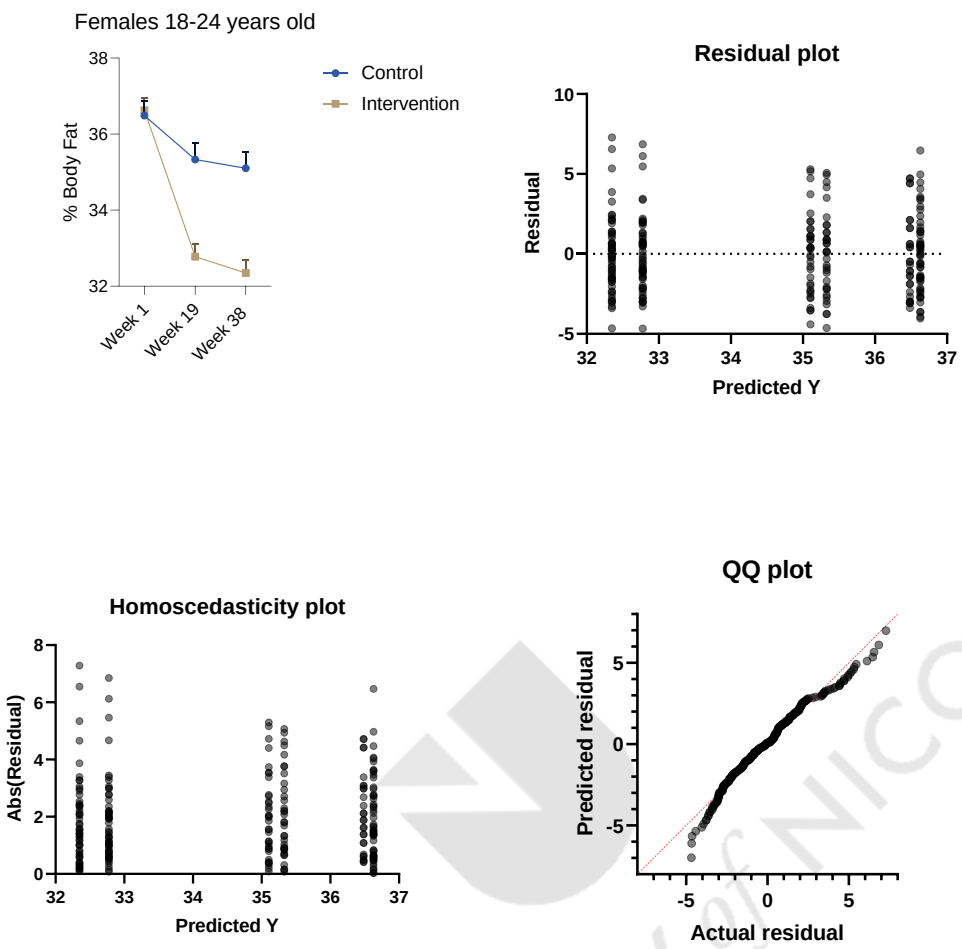
Figure 4.14 Female aged 18-24 years old decreased neck circumference at 19 weeks of treatment.



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	0.000	-1.229 to 1.229	No	ns	>0.9999
Week 1 vs. Week 38	0.2000	-1.029 to 1.429	No	ns	0.9222
Week 19 vs. Week 38	0.2000	-1.029 to 1.429	No	ns	0.9222
Intervention					
Week 1 vs. Week 19	1.630	0.6398 to 2.619	Yes	***	0.0004
Week 1 vs. Week 38	1.981	0.9917 to 2.971	Yes	****	<0.0001
Week 19 vs. Week 38	0.3519	-0.6380 to 1.342	No	ns	0.6798

Figure 4.14 Female aged 18-24 years old decreased neck circumference at 19 weeks of treatment. A) line graph comparing neck circumference measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

Figure 4.15 Female aged 18-24 years old decreased % Body fat at 19 weeks of treatment.

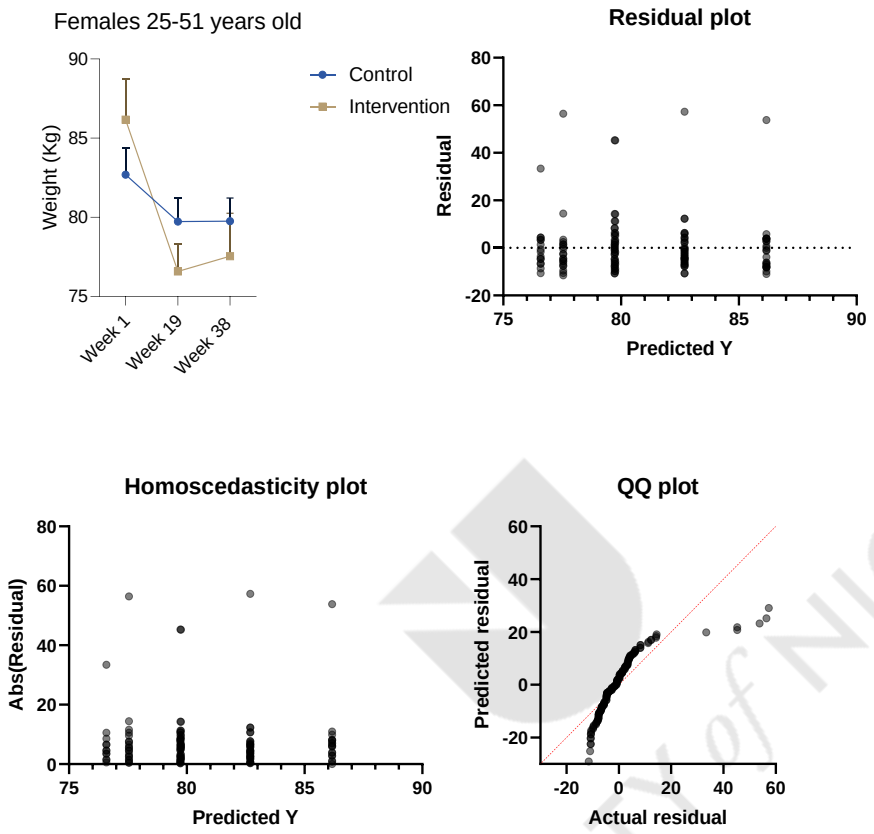


Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	1.155	-0.2138 to 2.525	No	ns	0.1169
Week 1 vs. Week 38	1.382	0.01303 to 2.752	Yes	*	0.0473
Week 19 vs. Week 38	0.2269	-1.142 to 1.596	No	ns	0.9194
Intervention					
Week 1 vs. Week 19	3.851	2.749 to 4.953	Yes	****	<0.0001
Week 1 vs. Week 38	4.279	3.177 to 5.382	Yes	****	<0.0001
Week 19 vs. Week 38	0.4283	-0.6740 to 1.531	No	ns	0.6307

Figure 4.15 Female aged 18-24 years old decreased % Body fat at 19 weeks of treatment. A) line graph comparing body fat measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; p<0.05, *; p<0.01, **; p<0.001, ***; p<0.0001, ****.

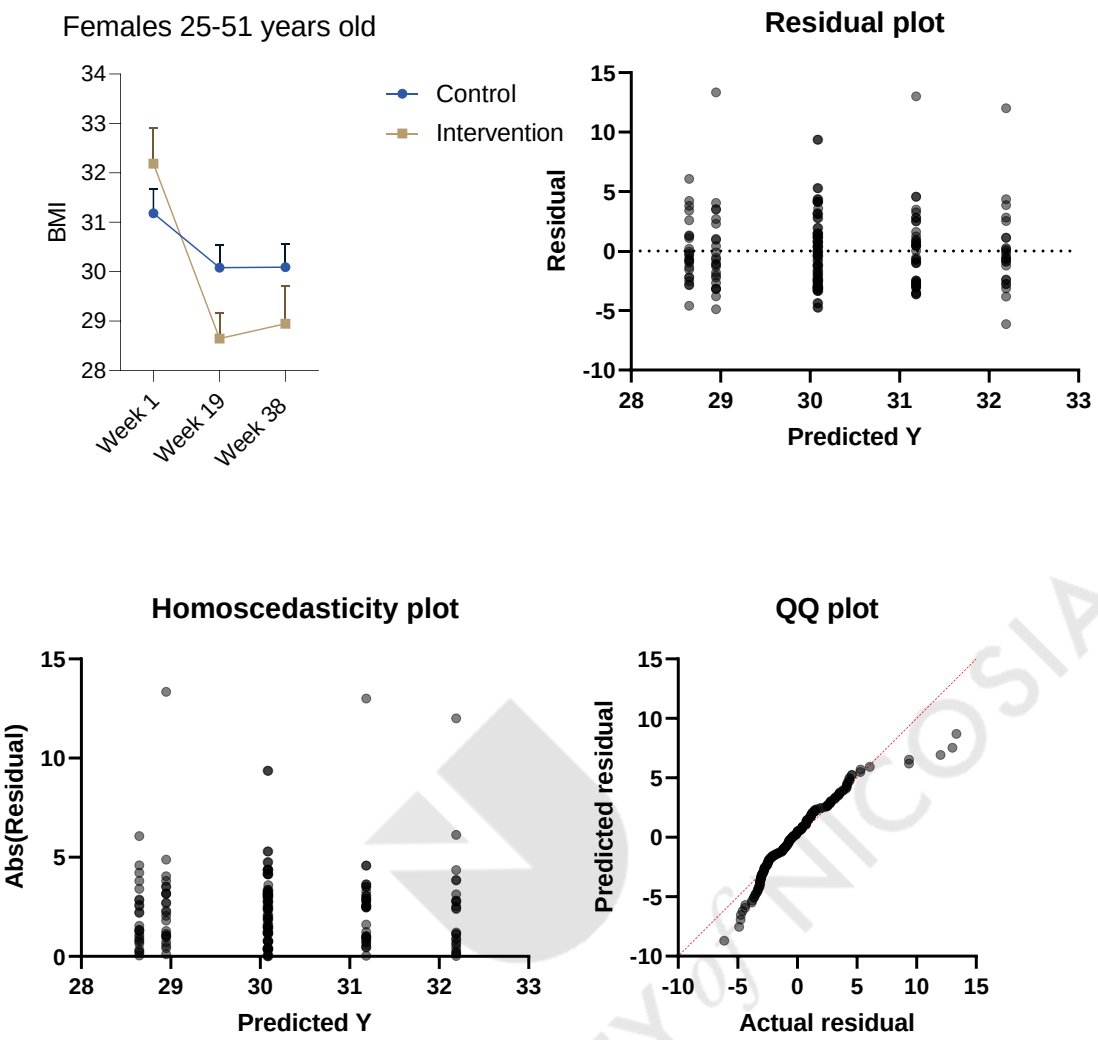
Furthermore, women aged 25-51 years old had a significant decrease in their body weight (p=0.005; Figure 4.16), BMI (p=0.0004; figure 4.17), waist-to-hip ratio (p=0.01; figure 4.18), neck circumference (p<0.0001; figure 4.19) and body fat (p=0.001; figure 4.20) during the first 19 weeks of treatment.

Figure 4.16 Females aged 25-51 years old lose weight at 19 weeks of treatment



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	2.968	-2.526 to 8.462	No	ns	0.4103
Week 1 vs. Week 38	2.944	-2.550 to 8.438	No	ns	0.4163
Week 19 vs. Week 38	-0.02439	-5.518 to 5.470	No	ns	>0.9999
Intervention					
Week 1 vs. Week 19	9.587	2.407 to 16.77	Yes	**	0.0053
Week 1 vs. Week 38	8.629	1.448 to 15.81	Yes	*	0.0139
Week 19 vs. Week 38	-0.9583	-8.139 to 6.223	No	ns	0.9467

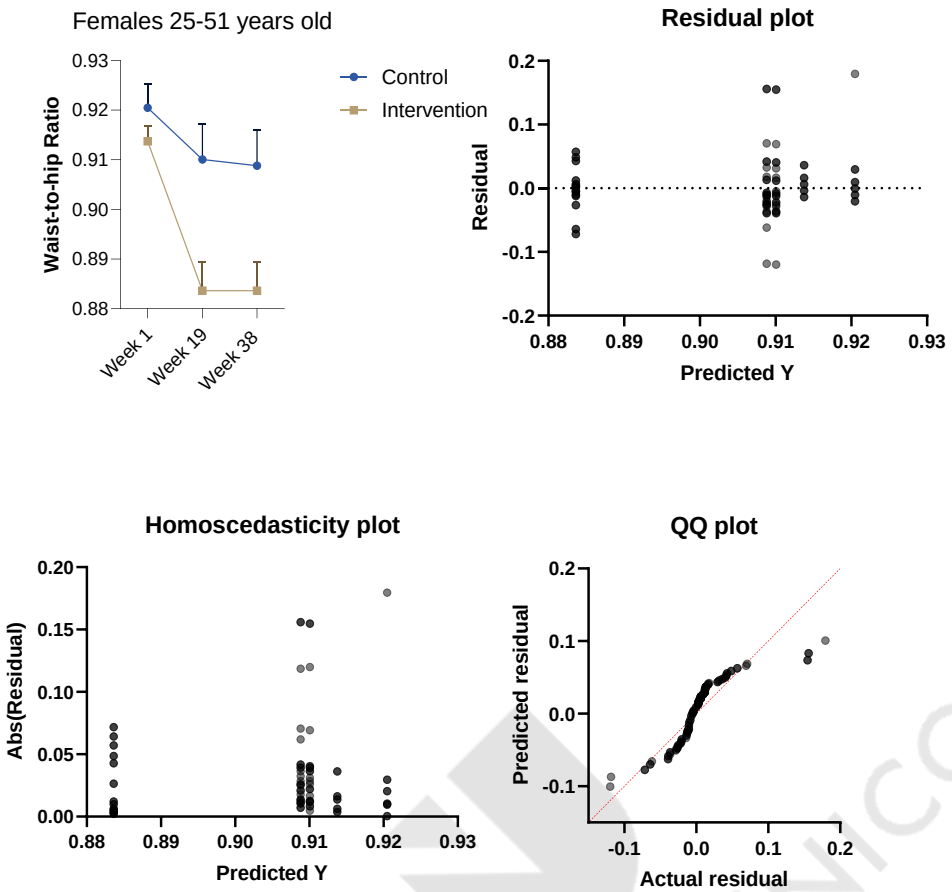
Figure 4.16 Females aged 25-51 years old lose weight at 19 weeks of treatment. A) line graph comparing weight measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; p<0.05, *; p<0.01, **; p<0.001, ***; p<0.0001, ****.



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	1.103	-0.5403 to 2.746	No	ns	0.2544
Week 1 vs. Week 38	1.093	-0.5503 to 2.736	No	ns	0.2607
Week 19 vs. Week 38	-0.01000	-1.653 to 1.633	No	ns	0.9999
Intervention					
Week 1 vs. Week 19	3.540	1.393 to 5.688	Yes	***	0.0004
Week 1 vs. Week 38	3.242	1.094 to 5.389	Yes	**	0.0013
Week 19 vs. Week 38	-0.2987	-2.446 to 1.849	No	ns	0.9422

Figure 4.17 Females aged 25-51 years old decreased BMI at 19 weeks of treatment. A) line graph comparing BMI measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

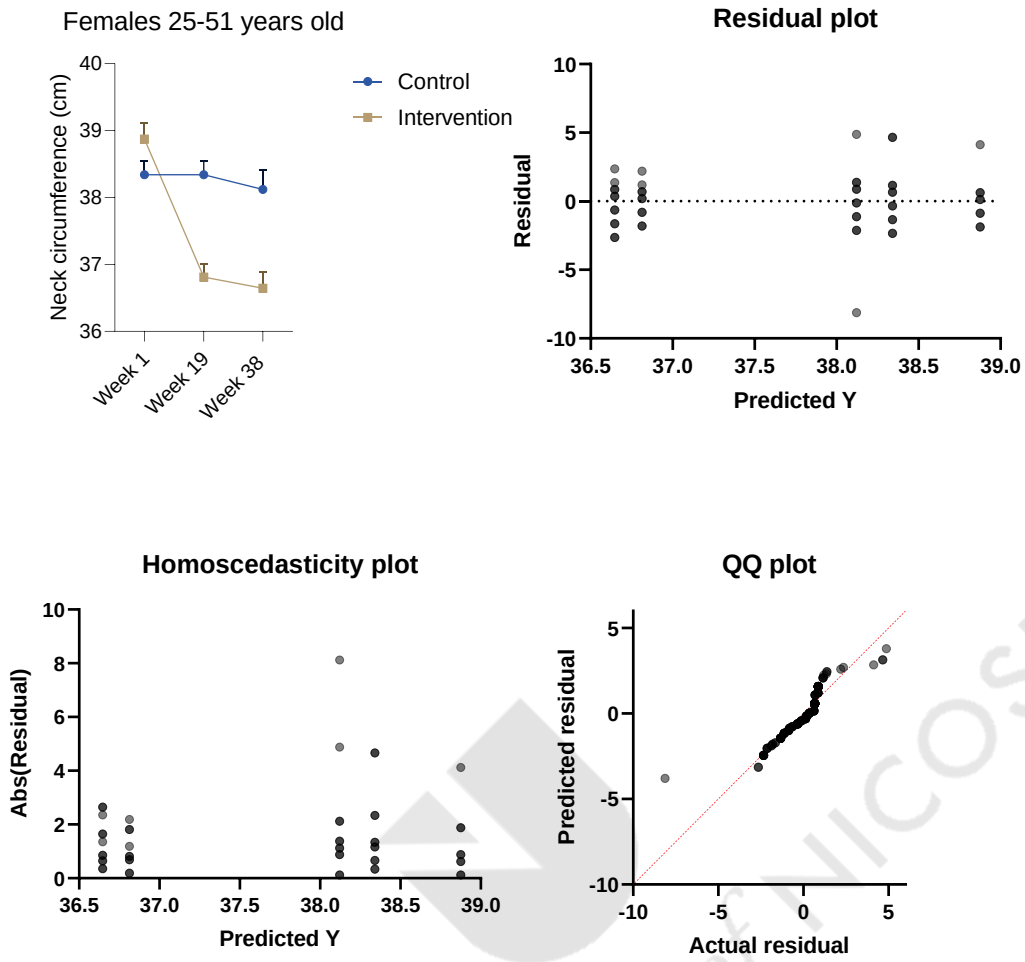
Figure 4.18 Females aged 25-51 years decreased waist to hip ratio at 19 weeks



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	0.01041	-0.008598 to 0.02941	No	ns	0.4005
Week 1 vs. Week 38	0.01166	-0.007345 to 0.03066	No	ns	0.3179
Week 19 vs. Week 38	0.001252	-0.01775 to 0.02026	No	ns	0.9867
Intervention					
Week 1 vs. Week 19	0.03011	0.005275 to 0.05496	Yes	*	0.0129
Week 1 vs. Week 38	0.03011	0.005275 to 0.05496	Yes	*	0.0129
Week 19 vs. Week 38	0.000	-0.02484 to 0.02484	No	ns	>0.9999

Figure 4.18 Females aged 25-51 years old decreased waist to hip ratio at 19 weeks of treatment. A) line graph comparing waist-to-hip ratio measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

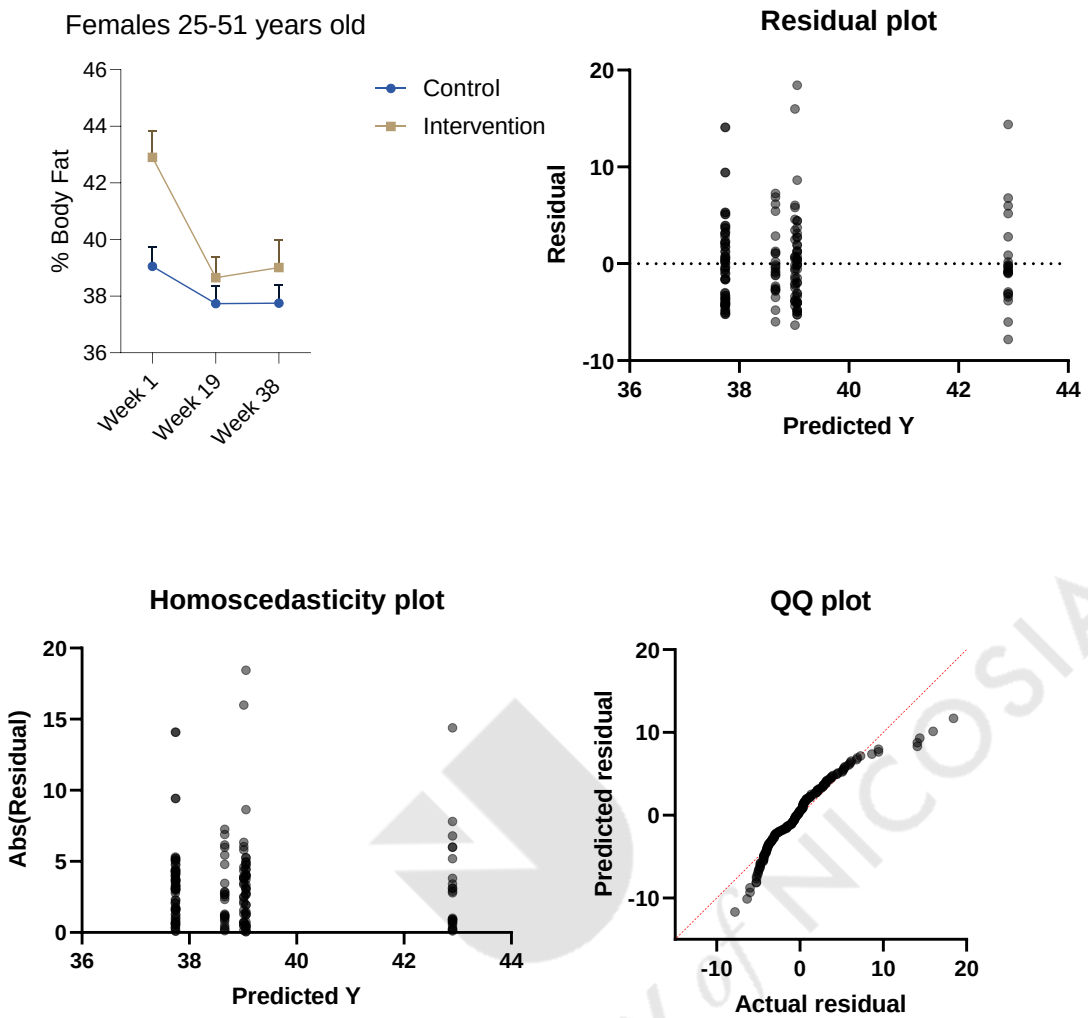
Figure 4.19 Females aged 25-51 years old neck circumference at 19 weeks of treatment.



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	0.000	-0.7172 to 0.7172	No	ns	>0.9999
Week 1 vs. Week 38	0.2195	-0.4977 to 0.9367	No	ns	0.7501
Week 19 vs. Week 38	0.2195	-0.4977 to 0.9367	No	ns	0.7501
Intervention					
Week 1 vs. Week 19	2.063	1.125 to 3.000	Yes	****	<0.0001
Week 1 vs. Week 38	2.229	1.292 to 3.167	Yes	****	<0.0001
Week 19 vs. Week 38	0.1667	-0.7707 to 1.104	No	ns	0.9074

Figure 4.19 Females aged 25-51 years old neck circumference at 19 weeks of treatment. A) line graph comparing neck circumference measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

Figure 4.20 Females aged 25-51 years old % body fat at 19 weeks of treatment



Tukey's multiple comparisons test	Predicted (LS) mean diff.	95.00% CI of diff.	Below threshold?	Summary	Adjusted P Value
Control					
Week 1 vs. Week 19	1.315	-0.8924 to 3.523	No	ns	0.3391
Week 1 vs. Week 38	1.303	-0.9044 to 3.511	No	ns	0.3457
Week 19 vs. Week 38	-0.01195	-2.220 to 2.196	No	ns	>0.9999
Intervention					
Week 1 vs. Week 19	4.246	1.361 to 7.132	Yes	**	0.0018
Week 1 vs. Week 38	3.888	1.002 to 6.774	Yes	**	0.0048
Week 19 vs. Week 38	-0.3583	-3.244 to 2.527	No	ns	0.9537

Figure 4.20 Females aged 25-51 years old % body fat at 19 weeks of treatment. A) line graph comparing body fat measurements between control (blue) and treatment (yellow). B) Residual, C) Homoscedasticity, D) QQ plot display the distribution of the data. Data were analyzed using 2-way ANOVA with Tukey's multiple comparisons test; $p<0.05$, *; $p<0.01$, **; $p<0.001$, ***; $p<0.0001$, ****.

4.5 Analysis of Worksheets

4.5.1 Eating habits and behavioural modification results (Worksheet I)

Worksheet I examined the Eating Behaviours of the IG for the three periods (table 4.19). It was noted the significant enhancements of the dietary habits of the IG.

Table 4-19 Worksheet I - behavioural modification on eating habits for weeks 1, 19, 38

		Week 1	Week 19	Week 38
		%	%	%
1.	Rate of consuming red meat	No consumption		
		0	34.4	71.7
2.	Portion size of red meat	150-180gr		
		22	0	0
3.	Preferred Variety of red meat	Loin or cuts only or 80% lean		
		0	29.6	29.6
4.	Rate of seafood consumption	Less than once a week	Once a week	Twice or more
		78	61	64.8
5.	Quantity of chicken/ turkey or seafood consumed	150gr		
		13.8	61	10.1
6.	Removing skin from poultry	Remove skin		
		34	66	89.9
7.	Eating legumes	eating at least 1-2 times per week		
		73	100	100
8.	Type of milk	1% milk		
		0	68.6	93.7
9.	Cheese intake	Low fat cheese/fat free		
		13.2	100	100
10.	Consumption reduced fat with good source of calcium (Ca) dietary items	Consume high Ca foods		
		44.7	61	89.9
11.	Kind of bread eaten	Whole grain bread		
		30.8	61	64.8
12.	Breakfast	No eating breakfast		
		78	39	64.8
13.	Sauce in pasta	High fat sauce		
		100	0	0
14.	Ordering Chinese	Chicken with steamed vegetables		
		30.8	70.4	70.4
15.	Pizza toppings	Vegetables		
		0	29.6	44
16.	Snacks	Fruits or yogurt		
		0	61	100
17.	Fruits and vegetables rich in vitamin A consumed every day	Consume 2 or more servings per week		
		0	70.4	70.4
18.	Salad sauces used	High fat sauces		
		100	0	0
19.	Use of Spreads in Bread, Rolls or Bagels	Marmalade		
		22	68.6	93.7

20.	Rate of spreads used for sandwiches	No spread		
		100	100	28.9
21.	Choice of frozen dessert	Frozen yogurt		
		13.8	61	61
22.	Rate of use of beverages with caffeine daily	Consume more than recommended		
		78	29.4	3.8
23.	Daily consumption of drinks	Drinking the suggested amounts		
		0	39	64.8
24.	Kind of cereal eaten	High fiber cereal		
		13.2	100	100
25.	Rate of eating fried foods	Never eating fried food in a week		
		0	68.6	93.7
26.	Rate of eating cruciferous vegetables	≥2 times consumption weekly		
		44.7	68.6	86.2

Mean Scores (SD) for Worksheet

The likert scale answers were appointed negative (-) and positive (+) scores from -4 to 4. Negative ranking represents a non-nutritious eating behaviour and eating habits.

The stages of scoring are as followed: Excellent, Very Good Fair, Seek Help.

The scoring for Worksheet I was ranged:

65-82 excellent

42-64 very good

28-41 good

16-27 fair

Scores below 16 needed nutritional assistance.

The final scoring was found from the deduction of the total (+) scores minus the total (-) scores (the total scores of the positive and negative numbers are considered as an absolute value).

As it shows at the table 4.20 at the beginning of the study, the mean scores of the IG was -34.84 (SD ± 6.75) whereas during week 19th were 42.93 (SD ± 8.49) and at week 38th were 62.15 (SD ± 11.19).

Table 4-20 Mean Scores of Worksheet I

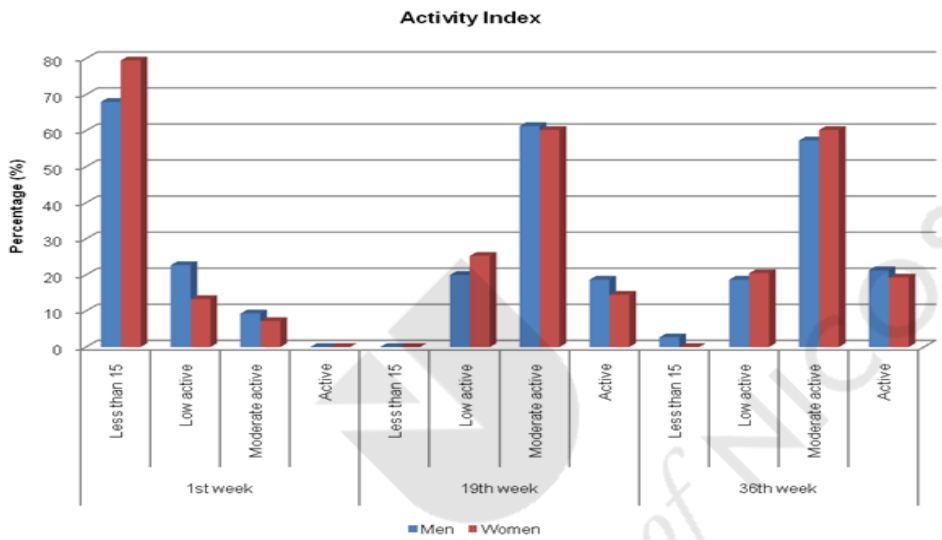
	Score week 1	Score week 19	Score week 38
N Valid	150	150	150
Missing	0	0	0
Mean	-34.84	42.93	62.15
Std Deviation	6.75	8.49	11.19

4.5.2 Physical activity behavioural modification results (worksheet II)

Activity indicator

The cross-tabulation table below shows the activity indicator level and the improvement of the participants as far as concern exercise during the study. It is evident that in the beginning of the study only about 7.5% of participants had moderate activity. The 62.5% of the participates, during the 19th week, had an activity indicator as 'moderate active' whereas during the 19th and 38th week the 60.1% had a 'moderate activity' indicator (Figure 4.21).

Figure 4.21 Physical Activity index



In Worksheet II it was assessed the contributing factors for PA performance at the three periods examined (table 4.21).

Table 4-21 What influences PA

% Within week Total N = 150							
		WEEK 1 N	%	WEEK 19 N	%	WEEK 38 N	%
1. Not available time for PA	YES	119	75.3	127	84.6 %	128	85.3 %
	NO	31	20.6	23	15.3 %	22	14.7 %
2. No energy	YES	100	66.7	10	6.7	0	0
	NO	50	33.3	140	93.3	150	100
3. I'm too tired	YES	96	64	27	18	27	18
	NO	54	36	123	8	123	88.7
4. Lack of discipline	YES	28	18.6	1	0.6	1	0.6
	NO	122	81.3	149	99.4	149	99.4
5. Too hard ... there's got to be an easier way!	YES	28	18.6	1	0.6	1	0.6
	NO	122	81.3	149	99.4	149	99.4
6. Discouraging	YES	10	6.6	1	0.6	1	0.6
	NO	10	93.7	149	99.4	1	99.4
	YES	19	12.6	0	0	0	0

7. Not enjoyable	NO	131	87.3	150	100	150	100
8. Bad experience w/ Delayed Onset of Muscle Soreness	YES	10	6.3	1	0.6	1	0.6
	NO	140	93.3	149	99.4	149	99.4
9. Expense of equipment, clothes, membership	YES	19	12.7	0	0	0	0
	NO	131	87.3	150	100	150	100
10. Distance	YES	0	0	0	0	0	0
	NO	150	100	150	100	150	100
11. Inconvenience	YES	39	26	0	0	0	0
	NO	111	74	150	100	150	100
12. Boredom	YES	39	26	0	0	0	0
	NO	111	74	150	100	150	100
13. Lack of variety	YES	39	26	0	0	0	0
	NO	111	74	150	100	150	100
14. Injury/health problems	YES	41	27.3	45	30	45	30
	NO	109	72.7	105	70	105	70
15. Chronic Physical Discomfort	YES	41	27.3	45	30	45	30
	NO	109	72.7	105	70	105	70
16. Embarrassment	YES	41	27.3	45	30	45	30
	NO	109	72.7	105	70	105	70
17. Social Discomfort	YES	81	54	27	18	27	18
	NO	69	46	123	82	123	82
18. Lack of understanding of the benefits	YES	69	46	27	18	27	18
	NO	81	54	123	82	123	82
19. Low priority	YES	31	20.7	1	0.7	1	0.7
	NO	118	78	149	99.3	149	99.3
20. Apathy	YES	50	33.3	0	0	0	0
	NO	100	66.7	150	100	150	100
21. Don't care to	YES	38	25.3	0	0	0	0
	NO	112	74.7	150	100	150	100
22. Weather condition	YES	38	25.3	0	0	0	0
	NO	112	74.7	150	100	150	100

The following questions present percentages of participants who cited certain factors as reasons for not engaging in physical activity (PA) over the course of three weeks:

Question 1: 75.3% of participants cited no availability as a factor for not doing PA in the first week, 84.6% in the 19th week, and 85.3% in the 38th week.

Question 2: 66.7% of participants cited no energy as a factor for not doing PA in the first week, 6.7% in the 19th week, and 0% in the 38th week.

Question 3: 64% of participants cited being too tired as a factor for not doing PA in the first week, 18% in the 19th week, and 18% in the 38th week.

Question 4: 18.6% of participants cited lack of discipline as a factor for not doing PA in the first week, 0.6% in the 19th week, and 0.6% in the 38th week.

Question 5: 18.6% of participants cited that PA is too hard for them as a factor for not doing PA in the first week, 0.6% in the 19th week, and 0.6% in the 38th week.

Question 6: 6% of participants cited that PA is discouraging as a factor for not doing PA in the first week, 0.6% in the 19th week and 0.6% in the 38th week.

Question 7: 12.6% of participants cited that PA is not enjoyable as a factor for not doing PA in the first week, 0% in the 19th week and 0% in the 38th week.

Question 8: 6.3% of participants cited that they had bad experience with PA as a factor for not doing PA in the first week, 0.6% in the 19th week and 0.6% in the 38th week.

Question 9: 12.7% of participants cited that the expense of equipment, clothes and membership was a factor for not doing PA in the first week, 0% in the 19th week and 0% in the 38th week.

Question 10: 100% of participants cited distance walked as a factor for not doing PA in the first week, 100% in the 19th week and 100% in the 38th week.

Question 11: 26% of participants cited inconvenience as a factor for not doing PA in the first week, 0% in the 19th week and 0% in the 38th week.

Question 12: 26% of participants cited boredom as a factor for not doing PA in the first week, 0% in the 19th week and 0% in the 38th week.

Question 13: 26% of participants cited lack of variety as a factor for not doing PA in the first week, 0% in the 19th week and 0% in the 38th week.

Question 14: 27.3% of participants cited injury and health problems as a factor for not doing PA in the first week, 30% in the 19th week and 30% in the 38th week.

Question 15: 27.3% of participants cited chronic physical discomfort as a factor for not doing PA in the first week, 30% in the 19th week and 30% in the 38th week.

Question 18: 54% of participants cited lack of understanding of the benefits of PA as a factor for not doing PA in the first week, 18% in the 19th week and 82% in the 38th week.

Question 19: 20.7% of participants cited low priority for PA as a reason for not engaging in it during the first week, 0.7% during the 19th week, and 0.7% during the 38th week.

Question 20: 33.3% of participants cited apathy towards PA as a reason for not engaging in it during the first week, 0% during the 19th week, and 0% during the 36th week.

Question 21: 25.3% of participants cited that they did not care for PA as a reason for not engaging in it during the first week, 0% during the 19th week, and 0% during the 38th week.

Question 22: 25.3% of participants cited weather conditions as a reason for not engaging in PA during the first week, 0% during the 19th week, and 0% during the 38th week.

Activity indicator by sex

As indicated in table 4.22, more women than men were as unavailable to exercise due to their schedule.

Table 4-22 Percentage participants unavailable to exercise

SEX			Unavailable to PA		
			Yes	No	Total
Men	Week	1st	57	16	73
			78%	22%	100%
		19th	62	11	73
			85%	15%	100%
		38th	62	11	73
			85%	15%	100%
	Total		181	38	219
			%	%	100%
Women	Week	1st	63	14	77
			82%	18%	100%
		19th	71	6	77
			92.2%	7.8%	100%
		38th	71	6	77
			%	%	100%
	Total		205	26	231
			89%	11%	100%

The factor ‘no energy to exercise’ appeared in 66%, 8%, 0% of men that participated for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘no energy to exercise’ appeared in 68%, 6.4%, 0% of women for week 1, week 19, and week 38 respectively (Table 4.23).

Table 4-23 No energy by sex (% Within week)

Sex			No energy		
			Yes	No	Total
Men	Week	1st	48	25	73
			66%	34%	100%
		19th	6	67	73
			8%	92%	100%
		38th	0	73	73
			0%	0%	100%
	Total		54	165	219
			25%	75%	100%
Women	Week	1st	52	25	77
			68%	32%	100%
		19th	5	72	77
			6.4%	94%	100%
		38th	0	77	77
			0%	100%	100%
	Total		57	174	231
			24.7%	75.3%	100%

The factor ‘being too tired to exercise’ appeared 66%, 16.4%, 33% of men that participated for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘being too tired to exercise’ appeared in 52%, 19.5%, 19.5% of women for week 1, week 19, and week 38 respectively (Table 4.24).

Table 4-24 I’m too tired by sex (% Within week)

Sex			I’m too tired		
			Yes	No	Total
Men	Week	1st	48	25	73
			66%	34%	0%
		19th	12	61	73
			16.4 %	83.6 %	100%
		38th	12	61	73
			16.4 %	83.6 %	100%
	Total		72	147	219
			33%	67%	100%
Women	Week	1st	40	37	77
			52%	48%	100%
		19th	15	62	77
			19.5 %	80.5 %	100%
		38th	15	62	77
			19.5 %	80.5%	100%
	Total		70	161	231
			30%	70%	100%

The factor ‘lacked discipline to do PA’, appeared 20.5%, 0%, 0% of men that participated for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘lacked discipline to do PA’ appeared in 18%, 1.2%, 1.2% of women for week 1, week 19, and week 38 respectively (Table 4.25).

Table 4-25 Lack of discipline to do PA

Sex			Lack of discipline		
			Yes	No	Total
Men	Week	1st	15	58	73
			20.5 %	79.5 %	100%
		19th	0	75	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		15	58	219
			20.5 %	79.5 %	100%
Women	Week	1st	14	63	77
			18%	%	100%
		19th	1	76	77
			1.2%	98.8 %	100%
		38th	1	76	77
			1.2%	98.8 %	100%
	Total		16	215	231
			7%	93%	100%

The factor of Too hard ... there's got to be an easier way! to do PA, appeared 18%, 0%, 0% of men participated for week 1, week 19, and week 38 respectively. In the contrary, the factor 'Too hard…there's got to be an easier way! To do PA' appeared 18%, 1.2%, 1.2% of women for week 1, week 19, and week 38 respectively (Table 4.26).

Table 4-26 Too hard... there's got to be an easier way

Sex			Too hard… there's got to be an easier way		
			Yes	No	Total
Men	Week	1st	13	60	73
			18%	82%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100.0%	100%
	Total		15	204	219
			6.8%	9.3%	100%
Women	Week	1st	14	63	77
			18%	82%	100%
		19th	1	76	77
			1.2%	98.8%	100%
		38th	1	76	77
			1.2%	98.8%	100%
	Total		16	215	231
			7%	93%	100%

The factor of ‘discouraging to do PA’, appeared 4.1%, 0%, 0% of men participated for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘discouraging to do PA’ appeared 2.3%, 1.3%, 1.3% of women for week 1, week 19, and week 38 respectively (table 4.27).

Table 4-27 Discouraging to do PA

Sex			Discouraging		
			Yes	No	Total
Men	Week	1st	3	70	73
			4.1%	95.9 %	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		5	214	219
			%	%	100%
Women	Week	1st	5	72	77
			2.3%	97.7 %	100%
		19th	1	76	77
			1.3%	98.7 %	100%
		38th	1	76	77
			1.3%	98.7 %	100%
	Total		7	224	231
			3%	97%	100%

The factor of the PA is not enjoyable, appeared 13.7%, 0%, 0% of men participated for week 1, week 19, and week 38 respectively. In the contrary, the factor 'Not enjoyable' appeared 11.7%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 4.28).

Table 4-28 Not enjoyable to do PA

Sex			Not enjoyable		
			Yes	No	Total
Men	Week	1st	10	63	73
			13.7 %	86.3 %	100%
		19th	0	73	73
			0%	100.0 %	100%
		38th	0	73	73
			0%	100%	100%
	Total		10	209	219
			4.5%	95.6 %	100%
Women	Week	1st	9	68	77
			11.7 %	88.3 %	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			0%	100%	100%
	Total		9	222	231
			3.9%	96.1 %	100%

The factor of had bad experience with delayed onset of muscle soreness from PA, appeared 4.1%, 0%, 0% of mean for week 1, week 19, and week 38 respectively. In the contrary, the factor 'Bad experience' appeared 6.5%, 1.3%, 1.3% of women for week 1, week 19, and week 38 respectively presented (Table 4.29).

Table 4-29 Bad experience with delayed onset of muscle soreness

Sex			Bad experience		
			Yes	No	Total
Men	Week	1st	3	70	73
			4.1%	95.9%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		3	216	219
			1.3%	98.7%	100%
Women	Week	1st	5	72	77
			6.5%	93.5%	100%
		19th	1	76	77
			1.3%	98.7%	100%
		38th	1	76	77
			1.3%	98.7%	100%
	Total		7	224	231
			3%	97%	100%

The factor of the ‘expense of equipment, clothes, and membership’ appeared 12.3%, 0%, 0% of men participated for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘expense of equipment, clothes and membership’ appeared 5.2%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 4.30)

Table 4-30 Expense of equipment, clothes, membership

Sex			Expense of equipment, clothes, membership		
			Yes	No	Total
Men	Week	1st	9	64	73
			12.3%	87.7%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		9	210	219
			4.1%	95.9%	100%
Women	Week	1st	4	73	77
			5.2%	94.9%	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			0%	100%	100%
	Total		4	227	231
			1.7%	98.3%	100.%

The factor ‘distance for PA’, appeared 100%, 100%, 100% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘distance for PA’ appeared 100%, 100%, 100% of women for week 1, week 19, and week 38 respectively presented (Table 4.31). The distance to PA was not a factor for either man and women.

Table 4-31 Distance to PA

Sex			Distance	
			No	Total
Men	Week	1st	73	73
			100%	100%
		19th	73	73
			100%	100%
		38th	73	73
			100%	100%
	Total		219	219
			100%	100%
Women	Week	1st	77	77
			100%	100%
		19th	77	77
			100%	100%
		38th	77	77
			100%	100%
	Total		219	231
			100%	100%

The factor ‘inconvenience for PA’, appeared 21.9%, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘inconvenience for PA’ appeared 19.5%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 32).

Table 4-32 Inconvenience for PA

Sex			Inconvenience		
Men	Week	1st	16	57	73
			21.9 %	78.1%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		16	203	219
			7.3%	92.7%	100%
Women	Week	1st	15	62	77
			19.5 %	80.5%	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			0%	100%	100%
	Total		15	216	231
			6.5%	93.5%	100%

The factor ‘boredom for not doing PA’, appeared 23.3%, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the fact ‘boredom for not doing PA’ appeared 18%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 33).

Table 4-33 Boredom

Sex			Boredom		
			Yes	No	Total
Men	Week	1st	17	56	73
			23.3 %	76.7%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		17	202	219
			7.8%	92.2%	100%
Women	Week	1st	14	63	77
			18%	82%	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			.0%	100%	100%
	Total		14	217	231
			6%	94%	100%

The factor 'lack of variety for not doing PA', appeared 9.6%, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor 'lack of variety for not doing PA' appeared 6.5%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 34).

Table 4-34 Lack of variety

Sex			Lack of variety		
			Yes	No	Total
Men	Week	1st	7	66	73
			9.6%	90.4%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		7	212	219
			3%	97%	100%
Women	Week	1st	5	72	77
			6.5%	93.5%	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			0%	100%	100%
	Total		5	226	231
			2%	98%	100%

The factor ‘injury/health problem for not doing PA’, appeared 29%, 32%, 32%of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘injury health problems’ appeared 33.8%, 28.6%, 28.6% of women for week 1, week 19, and week 38 respectively (Table 35).

Table 4-35 Injury health problems

Sex			Injury/health problems		
			Yes	No	Total
Men	Week	1st	21	52	73
			29%	71%	100%
		19th	23	50	73
			32%	68%	100%
		38th	23	50	73
			32%	68%	100%
	Total		67	152	219
			30.6%	69.4%	100%
Women	Week	1st	26	51	77
			33.8%	66.2%	100%
		19th	22	55	77
			28.6%	71.4%	100%
		38th	22	55	77
			28.6%	71.4%	100%
	Total		70	161	231
			30%%	70%	100%

The factor ‘chronic physical discomfort for not doing PA’, appeared 54.8%, 48%, 48% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘chronic physical discomfort for not doing PA’ of women appeared that women 52%, 58%, 58% for week 1, week 19, and week 38 respectively (Table 36).

Table 4-36 Chronic physical discomfort for not doing PA

Sex			Chronic Physical Discomfort		
			Yes	No	Total
Men	Week	1st	40	33	73
			54.8%	45.2%	100%
		19th	35	38	73
			48%	52%	100%
		38th	35	38	73
			48%	52%	100%
	Total		110	109	219
			50.2%	49.8%	100%
Women	Week	1st	40	37	77
			52%	48%	100%
		19th	45	32	77
			58%	42%	100%
		38th	45	32	77
			58%	42%	100%
	Total		130	101	231
			56.3%	43.7%	100%

The factor ‘embarrassment for not doing PA’, appeared 54.8%, 31.5%, 31.5% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘embarrassment’ appeared 52%, 27.3%, 27.3% of women for week 1, week 19, and week 38 respectively (Table 37).

Table 4-37 Embarrassment

Sex			Embarrassment		
			Yes	No	Total
Men	Week	1st	40	33	73
			54.8 %	45.2 %	100%
		19th	23	50	73
			31.5 %	68.5 %	100%
		38th	23	50	73
			31.5 %	68.5 %	100%
	Total		86	133	219
			39%	61%	100%
Women	Week	1st	40	37	77
			52%	48%	100%
		19th	21	56	77
			27.3 %	72.7 %	100%
		38th	21	56	77
			27.3 %	72.7 %	100%
	Total		82	149	231
			35%	65%	100%

The factor ‘social discomfort for not doing PA’ appeared 48%, 15%, 15% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘social discomfort for not doing’ appeared 49%, 10%, 10% of women for week 1, week 19, and week 38 respectively (Table 38).

Table 4-38 Social Discomfort

Sex			Social Discomfort		
			Yes	No	Total
Men	Week	1st	35	38	73
			48%	52%	100%
		19th	11	62	73
			15%	85%	100%
		38th	11	62	73
			15%	85%	100%
	Total		57	162	219
			26%	74%	100%
Women	Week	1st	38	39	77
			49%	51%	100%
		19th	8	69	77
			10%	90%	100%
		38th	8	69	77
			10%	90%	100%
	Total		44	187	231
			19%	81%	100%

The factor 'lack of understanding of the benefits of PA', appeared 36%, 15%, 15% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor 'lack of understanding of the benefits of PA', appeared 35%, 15%, 15% of women for week 1, week 19, and week 38 respectively presented (Table 39).

Table 4-39 Lack of understanding of the benefits of PA

Sex			Lack of understanding of the benefits of PA		
			Yes	No	Total
Men	Week	1st	26	47	73
			36%	64%	100%
		19th	11	62	73
			15%	85%	100%
		38th	11	62	73
			15%	85%	100%
	Total		48	171	219
			22%	78%	100%
Women	Week	1st	27	50	77
			35%	65%	100%
		19th	15	62	77
			19%	81%	100%
		38th	15	62	77
			19%	81%	100%
	Total		57	174	231
			25%	75%	100%

The factor ‘low priority for not doing physical activity’, appeared 23 %, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘low priority for not doing physical activity’ appeared 29%, 1.3%, 1.3% of women for week 1, week 19, and week 38 respectively (Table 40).

Table 4-40 Low priority for not doing PA

Sex			Low priority		
			Yes	No	Total
Men	Week	1st	17	56	73
			23%	77%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		17	202	219
			8%	92%	100%
Women	Week	1st	22	55	77
			29%	71%	100%
		19th	1	76	77
			1.3%	98.7 %	100%
		38th	1	76	77
			1.3%	98.7 %	100%
	Total		24	207	231
			10%	90%	100%

The factor ‘don’t care for PA’, appeared 25%, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘do not care for PA’ appeared 23%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 41).

Table 4-41 Do not care for PA

Sex			Do not care for PA		
			Yes	No	Total
Men	Week	1st	18	55	73
			25%	75%	100%
		19th	0	73	73
			0%	100 %	100%
		38th	0	73	73
			0%	100 %	100%
	Total		18	201	219
			8%	92%	100%
Women	Week	1st	18	59	77
			23%	77%	100%
		19th	0	77	77
			0%	100 %	100%
		38th	0	77	77
			0%	100 %	100%
	Total		18	213	231
			8%	92%	100%

The factor ‘apathy for not doing physical activity’, appeared 29%, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘apathy’ appeared 30%, 0%, 0% of women for week 1, week 19, and week 38 respectively (Table 42).

Table 4-42 Apathy for PA

Sex			Apathy		
			Yes	No	Total
Men	Week	1st	21	46	73
			29%	71%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		21	198	219
			10%	90%	100%
Women	Week	1st	23	54	77
			30%	70%	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			0%	100%	100%
	Total		23	208	231
			10%	90%	100%

The factor ‘weather for not doing physical activity’, appeared 23%, 0%, 0% of men for week 1, week 19, and week 38 respectively. In the contrary, the factor ‘weather conditions’ appeared 31%, 0%, 0% of women for week 1, week 19, and week 38 respectively presented (Table 43).

Table 4-43 Weather conditions

Sex			Weather Conditions		
			Yes	No	Total
Men	Week	1st	17	56	73
			23%	77%	100%
		19th	0	73	73
			0%	100%	100%
		38th	0	73	73
			0%	100%	100%
	Total		17	202	219
			8%	92%	100%
Women	Week	1st	24	63	77
			31%	69%	100%
		19th	0	77	77
			0%	100%	100%
		38th	0	77	77
			0%	100%	100%
	Total		24	207	231
			10%	90%	100%

According to Worksheet II, for the first week, the majority of participants cited that the factors that influenced them not to engage in physical activity were: 1) lack of time in their busy schedule at 81%, 2) lack of understanding of the benefits at 69%, 3) lack of energy at 66.7%, 4) feeling too tired at 64%, and 5) social discomfort at 54%. During the 19th week, the factors that influenced them not to engage in physical activity were: 1) lack of time in their busy schedule at 85.3%, 2) injury or health problems at 30%, 3) chronic physical discomfort and embarrassment at 30%, 4) embarrassment at 30%, and 5) feeling too tired at 18%. For the 38th week, the factors that influenced them not to engage in physical activity were: 1) lack of time in their busy schedule at 84.6%, and 2) chronic physical discomfort, injury or health problems, and embarrassment at 30% (Table 44).

Scoring for Worksheet II:

- A score of 3 or lower on the Likert scale is considered to indicate good motivation towards physical activity.
- A score of 4 to 5 on the Likert scale is considered to indicate poor motivation towards physical activity.
- A score of 6 to 8 on the Likert scale is considered to indicate very poor motivation towards physical activity.
- A score of 9 to 11 on the Likert scale is considered to indicate a need for help in regards to motivation towards physical activity.

Table 4-44 Barriers to PA

What influences PA the most for week 1 (YES)		
Q1	No time in my busy schedule	75.3%
Q18	Lack of understanding of the benefits	69
Q2	No energy	66.7
Q3	I'm too tired	64
Q17	Social Discomfort	54
Q20	Apathy	33.3
Q14	Injury/health problems	27.3
Q15	Chronic Physical Discomfort	27.3
Q16	Embarrassment	27.3
Q11	Inconvenience	26
Q12	Boredom	26
Q13	Lack of variety	26
Q21	Don't care to	25.3
Q22	Weather conditions	25.3
Q19	Low priority	20.7
Q4	Lack of discipline	18.6
Q5	Too hard ... there's got to be an easier way!	18.6
Q9	Expense of equipment, clothes, membership	12.7
Q7	Not enjoyable	12.6
Q6	Discouraging	6.6
Q8	Bad experience with Delayed Onset of Muscle Soreness	6.3
Q10	Distance	0

What influences PA the most for week 19 (YES)		
Q1	No time in my busy schedule	85.3%
Q14	Injury/health problems	30
Q15	Chronic Physical Discomfort	30
Q16	Embarrassment	30
Q3	I'm too tired	18
Q17	Social Discomfort	18
Q18	Lack of understanding of the benefits	18
Q2	No energy	6.7
Q19	Low priority	0.7
Q4	Lack of discipline	0.6
Q5	Too hard ... there's got to be an easier way!	0.6
Q6	Discouraging	0.6
Q8	Bad experience with Delayed Onset of Muscle Soreness	0.6
Q7	Not enjoyable	0
Q9	Expense of equipment, clothes, membership	0
Q10	Distance	0
Q11	Inconvenience	0
Q12	Boredom	0
Q13	Lack of variety	0
Q20	Apathy	0
Q21	Don't care to	0
Q22	Weather conditions	0

What influences PA the most for week 38 (YES)		
Q1	No time in my busy schedule	84.6%
Q14	Injury/health problems	30
Q15	Chronic Physical Discomfort	30
Q16	Embarrassment	30
Q3	I'm too tired	18
Q17	Social Discomfort	18
Q18	Lack of understanding of the benefits	18
Q2	No energy	6.7
Q19	Low priority	0.7
Q4	Lack of discipline	0.6
Q5	Too hard ... there's got to be an easier way!	0.6
Q6	Discouraging	0.6
Q8	Bad experience with Delayed Onset of Muscle Soreness	0.6
Q7	Not enjoyable	0
Q9	Expense of equipment, clothes, membership	0
Q10	Distance	0
Q11	Inconvenience	0
Q12	Boredom	0
Q13	Lack of variety	0
Q20	Apathy	0
Q21	Don't care to	0
Q22	Weather conditions	0

Table 4-45 Relation of BMI with ME (Q3-4 High; ME, 2-2.99 Medium ME, <2 Low ME)

	BMI		Score Mindful	
	MEAN	SD	MEAN	SD
Total(264)	24.21	4.11	2.80	0.30
<18.5(15)	17.43	0.07	2.83	0.29
18.5-24.9(175)	21.79	1.77	2.84	0.29
25-29.9(54)	26.81	1.28	2.73	0.30
>=30 (20)	33.50	3.25	2.61	0.26

Table 4-46 Multiple Comparisons (Post Hoc Tests) among ME subscales and BMI

		(I) BMI (groups)	(J) BMI (groups)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Disinhibition	Tukey HSD	healthy	owt	.29*	0.09	0.012	0.0470	0.5465
		overweight	hea	-.29*	0.09	0.012	-0.5465	-0.0470
	Bonferroni	healthy	owt	.29*	0.09	0.014	0.0400	0.5535
		overweight	hea	-.29*	0.09	0.014	-0.5535	-0.0400
Emotional	Tukey HSD	healthy	owt	.26*	0.09	0.022	0.0276	0.5025
			ob	.42*	0.13	0.015	0.0610	0.7812
		overweight	hea	-.26*	0.09	0.022	-0.5025	-0.0276
		obese	hea	-.42*	0.13	0.015	-0.7812	-0.0610
	Bonferroni	healthy	owt	.26*	0.09	0.025	0.0209	0.5092
			ob	.42*	0.13	0.016	0.0508	0.7913
		overweight	hea	-.26*	0.09	0.025	-0.5092	-0.0209
		obese	hea	-.42*	0.13	0.016	-0.79	-0.05
Summary Score	Tukey HSD	healthy	ob	.22*	0.06	0.007	0.04	0.39
		obese	hea	-.22*	0.06	0.007	-0.39	-0.04
	Bonferroni	healthy	ob	.22*	0.06	0.008	0.04	0.40
		obese	hea	-.22*	0.06	0.008	-0.40	-0.04

The mean difference is significant at 0.05 level.
owt-overweight hea-healthy, ob-obese

A randomly selected sample (N 264) of the overall sample was selected to examine the Mindful eating effect to BMI. Among 264 participants, 210 (80% females), 54 (20% males), 6% were underweight, 66% were normoweight, 54% were overweight, and 8% were obese. Emotional and disinhibition eating were more common among the participants. Restrictive eating was distinguishing between all participants, except ones with obesity and overweight. Adults with obesity perceived themselves as the least self-confident, attractive, and healthy, while the opposites were true for adults with normal weight. The groups that differed mostly from each other were normal weight and overweight. The Cypriot adults with normal BMI have the highest score of mindfulness (2.84/4) (Tables 4.45 and Table 4.46)

4.6 Conclusion

The results of this research project indicated that by integrating appropriate behavioural lifestyle changes using nutrition education with the NCP was an essential component of achieving and maintaining a healthy body weight.

5. CHAPTER 5 Discussion and Conclusions

5.1 Overweight, Obesity, Weight Management & Health related problems

Obesity is a multifactorial disease in which places an individual at health danger. WHO (2020) states that the occurrence of obesity is growing for both males and females, especially in the developed countries. In order to change this increasing trend involves variations in people's behaviour related to lifestyle. The therapy for overweight and obesity entails a comprehensive long term method linking eating habits, exercise pattern, mindful eating, and behavioural modification, with the use of NCP which in this research project it is proven to enhance the results. Professionals in the area of health have a significant role in encouraging protective procedures and inspiring healthy lifestyle practices. Because of the genetics of overweight, obesity and behaviour the alteration of eating and exercise habits for weight loss and maintenance can be difficult.

Moreover, increased abnormal body weight is the consequence of elongated-excess calorie intake. The processes of consuming excess calories and leading to overweight and obesity are multifaceted, linking hereditary, metabolism, social, environment, and psychological issues. Moderate weight loss can minimize the side effects of obesity. Obesity distresses many organs of the human body and leads to many diseases, which frequently can be changed or avoided by moderate weight loss. Proper excess weight treatment includes several similar principles applied in the treatment of other diseases.

Additionally, the health care team that should consists of medical doctors, dietitians/nutritionist, and other health professionals should be part of a long-term therapy program. A useful weight loss plan blends nutrition treatment, physical activity, and behaviour treatment.

Health weight and body fat are essential factors of health and wellbeing. There is a necessity to educate the children and adults about the importance of body fat and its relation to health problems. It is obvious if obesity and overweight decrease then other health related problems will be less such as heart disease, hypertension, diabetes, some types of cancers and even bone problems.

5.2 Body Composition

Body composition assessment must be included in the assessment part of NCP in order to help in health and fitness evaluation process. The most important is to give emphasis not only on body weight but also on body fat composition and lifestyle healthy behaviour. Also, body composition it's important to be taken into consideration because it helps health professional and people in general to create a comprehensive physical fitness level and shape, to achieve

healthy body fat and muscle mass composition following the basic nutrition and exercise guidelines.

Several studies suggest the neck circumference is associated to waist circumference and Body Mass Index, so it is considered an important indicator for predicting risk factors for many diseases such and heart disease, diabetes, insulin resistance, hypertension, and metabolic syndrome (Zhang, et al, 2020).

5.3 Fulfilment of Goals and outcomes

The goals of this research project was to produce guidelines/recommendations to use for the management of overweight and obesity. These guidelines will include specific recommendations of eating habits, physical activity, mindful eating, and behaviour through the use of NCP. The ultimate goal is to help overweight and obese people to lose and maintain weight making lifestyle changes in order to have long term wellbeing.

The outcomes of this research project research suggest that the therapy for overweight and obesity necessitates all steps of NCP (Nutrition Assessment, Nutrition Diagnosis, Nutrition Intervention and Nutrition Monitoring and Evaluation). Assessment and diagnosis involve the study of the weight of the patient and the overall risk condition. As BMI, WCir, WHR, NCir are considerably associated with TBF, it can be used to evaluate overweight and obesity and observe variations in body mass. Body fat levels ought to be evaluated at the beginning and throughout the weight loss therapy and abdominal fat can be evaluated by measuring the WC and NCir.

It is understandable that there is a necessity for additional surveys of behaviour change as far as lifestyle changes associated with nutritional habits, physical activity, mindful eating and the effectiveness of NCP.

5.4 Effectiveness of ME and behaviour, diet & exercise, on weight management

Studies indicated that diet only, exercise only, the combination of diet and exercise only, or even the use of medication that suppress hunger usually led to in minimal weight reduction with quick weight regain. Studies suggest that weight loss and maintenance are more successful when a mindful eating and behaviour change (diet and exercise) elements are combined with any other weight loss method. Effective weight loss with behaviour modification seeks at lowering caloric consumption, improving physical activity frequency, and developing nutrition awareness and food preferences for life. Even though a few patients can achieve this on their

own, many cannot. The ones that cannot achieve weight loss on their own will benefit from such a behaviour change program. It is important to emphasize that even those few patients that can manage to lose weight on their own might not lose body fat when they don't combine nutrition with physical activity. Furthermore, more maintenance of weight loss can be achieved when lifestyle changes are made.

The amount of weight loss and maintenance should not be the only system of measurement of successful obesity therapy. Instead, health professionals ought to help and encourage obese people to achieve sustainable improvements in the quality of their eating habits and physical activities if these behaviours don't follow exactly all the approved guidelines. These lifestyle alterations for long-term will possibly develop good health to obese individuals even if they don't meet their ideal body weight (Hall & Kahan, 2018)

Also, there are environmental burdens on body image such as family pressure, individual weight worries, and unhealthy behaviours related to body weight such as binge eating or starving and preparation of meals at home, timing of meals, kinds, and rate of physical activity confusing messages from magazines about weight loss.

Changing the lifestyle of obese people has been shown to be successful for losing weight and maintaining it. Nutrition, exercise, mindful eating, and behaviour change are vital approaches applied in lifestyle programmes. These programs support obese people to achieve a continual decrease in weight over a long period of time. The factors can link to different approaches to successfully stimulate weight loss, permitting individual preferences. The NCP improves the reliability and the quality of personalized patient treatment and the consistency of the individual's results, recommends structure and terminology for research studies and records gathering and a standardized language, all required for the greatest potential outcome.

The most frequent nutrition-related problem is overweight and obesity, with dietitians and nutritionists being the major health professional responsible for dietary/nutrition intrusions to prevent and treat the problem. In the NCP the individualized consultation is considered the key to the management of overweight and obesity. There is a need for more research studies to examine the impact of dietitian consultations on weight management. Furthermore, cost-effectiveness assessments will be vital in establishing the financial advantages of moderate weight loss (Williams et al., 2019).

5.5 Recommendations for Evaluation

Successful therapy of individuals with excess weight involves lifestyle behaviour that include both eating and physical activity behavioural changes. These eating and exercising behaviour are influenced by various factors. For this reason, interventions programs must include all the factors such as the Social-Ecological model (individual, relationship community, societal) at all levels than one factor alone (CDC, 2021). Registered dietitian/ nutritionists, as members of the healthcare team, should be updated and skilled in weight management to successfully assist and control attempts that can reduce the obesity epidemic.

5.6 NCP and obesity

The Nutrition Care Process (NCP) is a system designed to improve the consistency and effectiveness of personalized care for patients, clients, or groups, and to increase predictability of patient outcomes. NCP is not intended to standardize care for every patient, but rather to establish a standardized procedure for delivering care. Additionally, it is a system of standardized language for the treatment of critically ill patients in dietetics. The NCP consists of four steps: nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation.

Nutrition assessment is a systematic method of collecting, organizing, and analyzing important data to identify nutrition-related issues and their causes. This includes reassessing data from previous contacts, comparing and revaluating data, and collecting new data that may lead to new or revised nutrition diagnoses based on the patient's status or situation. It is an ongoing, dynamic process.

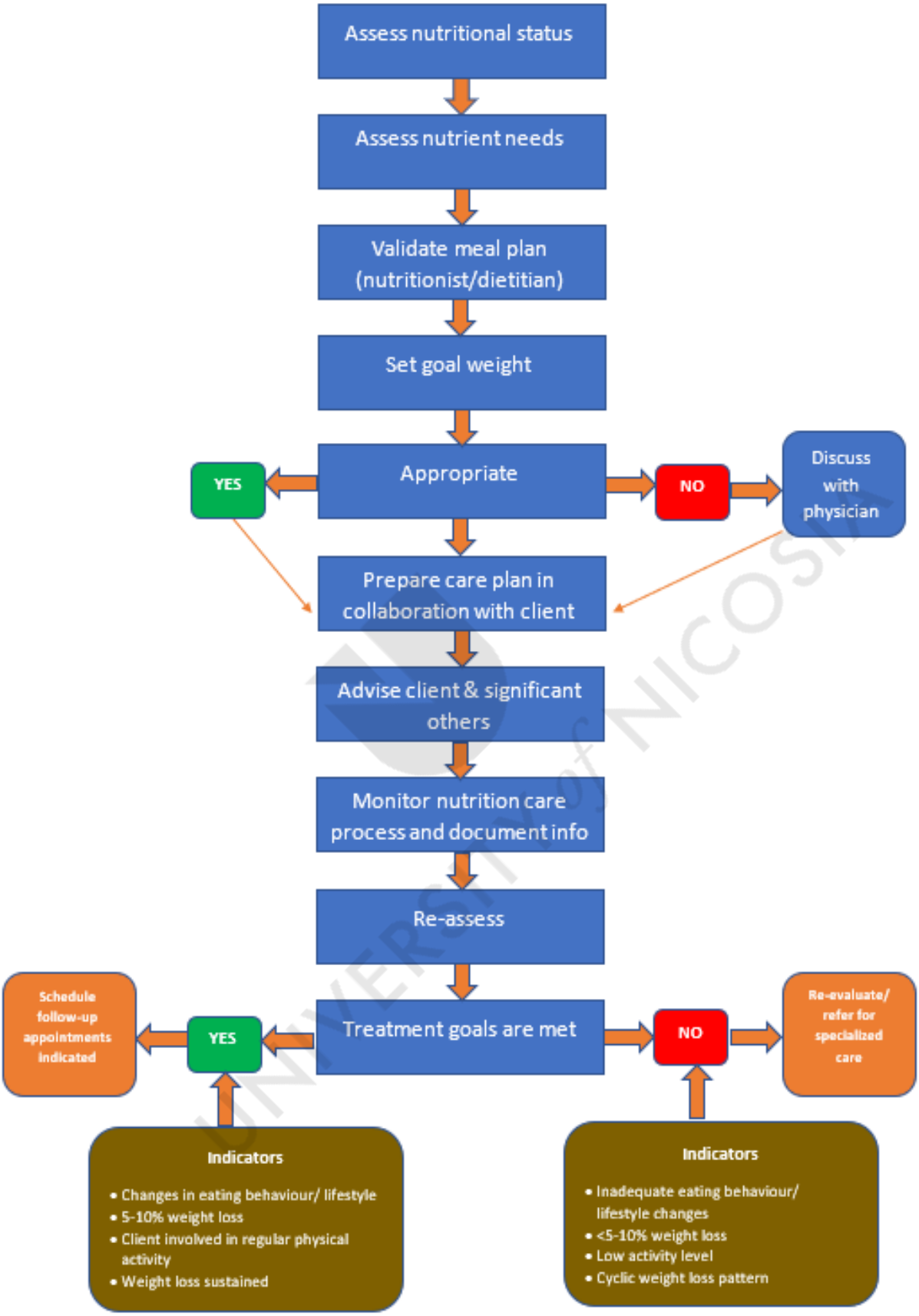
Nutrition diagnosis is the dietitian's documentation and classification of an existing nutrition problem that the practitioner is responsible for addressing. Nutrition diagnoses are different from medical diagnoses.

Nutrition intervention is a planned action designed to change a nutrition-related behavior, risk factor, environmental condition, or aspect of health status to resolve or improve the identified nutrition diagnosis. Nutrition interventions are selected and tailored to the patient's needs by planning and implementing appropriate interventions.

Nutrition monitoring and evaluation are used to determine and measure progress made by the nutrition intervention and whether nutrition-related goals or expected outcomes are being met. The aim is to promote consistency within the dietetics profession in assessing the effectiveness

of nutrition intervention. NCP provides dietitians with a revised "road map" for high-quality, patient-centered nutrition care, with a critical path for the nutritional management of obesity presented in Figure 5.1.

Figure 5.1 Critical Path for the Nutritional Management of Obesity (NCP)



5.7 Successful Weight Management

Successful body weight control implies a watchful control of food consumption, exercise level and frequency, behaviour change and an optimistic approach to attaining proper body composition. The goal is to give emphasis on achieving good wellbeing. A healthy lifestyle of good eating and exercise habits will help achieve a healthy body composition and weight. It is important to assure enough calories to support lean body mass during weight and fat loss. In order to achieve this, it recommended about 20 Kcal per kilo of current weight. It is also recommended no more than 0.5-1 kilo per week of weight to support lean body mass. In order to achieve weigh and fat loss and support lean body mass a decrease of 500 kcals per day which this equal to 3500 kcals, per week and leads to 0.5 kilo of fat. Obesity is multifactorial and may depend on the following: Metabolism, genes, environment, cultural, psychology and behaviour, but the final etiology continues to be unidentified. Several important reasons promoting obesity include food consumption, inactive lifestyle, mostly increased consumption of fat and simple sugars. The increase in consumption of processed and fast food have been increasing, while eating healthy such as fruits and vegetables. Overweight and obesity develop when additional food energy is consumed comparing to the energy than spent during time. Attaining weight loss in the obese people is a difficult process to attain.

5.8 Nutrition recommendations for weight management

Moreover, studies suggest that only a small percentage (about 8%) of the people that lose weight can maintain it. There are no steady measures that will specify the categories of people who will effectively lose weight.

Interventions for the Treatment of Overweight and Obesity in adults are to (ADA, 2020):

- Attain and sustain healthful body weight and composition
- Offer ideal diet plans via a healthy balanced diet at the correct quantities which will accomplish healthy weight reduction of 0.5-1 kg/ week.
- Avoid or manage health problems such as high blood pressure, diabetes related to obesity
- Establish the degree of obesity and the intervention requirements of patients with abnormal biochemical analysis.
- Establish attainable goals. Advice the obese person to establish short and long-term goals. An attainable goal is a 5-10% reduction of initial body weight at 0.5-1 kg per week.

- Have about six meals a day, including snacks. This helps avoid eating more later on during the day.
- Give adequate liquids to sustain excretion – about 8 cups a day depending on body weight. Also, fluid intake minimizes consumption of extra and unneeded calories.
- Sodium intake must be decreased when there is water retention
- Recommend improving intake of fiber to promote longer chew up, generate additional bulk and enhance satiation.
- Reduce high in fat content food and minimize alcohol consumption.
- Avoid very low-calorie diets which can lower Resting Metabolic Rate and alter the level of weight loss. Avoid diets < than 1200 kcal per day.
- Plan follow-up meetings with a dietitian/nutritionist to monitor improvement and weight. It is better to weigh on the same scale at the same time of the day.
- Promote frequent physical activity based on professional guidelines for a weight loss program. Encourage everyday physical activities such as going up the stairs without using the elevator.
- Personalized nutrition counselling is recommended
- Obese patients that stop smoking should be watched more often as they have more chances of gaining weight.
- Promote group and family sessions.
- Self-management of body weight is very effective, and it can be accomplished by involving the obese overweight patient in the development of a weight loss program. The program should include the guidance of the dietitian/ nutritionist for a healthy balanced diet including tips for choosing the right foods low in fat and calories, portion sizes, methods of cooking and what to eat when going out.
- Promote healthy eating behaviour and lifestyle behaviour that will promote weight loss.

Lifelong behaviour should include:

- Maintaining food records including food selections, circumstances that promote unhealthful eating and drinking, so to recognize what makes one make the incorrect choices.
- Watching and recording body weight on a weekly basis and this can be planned accordingly.
- Start a modest physical activity, almost every day for a minimum of one hour each day. Aerobic exercise is recommended as it helps increase calorie consumption.

- Give emphasis on the portion sizes of food, eating slowly, using smaller plates, chewing food well.
- Avoiding unhealthy diet programs that promise fast weight loss such as avoiding certain macronutrients.
- Promote consumer awareness of food labelling.

5.9 Behaviour Modification Treatment for Eating and Exercise Habits

Overweight and obesity people (BMI over 25 kg/m^2) or with high WCir or any other risk factors should seek help for weight management. People that are overweight but have no risk factors should be assisted to achieve a healthy weight. If major consideration in advising overweight and obese people to lose weight is their motivation level.

The overall goal of therapy for weight management is to decrease body weight, maintain that weight loss over time, and prevent additional weight gain while managing associated health risks. This can be achieved through a combination of strategies, including nutritional treatment, increased physical activity, and behavioral therapy. Research suggests that the most effective approach is a personalized program that includes a tailored diet plan, increased physical activity, mindful eating, and behavioral therapy, all guided by the Nutrition Care Process (NCP). This program typically lasts for 38 weeks and aims for a 10% reduction in initial body weight. Ongoing therapy also focuses on modifying or maintaining healthy behaviors to continue weight loss, maintain the desired weight, and prevent further weight gain.

5.10 Treatment period

Behaviour change includes different techniques and are used with different nutrition and exercise programs and for this reason it is difficult to evaluate which component is the most effective. Based on various reviews of weight loss regimes using behaviour change techniques (Traverso, 2000) the typical length of behavioural treatment regime was demonstrated about 38 weeks in total which this comprised of about 19 weeks weight loss with behaviour change and about 19 weeks for maintenance.

5.11 Maintenance period

The main issue with treating obesity is that individuals tend to regain weight after the treatment ends. This is due to a lack of long-term adherence to healthy eating and exercise habits. Studies have shown that longer treatment and follow-up periods are more effective in maintaining weight loss. This highlights the need for a continuous-care model for obesity. One study found

that using a combination of strategies, such as therapist/dietitian support with individual and group sessions for reinforcing healthy eating and exercise habits, can help individuals maintain modest weight loss in the long-term (Traverso, 2000).

5.12 Discussion of the Results

Overall, for both men and women and age groups, the intervention group had a sharp significant decrease in weight, BMI, waist-to-hip ratio, neck circumference and percentage of body fat during the first 19 weeks of their treatment. Followed by a plateau during the next 19 weeks of maintenance. While the control group did not follow the same trend as both young and adult men and women did face a small decrease in their body measurements.

Worksheet I examined the Eating Behaviors of the IG for the three periods, and it was noted significant enhancements of the dietary habits of the IG. According to Worksheet II the IG indicated that the reason for not exercising was the 'no time in the busy schedule and this did not change at week 38th. At the same time physical activity was increased by the end of the study. The busy schedule was taken into consideration and guidelines and recommendations were provided to incorporate physical activity in the busy schedule with other means such as using the stairs instead of the elevator or park their vehicle 10 minutes away from work.

Interventions for obesity should focus on developing healthy and mindful eating and physical activity habits rather than solely aiming for an ideal body weight. Once an initial weight management program is completed, individuals should continue working to maintain a desired weight. Effective treatment involves long-term follow-up, including regular visits with a dietitian, frequent monitoring, and support. During these meetings, dietitians should be knowledgeable, respectful, and supportive of the individual and their family to encourage necessary improvements and lifestyle changes.

5.13 Physical Activity for weight management

Frequent exercise is an important element of any weight loss and maintenance regime and add to dietary procedures. Although exercise alone does not automatically decrease weight, it is reducing body fat and increase basal metabolic rate. People are more likely to engage into physical activity if it is part of their lifestyle. The type of physical activity how long and how often should be done must be personalized based on individuals' preferences, abilities, and convenience. Physical activity becomes more enjoyable and possible to happen when doing it with friends and family members (ADA 2020).

There have been numerous studies associating the effects on weight loss of following only a diet or doing only physical activity or doing both diet and exercise (NHLBI 2004). These studies show that doing only exercise the results on weight loss will be very small but when exercise is accompanying a diet plan increases then weight loss is more successful. These low effect of exercise on weight loss might be due to the fact that many of these studies have short length. The highest benefits of physical activity are seen in the maintenance of weight loss. In studies that have observed long-term weight losses all of them had better results when both diet and exercise were followed than when only exercise or only diet were followed. (Wing et al., 1999). Studies emphasize the benefits of long-term physical activity for maintenance of weight loss (Pronk et al., 1994; Mekary et al, 2010).

Exercise regimes that have been proven to be successful in weight loss incorporate different behavioural modification techniques. For instance, they recognize whether a patient is willing to modify their behaviour in terms of setting their goals and identifying any difficulties that they might face but also recognize the need of social support. These procedures can be included into counseling programs by health professionals.

What is important to note is that exercise is implemented to people that are willing to adapt their behaviour. In fact, young adults that have satisfactory exercise levels should be encouraged to continue exercising frequently in order to lose and maintain healthy weight. This strategy makes the counselling process more efficient and effective for health professionals.

On the other hand, for people that are not prepared to start any physical activity, it is important to emphasise the downside of not exercising. Very often, health professionals recommend exercise to tackle problems such as high blood pressure, high cholesterol levels and triglycerides and hyperglycemia. Therefore, emphasizing the benefits of exercise to prevent and tackle the above-mentioned disorders can give these individuals a motive to exercise. Besides emphasizing on the benefits, it is important to identify potential barriers to exercise that people might face in their everyday life. For example, busy schedules, lack of means of transport, but also disliking exercise. For these individuals, emphasizing on how physical activity can help but also identifying any possible obstacles they might face is the initial step to motive them in becoming more active.

For both groups, prescribing guidelines and recommendations for physical activity may be a more effective way to ensure their adhere to physical activity regimes (CDC 2001; Jones et al, 2019). People are familiar with the use of a prescription by a medical doctor; therefore, it allows them to set their physical activity goals that comply with the prescription. Implementing

behavioural modification concepts, in this case physical activity, into prescriptions will aid in the counselling process.

In the prescription of physical activity, a detailed action plan should be included. As individuals are motivated to lose weight, the activity action plan through counselling would ultimately result to a behavioural change. Action plans include increasing moderate exercise to 30-60 minutes/day (this can be divided to 10-15 mins of 4-6 rounds of exercise daily). In addition, the action plan should include details on the type, intensity, duration, and location of exercise (ACSM, 2018)). finally, any difficulties that the individual might face to exercise must be clearly indicated in order to find possible solutions. Having this action plan, helps in achieving their short- and long-term goals of physical activity. This action plan for physical activity can be provided by sports nutritionists and clinical dietitians as they are trained to identify possible solutions to any obstacles.

In the current research work participants were inspired to increase their physical activity gradually. The participants had an individualized plan and were guided to slowly increase their activity until they reach a level of at least 1000 kcal/week (or at least 150 min/week). They chose the type of activity they preferred.

The study concluded important guidelines regarding Mindful Eating to be used in the counselling process by the various health professionals. These guidelines are in line with the recommendation of other researchers such as Armand et al (2015). The Mindful Eating guidelines derived by the analysis of the questionnaires are presented below.

1. Before eating, consider your feelings and differentiate between wants and needs. Take time to reflect on whether you are truly hungry or if other emotions or circumstances are driving your desire to eat. Then, make a conscious decision about whether, what, and how you want to eat.
2. When eating, sit down and give your full attention to the meal. Multitasking or eating on the go can make it harder to appreciate food and keep track of how much you are consuming.
3. Avoid distractions such as watching TV or working in front of a screen while eating. These can make it harder to be mindful of what and how much you are eating.
4. Serve out specific portions of food to help maintain control over how much you are eating and make it easier to appreciate the food in front of you.
5. Using smaller plates can also aid in portion control, particularly when eating at all-you-can-eat buffets.
6. Chew your food thoroughly to help prevent overeating and give your gut time to signal to the brain that you are full.
7. Practice putting down your utensils after each bite and waiting to pick them up again until you have fully enjoyed and swallowed the food in your mouth.
8. It is okay to not finish everything on your plate and not feel guilty about it.

5.14 Strengths

It is the first research work in Cyprus to assess the advantages of the Nutrition Care Process (NCP). The NCP is used in this project to enhance the reliability and value of personalized treatments for weight loss participants and at the same time leaded to effective weight management outcomes. Simultaneously, it is the first study in Cyprus to assess the effectiveness of mindful eating and behavior change through nutrition and exercise in the management of body weight and body composition. Moreover, participants were voluntarily partaken into this study so the chances of dropping out of the study was minimized. The participants were provided free nutritional assessment, diet and exercise programs and monitoring which in other case the cost of these is high.

For more accurate results different methods for diet and exercise assessment and treatment were used, such as food record, 24-hour recalls, food frequency, mindful eating guidelines and physical activity tips to overcome barriers. Understanding the strengths and weakness of the different methods was important to minimize statistical errors. Moreover, to eliminate possible interpretation problems Worksheets were modified from the previous self-study. These worksheets are proven to be extremely well structure tools for dietitians/ nutritionists and can be part of NCP for better Process of Nutrition and Dietetic Practice. An additional advantage is that they can be used for the behavioural change for eating and exercise habits.

5.15 Weaknesses

The procedure of counsel therapy was considered time consuming but at the same time very effective in the current study of weight controlling. Moreover, the process of supervising was very intensive and required an expert in the field to manage it. As obesity is a chronic disease requires a long-term adherence program not only by the patient but also by the health care provider; this makes the process more difficult. Furthermore, the groups were not divided into overweight and obese, as weight loss in an obese person with a BMI of 35 is much higher than a person with a BMI of 25. Difficult to recruit participants(including patients and professionals) and follow through for a long period time.

5.16 Deliverables

(1) A scientific article published in the Arab Journal of Nutrition and Exercise with the title "The integration of eating habits and physical activity through the nutrition care process to tackle the obesity epidemic. A narrative review of the evidence.

(2) The book publication Philippou C, Andreou E (2020) 'Smart Eating for Better Exercising. Become your educator for better physical status'. ISBN 978-9963-9876-9-6.

(3) The results of the pilot study were presented in the international scientific conference of the Cyprus Dietetic and Nutrition Association in collaboration with EFAD in November 2021 after they have been accepted by the scientific committee.

(4) POSTER 11th CyDNA Conference. The integration of eating habits and physical activity through the nutrition care process to tackle the obesity epidemic. A narrative review of the evidence. Philippou, Papandreou, Zampelas, Andreou (2021)

(5) Presentation of the topic 'Promoting Healthy Behaviour through a serious game' from the nutrition education perspective in the 11th International Nutrition and Dietetics Conference.

(6) The modified NCP (figure 5.1) for the dietitians in Cyprus which there was an adjustment from the original, will be used by the national association in Cyprus (CyDNA) and the Cyprus Registration Board for Food Scientists, Technologists and Dietitians.

(7) The final results were presented in the Nutrition Society Winter Conference 2022-2023 with the title 'Architecture of food: processing, structure and health' 'The prevalence of "Mindful Eating" in adults in Cyprus and its relation to Body Mass Index.'

(8) Andreou, E., Philippou, C., & Korfiati, P. (2023). The prevalence of "Mindful Eating" in adults in Cyprus and its relation to Body Mass Index. Proceedings of the Nutrition Society, 82(OCE1), E26. doi:10.1017/S0029665123000344

Concluding, the NCP is one of the most efficient ways of communication with other health professionals, a common nutrition terminology and language for the dietitians/nutritionist to use in order to solve nutritional problems and the most effective for assessment, nutrition diagnosis, nutritional planning, nutrition intervention, follow up and re-evaluation of patient/ client. For the assessment of obesity and overweight many measurements were used making the results more accurate. These measurements were: weight, height, Body Mass Index, Waist Circumference, Neck Circumference, and Body Fat Composition. Participants' food intake history and physical activity habits were also assessed using the Mindful Eating Questionnaire (MEQ) and the International Physical Activity Questionnaire (IPAQ). Validated Worksheets for lifestyle changes were applied to the intervention group and better results for weight management were observed in this group. Mindful Eating and Body Mass Index appear to be strongly correlated whereas ME and dietary restriction appear to be only somewhat correlated, and each is differentially associated with meal consumption. High mindful eating scoring appears to relate to normal BMI. The psychological well-being of being overweight should not be underestimated. Emotional and external eating were correlated with low mindful eating, and gender differences were found in different aspects of mindful eating types.

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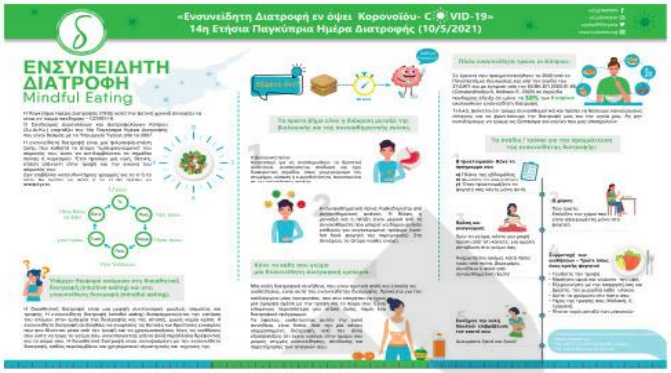
Appendices

Appendix I – Mindful Eating Questionnaire

Mindful eating- ΕΝΣΥΝΕΙΔΗΤΗ ΔΙΑΤΡΟΦΗ «Διερεύνηση της εφαρμογής της ενσυνείδητης διατροφής από τους Κυπρίους ενήλικες με τη χρήση του ερωτηματολογίου ενσυνείδητης διατροφής(MEQ) και συσχετισμός των αποτελεσμάτων με τον Δείκτη Μάζα Σώματος».

ΑΡΧΙΚΑ ΜΕΛΕΤΗΣ: ΜΕ-ΕΔ/ ΕΕΒΚΕΠ2020.01.66

* Required



Mindful eating- ΕΝΣΥΝΕΙΔΗΤΗ ΔΙΑΤΡΟΦΗ «Διερεύνηση της εφαρμογής της ενσυνείδητης διατροφής από τους Κυπρίους ενήλικες με τη χρήση του ερωτηματολογίου ενσυνείδητης διατροφής (MEQ) και συσχετισμός των αποτελεσμάτων με τον Δείκτη Μάζα Σώματος».

Στόχος: Η σχέση της διατροφικής εκπαίδευσης και της σωματικής άσκησης, με τη χρήση της ενσυνείδητης διατροφής και συμπεριφοράς, στη διαχείριση του βάρους για πρωτοβάθμια περίθαλψη στην Κύπρο μέσω της Διαδικασίας Διατροφικής Φροντίδας ('The determination of 'The relation of nutrition education and physical activity, with the use of mindful eating and behaviour, on weight management in primary care in Cyprus through Nutrition Care Process')

ΑΡΧΙΚΑ ΜΕΛΕΤΗΣ: ΜΕ/ΕΔ Η έρευνα αυτή πραγματοποιείται από το Πανεπιστήμιο Λευκωσίας (LHS), έχει γνωμοδότηση από την ΕΕΒΚ και είναι υπό την αιγίδα του Συνδέσμου Διαιτολόγων και Διατροφολόγων Κύπρου (Συ.Δι.Κυ.) και του ΜΑΖΙ (Ίδρυμα Διατροφικών Διαταραχών και Παχυσαρκίας). Ο Συ.Δι.Κυ. αποφάσισε να συνεχίσει αυτή την έρευνα με Θέμα την Ενσυνείδητη Διατροφή που πραγματοποιήθηκε το 2020-2021 μέχρι το 2023. Ερωτηματολόγιο Ενσυνείδητης διατροφής Αγαπητέ αναγνώστη/αναγνώστρια, Καλείστε να λάβετε μέρος εθελοντικά σε μία ερευνητική μελέτη από το Πανεπιστήμιο Λευκωσίας. Θα σας ζητηθεί να απαντήσετε σε ένα σύντομο ερωτηματολόγιο που δεν παίρνει περισσότερο από 5-10 λεπτά για να ολοκληρωθεί. Οι απαντήσεις σας θα παραμείνουν ανώνυμες και έχετε την επιλογή να αποχωρήσετε από τη μελέτη, όποτε το επιθυμείτε. Όλα τα δεδομένα θα φυλαχτούν σύμφωνα με τη διαδικασία του πανεπιστημίου Λευκωσίας για την αποθήκευση και το χειρισμό των ερευνητικών δεδομένων. Πριν αποφασίσετε αν θέλετε να συμμετάσχετε ή όχι, διαβάστε τα παρακάτω: Το θέμα της έρευνας είναι η «Διερεύνηση της εφαρμογής της ενσυνείδητης διατροφής από τους Κυπρίους ενήλικες με τη χρήση του ερωτηματολογίου ενσυνείδητης διατροφής(MEQ) και συσχετισμός των αποτελεσμάτων με τον Δείκτη Μάζα Σώματος» με κύριο στόχο τη διαπίστωση της σχέσης της διατροφικής εκπαίδευσης και της σωματικής άσκησης, με τη χρήση της ενσυνείδητης διατροφής και συμπεριφοράς, στη διαχείριση του βάρους στην πρωτοβάθμια περίθαλψη στην Κύπρο μέσω της Διαδικασίας Διατροφικής Φροντίδας. Η ενσυνείδητη διατροφή (ΕΔ) εστιάζετε στην επιβράδυνση της διαδικασίας κατανάλωσης χωρίς περισπασμούς, λαμβάνοντας υπόψη το αίσθημα του κορεσμού. Διάφορες επιστημονικές μελέτες έχουν συσχετίσει θετικά

αποτελέσματα της τεχνικής αυτής για διάφορους λόγους, όπως διαχείριση διατροφικών διαταραχών, κατάθλιψη, άγχος και λανθασμένες συμπεριφορές απέναντι στο φαγητό. Με την εφαρμογή ενσυνείδητης διατροφής, εστιαζόμαστε στις αισθήσεις που βιώνουμε κατά την κατανάλωση φαγητού, όπως όσφρησης, ακοής, υφής, χρωμάτων και γεύσεων. Η ΕΔ στοχεύει στην απόλαυση της διαδικασίας λήψης τροφής, με αποτέλεσμα ελευθερία στην κατανόηση παραγόντων όπου μπορεί να προκαλέσουν ξέσπασμα απέναντι στο φαγητό. Τα επίπεδα παχυσαρκίας αναπτύσσονται ραγδαία με την πάροδο του χρόνου. Άλλες μελέτες έχουν συσχετίσει την ψυχολογική κατάσταση του ατόμου με παχυσαρκία και αυξημένα επίπεδα υπερφαγίας. Η ενσυνείδητη διατροφή μπορεί να ενσωματωθεί σε προγράμματα αλλαγής διατροφικής συμπεριφοράς. Εστιάζετε στο παρόν επιβραδύνοντας τη διαδικασία κατανάλωσης τροφής, λαμβάνοντας υπόψη το αίσθημα του κορεσμού χωρίς να κρίνει το τρόφιμο καλό ή κακό. Διάφορες επιστημονικές μελέτες έχουν συσχετίσει θετικά αποτελέσματα για αντιμετώπιση διατροφικών διαταραχών, κατάθλιψης, άγχους και υπερφαγίας. Με την εφαρμογή αυτής της τεχνικής το άτομο αναπτύσσει επίγνωση στα εσωτερικά ερεθίσματα του σώματος, ελέγχοντας τις παρορμητικές συμπεριφορές με αποτέλεσμα δημιουργία υγιής σχέσης με το φαγητό. Επιπλέον, σκοπός αυτής της ερευνητικής μελέτης είναι να διερευνηθεί η εφαρμογή τεχνικής «ενσυνείδητης διατροφής» από τους Κύπριους ενήλικες και να συσχετιστεί με τον Δείκτη Μάζα Σώματος.

Ο σκοπός αυτός θα επιτευχθεί με τη χρήση ηλεκτρονικού επικαιροποιημένου ερωτηματολογίου (Mindful Eating Questionnaire- MEQ) το οποίο θα απαντηθεί μόνο από άτομα άνω των 18 ετών και να διατηρηθεί η ανωνυμία. Στόχοι Να διερευνήσουμε μέσω ερωτηματολογίου Mindful Eating Questionnaire (MEQ)

1. Αξιολόγηση ενήλικου πληθυσμού στην Κύπρο και Ελλάδα για τα επίπεδα ενσυνείδητης διατροφής

2. Αξιολόγηση και συσχέτιση μεταξύ επιπέδων «Ενσυνείδητης Διατροφής» με ΔΜΣ, Φυσική δραστηριότητα και Διατροφικές συνήθειες

3. Διερεύνηση κατά πόσο τα άτομα επικεντρώνονται στα εσωτερικά ερεθίσματα πείνας και κορεσμού σε αντίθεση με την συναισθηματική κατάσταση ή τα εξωτερικά ερεθίσματα (περιβάλλον) που καθοδηγούν τη διατροφική συμπεριφορά.

4. Η διερεύνηση των συμπεριφορών των ατόμων σχετικά με την πρόσληψη τροφής και των αντιλήψεων για το βάρος του σώματός τους. Τα παραπάνω προκύπτουν από τις βαθμολογίες των ατόμων στο ερωτηματολόγιο MEQ και τις υποκλίμακές του (Disinhibition- Αποστασιοποίηση, Awareness- Ευαισθητοποίηση, External cues - Εξωτερικές υποδείξεις, Emotional response -Συναισθηματική αντίδραση, Distraction- Απόσπαση)

5. Η συσχέτιση των παραπάνω και του τελικού σκορ του MEQ με το Δείκτη Μάζας Σώματος των συμμετεχόντων όπως αυτός εξήχθη από τα στοιχεία για ύψος και βάρος που θα αυτό-δηλωθούν. 6. Η σχέση της διατροφικής εκπαίδευσης και της σωματικής άσκησης, με τη χρήση της ενσυνείδητης διατροφής και συμπεριφοράς, στη διαχείριση του βάρους για πρωτοβάθμια περίθαλψη στην Κύπρο μέσω της Διαδικασίας Διατροφικής Φροντίδας

(ΓΕΝΙΚΟΣ ΣΤΟΧΟΣ) Στην πρώτη φάση της έρευνας, ερευνήτρια ήταν η Άντρεα Κωνσταντινίδου, MSc Κλινική Διαιτολόγος καθώς και για την 1η και 2η φάση ερευνήτριες είναι η Δρ Χριστιάνα Φιλίππου**,** Κλινική & Αθλητική Διαιτολόγος, η κα Πέρσα Κορφιάτη, Ψυχολόγος και ερευνητής ο Καθηγητής Δημήτρης Παπανδρέου. Συντονίστρια της έρευνας είναι η Δρ Ελένη Ανδρέου.

Εάν έχετε οποιεσδήποτε απορίες ή ανησυχίες σχετικά με αυτή την ερευνητική μελέτη, μη διστάσετε να επικοινωνήσετε μαζί με την συντονίστρια της έρευνας: Δρ. Ελένη Ανδρέου, Αναπληρώτρια Καθηγήτρια Πανεπιστημίου Λευκωσίας και Πρόεδρος Συ.Δι.Κυ στο andreou.el@unic.ac.cy ή eandreou@eleniandreou.diet. Σας ευχαριστούμε για το χρόνο σας, η Ερευνητική Ομάδα Το ερωτηματολόγιο είναι ΕΜΠΙΣΤΕΥΤΙΚΟ και η συμπλήρωση του είναι ΕΘΕΛΟΝΤΙΚΗ και δεν θα διαρκέσει περισσότερο από λίγα λεπτά. Σας ευχαριστούμε πολύ για τον ενθουσιασμό και την υποστήριξή σας. Στη Κύπρο υπεύθυνο Ίδρυμα για την πραγματοποίηση της συγκεκριμένης μελέτης είναι το Ερευνητικό Ίδρυμα Πανεπιστημίου Λευκωσίας με υπεύθυνη καθηγήτρια τη Δρ. Ελένη Ανδρέου, Αναπληρώτρια Καθηγήτρια στο Τμήμα Ζωής και Επιστημών Υγείας του Πανεπιστημίου Λευκωσίας (email: andreou.el@unic.ac.cy Τηλ: 22841740). Για την συμμετοχή σας στη μελέτη ΜΕ/ΕΔ, πρέπει να έχετε ενημερωθεί και να παρέχετε την συγκατάθεση σας σχετικά με την πολιτική προστασίας προσωπικών δεδομένων της μελέτης. Στο πλαίσιο αυτό, θα θέλαμε να σας ενημερώσουμε για τα εξής:

(1) Οι υπεύθυνοι ερευνητές αναλαμβάνουν την ευθύνη για την συλλογή και στατιστική ανάλυση των πληροφοριών που παρέχονται ανώνυμα από εσάς για τις ανάγκες του ερευνητικού έργου.

(2) Κανένας τρίτος δεν θα έχει πρόσβαση με οποιονδήποτε τρόπο στις προσωπικές πληροφορίες των συμμετεχόντων κατά τη διάρκεια ή μετά την ολοκλήρωση αυτής της εργασίας.

(3) Όλες οι πληροφορίες που θα αποκτηθούν θα διατηρηθούν ασφαλείς στους φακέλους και αρχεία που προστατεύονται με κωδικό πρόσβασης και δεν θα διανεμηθούν σε οντότητες εκτός των συνεργατών ΜΕ/ΕΔ, οι οποίοι συμφώνησαν σε αυτή την πολιτική.

(4) Όλες οι σχετικές πληροφορίες θα χρησιμοποιηθούν για τη στατιστική ανάλυση προκειμένου να επιτευχθεί ο σκοπός αυτής της έρευνας και τα αποτελέσματα θα παρουσιαστούν σε επιστημονική/ες δημοσίευση/εις.

(5) Στο τέλος αυτής της έρευνας, κανένας από τους συνεργάτες του ΜΕ/ΕΔ δεν θα διατηρήσει κανένα από τα πρωταρχικά δεδομένα που έχουν παράσχει οι συμμετέχοντες.

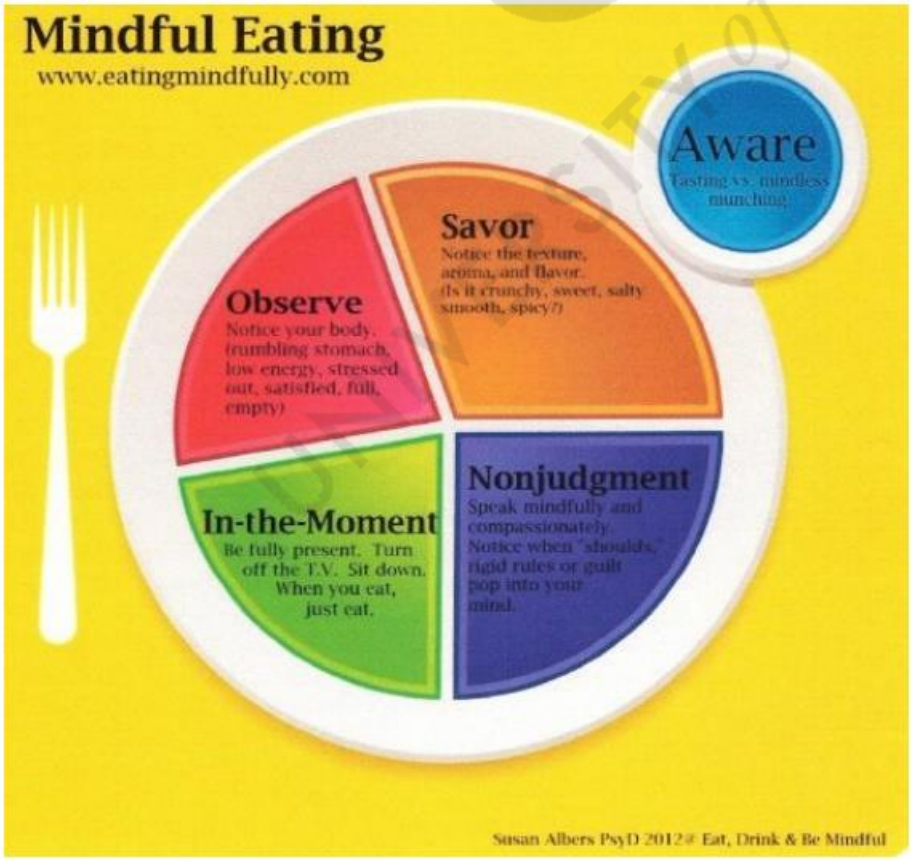
(6) Όλα τα πρωτογενή δεδομένα θα καταστραφούν, εφόσον έχει ολοκληρωθεί κάθε προβλεπόμενη ανάλυσή τους.

(7) Η κοινοποίηση των αποτελεσμάτων της έρευνας στους συμμετέχοντες πραγματοποιείται με πρωτοβουλία των ιδίων συμμετεχόντων, εφόσον το επιθυμούν.

(8) Ως δυνητικός συμμετέχων έχετε το δικαίωμα να λάβετε διευκρινίσεις σχετικά με πιθανές αμφιβολίες που ενδέχεται να έχετε ανά πάσα στιγμή. Μπορείτε να ζητήσετε λεπτομερέστερες πληροφορίες σχετικά με αυτήν την έρευνα. Για το σκοπό αυτό μπορείτε να επικοινωνήσετε απευθείας με την συντονίστρια που είναι υπεύθυνη για τη μελέτη, τα στοιχεία επικοινωνίας της οποίας αναφέρονται στην αρχή αυτού του εγγράφου. Εφόσον η πολιτική προστασίας προσωπικών δεδομένων της παρούσας μελέτης, όπως αυτή περιγράφεται συνοπτικά στα παραπάνω 8 σημεία, σας βρίσκει σύμφωνο/σύμφωνη, παρακαλώ επιλέξτε το αντίστοιχο πεδίο στην ερώτηση "1" παρέχοντας την συγκατάθεση σας αφού διαβάσετε το κείμενο προσεκτικά μέχρι τώρα.

(9) Η παρούσα έρευνα έχει αρ. φακέλου στην Εθνική Επιτροπή Βιοηθικής Κύπρου (ΕΕΒΚ) με γνωμοδότηση υπέρ της, ΕΕΒΚΕΠ2020.01.66 Το ερωτηματολόγιο θα είναι ανοικτό για ένα μήνα από 28/8/2022- 1/10/2022 (2η φάση).

Η Σωστή Διατροφή είναι δική μας απόφαση και απόλαυση! Σας ευχαριστούμε!



1. Με το παρόν δηλώνω ενήμερος/ενήμερη ότι τα δεδομένα που συλλέγονται είναι ΕΜΠΙΣΤΕΥΤΙΚΑ και θα χρησιμοποιούνται μόνο ανώνυμα για στατιστική ανάλυση και επιστημονική δημοσίευση. *Σημειώστε μόνο μια απάντηση στο αντίστοιχο πεδίο.* Η συμπλήρωση του παρακάτω πεδίου Απαιτείται. *

Mark only one oval.

- *Έχω ενημερωθεί για την πολιτική προστασίας προσωπικών δεδομένων της παρούσας μελέτης και επιτρέπω την χρήση αυτού του ερωτηματολογίου και των απαντήσεων μου για ανώνυμη στατιστική ανάλυση και επιστημονική δημοσίευση.
- ΔΕΝ επιθυμώ να λάβω μέρος στην παρούσα μελέτη

ΔΗΜΟΓΡΑΦΙΚΑ & ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

2. 1. Παρακαλώ σημειώστε το φύλο σας * *

Mark only one oval.

- ΑΝΤΡΑΣ
- ΓΥΝΑΙΚΑ
- Δεν απαντώ

3. 2. Παρακαλώ σημειώστε την ηλικία σας (έτη) *

_____

4. 3. Παρακαλώ σημειώστε την υπηκοότητά σας *

_____

5. 4.Παρακαλώ σημειώστε το επίπεδο εκπαίδευσής σας *

Mark only one oval.

- Πρωτοβάθμια (Δημοτικό σχολείο)
- Δευτεροβάθμια (Γυμνάσιο ή/και Λύκειο)
- Τριτοβάθμια (Πανεπιστήμιο/Κολλέγιο σε προπτυχιακό επίπεδο)
- Τριτοβάθμια (Πανεπιστήμιο/Κολλέγιο σε μεταπτυχιακό επίπεδο ή διδακτορικό)

6. 5.Παρακαλώ σημειώστε την οικογενειακή σας κατάσταση *

Mark only one oval.

- Άγαμος(η)/Ελεύθερος(η)
- Έγγαμος (η)/Συμβίωση/Σχέση
- Διαζευμένος(η)/Σε διάσταση
- Χήρος(α)

7. 6.Παρακαλώ αναφέρετε το συνόλικο αριθμό των ατόμων που ζουν στο νοικοκυριό σας (συμπεριλαμβανομένου του εαυτού σας). *

8. 7.Παρακαλώ αναφέρετε τη χώρα μόνιμης κατοικίας σας *

Mark only one oval.

- Κύπρος
- Other: _____

9. 8.Παρακαλώ σημειώστε την πόλη ή περιοχή διαμονής σας στην Κύπρο* *

Mark only one oval per row.

	Λευκωσία	Λεμεσός	Λάρνακα	Πάφος	Αμμόχωστος	Αλλού	Δεν ισχύει
Πόλη							
Χωριό επαρχίας							
Αλλού							

10. 9. Πόσα χρόνια βρίσκεστε στη χώρα μόνιμης κατοικίας σας; *

11. 10. Παρακαλώ σημειώστε την επαγγελματική σας κατάσταση κατά το προηγούμενο έτος *

Mark only one oval.

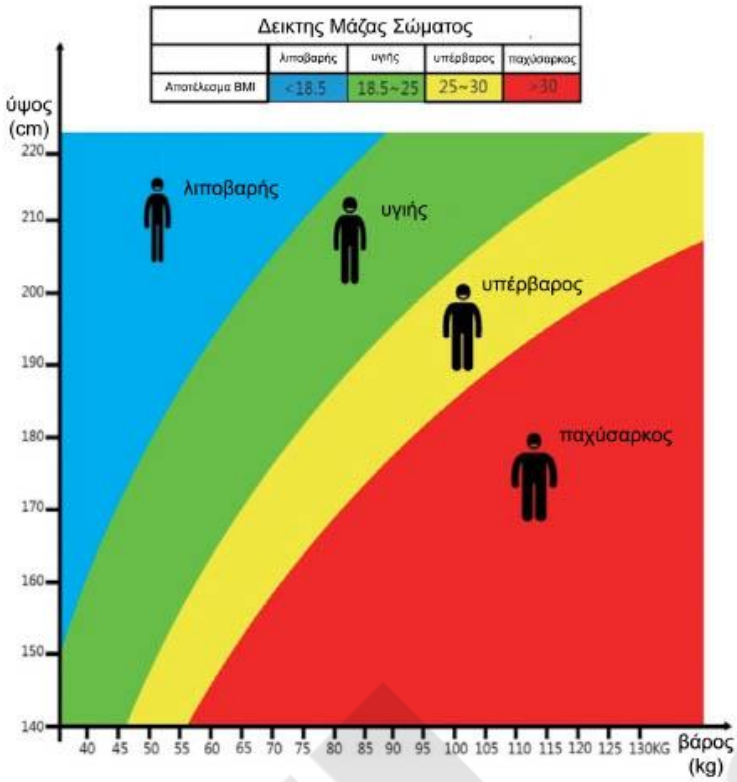
- Φοιτητής/τρια
- Άνεργος/η για ολόκληρο το χρόνο
- Άνεργος/η για μέρος του χρόνου
- Εργαζόμενος/η
- Συνταξιούχος/α
- Other: _____

12. 11. Ποιο είναι, περίπου, το καθαρό μηνιαίο σας εισόδημα σε ευρώ *

Mark only one oval.

- ΔΕΝ ΕΧΩ/ ΔΕΝ ΑΠΑΝΤΩ
- ΜΕΧΡΙ 1000
- 1001-2000
- 2001-3000
- >3000

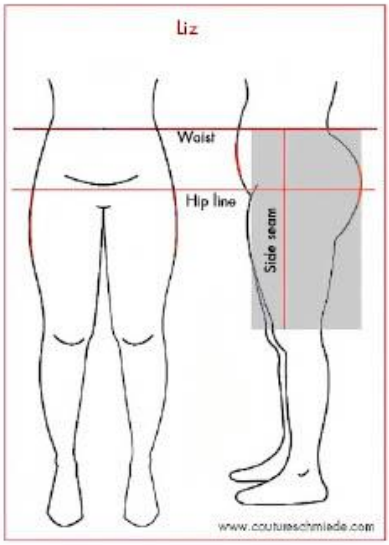
ΣΩΜΑΤΟΜΕΤΡΗΣΕΙΣ , ΙΑΤΡΙΚΟ ΙΣΤΟΡΙΚΟ, ΑΣΚΗΣΗ

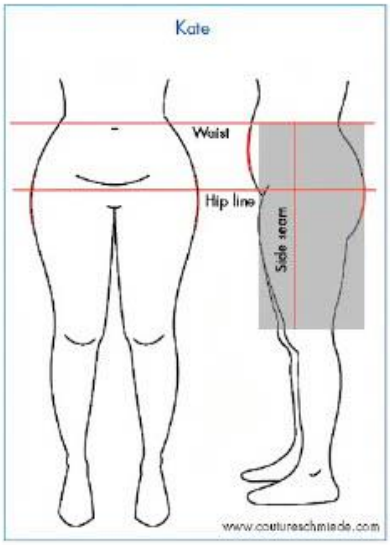


13. 12. Παρακαλώ σημείωστε το βάρος σας (π.χ. 80 κιλά) *

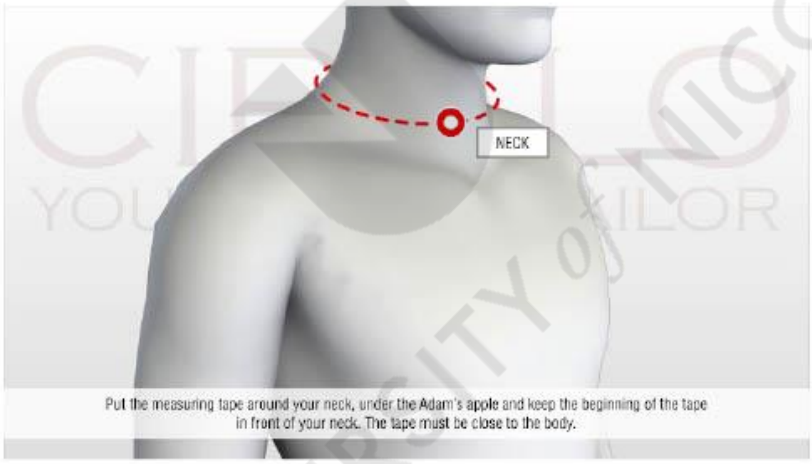
14. 13. Παρακαλώ σημείωστε το ύψος σας (π.χ. 1.80 μέτρα) *

15. Γράψετε την περίμετρο μέσης σας σε εκατοστά (cm)

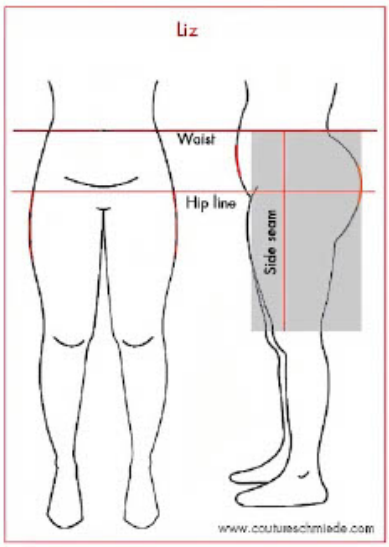


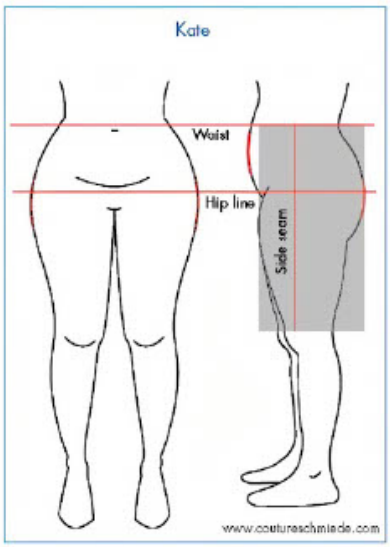


16. Γράψετε την περίμετρο του λαιμού σε εκατοστά (cm)



17. Γράψετε την περίμετρο περιφέρειας σε εκατοστά (cm)





18. 14. Στο παρόν στάδιο πάσχετε από οποιάδηποτε διαγνωσμένη πάθηση; *

Mark only one oval.

- Ναι
- Όχι

19. 15. Αν η απάντηση σας είναι 'Ναι'. Παρακάλω σημειώστε την πάθηση ή τις παθήσεις παρακάτω:

20. 16. Καπνίζετε; *

Mark only one oval.

- Ναι
- Όχι

21. 17. Ποιά είναι η συνήθης δραστηριότητά σας σε μία τυπική ημέρα; (στην εργάσια, στο πανεπιστήμιο ή στο σπίτι) *

Mark only one oval.

- Συνήθως είμαι καθισμένος/η και δεν περπατώ πολύ (π.χ. δουλειά γραφείου, οδηγός)
- Περπατώ μερικές ώρες, άλλα χωρίς να κάνω κάποια έντονη προσπάθεια (π.χ. πωλήτης)
- Περπατώ αρκετές ώρες σε συνδυασμό με κάποια έντονη προσπάθεια (π.χ.: καθαριστής, φορτωτής)
- Κάνω κάποια σκληρή εργασία που απαιτεί έντονη δραστηριότητα και προσπάθεια (π.χ.: οικοδόμος, αγρότης)
- Other: _____

22. 18. Ποιό είδος δραστηριότητας κάνετε πιο συχνά στον ελεύθερό σας χρόνο; *

Mark only one oval.

- Δραστηριότητες που δεν απαιτούν σωματική δραστηριότητα (παρακολούθηση τηλεόρασης)
- Χαλαρωτικές δραστηριότητες (περπάτημα) μερικές φορές την εβδομάδα
- Αθλητισμός και (ή) έντονη σωμάτική άσκηση
- Yoga
- Other: _____

23. 19. Κατά μέσο όρο, τον περασμένο μήνα, πόσο συχνά κάνατε κάποια άσκηση π.χ. γρήγορο περπάτημα, τρέξιμο, ποδηλασία, κολύμπι, γυναστήριο ή άλλο άθλημα *

Mark only one oval.

- Ποτέ
- Περιστασιακά αλλά όχι τακτικά
- Τακτικά, λιγότερο από 150 λεπτά την εβδομάδα
- Τακτικά, 150 λεπτά ή περισσότερο την εβδομάδα
- Other: _____

24. 20. Κατά μέσο όρο, τον προηγούμενο μήνα, πόσες ώρες κοιμηθήκατε το βράδυ *

Mark only one oval.

- Λιγότερο από 6 ώρες/βράδυ
- 6-7 ώρες/βράδυ
- 7-8 ώρες/βράδυ
- 8-10 ώρες/βράδυ
- Περισσότερες από 10 ώρες/βράδυ
- Other: _____

25. 21. Εκτός από τον βραδινό σας ύπνο, κοιμόσαστε για λίγη ώρα και άλλες φορές μέσα στη μέρα *

Mark only one oval.

- Όχι
- Ναι, αλλά μόνο περιστασιακά
- Ναι, συχνά

26. 22. Αν η απάντησή σας στην προηγούμενη ερώτηση ήταν θετική, πόσες ώρες κοιμόσαστε κατά τη διάρκεια της ημέρας (εκτός από τον βραδινό σας ύπνο) *

Mark only one oval.

- Λιγότερο από 30 λεπτά
- 30 λεπτά εώς 1 ώρα
- Περισσότερο από 1 ώρα
- Δεν κοιμάμαι τη μέρα
- Other: _____

ΔΙΑΤΡΟΦΙΚΕΣ ΣΥΝΗΘΕΙΕΣ

27. 23. Πόσα γεύματα καταναλώνετε σε μια τυπική ημέρα; (συμπεριλάβετε: πρωϊνό, μεσημεριανό γεύμα, δείπνο, πρωϊνό και απογευματινό σνακ και προ ύπνου) *

Mark only one oval per row.

	1 ή λιγότερα	2	3	4	5	6 ή περισσότερα
Κυρια Γευματα (προγευμα, μεσημεριανό, βραδυνό)	◯	◯	◯	◯	◯	◯
Ενδιάμεσα	◯	◯	◯	◯	◯	◯

28. 24. Χρησιμοποιείτε το ελαιόλαδο ως βασική πηγή μαγειρικού λίπους; *

Mark only one oval.

◯ Ναι
◯ Όχι

29. 25. Πόσες κουταλιές της σούπας ελαιόλαδο καταναλώνετε σε μια τυπική ημέρα; (Στην ποσότητα συμπεριλαμβάνονται οι ποσότητες για το μαγείρεμα, τις σαλάτες, τα γεύματα κλπ) * *

Mark only one oval.

- 1 ή λιγότερο
- 2-3
- 4 ή περισσότερο

30. 26. Πόσες μερίδες λαχανικών καταναλώνετε σε μια τυπική ημέρα; Περιλαμβάνονται μαγειρεμένα και ωμά λαχανικά. (Μια μερίδα = ένα φλιτζάνι ωμά ή μισό φλιτζάνι βρασμένα λαχανικά). *

Mark only one oval.

- <1
- 1
- 2
- 3 ή περίσσοτερα

31. 27. Πόσες μερίδες φρέσκων φρούτων καταναλώνετε σε μια τυπική ημέρα; (Μια μερίδα = μια μονάδα φρούτου μεσαίου μεγέθους, ένα μεγάλο φλιτζάνι φέτες φρούτων ή ½ φλιτζάνι φρεσκοστυμμένος χυμός). *

Mark only one oval.

- < 1
- 1
- 2
- 3 ή περισσότερες

32. 28. Πόσες μερίδες κόκκινου κρέατος (χοιρινό, βοδινό, αρνίσιο), χάμπεργκερ ή προϊόντα κρέατος καταναλώνετε σε μια τυπική εβδομάδα; (Μια μερίδα = 90 έως 180 γρ = 1/4-1/2 πιάτο) *

Mark only one oval.

- <1
- 2-4
- 5-6
- 7 ή περισσότερες
- Δεν τρώω κρέας, είμαι χορτοφάγος
- Δεν τρώω κρέας, λόγο νηστείας

33. 29. Πόσες μερίδες βούτυρο, μαργαρίνη ή κρέμα καταναλώνετε σε μια τυπική ημέρα; (Μία μερίδα = 5 γρ = ένα κουτάλι γλυκού για το βούτυρο και τη μαργαρίνη, 2 κουταλιές για τη κρέμα γάλακτος). *

Mark only one oval.

- <1
- 1
- >1
- Καθόλου

34. 30. Πόσα γλυκά ροφήματα και αναψυκτικά καταναλώνετε σε μια τυπική ημέρα π.χ. πορτοκαλάδα ή λεμονάδα , κόλα, σόδα κλπ. ή γλυκά ροφήματα όπως σοκολάτα, καφές με κρέμα ή σαντιγή, τυποποιημένο κρύο τσάι με προσθήκη ζάχαρης, λικέρ ή αλκοολούχα ποτά (εκτός από κρασί). *

Mark only one oval.

- <1
- 1
- >1
- Καθόλου
- Other: _____

35. 31. Πόσα ποτήρια κρασιού καταναλώνετε σε μια τυπική εβδομάδα; *

Mark only one oval.

- <1 (Περιστασιακά)
- 2-6 (Μερικές φορές άλλα όχι καθημερινά)
- 7-14 (1-2 ποτήρια την ημέρα)
- >14 (Περισσότερα απο 2 ποτήρια την ημέρα)
- Καθόλου

36. 32. Πόσες μερίδες όσπρια καταναλώνετε σε μια τυπική εβδομάδα; π.χ. φασόλια, λουβιά, ρεβίθια, φακές. (Μία μερίδα = 185 γρ = 1 φλιτζάνι) *

Mark only one oval.

- <1
- 1
- 2
- 3 ή περισσότερες
- καθόλου

37. 33. Πόσες μερίδες ψαριών, θαλασσινών καταναλώνετε σε μια τυπική εβδομάδα; (Μια μερίδα = 100 έως 150 γρ = 1/4-1/2 πιάτο) * *

Mark only one oval.

- <1
- 1
- 2
- 3 ή περισσότερες
- Καθόλου

38. 34. Πόσες φορές την εβδομάδα καταναλώνετε γλυκά ή γλυκά όπως κέϊκ, μπισκότα, γλυκίσματα ή κρέμες κ.α.; *

Mark only one oval.

- <1
- 1
- 2
- 3
- 4 ή περισσότερες
- Καθόλου

39. 35. Προτιμάτε να καταναλώνετε κρέας κοτόπουλου, γαλοπούλας ή κουνελιού ή πηγή χορτοφαγικής πρωτεΐνης όπως όσπρια αντί για μοσχάρι, χοιρινό, κιμά; * *

Mark only one oval.

- Ναι, προτιμώ άσπρο κρέας ή όσπρια αντί κόκκινο κρέας
- Όχι, προτιμώ κόκκινο κρέας αντί άσπρο κρέας ή όσπρια
- Δεν τρώω κρέας, είμαι χορτοφάγος
- Δεν τρώω κρέας, νηστεύω

40. 36. Πόσες φορές την εβδομάδα καταναλώνετε πιάτα μαγειρεμένα με σάλτσα ντομάτας ή σάλτσα ντομάτας με κρεμμύδι ή σκόρδο και ελαιόλαδο (λαδερά); * *

Mark only one oval.

- 0- <1
- 1
- 2 ή περισσότερες

41. 37. Πόσες μερίδες γάλα, γιαούρτι ή τυρί καταναλώνετε σε μια τυπική ημέρα; (Μία μερίδα = 1 φλυντζάνι γάλα ή 1 φλυντζάνι γιαούρτι ή 2 λεπτές φέτες τυρί (30γρ) *

Mark only one oval.

- <1
- 1
- 2
- 3 ή περισσότερες
- Πίνω ή τρώω μονο υποκατάστατα γάλατος (πχ γαλα καρυδας)

42. 38. Τρώτε κατά προτίμηση γαλακτοκομικά (γάλα, γιαούρτι ή τυρί) χαμηλής περιεκτικότητας σε λιπαρά; *

Mark only one oval.

- Ναι
- Όχι

43. 39. Προτιμάτε συνήθως να καταναλώνετε δημητριακά ολικής άλεσης; *

Mark only one oval.

- Ναι
- Όχι

44. 40. Πόσα ποτήρια καφεϊνούχων ροφημάτων καταναλώνετε σε μια τυπική ημέρα; π.χ. καφέ, μαύρο ή πράσινο τσάι ή ενεργειακά ποτά; *

Mark only one oval.

- <1
- 1-3
- >3

45. 41. Πόσο νερό πίνετε σε μια τυπική ημέρα; *

Mark only one oval.

- <1 λίτρο (4 ποτήρια)
- 1-2 λίτρα (4-8 ποτήρια)
- >2 λίτρα (>8 ποτήρια)
- Other: _____

46. 42. Πως θα χαρακτηρίζετε το βάρος σας; *

Mark only one oval.

- Σταθεροποιημένο
- Θα ήθελα να χάσω βάρος
- Θα ήθελα να χάσω λίπος
- Θα ήθελα να βάλω βάρος/μυική μάζα

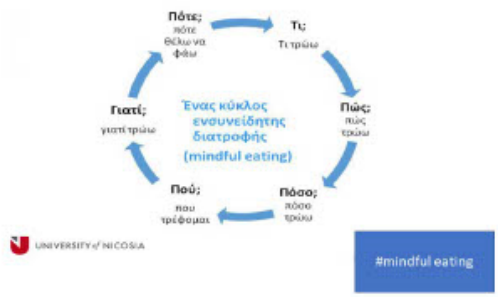
ΕΝΣΥΝΕΙΔΗΤΗ ΔΙΑΤΡΟΦΗ

"Mindful eating" describes a nonjudgmental awareness of physical and emotional sensations associated with eating. This study reports the implementation of a mindful eating questionnaire (MEQ) to support rigorous scientific inquiry into this concept.(Framson C, 2009)

Η «ενσυνείδητη διατροφή» περιγράφει μια μη επικριτική επίγνωση των σωματικών και συναισθηματικών αισθήσεων που σχετίζονται με το φαγητό. Αυτή η έρευνα αναφέρει την εφαρμογή ενός ερωτηματολογίου (MEQ) ενσυνείδητης διατροφής για την υποστήριξη αυστηρής επιστημονικής έρευνας σχετικά με αυτή την έννοια.(Framson C, 2009)

(ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1,0-ΔΕΝ ΙΣΧΥΕΙ)

ΕΝΣΥΝΕΙΔΗΤΗ ΔΙΑΤΡΟΦΗ-MINDFUL EATING



47. 43(1). Τρώω πολύ γρήγορα με αποτέλεσμα να μην μπορώ να αισθανθώ την γεύση του φαγητού μου. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

48. 44(2). Όταν τρώω «all you can eat» μπουφέ , συνήθως κάνω υπερφαγία. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1,0-ΔΕΝ ΤΡΩΩ ΣΕ ΜΠΟΥΦΕ) *

Mark only one oval.

	0	1	2	3	4	
ΔΕΝ ΤΡΩΩ ΣΕ ΜΠΟΥΦΕ	◯	◯	◯	◯	◯	ΠΟΤΕ ΣΠΑΝΙΑ

49. 45(3). Στους εξόδους όπου υπάρχει πολλή ποσότητα καλού φαγητού , συνειδητοποιώ ότι με κάνει να θέλω να φάω περισσότερο από ότι θα έπρεπε. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ /ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

50. 46(4). Συνειδητοποιώ ότι οι διαφημίσεις φαγητού με κάνουν να θέλω να φάω. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1,0-ΟΙ ΔΙΑΦΗΜΗΣΕΙΣ ΔΕΝ ΜΕ ΚΑΝΟΥΝ ΠΟΤΕ ΝΑ ΘΕΛΩ ΝΑ ΦΑΩ) *

Mark only one oval.

	0	1	2	3	4	
ΟΙ ΔΙΑΦΗΜΗΣΕΙΣ ΔΕΝ ΜΕ ΚΑΝΟΥΝ ΠΟΤΕ ΝΑ ΘΕΛΩ ΝΑ ΦΑΩ	◯	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

51. 47(5). Όταν η ποσότητα φαγητού στο εστιατόριο είναι πολύ μεγάλη , σταματώ να τρώω όταν νιώθω χορτάτος/η. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

52. 48(6). Οι σκέψεις μου τείνουν να περιπλανώνται ενώ τρώω. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

53. 49(7). Όταν τρώω ένα από τα αγαπημένα μου φαγητά, δεν συνειδητοποιώ πότε έχω φάει αρκετά (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ /ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

54. 50(8). Παρατήρησα ότι όταν πηγαίνω σε θέατρο/κινηματογράφο θέλω να φάω γλυκά ή ποπ-κορν (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1,0-ΔΕΝ ΤΡΩΩ ΓΛΥΚΞΑ/ΠΟΠ ΚΟΡΝ) *

Mark only one oval.

	0	1	2	3	4	
Δεν τρώω ποτε γλυκά ή ποπ κορν	◯	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

55. 51(9). Όταν δεν στοιχίζει περισσότερα λεφτά, παίρνω την μεγαλύτερη μερίδα φαγητού ή ροφήματος ανεξαρτήτως πόσο πεινασμένος/η νιώθω. (ΠΟΤΕ / ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

56. 52(10). Καταλαβαίνω πότε υπάρχουν πικάντικες γεύσεις στο φαγητό μου. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

57. 53(11). Όταν υπάρχουν περίσσευμα από φαγητό που μου αρέσει, θα το καταναλώσω (2η μερίδα) ασχέτως εάν είμαι χορτάτος (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

58. 54(12). Όταν καταναλώνω ένα «απολαυστικό» φαγητό, συνειδητοποιώ ότι αυτό με χαλαρώνει. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ /ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

59. 55(13). Τρώω ενδιάμεσα γεύματα χωρίς να συνειδητοποιώ ότι τρώω. (ΠΟΤΕ / ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

60. 56(14). Όταν τρώω ένα μεγάλο γεύμα , συνειδητοποιώ ότι με κάνει να νιώθω «βαρετός/ή» (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

61. 57 (15). Σταματώ να τρώω όταν νιώθω χορτάτος/η ασχέτως ότι είναι φαγητό όπου αγαπώ (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

62. 58(16). Εκτιμώ την εμφάνιση του στο πιάτο μου. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

63. 59(17). Όταν νιώθω άγχος από την δουλεία μου , θα βρω κάτι να φάω. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1,0-ΔΕΝ ΔΟΥΛΕΥΩ) *

Mark only one oval.

	0	1	2	3	4	
ΔΕΝ ΔΟΥΛΕΥΩ	◯	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

64. 60(18). Αν υπάρχει καλό φαγητό σε έξοδο, θα συνεχίσω να τρώω ασχέτως εάν είμαι χορτάτος/η (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

65. 61(19). Όταν είμαι στεναχωρημένος/η, τρώω για να νιώσω καλύτερα. (ΠΟΤΕ / ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

66. 62(20). Καταλαβαίνω όταν το φαγητό και το ποτό είναι πολύ γλυκό (ΠΟΤΕ / ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

67. 63(21). Πριν να καταναλώσω φαγητό, κάνω παύση για να εκτιμήσω τα χρώματα και τις μυρωδιές του φαγητού μου. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

68. 64(22). Γεύομαι κάθε μπουκιά του φαγητού που τρώω. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

69. 65(23). Καταλαβαίνω πότε τρώω και δεν είμαι πεινασμένος/η. (ΠΟΤΕ / ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1,0-ΠΟΤΕ ΔΕΝ ΤΡΩΩ ΑΝ ΔΕΝ ΕΙΜΑΙ ΠΕΙΝΑΣΜΕΝΟΣ/Η) *

Mark only one oval.

	0	1	2	3	4	
ΠΟΤΕ ΔΕΝ ΤΡΩΩ ΑΝ ΔΕΝ ΕΙΜΑΙ ΠΕΙΝΑΣΜΕΝΟΣ/Η	◯	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

70. 66(24). Καταλαβαίνω όταν τσιμπολογώ γλυκά , απλά και μόνο επειδή βρίσκονται μπροστά μου. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

71. 67(25). Όταν βρίσκομαι σε εστιατόριο, μπορώ να πω πότε η ποσότητα που μου έχουν σερβίρει είναι πολύ μεγάλη για εμένα. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

72. 68(26). Καταλαβαίνω πότε το φαγητό όπου έχω καταναλώσει επηρεάζει την συναισθηματική μου κατάσταση. (ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

73. 69(27). Εχω πρόβλημα να μην καταναλώνω παγωτό, μπισκότα ή τσιπς όταν υπάρχουν στο σπίτι(ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1). *

Mark only one oval.

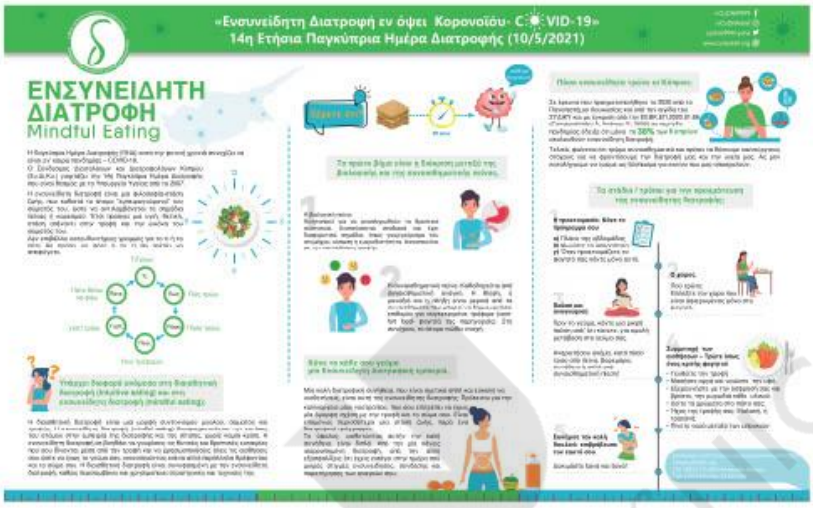
	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

74. 70(28). Σκέφτομαι πράγματα που θέλω να κάνω, όταν τρώω(ΠΟΤΕ /ΣΠΑΝΙΑ =4, ΜΕΡΙΚΕΣ ΦΟΡΕΣ-3, ΣΥΧΝΑ=2, ΣΥΝΗΘΩΣ/ΠΑΝΤΑ-1) *

Mark only one oval.

	1	2	3	4	
ΣΥΝΗΘΩΣ/ΠΑΝΤΑ	◯	◯	◯	◯	ΠΟΤΕ/ΣΠΑΝΙΑ

ΣΑΣ ΕΥΧΑΡΙΣΤΟΥΜΕ!



LONG LAST 7 DAYS SELF-ADMINISTERED FORMAT

FOR USE WITH YOUNG AND MIDDLE-AGED ADULTS (15-69 years)

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) version for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health–related physical activity.

Background on IPAQ

The development of an international measure for physical activity commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries (14 sites) during 2000. The final results suggest that these measures have acceptable measurement properties for use in many settings and in different languages, and are suitable for national population-based prevalence studies of participation in physical activity.

Using IPAQ

Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.

ΔΙΕΘΝΗΣ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ ΓΙΑ ΤΗΝ ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

Ενδιαφερόμαστε να ερευνήσουμε για τα είδη φυσικής δραστηριότητας που κάνουν οι άνθρωποι στην καθημερινότητα τους. Οι ακόλουθες ερωτήσεις είναι σχετικές με την φυσική δραστηριότητα σας τις **τελευταίες 7 ημέρες**. Παρακαλώ απαντήστε σε όλες τις ερωτήσεις αν και πιστεύετε ότι δεν είστε καθόλου δραστήριοι. Παρακαλώ σκεφτείτε τις δραστηριότητες που κάνετε στην εργασία ή στο σπίτι ή στον κήπο (αυλή) ή να μεταβείς από μέρος σε μέρος στον ελεύθερο σας χρόνο για αναψυχή, άσκηση και αθλητισμό.

Σκεφτείτε όλες τις **έντονες** και **μέτριες** δραστηριότητες που κάνατε τις **τελευταίες 7 ημέρες. Έντονη** φυσική δραστηριότητα αναφέρεται στις δραστηριότητες που απαιτούν έντονη προσπάθεια και σε κάνουν να αναπνέεις πολύ έντονα. **Μέτρια** φυσική δραστηριότητα αναφέρεται σε δραστηριότητες που η προσπάθεια είναι περισσότερη από την κανονική.

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

ΜΕΡΟΣ 1: ΦΥΣΙΚΕΣ ΔΡΣΤΗΡΙΟΤΗΤΕΣ ΠΟΥ ΕΧΟΥΝ ΣΧΕΣΗ ΜΕ ΤΗΝ ΕΡΓΑΣΙΑ / PART 1: JOB-RELATED PHYSICAL ACTIVITY

Το πρώτο μέρος αναφέρεται στην εργασία σας. Αυτό περιλαμβάνει πληρωμένη εργασία, καλλιέργεια, εθελοντική εργασία, διάβασμα και οτιδήποτε άλλη απλήρωτη εργασία που κάνατε εκτός σπιτιού. /The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Εργάζεστε τώρα ή κάνετε οποιαδήποτε άλλη απλήρωτη εργασία εκτός σπιτιού? / Do you currently have a job or do any unpaid work outside your home?

Ναι /Yes

Όχι /No →

Να απαντήσετε Όχι μεταφερθείτε στο ΜΕΡΟΣ 2

Skip to PART 2: TRANSPORTATION

Οι επόμενες ερωτήσεις αναφέρονται στις φυσικές δραστηριότητες που κάνετε τις **τελευταίες 7 ημέρες** στην εργασία σας ή σε εθελοντικές εργασίες. /The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2.Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες μέρες κάνετε **έντονη** φυσική δραστηριότητα όπως ανασήκωση βαριών αντικειμένων, σκάλισμα, βαριά κατασκευή ή ανεβοκατέβασμα σκάλων **ως μέρος της εργασία σας**? Σκεφτείτε μόνο τις φυσικές δραστηριότητες που κάνετε για τουλάχιστον 10 συνεχόμενα λεπτά την φορά. /During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing upstairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

ημέρες/εβδομάδα /days per week

Καθόλου έντονη φυσική δραστηριότητα στην εργασία/ No vigorous job-related physical activity -→ Μεταφερθείτε στην ερώτηση 4 /*Skip to question 4*

3. Πόσο χρονικό διάστημα συνήθως ξοδεύεις σε μία από εκείνες τις μέρες σε **έντονη** φυσική δραστηριότητα ως μέρος της εργασίας σας? How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

4. Ξανασκεφτείτε για μόνο εκείνες τις φυσικές δραστηριότητες που κάνετε για τουλάχιστον 10 λεπτά την φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες μέρες κάνετε **μέτρια** δραστηριότητα όπως μεταφορά ελαφριών αντικειμένων **ως μέρος της εργασίας σου**? Μην περιλάβεις το περπάτημα. / Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

ημέρες/ εβδομάδα / days per week

Καθόλου μέτρια δραστηριότητα στην εργασία → ***Αν Απαντήσετε ΟΧΙ μεταφερθείτε στην ερώτηση 6 /*** moderate job-related physical activity ***Skip to question 6***

5. Πόσο χρόνο ξοδεύεις συνήθως σε εκείνες τις μέρες κάνοντας **μέτρια** φυσική δραστηριότητα? / How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

6. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες κάνετε **περπάτημα** για τουλάχιστον 10 συνεχόμενα λεπτά την φορά ως μέρος της δουλειάς σας? Παρακαλώ μην περιλάβετε το περπάτημα που ξοδέψατε περπατώντας προς την δουλειά σας? / During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

ημέρες/εβδομάδα /days per week

No job-related walking ***to PART 2: TRANSPORTATION***

7. Πόσο χρόνο συνήθως ξοδεύεις σε μία από εκείνες τις ημέρες περπατώντας ως μέρος την δουλειά σας?/ How much time did you usually spend on one of those days **walking** as part of your work?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

ΜΕΡΟΣ 2: ΜΕΤΑΦΟΡΑ ΚΑΙ ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ / PART 2: TRANSPORTATION PHYSICAL ACTIVITY

Αυτές οι ερωτήσεις είναι για το πώς μεταφέρεστε από μέρος σε μέρος όπως δουλειά, καταστήματα, σινεμά και άλλα /These questions are about how you travelled from place to place, including to places like work, stores, movies, and so on.

8. κατά την διάρκεια των τελευταίων 7 ημερών πόσες ημέρες ταξιδέψατε με μηχανοκίνητο όπως τρένο, λεωφορείο, αυτοκίνητο ή με μοτοποδήλατο /During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

ημέρες/εβδομάδα /days per week

Καθόλου μεταφορά με μηχανοκίνητο → ***Μεταφερθείτε στην ερώτηση 10***

No traveling in a motor vehicle → ***Skip to question 10***

9. Πόσο χρόνο συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες ταξιδεύοντας με τρένο, λεωφορείο, αυτοκίνητο, μοτοποδήλατα ή μηχανοκίνητο? /How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

Τώρα σκεφτείτε μόνο την ποδηλασία και περπάτημα που μπορεί να κάνετε ταξιδεύοντας για να κάνετε εργασίες της δουλειάς και να μεταφερθείτε από μέρος σε μέρος? /Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες κάνατε **ποδηλασία** ή **περπάτημα** για τουλάχιστον 10 λεπτά για να μεταφερθείτε από μέρος σε μέρος? / During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

ημέρες/εβδομάδα /days per week

Καθόλου ποδηλασία από μέρος σε μέρος →**Μεταφερθείτε στην ερώτηση 12**

No bicycling from place to place → ***Skip to question 12***

11. Πόσο χρονικό διάστημα συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες για να μεταφερθείτε με **ποδηλασία** από ένα τόπο σε άλλο?/ How much time did you usually spend on one of those days to **bicycle** from place to place?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

12. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες **περπάτησε** τουλάχιστον 10 λεπτά την φορά για να μεταφερθείτε **από το ένα μέρος στο άλλο?/** During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

ημέρες/εβδομάδα /days per week

Καθόλου περπάτημα από το ένα μέρος στον άλλο → ***Αν απαντήσετε καθόλου πηγαίνετε το ΜΕΡΟΣ 3 – Οικιακά, Συντήρηση σπιτιών και φροντίδα της οικογένειας***

No walking form place to place → ***Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY***

13. Πόσο χρονικό διάστημα συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες σε περπάτημα για να μεταφερθείτε από το ένα μέρος στο άλλα./ How much time did you usually spend on one of those days walking from place to place?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

ΜΕΡΟΣ 3 – Οικιακά, Συντήρηση σπιτιών και φροντίδα της οικογένειας.

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

Το μέρος αυτό αναφέρεται στις φυσικές δραστηριότητες που έχετε κάνει τις **τελευταίες 7 ημέρες** στο σπίτι και στην αυλή του σπιτιού, όπως οικιακά, κηπουρική, συντήρηση σπιτιού και την φροντίδα της οικογένειας. /This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Σκεφτείτε μόνο εκείνες τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 συνεχόμενα λεπτά. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες κάντε **έντονη** φυσική δραστηριότητα όπως βαριά μετακίνηση αντικειμένων, τεμαχίζοντας ξύλα, μετακινώντας χώμα με φτυάρι, σκάβοντας στον κήπο?/ Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

ημέρες/εβδομάδα/ days per week

Καθόλου έντονη φυσική δραστηριότητα στον κήπο → **Μεταφερθείτε στην ερώτηση 16**

No vigorous activity in garden or yard → ***Skip to question 16***

15. Πόσο χρονικό διάστημα συνήθως ξοδέψατε εκείνες τις μέρες κάνοντας **έντονη** δραστηριότητα στον κήπο ή αυλή του σπιτιού? /How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

16. Ξανασκεφτείτε μόνο τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 λεπτά κάθε φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες μέρες κάνατε **μέτρια** δραστηριότητα όπως μεταφορά ελαφριών φορτίων, σκούπισμα, πλένοντας παράθυρα και την εκκαθάριση στον κήπο./ Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

ημέρες/εβδομάδα /days per week

Καθόλου μέτρια δραστηριότητα στον κήπο ή στην αυλή. → ***Μεταφερθείτε στην ερώτηση 18.***

No moderate activity in garden or yard → ***Skip to question 18***

17. Πόσο χρόνο συνήθως ξοδέψατε σε μία από εκείνες τις ημέρες κάνοντας **μέτρια φυσική** δραστηριότητα στον κήπο ή την αυλή σας? /How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

18. Ακόμη μία φορά, σκεφτείτε μόνο την φυσική δραστηριότητα που έκανες για τουλάχιστον 10 λεπτά κάθε φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες ημέρες κάνατε **μέτρια** φυσική δραστηριότητα όπως να μεταφέρεις ελαφριά βάρη, να πλένεις παράθυρα, να τρίβεις το πάτωμα ή να σκουπίζεις μέσα στο σπίτι? /Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

ημέρες/εβδομάδα /days per week

Καθόλου μέτρια φυσική δραστηριότητα μέσα στο *σπίτι* → ***Μεταφερθείτε στο ΜΕΡΟΣ 4: ΑΘΛΗΜΑ και ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ στον ΧΡΟΝΟ ΔΙΑΣΚΕΔΑΣΗ***

No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. Πόσο χρόνο συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες κάνοντας **μέτρια** φυσική δραστηριότητα μέσα στο σπίτι? /How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

ΜΕΡΟΣ 4: ΑΝΑΨΥΧΗ, ΑΘΛΗΜΑ ΚΑΙ ΦΥΣΙΚΗ ΔΡΑΣΤΗΙΟΤΗΤΑ ΣΤΟΝ ΧΡΟΝΟ ΔΙΑΣΚΕΔΑΣΗΣ /PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

Αυτό το μέρος είναι όλο για την φυσική δραστηριότητα που έκανες τις **τελευταίες 7 ημέρες** ως μέρος την αναψυχής σας, ως άθλημα ή ως μέρος της διασκέδασης σας?/This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Μην υπολογίσετε καθόλου οποιοδήποτε περπάτημα έχεις ήδη αναφέρει, κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες μέρες έκανες περπάτημα για τουλάχιστον 10 λεπτά συνεχόμενα την φορά στον χρόνο διασκέδασης σου?/ Not counting any walking you have

already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

ημέρες/εβδομάδα /days per week

Καθόλου Περπάτημα στον χρόνο διασκέδασης → **Μεταφερθείτε στην ερώτηση 22**

No walking in leisure time → ***Skip to question 22***

21. Πόσο χρόνο συνήθως ξοδέψατε σε μία από εκείνες τις μέρες για **περπάτημα** στον χρόνο διασκέδασης σας?/ How much time did you usually spend on one of those days **walking** in your leisure time?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

22. Σκεφτείτε μόνο εκείνες τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 λεπτά κάθε φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες μέρες κάνετε **έντονη** φυσική δραστηριότητα όπως αεροβική, τρέξιμο, γρήγορη ποδηλασία ή γρήγορη κολύμβηση **στον χρόνο διασκέδασης σας;**/ Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

ημέρες/εβδομάδα /days per week

Καθόλου έντονη δραστηριότητα στον χρόνο διασκέδασης → **Μεταφερθείτε στη ερώτηση 24**

No vigorous activity in leisure time → ***Skip to question 24***

23. Πόσο χρόνο συνήθως ξοδέψατε σε μία από εκείνες τις μέρες κάνοντας **έντονη** φυσική δραστηριότητα στον χρόνο διασκέδασης σας?/ How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

24. Ξανά σκεφτείτε μόνο εκείνες τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 συνεχόμενα λεπτά την φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες ημέρες κάνατε **μέτρια** φυσική δραστηριότητα όπως ποδηλασία σε κανονικό ρυθμό, κολύμπι σε κανονικό ρυθμό και διπλή αντισφαίριση στον χρόνο διασκέδασης σας?/ Again, think about

only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

ημέρες/εβδομάδα /days per week

Καθόλου δραστηριότητα στον χρόνο διασκέδασης σας → ***Μεταφερθείτε στο ΜΕΡΟΣ 5: ΧΡΟΝΟΣ ΚΑΘΙΣΤΙΚΗΣ ΖΩΗΣ***

No moderate activity in leisure time →***Skip to PART 5: TIMESPENT SITTING***

25. Πόσο χρονικό διάστημα συνήθως ξοδέψατε σε μία από εκείνες τις μέρες κάνοντας **μέτρια** φυσική δραστηριότητα στον χρόνο διασκέδασης σας?/ How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

ΜΕΡΟΣ 5: ΧΡΟΝΟΣ ΚΑΘΙΣΤΙΚΗΣ ΖΩΗΣ /*PART 5: TIME SPENT SITTING*

Η τελευταία ερώτηση αναφέρεται στον χρόνο που ξοδέψατε κάνοντας καθιστική εργασία στην δουλειά, στο σπίτι, στο διάβασμα ή στον χρόνο διασκέδασης σας?/ The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσο χρόνο ξοδέψατε **καθισμένοι** την εβδομάδα (εκτός Σαββατοκύριακο) /During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

27. Κατά την διάρκεια **των τελευταίων 7 ημερών** πόσο χρόνο συνήθως ξοδέψατε καθισμένοι το Σαββατοκύριακο?/ During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

ώρες/ημέρα /hours per day
λεπτά/ημέρα /minutes per day

Αυτό είναι το τέλος του ερωτηματολόγιου, σας ευχαριστούμε για την συμμετοχή σας.
/This is the end of the questionnaire, thank you for participatin

Appendix III - Worksheet I - Identification of eating habits

- For each question, select the answer that best reflects your diet. If you select more than one answer, the score will be averaged by adding the individual scores and dividing by the number of answers you selected.
- Keep the quiz as incentive. The quiz will be repeated on the 1st week, 18th week and 38th week.

1. How many times a week do you eat red meat? (Include beef, lamb, pork, veal.)
    a. 0
    b. 1 or 2
    c. 3 or 4
    d. 5 or 6
    e. More than 6

2. How many ounces of red meat constitute your normal portion? (Hint: 3 ounces (or 90gr), cooked, is approximately the size of a deck of cards.)
    a. 3 ounces
    b. 4 ounces
    c. 5 ounces
    d. 6 or more ounces

3. What kind of red meat do you usually choose?
    a. Loin or round cuts only
    b. 80% lean
    c. Ribs, T-bon
    d. Hot dogs, bacon, bologna

4. How many times a week do you eat seafood? (Omit fried dishes; include shellfish like shrimp and lobster.)
    a. 2 or more
    b. 1
    c. Less than 1
    d. Never

5. How many ounces of poultry or seafood do you eat for a serving? (Do not count fried items.)
    a. 3 ounces
    b. 4 ounces
    c. 5 ounces
    d. 6 or more ounces

6. Do you remove the skin from poultry?
    a. Yes
    b. Don't eat poultry
    c. No

7. How many times a week do you eat at least one half-cup serving of legumes? (Include beans like soybeans, navy, kidney, garbanzo, baked beans, lentils.)
    a. 3 or more
    b. 1 or 2
    c. Less than 1
    d. Never eat legumes

8. What kind of milk do you drink?
    a. Skim or 1%
    b. Don't drink milk
    c. 2%
    d. Whole

9. What kind of cheese do you usually eat?
    a. Fat-free
    b. Lowfat (5 grams fat or less per ounce)
    c. Don't eat cheese
    d. Whole milk cheese

10. How many servings of low-fat, high-calcium foods do you eat daily? (One cup of yogurt or milk, 2 ounces of cheese, or one cup chopped broccoli, kale, or greens count as a serving.)
    a. 3 or more
    b. 1 or 2
    c. 0

11. What kind of bread do you eat most often?
    a. 100% whole wheat
    b. Whole grain
    c. White, "wheat," Italian or French
    d. Croissant or biscuit

12. Which is part of your most typical breakfast?
    a. High-fiber cereal and fruit
    b. Roll or toast

c. Don't eat breakfast
d. Danish, pastry, or doughnut

13. What kind of sauce or topping is usually on the pasta you eat?
    a. Vegetables tossed lightly with olive oil
    b. Tomato or marinara sauce
    c. Meat sauce
    d. Alfredo or cream sauce

14. Which would you be most likely to order at a Chinese restaurant?
    a. Chicken with steamed vegetables over white rice
    b. Cold sesame noodles
    c. Twice-fried pork /beef
    d. Sizzly shrimps

15. Which would you be most likely to choose as toppings for pizza?
    a. Vegetables (e. g., broccoli, peppers)
    b. Plain cheese
    c. Extra cheese
    d. Sausage and pepperoni

16. What is the most typical snack for you?
    a. Fresh fruit
    b. Lowfat yogurt
    c. Crackers or Rusks
    d. Potato chips
    e. Candry bar

17. How many half-cup servings of a high vitamin C fruit or vegetable do you eat daily? (Include citrus fruit and juices, kiwi, papaya, strawberries, broccoli, peppers, potatoes, tomatoes.)
    a. 2 or more
    b. 1
    c. None

18. How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily? (Include apricots, cantaloupe, mango, broccoli, carrots, greens, spinach, sweet potato, winter squash.)
    a. 2 or more
    b. 1
    c. None

19. What kind of salad dressing do you most often choose?
    a. Fat-free or low-fat
    b. Lemon juice or herb vinegar
    c. Olive or canola oil-based
    d. Creamy or cheese-based

20. What do you usually spread on bread, rolls, or bagels?
    a. Nothing
    b. Jam, jelly, or honey
    c. Light butter or light margarine
    d. Margarine
    e. Butter

21. What spread do you usually choose for sandwiches?
    a. Nothing
    b. Mustard
    c. Light mayonnaise
    d. Mayonnaise, margarine, or butter

22. Which frozen dessert do you usually choose?
    a. Don't eat frozen desserts
    b. Fat-free frozen yogurt
    c. Sorbet or sherbet
    d. Light ice cream
    e. Ice cream

23. How many cups of caffeinated beverages (e. g., coffee, tea, or soda) do you usually drink in a typical day?
    a. None
    b. 1 to 2
    c. 3 or 4
    d. 5 or more

24. How many total cups of fluid do you drink in a typical day? (Include water, juice, milk.)
    a. 8 or more
    b. 6 to 7
    c. 4 or 5
    d. Less than 4

25. What kind of cereal do you eat?
    a. High-fiber cereals such as bran flakes
    b. Low-fiber, low-sugar cereals, such as puffed rice, corn flakes, Corn Chex, or Cheerios.
    c. Sugary, low-fiber cereals, like Frosted Flakes, or fruit-flavored cereals
    d. Regular (high-fat) granola

26. How many times a week do you eat fried foods?
    a. never
    b. 2 or less
    c. 3 or more

27. How many times a week do you eat cancer-fighting cruciferous vegetables? (Include broc-coli, cauliflower, brussels sprouts, cabbage, kale, bok choy, cooking greens, turnips, rutabaga.)
    a. 3 or more
    b. 1 to 2
    c. Rarely
    d. None

Calculate Your Score:

Score: _____ - _____ = _____
(total of + answers) (total of - answers)

Scoring

65-82: Excellent
42-64: Very good
28-41: Good
-16-27: Fair
Below 16 Get help!

Example: (total + answers)=50; (total – answers)= 34; Score=16

1	(a)	+4	**2**	(a)	+2	**3**	(a)	+2	**4**	(a)	+4	**5**	(a)	+2
	(b)	+2		(b)	+1		(b)	+1		(b)	+2		(b)	+1
	(c)	-2		(c)	-2		(c)	-4		(c)	0		(c)	-2
	(d)	-4		(d)	-3		(d)	-5		(d)	-3		(d)	-3
	(e)	-5												
6	(a)		+2	7	(a)	+4	8	(a)	+3	9	(a)	+2	10	(a) +4
	(b)		0		(b)	+2		(b)	0		(b)	+1		(b) +2
	(c)		-3		(c)	0		(c)	-3		(c)	0		(c) -3
					(d)	-1		(d)	-4		(d)	-4		

11	(a)	+4	12	(a)	+4	13	(a)	+3	14	(a)	+3	15	(a)	+3
	(b)	+2		(b)	+1		(b)	+2		(b)	-1		(b)	0
	(c)	0		(c)	-2		(c)	-3		(c)	-4		(c)	-3
	(d)	-4		(d)	-3		(d)	-4					(d)	-4

16	(a)	+4	17	(a)	+3	18	(a)	+3	19	(a)	+3	20	(a)	+1
	(b)	+3		(b)	+1		(b)	+1		(b)	+3		(b)	-1
	(c)	+1		(c)	-3		(c)	-3		(c)	+1		(c)	-2
	(d)	-3								(d)	-3		(d)	-3
	(e)	-3											(e)	-4

21	(a)	+3	**22**	(a)	+3	**23**	(a)	+2	**24**	(a)	+3	**25**	(a)	+3
	(b)	+2		(b)	+1		(b)	0		(b)	+2		(b)	0
	(c)	-1		(c)	+1		(c)	-1		(c)	+1		(c)	-2
	(d)	-3		(d)	-2		(d)	-4		(d)	-1		(d)	-3
				(e)	-4									
				26	(a)	+4	**27**	(a)	+4					
					(b)	0		(b)	+2					
					(c)	-3		(c)	-4					

Appendix IV – Worksheet II – Physical activity index and what influences physical activity

Name_____

Date_____ **Date of birth**_____ **Section** _____

Gender:	**Male**	
	Female	

A. How often do you exercise?

B. What influences the Physical Activity?

A. Instructions: Keep the quiz as incentive. The quiz will be repeated on the 1st week, 19th week and 38th week.

Calculate Your Activity Index

1. Frequency: How often do you exercise?

If you exercise:	Your frequency score is:
Less than 1 time a week	0
1 time a week	1
2 times a week	2
3 times a week	3
4 times a week	4
5 or more times a week	5

2. Duration: How long do you exercise?

If each session continues for:	Your duration score is:
Less than 5 minutes	0
5 to 14 minutes	1
15 to 29 minutes	2
30 to 44 minutes	3
45 to 59 minutes	4
60 minutes or more	5

3. Intensity: How hard do you exercise?

If exercise results in:	Your intensity score is:
No change in pulse from resting level	0
Little change in pulse from resting level (Slow walking, bowling, yoga)	1
Slight increase in pulse and breathing (table tennis, active golf with no golf cart)	2
Moderate increase in pulse and breathing (leisurely bicycling, easy continuous swimming, rapid walking)	3
Intermittent heavy breathing and sweating (tennis singles, basketball, squash)	4
Sustained heavy breathing and sweating (jogging, cross-country skiing, rope skipping)	5

To calculate your activity index, we'll multiply your three scores:

Frequency		x Duration		x Intensity		= Activity index

To assess your activity index, refer to the following table:

If your activity index is:	Your estimated level of activity is:
Less than 15	Sedentary
15-24	Low active
25-40	Moderate active
41-60	Active
Over 60	High active

B. Instructions:

(a) Answer YES (Y) or NO (N) to the following statements.
(b) Number in order the first three according to your influences
(c) Keep the quiz as incentive. The quiz will be repeated on the 1st week, 19th week and 36^{8h} week.

(A)

1. "No time in my busy schedule." ___
2. No Energy
3. "I'm too tired"
4. Lack of discipline
5. "Too hard... there's got to be an easier way!"
6. Discouraging
7. Not enjoyable
8. Bad experience with Delayed Onset of Muscle Soreness (DOMS)
9. Expense of equipment, clothes, membership
10. Distance
11. Inconvenience
12. "Boredom"
13. Lack of variety
14. Injury/Health Problems

15. Chronic Physcial Discomfort
16. Embarrassment
17. Social Discomfort
18. Lack of understanding of the benefits
19. "Low Priority"
20. Apathy
21. "Don't care to"
22. Weather conditions.

(B) Put the above statements in order (only the first three): (a) _____, (b) _____, (c)_____

Scoring

If you have answer:

<3 YES	good motivation
4-5 YES	poor motivation
6-8 YES	very poor motivation
9-11 YES	Get help

Appendix V – Consent form

CONSENT FORMS

for participation in a research programme
(The forms are comprised of ..... pages)

This form provides the following clear and comprehensible explanations regarding the research study you are to take part in, as well as information regarding your rights.
More specifically:

1. The purposes of the research study are clearly described as well as any potential risks/side effects that may exist or inconvenience that you may suffer from your participation in the programme.
2. It is explained in every detail who will have access to the data concerning you and which will result from the programme you will participate in and/or other material/data you will voluntarily provide for the programme.
3. The time period during which the Programme Directors will have access to your information and/or material concerning you.
4. An estimation is given on the possible outcome you may be benefitted from as a participant, for the researchers and/or sponsors of this programme.
5. **You should not take part in the study if you do not wish to, or if you have any concerns about your participation in the programme.**
6. If you decide to join, you must indicate if you have participated in any other research programmes within the last 12 months.
7. If you decide not to participate and are a patient, your treatment will not be affected by your decision.
8. **You are free to withdraw your consent to participating in the programme at any time.**
9. If you are a patient, your decision to withdraw your consent will not have any effect on your treatment.
10. All pages of consent forms must bear your full name and signature.

1. Programme Title you are invited to participate in:

2. Protocol Number given by the Cyprus National Bioethics Committee:

3. Scientific Director of the Programme you are invited to participate in

4. Programme Duration:

Participant's Initials: ……..

(Form EEBK03 – Adults without the use of biological material
Date of submission: ……...

CONSENT FORMS **for participation in a research programme** (The forms are comprised of ..... pages)

5. Do you give consent for yourself or for someone else?	For me: ☐ For someone else: ☐
If you have responded for another person, please provide details and name.	

6. Question	YES or NO	
Did you, yourself, fill in your consent forms?	☐	☐
Have you participated in any other research programme, over the past 12 months?	☐	☐
Have you read and understood the information regarding patients and/or volunteers?	☐	☐
Have you had the opportunity to ask questions and discuss the Programme?	☐	☐
Have you been given satisfactory answers and explanations to any of your questions?	☐	☐
Do you understand that you can withdraw from the programme whenever you wish?	☐	☐
Do you understand that if you withdraw, you do not need to give any explanations for your decision?	☐	☐
(For patients) Do you understand that, if you withdraw, there will be no impact on any treatment you are receiving or you may receive in the future?	☐	☐
Do you agree to take part the programme?	☐	☐
Which Director did you speak with?		

7. Brief description of the programme (purpose, recruitment procedures, number of participants, as well as any other essential information)

Participant's Initials: ……..

(Form EEBK03 – Adults without the use of biological material
Date of submission: ……...

CONSENT FORMS **for participation in a research programme** (The forms are comprised of ..... pages)

8. Details of what will be requested and/or what will happen to programme participants

9. Research Programme Funding Information

10. Details of any risks that may exist or any inconvenience that programme participants may incur

11. Details of what information and/or what material will be collected under the programme, who will have access to it and for how long.

12. Details of what data will be generated for you within the programme, who will have access to them and for how long.

Participant's Initials: ……..

(Form EEBK03 – Adults without the use of biological material
Date of submission: ……...)

CONSENT FORMS **for participation in a research programme** (The forms are comprised of ..... pages)

13. Expected benefit for participants

14. Expected benefit for researchers and/or sponsors

15. Details of termination or early discontinuance of the research programme.

16. Site and duration of storage of data and/or biological samples to be taken under the programme

17. Description of procedures of handling data and/or biological samples of participants who withdraw from the study prior to its completion.

18. Full contact details and title of the person to whom participants can submit complaints or grievances regarding the programme they participate in.

Participant's Initials: ……..

(Form EEBK03 – Adults without the use of biological material
Date of submission: ……...)

CONSENT FORMS **for participation in a research programme** (The forms are comprised of ..... pages)

19. Full contact details and title of the person whom participants can contact for more information or clarifications about the research programme.

Surname:	…….…….	Name:	……..
Signature:		Date:	

Participant's Initials: ……..

(Form EEBK03 – Adults without the use of biological material
Date of submission: ……...)

All the papers of these consent documents should bare your name and signature.

Appendix VI – Viva Presentation

1

UNIVERSITY of NICOSIA

The impact of nutrition education and physical activity on weight management in primary care in Cyprus using the Nutrition Care Process with emphasis in mindful eating and behaviour

Supervision Team: Dr Eleni Andreou (1st)
Prof Antonis Zampelas
Prof Demetris Papandreou

2

Presentation Outline

Candidate Profile
- Academic studies & Professional development

Introduction
- Background & Importance of the study

Literature Review
- Review

Methodology
- Design, Sampling, Data collection & Analysis

Results, Discussion & Conclusions
- Discussion, Strengths, Weaknesses, Suggestions

UNIVERSITY of NICOSIA

3

Candidate Profile - Academic studies

Inspector of Health Education in Secondary General Education, Ministry of Education, Sports & Youth

PhD candidate, University of Nicosia

DProf
Doctorate in Processional Studies – Nutritional Science, Clinical Dietetics and Health Education

MSc
Sports Nutrition

RDN
Registered Clinical Dietitian and Nutritionist

BSc
Nutrition & Dietetics

UNIVERSITY of NICOSIA

4

Candidate Profile – Current Professional Positions

Inspector of Health Education (HE) in Secondary Education, Ministry of Education, Sports and Youth

V. President of the Cyprus Dietetic and Nutrition Association

Secretary of the Cyprus Society of Clinical Nutrition and Metabolism Association

Committees related to PhD topic
Representative of Ministry of Education in

School Canteens
Childhood Obesity (Cyprus Parliament)
Lifestyle – Nutrition and Exercise (Ministry of Health)
Strategic Planning for Cardiovascular disease (Ministry of Health)
School Medicine Program (Ministry of Health)

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5

Outline

- ***Introduction***
  - *Body Mass Classification*
  - *Mindful Eating (Benefits & Challenges)*
  - *Nutrition Care Process (NCP)*
  - *Rationale & Purpose of the project*
  - *Research questions*
- **Literature Review**
  - Obesity Epidemic
  - Behavioral change and effectiveness
  - Weight control
  - Physical activity
- ***Methodology***
  - *Volunteer characteristics*
  - *Study protocol & duration*
  - *Anthropometrics*
  - *Diet record and guidelines*
  - *Physical activity guidelines*
  - *Evaluation of eating & physical activity*
  - *NCP*
  - *Questionnaires – tools for assessment*
  - *Worksheets*
- ***Results***
  - *Demographics*
  - *Mindful eating questionnaire*
  - *International Physical Activity Questionnaire (IPAQ)*
  - *Analysis of worksheets*
- ***Discussion & Conclusions***
  - *Recommendations for evaluation and action plan*
  - *Strengths and Weaknesses*
  - *Deliverables*

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6

Introduction

- *Body Mass Index Classification (BMI)*
- *Mindful Eating - ME (Benefits & Challenges)*
- *Nutrition Care Process (NCP)*
- *Rationale & Purpose of the project*
- *Research questions*

Introduction

Obesity & Body mass classification

- **Human weight reached high levels**, which is out of range, creating internationally a warning for public health disease risks.
- Main classification method of obesity is based on **Body Mass Index (BMI)**
- Obese people with Covid-19 less than 60 years of age had doubled the chances to be admitted to the health institutes
- Useful methods of weight therapy are essential for the **continuous education of health professionals**
- **Behaviour therapy** methods are getting growing consideration in the management of obesity

Classes of severity	BMI
Class I	30-34.9 kg/m²
Class II	35-39.9 kg/m²
Class III	≥ 40 kg/m²

World Health Organization, 2016

(WHO, 2018), (Chiapetta, 2020)

Introduction

Mindful eating (ME)

- Prioritizes how we eat over what we eat
- Be present and aware of thoughts and emotions while eating
- Eat slowly and avoid distractions
- Pay attention to hunger and fullness signals
- Choose satisfying and nutritious foods
- Be aware of how the body responds to different foods
- Environmental distractions can contribute to overeating

(Martin, Prichard, Hutchinson, & Wilson, 2013)

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9

Introduction

Mindful eating (ME)

- Benefits of Mindful Eating:
  - Healthier relationship with food
  - Selection of enjoyable and nutritious food
  - Improved awareness of hunger and fullness
  - Effective weight management
  - Increased self-esteem
  - Feeling of empowerment
- Challenges of Mindful Eating:
  - Demanding work schedules and family obligations
  - Abundance of fast food and unhealthy snacks
  - Societal emphasis on productivity

(Eating Disorders Foundation of Victoria Inc., 2014)

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10

Introduction

Nutrition Care Process (NCP) is a method

- is a systematic approach to providing high quality nutrition care. The NCP consists of four distinct, interrelated steps:
  1. Nutrition Assessment and Reassessment,
  2. Nutrition Diagnosis,
  3. Nutrition Intervention, and
  4. Nutrition Monitoring and Evaluation.
- found to enhance efficiency and effectiveness in delivering nutrition care.

✓ Personalized nutrition care provided by dietitians has been found to be more effective for body mass control than typical care.

✓ There is a need for advanced research for behaviour change through nutrition education and exercise for the Cypriot population using the NCP.

✓ There is limited research on the use of NCP for the management of obesity in conjunction with behaviour change for adults.

(Swan et al., 2017; Memmer et al., 2013)

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11

Rationale of the project

Aims and Objectives

Lack of common language (NCP) for better assessment, plan, intervention and follow up of patients for weight management

The project's aims and objectives:

- Identifying the barrier that prevent to eating healthy and exercising
- Creating healthy lifestyle guidelines for behavioral changes through nutrition education and exercise for people in Cyprus with the use of NCP and ME
- Emphasizing weight management as a chronic health problem with a great deal of reverting
- Using the NCP for the management of body weight adapted to the lifestyle of people in Cyprus.
- Decreasing of the weight problem in Cyprus and Europe.

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12

Research Questions

1. What is the impact of nutrition education, mindful eating, exercise, and behaviour change with the implementation of NCP on weight management?
2. Is nutrition education for dietary lifestyle and exercise with NCP a more effective way for weight loss in the case of obesity/overweight?
3. Is there a major effect and impact of the dietary and exercise behaviour with the use of NCP on weight maintenance?

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13

Literature Review

Pillars of Obesity

- Obesity Epidemic
- Behavioral change and effectiveness
- Weight control and dietary habits
- Physical activity

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14

Arab Journal of Nutrition and Exercise
Volume 6, Issue no. 1, DOI 10.18502/ajne.v6i1.10064
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Narrative Review

Integration of Healthy Eating Habits and Physical Activity through Nutrition Care Process to Tackle the Obesity Epidemic: A Narrative Review of the Evidence

Christiana Philippou[1], Eleni Andreou[2*]

[1]Department of Dietetics/Nutrition, University of Nicosia, Cyprus
[2]European University of Cyprus, Cyprus

ORCID
Eleni Andreou: https://orcid.org/0000-0002-0449-6782

Corresponding Author: Eleni Andreou; email: eandreou@eleniandreou.diet

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Abstract

Background: Obesity is a rising global health problem which is already at epidemic proportions. Effective methods of treatment are required and should be imparted by efficient means to dietitians and other health professionals dealing with weight management. Research shows that behavioral modification techniques are the most effective way to achieve and maintain a healthy weight compared to diet and physical activity alone.

Aim: This narrative review focusses on diet and physical activity behavioral modification techniques to promote effective weight management for sedentary and active adults using the Nutrition Care Process (NCP).

Methods: PubMed, Scopus, Embase, Science Direct, Web of Science and Pro-Quest databases were searched for relevant articles.

Results: A healthy eating habit is one of the contributing factors to improved health. Physical activities also help improve and maintain one's health. This article discusses the importance of eating habits and physical activities among school students. In addition, health issues related to eating habits and the practice of physical activities are also highlighted. Overall, the results revealed that healthy eating habits and regular physical activities help in maintaining good health.

Conclusion: NCP is a systematic approach to provide high-quality nutrition care. Using the NCP does not mean that all clients get the same care. Use of a care process provides a framework for the dietitian to individualize care, taking into account clients' needs and values, and using the best evidence available to make decisions.

Keywords: obesity, weight control, physical activity, nutrition knowledge, eating habits, nutrition care process

Literature Review

Obesity epidemic

- Obesity is a global epidemic that is continuously increasing (WHO, 1998; Caballero, 2007).
- Overweight and obesity increase the risk for chronic diseases, such as diabetes mellitus, heart problems, and cancer (Bhurosy & Jeewon, 2014; IOTF, 2016).
- The United Nations reports that obesity is rising in all developing countries, as well as in nations where there is undernutrition (WHO, 2021).
- Almost 2 billion adults were overweight in 2016, and 650 million were obese (WHO, 2021).
- More deaths are related to obesity than to malnutrition worldwide (WHO, 2021).
- COVID-19 severity is enhanced by an increase in BMI, and obese people with BMI > 40 kg/m² are twice as likely to be hospitalized (Petrilli, 2020; Chiapetta, 2020).

Literature Review

Obesity in Cyprus

- In 2006, 34% of Cypriot adults were overweight and 23% were obese, while in 2009, the numbers were 36% and 27.8%, respectively.
- Mediterranean diet has health benefits, but changes in lifestyle led to an escalation of obesity in the region and worldwide.
- In Cyprus, 63% of adults were aware of their weight status, and 76% of males and 53% of females were overweight and obese (Andreou et al, 2011).
- Childhood obesity rates are higher in Southern Europe, with nearly one in five boys in Cyprus, Greece, Italy, Malta, San Marino, and Spain being obese (WHO 2021).
- Based on IOTF in 2009 Cyprus is second after US in obesity

Country	Percentage of Obese Men	Percentage of Obese Women
Finland (2005)	14.4	19.3
Russia	10.8	27.9
England	17	20
Germany	17.2	19.3
Czech	16.3	20.2
Scotland	15.9	17.3
Belgium	12.1	18.4
Spain	11.5	15.2
Sweden	10	11.9
France	9.6	10.5
Denmark	10	9
Holland	8.4	8.3
Italy	6.5	6.3
Cyprus (1999 – 2000)	26.6	23.7
Cyprus (2009)	28.8	26.9
Greece (2003)	26	18.2
Australia	18	18
USA	31.1	33.2

International Obesity Task Force (IOTF) 2009
Andreou E., et al (2009)

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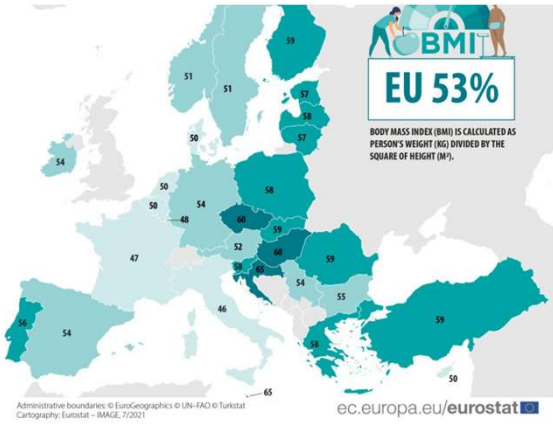
17

Obesity in Cyprus

Nearly one in every two adults in Cyprus are overweight

- A total of 47.7% of the adult population in Cyprus had a normal body mass index (BMI), while 48.5% were overweight in 2019, Eurostat said. 33.8% were pre-obese, and 14.6% were obese.
- Another 3.9% were considered underweight.



Overweight population (BMI≥25)
% of adult population, 2019

Eurostat: Nearly one in two adults in Cyprus are overweight | Cyprus Mail (cyprus-mail.com)

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18

Literature Review

Behavioural Change

- Behaviour change involves decreasing or increasing a specific type of behaviour or response.
- It can be used by parents to teach their children right from wrong, and by counsellors to promote healthy behaviours.
- In weight loss, behaviour change involves reducing food intake, increasing physical activity, and improving dietary awareness, habits and choices.
- Studies show that behaviour therapy programs are more effective for long-term weight loss and maintenance than diet or physical activity alone.

(Wadden 2004; Martin 2007), (Vogel et al., 2009)

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19

Literature Review

Behavioural Change

- Successful weight loss includes regular physical activity of at least 30 minutes a day, at least 4 days a week.
- Frequent physical activity is linked to better long-term weight loss results.
- Combining healthy eating, exercise, and behaviour change programs is the best approach for weight management, according to health professionals.

(Wadden 2002; Martin 2007), (Vogel et al., 2009)

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20

Literature Review

Effectiveness of Behavioural Change programs for Obesity and Overweight

- The best approach for weight management, according to health professionals.
- Lifestyle changes, including dietary and physical activity interventions, have been shown to improve health-related risk factors such as cardiovascular disease and type II diabetes.
- Self-monitoring of weight and food consumption, as well as consistency in food choices and exercise, have been found to assist in weight management.
- Health professionals should offer plans that include attainable goals, frequent patient interaction, and communication.

(Grave et al, 2011; Gave & Galugi, 2020).

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21

Literature Review

Effectiveness of Behavioural Change programs for Obesity and Overweight

- Behavioural methods for weight management involve evaluating and modifying actions, controlling actions through monitoring, and altering physical, social, and cognitive cues.
- Behavioural treatment programs that include nutrition plans, physical activity programs, and cognitive-behavioural tactics are effective for achieving lasting habit modifications in conjunction with dietary plan and exercise.
- Longer periods of behavioural treatment programs have better results.
- Programs tailored to lifestyle changes must include cognitive change.
- Elements of behavioural change include identifying and modifying cues, setting goals, monitoring progress, rewarding successes, and using cognitive and emotional strategies to manage behaviours.

(Grave et al, 2011; Gave & Galugi, 2020)

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22

Literature review

Weight loss, physical activity, and weight control

- In most physical activity intervention programs, body weight loss is often low.
- Even when obese people exercise and utilize a lot of energy, there is a need to follow a diet to lose weight.
- Different types of physical activities can impact weight loss differently, with the use of home exercise equipment showing the greatest weight loss.
- Participation in behavioral weight loss programs is supported to slowly increase physical activity until a minimum of 1000 calories per week is reached.

(Johns et al 2014), (Franz et al, 2007)

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23

Literature review

Physical activity guidelines

- NHLBI (2000) recommends adults to aim for 300-500 kcal per training session and 1,000-2,000 kcal per week.
  - For obese individuals, starting with moderate physical activity of 30-45 minutes duration for 3-5 days per week is recommended
- ACSM (2019) guidelines for weight loss and overall health include 30-60 minutes of moderate-intensity aerobic activity at least 5 times a week or 20-60 minutes of vigorous aerobic activity at least 3 times a week, as well as resistance and flexibility training.
- The recommendation for physical activity is at least 30 minutes every day (WHO 2011).
- Regular physical activity can decrease the risk of illnesses such as diabetes, cancer, and heart disease, improve mental health and self-confidence, and improve muscle and skeletal health.

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24

Literature review

NCP

- Providing outstanding nutrition care involves getting the best option at the right time, in the most appropriate way, for the right person, and achieving the best outcomes.
- The NCP is a scientific technique that supports dietetic specialists in delivering safe and effective nutrition care.
- A study by Yeong et al. (2020) found that an NCP-based intervention can improve dietary habits and self-perception of health and reduce BMI-z-score in severely obese children and adolescents.
- Another study by Chen et al. (2018) suggested that mobile apps can enhance the efficiency and success of the NCP, by allowing dietitians to spend more time on education and counselling, and by facilitating patient-dietitian communication and progress monitoring.

Literature review

Mindful eating

- Mindful eating (ME) involves full concentration and dedication to the process of nutrition and can help individuals recognize physical and emotional sensations during eating (Framson et al., 2009).
- The skill of ME can help individuals recognize the feeling of satiety and respond to inappropriate food cues (The Center for Mindful Eating, 2020).
- ME is not a rule-based nutritional approach, but a technique-perception that helps with self-control of nutritional intake and eating habits (Winkens, 2018).
- Conscious consumption involves observing all the senses, recognizing repetitive eating habits, and identifying triggers for food consumption (Albers, 2008).
- Mindful eating helps retrain eating behaviors for those struggling with weight management (Ashley, Mason et al., 2015).

Methodology

Longitudinal, Cross sectional Observational study/ Pilot Study

- Volunteer characteristics
- Study protocol & duration
- Anthropometrics
- Diet record and guidelines
- Physical activity guidelines
- Evaluation of eating & physical activity
- NCP
- Questionnaires – tools for assessment
- Worksheets (Pilot Study for Validation of worksheets)
- Consent form

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27

Methodology

Outline

- Observation, longitudinal study
- The study design included the quantitative component (questionnaires, worksheets, anthropometrics/somatometrics)
- Validated questionnaire and worksheets were used as the main research tools for the study.
- The worksheets were used as part of the behavioral change procedure for eating, physical activity for overweight and obesity management, involving various approaches through the use of the NCP.
- Volunteers were recruited through various social media platforms, including Google forms and announcements through the Cyprus Dietetic and Nutrition Association (CyDNA) social media and website and its active members.
- The Cyprus Bioethics Committee granted their approval for the research with the number **ΕΕΒΚΕΠ2020.01.66.**

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28

Methodology

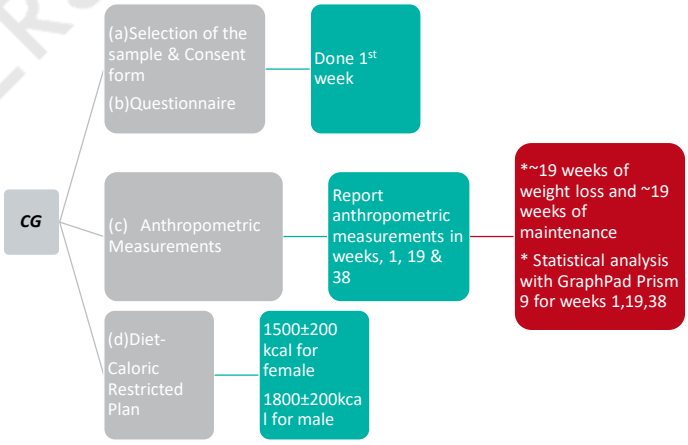
Volunteer Characteristics

- The sample size was 300 adults (150 CG and 150 IG).
- The sample was comprised of overweight and obese people aged from 18 to 51 years, with 51% women and 49% men.
- The age groups studied were between the age of 18-24 and 25-51 for adults, according to WHO (2020) and National Research Council for the RDA (NRC, 1989) guidelines.
- Demographic information was obtained based on sexual characteristics, age, origin, marital status, education, and occupation.
- The obesity and overweight percentages for men was 28.8%/46.9% and for female was 26%/26.9%, respectively (Andreou et al, 2009).

Methodology

Study Protocol – Control Group

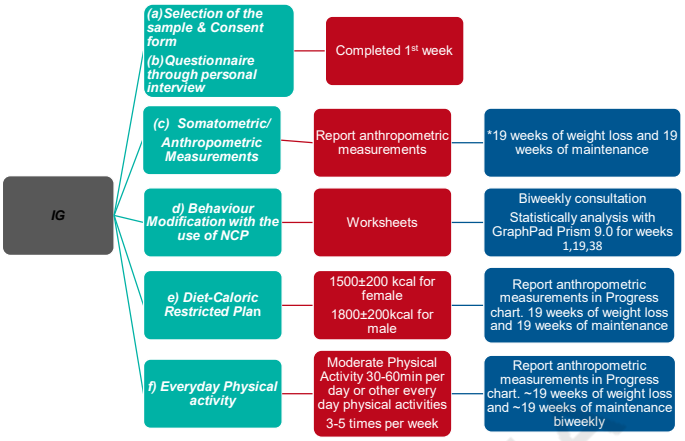
- The CG followed an energy-restricted diet program only, without any additional intervention.
- The calorie intake for females in the CG was restricted to 1500 ± 200 kcal/day, while for males it was restricted to 1800 ± 200 kcal/day



Methodology

Study Protocol – Intervention Group

- IG followed an energy-restricted diet program, like the CG, but in addition, they also received a nutrition intervention plan with standardized procedures for nutrition, physical activity, and behavior modification guidelines using the NCP
  - a systematic approach, providing nutrition care that involved assessing, diagnosing, planning, implementing, and monitoring nutrition interventions.



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31

Methodology

Study Duration

- Both the Control Group (CG) and Intervention Group (IG) followed a calorie-restricted program for 19±2.5 weeks, followed by a maintenance period of 19±2.5 weeks.
- The CG was evaluated at weeks 1, 19, and 38±2.5 only.
- The IG had behavior change sessions every two weeks, which included nutrition and physical activity guidelines and for statistical purposes weeks 1, 19, and 38±2.5 were analyzed
- For the IG, the diet plan was changed every two weeks based on likes and dislikes and preferences.

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32

Methodology

Somatometrics (Anthropometrics)

- The **weight** of the participants was measured using the Charder MA801 scale with an accuracy of ± 0.1 kg and a maximum weight capacity of 300 kg.
- **Height** was assessed using a stadiometer
  - Participants were instructed to fast prior to weighing, wear light clothing and no shoes, and empty their bladder (follow the company's instructions).
- **Neck circumference** (NCir)
  - A cut-off point of NCir ≥ 35.5 cm in men and NCir ≥ 32 cm in women was used to indicate overweight/obesity.
  - NCir was measured using a tape measure in the middle of the neck, between the collarbone and chin.
- **Waist to Hip ratio (WHR) -** ≥ 1.0 obese men, ≥ 0.85 obese women

(NIH, US Department of Health & Human Services, 2022)

Methodology

Somatometrics (Anthropometrics)

- WCir was measured with a tape measure at the point of the smaller area of waist.

(NIH, U.S. Department of Health & Human Services, 2022)

			Disease Risk* Relative to Normal Weight and Waist Circumference	
	BMI (kg/m²)	Obesity Class	Men 102 cm (40 in) or less Women 88 cm (35 in) or less	Men > 102 cm (40 in) Women > 88 cm (35 in)
Underweight	< 18.5		-	-
Normal	18.5–24.9		-	-
Overweight	25.0–29.9		Increased	High
Obesity	30.0–34.9	I	High	Very High
	35.0–39.9	II	Very High	Very High
Extreme Obesity	40.0 +	III	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.
\+ Increased waist circumference also can be a marker for increased risk, even in persons of normal weight.

Methodology

Somatometrics (Anthropometrics)

- Bioelectrical impedance analysis (BIA) was used to assess body composition
- BIA measures the electrical impedance to calculate total body water (TBW) and estimate body fat and fat-free mass
- The accepted body fat percentage for men is 14-28% and for women is 15-29%

Male	AGE				
Fitness Category	20-29	30-39	40-49	50-59	60+
Essential Fat	2 - 5	2 - 5	2 - 5	2 - 5	2 - 5
Excellent	7.1 - 9.3	11.3 - 13.8	13.6 - 16.2	15.3 - 17.8	15.3 - 18.3
Good	9.4 - 14	13.9 - 17.4	16.3 - 19.5	17.9 - 21.2	18.4 - 21.9
Average	14.1 - 17.5	17.5 - 20.4	19.6 - 22.4	21.3 - 24	22 - 25
Below Average	17.4 - 22.5	20.5 - 24.1	22.5 - 26	24.1 - 27.4	25 - 28.4
Poor	>22.4	>24.2	>26.1	>27.5	>28.5

Female	AGE				
Fitness Category	20-29	30-39	40-49	50-59	60+
Essential Fat	10 - 13	10 - 13	10 - 13	10 - 13	10 - 13
Excellent	14.5 - 17	15.5 - 17.9	18.5 - 21.2	21.6 - 24.9	21.1 - 25
Good	17.1 - 20.5	18 - 21.5	21.3 - 24.8	25 - 28.4	25.1 - 29.2
Average	20.6 - 23.6	21.6 - 24.8	24.9 - 28	28.5 - 31.5	29.3 - 32.4
Below Average	23.7 - 27.6	24.9 - 29.2	28.1 - 32	31.6 - 35.5	32.5 - 36.5
Poor	>27.7	>29.3	>32.1	>35.6	>36.6

ACSM (2008)

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35

Methodology

BMI

- BMI was calculated using weight in kilograms divided by the height in meters squared.
- WHO guidelines were used to categorize BMI into different groups.
- Overweight individuals were those with a BMI of 25-29.9 kg/m² and/or 20%.
- Obese individuals were those with a BMI of more than 30 kg/m²

Category	BMI (kg/m²)
Underweight (Severe thinness)	< 16.0
Underweight (Moderate thinness)	16.0 – 16.9
Underweight (Mild thinness)	17.0 – 18.4
Normal range	18.5 – 24.9
Overweight (Pre-obese)	25.0 – 29.9
Obese (Class I)	30.0 – 34.9
Obese (Class II)	35.0 – 39.9
Obese (Class III)	≥ 40.0

Taken from WHO/Europe (2020) | Nutrition - Body mass index – BMI

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36

Methodology

Diet Record and Physical activity guidelines

- Participants (IG) completed food logs and nutrition worksheets every two weeks
- Physical activity worksheets were also completed every two weeks (IG)
- Physical activity recommendations were based on WHO, ACSM, and Piercy et al.2018 guidelines
  - Recommendations included moderate aerobic activity for 30-45 min on 5 days a week and exercise to maintain muscle mass at least twice per week, as well as everyday physical activities
- Behaviour change sessions were provided only to the (IG), with a duration of about one hour for the initial session and 20-30 minutes for follow-up sessions
- Eating and physical activity habits were evaluated using interviews, worksheets, and diet logs
- Improvements were assessed using Weight, Neck Circumference, Waist Circumference, Total Body Fat Percentage, and Body Mass Index

Methodology

NCP and ABC method

- Two worksheets were used to monitor and assess eating and physical activity behaviors using the ABC functional behavioral assessment method.
- The worksheets were used in the intervention procedure with the use of NCP
- The worksheets were used to help participants make behavior changes and improve their eating and physical activity habits.

	Antecedents	Behaviour	Consequences
Worksheet I – Identify eating habits	Eat very often red meat in large quantities, fried foods and avoid beans and vegetables.	Eat beans and salads more often accompanied with fish and olive oil in the normal quantities	Consume low amounts of meat-derived fat
Worksheet II - What influences the Physical Activity?	Long distance to the gym	Use every day physical activities such as walking in the park	Raise metabolic rate
Total outcome	Unhealthy eating and physical activity habits	Improved behaviour towards a healthier lifestyle	Achieve and maintain a healthy weight

Adapted from Andreou & Philippou (2011)

Methodology

Tools Used for Nutrition and Physical Activity Assessment

- The mMEQ was used to assess mindful eating and nutrition behavior among Cypriot adults, with participant anonymity maintained through the use of assigned codes and signed consent forms.
- IPAQ is a questionnaire that assesses physical activity in four different domains and also includes questions about sedentary behavior. It records the number of days/week and time/day devoted to moderate and/or vigorous activities.

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39

Methodology

Tools Used for Nutrition and Physical Activity Assessment and Implementation

- The progress charts were also used alongside worksheets to assess the progress of the intervention.

Tools used for initial assessment	Tools used for implementation using NCP
Nutrition Assessment (Mindful Eating Questionnaire/Nutritional habits	Worksheet I – Identifying the eating habits
IPAQ, 2005	Worksheet II – What influences the Physical Activity

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40

Methodology

Statistics

- Data analysis and visualization was done using GraphPad software and SPSS26
- Data was expressed as means ± the standard error of the mean (SEM)
- Two-way analysis of variance (ANOVA), t –test were performed to determine significant differences between control and intervention groups
- Tukey's post-hoc multiple comparison test was used for two-way ANOVA
- Differences between intervention groups were statistically significant when $p \leq 0.05$.

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41

Results

- Demographics
- Mindful eating questionnaire
- International Physical Activity Questionnaire (IPAQ)
- Analysis of worksheets

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42

Results

mEQ

Time of Sleep	N	%
Less than 6 hours/night	25	8,0
6-7 hours/night	119	37.8
7-8 hours/night	114	36,1
8-10 hours/night	53	16.8
More than 10 hours/night	4	1.3
Meals per day		
1 or less	10	2.9
2	66	21.8
3	230	72.8
4	3	.8
5	3	.8
6 or more	3	.8
Snacks per day		
1 or less	72	22.6
2	147	46.4
3	75	23.4
4	20	6.3
5	1	1.3
Vegetables per day		
<1	35	10.8
1	96	30.4
2	116	36.7
3 or more	68	21.7
Fruits per day		
< 1	40	12.5
1	109	34.6
2	126	40.0
3 or more	40	12.5
Red Meat per week		
<1	89	28.3
2-4	160	50.8
5-6	19	5.8
7 or more	11	3.3
I don't eat meat, I'm a vegetarian	16	5.0
I don't eat meat, fasting period	20	6.3
Wine per week		
<1 (Occasional)	143	45.4
2-6	54	17.1

7-14 (1-2 glasses per day)	5	1.7
>14 (More than 2 glasses per day)	2	.4
Not at all	111	35.2
Sweet liquids, soft drinks (lemonades, coca cola)		
<1	75	23.7
1	66	20.9
>1	43	13.8
None	131	41.6
Legumes per week		
<1	20	6.4
1	57	18.2
2	167	53.0
3 or more	60	19
None	11	3.4
Fish per week		
<1	57	18.0
1	141	44.8
2	81	25.9
3 or more	20	6.3
None	16	5.0
Olive oil per day		
1 or less	109	34.7
2-3	162	51.5
4 or more	44	13.8
Sweets per week		
<1	33	10.4
1	61	19.2
2	22	22.9
3	64	20.4
4 or more	69	21.7
None	17	5.4
Water		
<1 litre (4 glasses)	96	30.4
1-2 litres (4-8 glasses)	148	47.1
2 litres (8 glasses)	66	20.8
Other	5	1.7
Low fat Dairy products		
Yes	247	78.7
No	68	21.3

Results

Physical Activity (PA)/Exercise Questionnaire/IPAQ

Table 4-4 Job related physical activities (days/week)

Vigorous			Moderate		*Sedentary*	
No DAYS	Frequency of Sample	Valid %	Frequency of Sample	Valid %	Frequency of Sample	Valid %
0	129	41	155	49,2	21	6,7
1	155	49,2	80	25,4	109	34,6
2	14	4,4	34	10,8	56	49,5
3	7	2,2	28	8,9	10	3,2
4	5	1,6	5	1,6	6	1,9
5	1	0,3	6	1,9	8	2,5
6	4	1,3	0,6	0,6	2	0,8
7	0	0	5	1,6	3	1,0
Total	315	100	315	100	315	100

Table 4-12 Sitting on a weekend (min)

Sitting on a weekend		
No min.	Frequency of Sample	Valid %
0	100	3.70
120	3	1.0
180	13	4.10
240	4	1.30
300	10	3.20
330	2	0.60
360	40	12.70
420	34	10.80
450	45	14.30
540	23	7.30
570	2	0.60
600	11	3.50
720	27	8.60
Total	315	100

Results

Progress Charts – Males

Table 4-15 Week 1-19 Males

	Control						Intervention						Statistical Significance	
	18-24 (n= 17)		25-51 (n= 57)				18-24 (n= 29)		25-51 (n= 43)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	94.88	8.45	86.19	7.36	-3.11	-3.77	80.38	9.11	82.29	11.13	-8.95	-10.36	0.00	0.02
BMI	29.53	1.20	27.74	2.06	-0.87	-1.22	26.49	2.14	26.01	2.57	-2.93	-3.24	0.00	0.00
Waist circumference (cm)	108.25	4.47	103.90	3.71	-0.31	-0.60	98.63	6.74	98.50	7.33	-6.53	-7.21	0.00	0.00
Hip circumference (cm)	109.69	4.97	106.74	3.45	-0.19	-0.86	102.84	3.95	103.14	4.06	-4.69	-4.36	0.00	0.00
Neck Circumference (cm)	43.38	1.65	42.21	2.10	-0.13	-0.64	39.97	3.16	40.14	3.42	-2.81	-2.79	0.00	0.00
Waist to Hip Ratio	0.99	0.03	0.97	0.02	0.00	0.00	0.96	0.04	0.95	0.04	-0.02	-0.03	0.01	0.00
Body Fat (%) BMI method	24.30	1.81	24.67	3.01	-1.05	-1.46	20.79	2.65	23.10	3.67	-3.51	-3.89	0.00	0.04

Table 4-17 Week 19-38 Males

	Control						Intervention							
	18-24 (n= 17)		25-51 (n= 57)				18-24 (n= 17)		25-51 (n= 57)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	94.88	8.45	86.19	7.36	-1.38	-0.14	78.75	8.33	80.93	10.26	-1.63	-1.36	0.00	0.02
BMI	29.53	1.20	27.74	2.06	-0.36	-0.05	25.97	2.03	25.60	2.42	-0.52	-0.41	0.00	0.00
Waist circumference (cm)	108.25	4.47	103.90	3.71	-0.19	-0.05	98.06	7.55	98.07	7.87	-0.56	-0.43	0.00	0.00
Hip circumference (cm)	109.69	4.97	106.74	3.45	0.00	-0.07	102.28	4.54	102.71	4.48	-0.56	-0.43	0.00	0.00
Neck Circumference (cm)	43.38	1.65	42.21	2.10	0.31	0.10	39.63	3.67	39.79	3.88	-0.34	-0.36	0.00	0.00
Waist to Hip Ratio	0.99	0.03	0.97	0.02	0.00	0.00	0.96	0.04	0.95	0.04	0.00	0.00	0.01	0.00
Body Fat (%) BMI method	24.30	1.81	24.67	3.01	-0.43	-0.06	20.16	2.48	22.61	3.53	-0.62	-0.49	0.00	0.04

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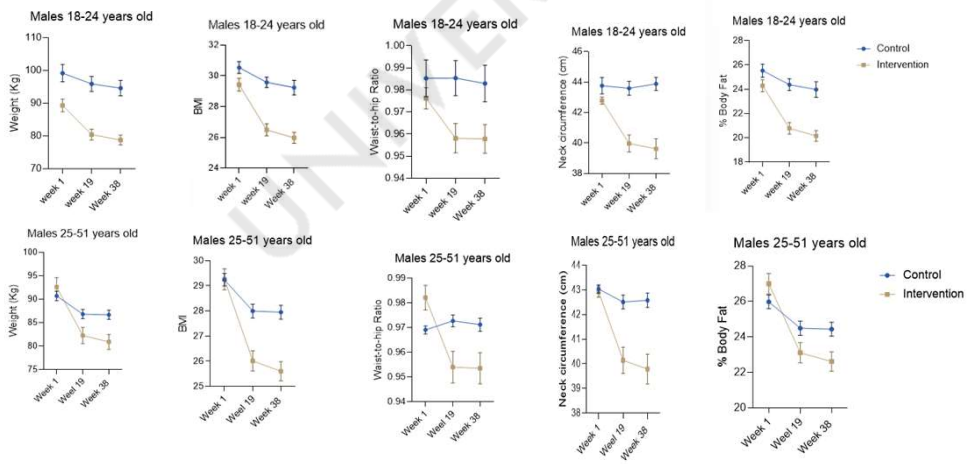
45

Results

Progress Charts – Males



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46

Results

Progress Charts – Females

Table 4-16 Week 1-19 Females

	Control						Intervention						Statistical Significance	
	18-24 (n= 35)		25-51 (n= 41)				18-24 (n= 54)		25-51 (n= 24)				Two-tailed T.test Control Vs Intervention	
	Mean	Std. Dev	Mean	Std. dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. Dev	Mean	Std. Dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	78.77	5.83	79.73	9.23	-3.12	-2.97	73.04	4.69	76.58	8.36	-8.55	-9.59	0.00	0.18
BMI	29.50	1.93	30.08	2.93	-1.11	-1.10	27.53	1.99	28.65	2.52	-3.21	-3.54	0.00	0.05
Waist circumference (cm)	98.96	6.75	96.32	8.74	-4.10	-3.70	90.15	7.70	99	6.78	-12.35	-3.33	0.00	0.21
Hip circumference (cm)	112.09	5.89	105.87	8.52	-0.06	-0.07	99.83	7.69	112	6.13	-12.09	-0.08	0.00	0.00
Neck Circumference (cm)	38.20	1.05	38.34	1.29	0.00	0.00	36.67	2.96	36.81	0.90	-1.63	-2.06	0.00	0.00
Waist to Hip Ratio	0.88	0.03	0.91	0.05	-0.04	-0.03	0.90	0.03	0.88	0.03	-0.01	-0.03	0.00	0.01
Body Fat (%) BMI method	35.15	2.44	37.74	4.02	-1.33	-1.32	32.78	2.35	38.66	3.47	-3.85	-4.25	0.00	0.36

Table 4-18 Week 19-38 Females

	Control						Intervention						Two-tailed T.test Control Vs Intervention	
	18-24 (n= 35)		25-51 (n= 41)				18-24 (n= 54)		25-51 (n= 24)					
	Mean	Std. dev	Mean	Std. dev	Δ Mean 18-24	Δ Mean 25-51	Mean	Std. dev	Mean	Std. dev	Δ Mean 18-24	Δ Mean 25-51	18-24	25-51
Weight (Kg)	78.69	5.84	79.76	9.23	-0.09	0.02	72.07	4.57	77.54	13.01	-0.96	0.96	0.00	0.43
BMI	29.47	1.96	30.09	2.94	-0.03	0.01	27.17	2.04	28.95	3.69	-0.36	0.30	0.00	0.18
Waist circumference (cm)	98.96	6.75	95.79	9.16	-0.03	-0.54	89.78	8.04	99.00	6.79	-0.37	0.00	0.00	0.15
Hip circumference (cm)	112.09	5.89	105.41	8.79	-0.20	-0.46	99.48	7.96	112.00	6.13	-0.35	0.00	0.00	0.00
Neck Circumference (cm)	38.20	1.05	38.34	1.29	-0.20	-0.22	36.31	3.16	36.65	1.18	-0.35	-0.17	0.01	0.00
Waist to Hip Ratio	0.88	0.03	0.91	0.05	0.00	0.00	0.90	0.03	0.88	0.03	0.00	0.00	0.01	0.02
Body Fat (%) BMI method	35.10	2.48	37.75	4.03	-0.04	0.01	32.35	2.40	39.02	4.64	-0.43	0.36	0.00	0.26

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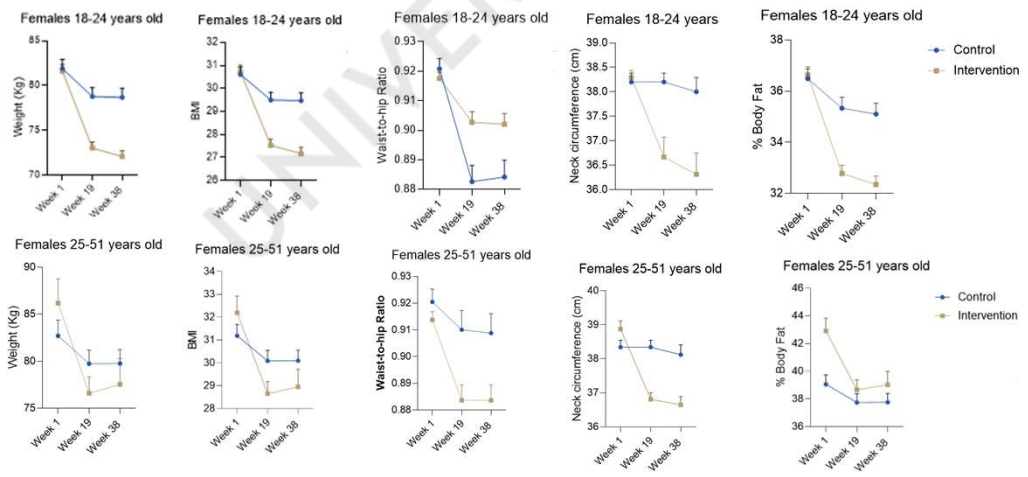
47

Results

Progress charts - Females



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48

Results

Eating habits and behavioural modification results (Worksheet I)

Table 4-20 Mean Scores of Worksheet I

	Score week 1	Score week 19	Score week 38
N Valid	150	150	150
Missing	0	0	0
Mean	-34.84	42.93	62.15
Std Deviation	6.75	8.49	11.19

Scoring was ranged at: 65-82 excellent, 42-64 very good, 28-41 good, 16-27 fair.

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49

Mindful Eating

Results

Table 4-45 Relation of BMI with ME (Q3-4 High; ME, 2-2.99 Medium ME, <2 Low ME)

	BMI		Score Mindful	
	MEAN	SD	MEAN	SD
Total(264)	24.21	4.11	2.80	0.30
<18.5(15)	17.43	0.07	2.83	0.29
18.5-24.9(175)	21.79	1.77	2.84	0.29
25-29.9(54)	26.81	1.28	2.73	0.30
>=30 (20)	33.50	3.25	2.61	0.26

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50

Factor and items	Cronbach's α	Item-total correlation[a]
Factor 1: Disinhibition	**.83**	**0.71**
I stop eating when I'm full even when eating something I love.		0.67
When a restaurant portion is too large, I stop eating when I'm full.		0.65
When I eat at "all you can eat" buffets, I tend to overeat.		0.63
If there are leftovers that I like, I take a second helping even though I'm full.		0.61
If there's good food at a party, I'll continue eating even after I'm full.		0.60
When I'm eating one of my favorite foods, I don't recognize when I've had enough.		0.53
When I'm at a restaurant, I can tell when the portion I've been served is too large for me.		0.43
If it doesn't cost much more, I get the larger size food or drink regardless of how hungry I feel.		0.30
Factor 2: Awareness	**.74**	**0.69**
I notice when there are subtle flavors in the foods I eat.		0.59
Before I eat I take a moment to appreciate the colors and smells of my food.		0.57
I appreciate the way my food looks on my plate.		0.55
When eating a pleasant meal, I notice if it makes me feel relaxed.		0.41
I taste every bite of food that I eat.		0.41
I notice when the food I eat affects my emotional state.		0.36
I notice when foods and drinks are too sweet.		0.35
Factor 3: External cues	**.70**	**0.57**
I recognize when food advertisements make me want to eat.		0.61
I notice when I'm eating from a dish of candy just because it's there.		0.54
I recognize when I'm eating and not hungry.		0.48
I notice when just going into a movie theater makes me want to eat candy or popcorn.		0.43
When I eat a big meal, I notice if it makes me feel heavy or sluggish.		0.32
At a party where there is a lot of good food, I notice when it makes me want to eat more food than I should.		0.24
Factor 4: Emotional response	**.71**	**0.65**
When I'm sad I eat to feel better.		0.61
When I'm feeling stressed at work I'll go find something to eat.		0.60
I have trouble not eating ice cream, cookies, or chips if they're around the house.		0.42
I snack without noticing that I am eating.		0.39
Factor 5: Distraction	**.64**	**0.57**
My thoughts tend to wander while I am eating.		0.55
I think about things I need to do while I am eating.		0.48
I eat so quickly that I don't taste what I'm eating.		0.33

[a]Individual item scores are correlated with the score of the factor that contains that item; factor scores are correlated with summary score.

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51

Table2. Data from a study comparing the subscales scores of participants (response) according to score – the amount of variation between groups and – the amount of variation within groups. **[Anova Test ; p <0.05]**

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Disinhibition	Between Groups	5.508	3	1.836	4.770	.003
	Within Groups	100.069	260	.385		
	Total	105.577	263			
Emotional	Between Groups	5.585	3	1.862	5.348	.001
	Within Groups	90.505	260	.348		
	Total	96.090	263			
Summary Score	Between Groups	1.239	3	.413	4.943	.002
	Within Groups	21.727	260	.084		
	Total	22.967	263			

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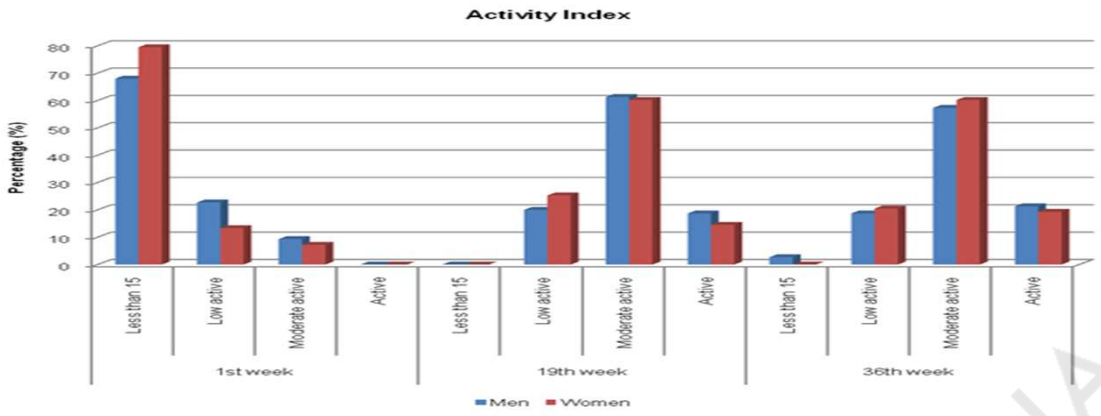
52

Results

Physical activity behavioural modification results (worksheet II)



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53

Results

Physical activity behavioural modification results (worksheet II)

What influences physical activity

- First week:
  - Lack of time in their busy schedule at 81%
  - Lack of understanding of the benefits at 69%
  - Lack of energy at 66.7%
  - Feeling too tired at 64%
  - Social discomfort at 54%
- 19th week:
  - Lack of time in their busy schedule at 85.3%
  - Injury or health problems at 30%
  - Chronic physical discomfort and embarrassment at 30%
  - Embarrassment at 30%
  - Feeling too tired at 18%
- 38th week:
  - Lack of time in their busy schedule at 84.6%
  - Chronic physical discomfort, injury or health problems, and embarrassment at 30%

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54

Discussion & Conclusions

- Recommendations for evaluation and action plan
- Strengths and Weaknesses
- Deliverables

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55

Discussion & Conclusions

Goals and outcomes of research study

- The goal of this research was to produce guidelines/recommendations for the management of overweight and obesity.
  - The guidelines include recommendations for eating habits, physical activity, mindful eating, and behavior using NCP.
- The ultimate goal was to help overweight and obese people lose and maintain weight for long-term well-being.
- NCP is necessary for weight loss therapy.
  - Assessment and diagnosis involve studying the patient's weight and overall risk condition.
  - BMI, WCir, WHR, and NCir are used to evaluate overweight and obesity and observe variations in body mass.
  - Body fat levels should be evaluated at the beginning and throughout the weight loss therapy, and abdominal fat can be evaluated by measuring the WC and NCir.

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56

Discussion & Conclusions

Effectiveness of ME and behaviour, diet & exercise, through NCP on weight management

- Combining mindful eating and behaviour change with weight loss methods leads to more successful weight loss and maintenance.
- Personalized nutrition interventions through the NCP can improve reliability and consistency of results in weight management.
- Dietitians and nutritionists play a crucial role in preventing and treating overweight and obesity.
- More research studies are needed to examine the impact of dietitian consultations with the use of NCP on weight management and establish cost-effectiveness of moderate weight loss.

(Williams et al., 2019), (Hall & Kahan, 2018)

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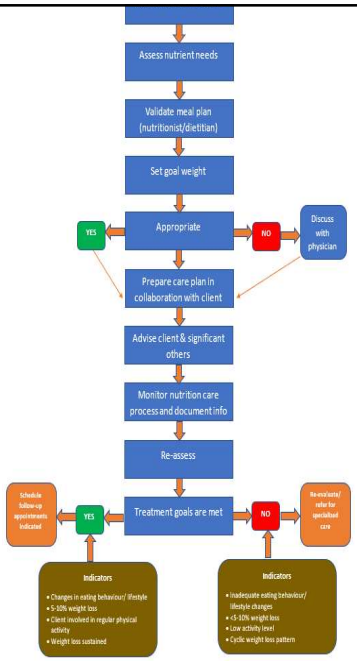
57

Discussion & Conclusions

NCP

- NCP is a system for delivering personalized care to patients.
- It consists of four steps: nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation.
- Nutrition assessment involves collecting and analyzing data to identify nutrition-related issues.
- Nutrition diagnosis is the documentation and classification of an existing nutrition problem.
- Nutrition intervention is a planned action designed to improve the identified nutrition diagnosis.
- Nutrition monitoring and evaluation are used to measure progress made by the nutrition intervention.
- NCP provides a roadmap for high-quality, patient-centered nutrition care.



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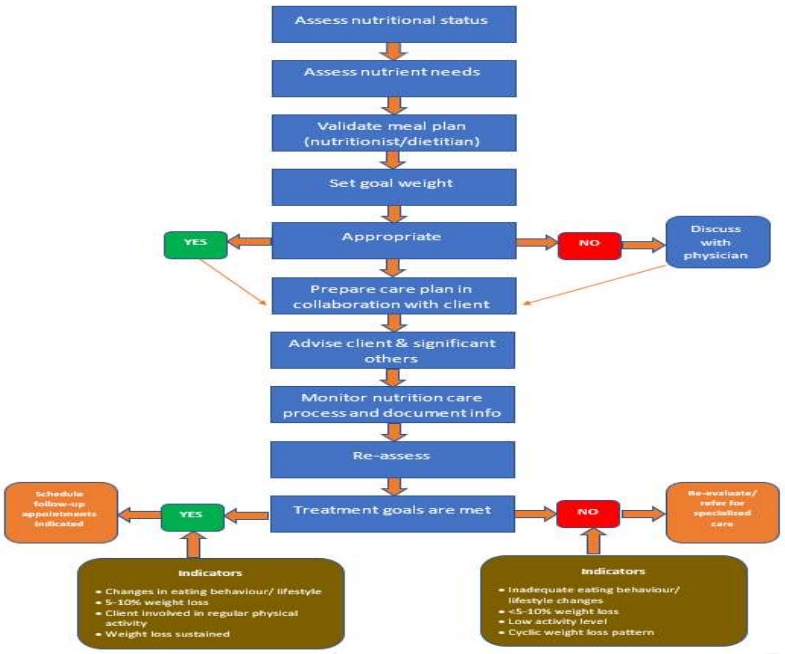
58



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59

Discussion & Conclusions

Results

- Intervention group showed significant decrease in weight, BMI, waist-to-hip ratio, neck circumference, and body fat in first 19 weeks, with a plateau in maintenance phase
- CG did not follow the same trend, with only small decreases in body measurements
- Eating behaviors of IG significantly improved during three periods
- Lack of time was the reason for not exercising, but physical activity increased by the end of the study through the use of behaviour modification and NCP
- Interventions should focus on developing healthy eating and physical activity habits rather than just achieving an ideal body weight
- Long-term follow-up with regular visits with a dietitian, frequent monitoring, and support is essential for effective treatment.

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60

Discussion & Conclusions

Physical activity

- In the current study participants were inspired to increase their physical activity gradually.
- The participants had an individualized guidelines as far as behaviour change and were guided to slowly increase their activity until they reach a level of at least 1000 kcal/week (or at least 150 min/week).
- They chose the type of activity they preferred.

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61

Discussion & Conclusions

Mindful Eating

- Mindful Eating tips used in the counselling process for the IG by Armand et al (2015)

1. Before eating, consider your feelings and differentiate between wants and needs. Take time to reflect on whether you are truly hungry or if other emotions or circumstances are driving your desire to eat. Then, make a conscious decision about whether, what, and how you want to eat.
2. When eating, sit down and give your full attention to the meal. Multitasking or eating on the go can make it harder to appreciate food and keep track of how much you are consuming.
3. Avoid distractions such as watching TV or working in front of a screen while eating. These can make it harder to be mindful of what and how much you are eating.
4. Serve out specific portions of food to help maintain control over how much you are eating and make it easier to appreciate the food in front of you.
5. Using smaller plates can also aid in portion control, particularly when eating at all-you-can-eat buffets.
6. Chew your food thoroughly to help prevent overeating and give your gut time to signal to the brain that you are full.
7. Practice putting down your utensils after each bite and waiting to pick them up again until you have fully enjoyed and swallowed the food in your mouth.
8. It is okay to not finish everything on your plate and not feel guilty about it.

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62

Discussion & Conclusions

Strengths

- First study in Cyprus to assess advantages of Nutrition Care Process (NCP) for weight loss and maintenance
- NCP enhances reliability and value of personalized treatments for weight loss and leads to effective weight management outcomes
- First study in Cyprus to assess effectiveness of mindful eating and behavior change through nutrition and exercise for weight and body composition management
- Participants were voluntarily partaken to minimize chances of dropping out of study
- Participants provided free nutritional assessment, diet and exercise programs, and monitoring
- Different methods for diet and exercise assessment and treatment were used to minimize statistical errors
- Worksheets were modified for better structure and can be part of NCP
- Worksheets can be used for behavioral change in eating and exercise habits.

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63

Discussion & Conclusions

Weaknesses

- Counsel therapy was effective but time-consuming in weight control study
- Intensive supervision by an expert was required
- Obesity is a chronic disease that requires long-term adherence
- Difficulty in recruitment and follow-through of participants
- Groups were not divided by overweight and obese status, leading to differing weight loss results

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64

Discussion & Conclusions

Deliverables - Dissemination of the study's parts

- (1) A scientific article published in the Arab Journal of Nutrition and Exercise with the title "The integration of eating habits and physical activity through the nutrition care process to tackle the obesity epidemic. A narrative review of the evidence (2022)
- (2) The book publication Philippou C, Andreou E. 'Smart Eating for Better Exercising. Become your educator for better physical status'. ISBN 978-9963-9876-9-6. (2020)
- (3) The results of the pilot study were presented in the international scientific conference of the Cyprus Dietetic and Nutrition Association in collaboration with EFAD in November (2021) after they have been accepted by the scientific committee.

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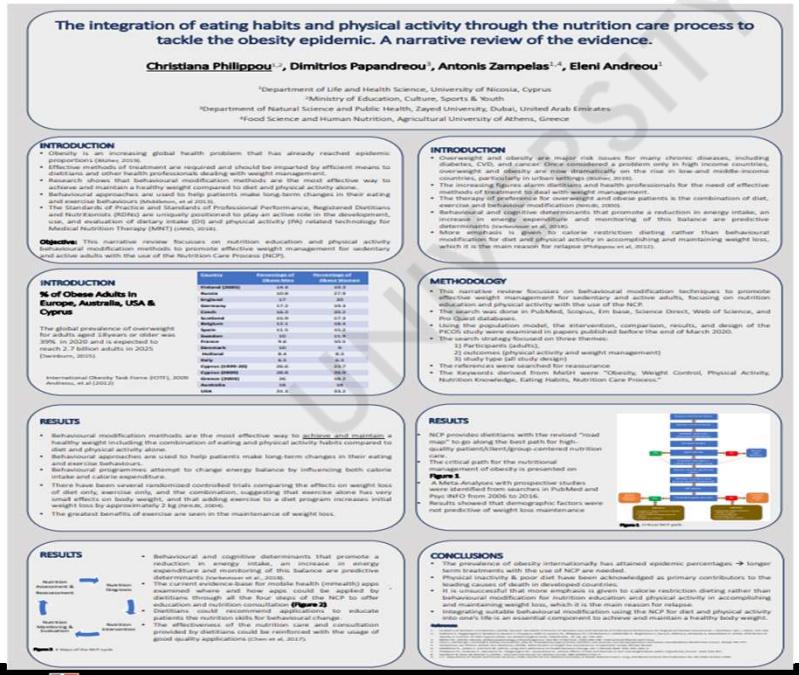
65



(4) POSTER 11th CyDNA Conference The integration of eating habits and physical activity through the nutrition care process to tackle the obesity epidemic. A narrative review of the evidence. Christiana Philippou, Dimitrios Papandreou, Antonis Zampelas, Eleni Andreou (2021)

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66

Discussion & Conclusions

Deliverables - Dissemination of the study's parts

- (5) Presentation of the topic 'Promoting Healthy Behaviour through a serious game' from the nutrition education perspective in the 11th International Nutrition and Dietetics Conference.
- (6) The modified NCP (figure 5.1) for the dietitians in Cyprus which there was an adjustment from the original, will be used by the national association in Cyprus (CyDNA) and the Cyprus Registration Board for Food Scientists, Technologists and Dietitians.
- (7) The final results were presented in the Nutrition Society Winter Conference 2022-2023 with the title 'Architecture of food: processing, structure and health' 'The prevalence of "Mindful Eating" in adults in Cyprus and its relation to Body Mass Index.'
- (8) Andreou, E., Philippou, C., & Korfiati, P. (2023). The prevalence of "Mindful Eating" in adults in Cyprus and its relation to Body Mass Index. Proceedings of the Nutrition Society, 82(OCE1), E26. doi:10.1017/S0029665123000344
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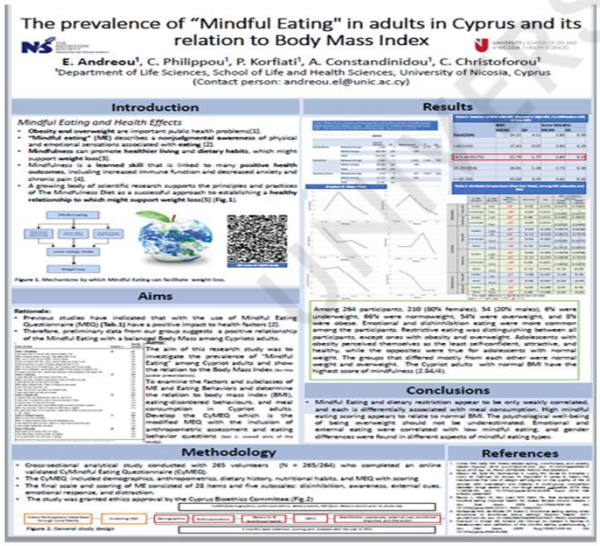
67

Andreou, E., Philippou, C., & Korfiati, P. (2023). The prevalence of "Mindful Eating" in adults in Cyprus and its relation to Body Mass Index. *Proceedings of the Nutrition Society, 82*(OCE1), E26. doi:10.1017/S0029665123000344



7 & 8

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68

Study Conclusions

- The NCP is an effective way to communicate with health professionals and solve nutritional problems.
- Many measurements were used for the assessment of obesity and overweight, including weight, height, BMI, Waist Circumference, Neck Circumference, and Body Fat Composition.
- The Mindful Eating Questionnaire (MEQ) and International Physical Activity Questionnaire (IPAQ) were used to assess food intake and physical activity habits.
- Validated Worksheets for lifestyle changes were applied to the intervention group, resulting in better weight management outcomes.
- Mindful Eating and BMI are strongly correlated, while ME and dietary restriction are only somewhat correlated.
- High mindful eating scores are associated with a normal BMI.
- Emotional and external eating are correlated with low mindful eating, and gender differences were found in different aspects of mindful eating type

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69

Dedication

I dedicate this thesis

To my beloved father's memory

Μιχαήλ Φιλίππου

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70

Acknowledges

I would also like to thank

- My supervisor, Dr Eleni Andreou, Associate Professor for her support and guidance

&

- Prof Demetris Papandreou and Prof Antonis Zampellas for their useful feedback

- Dr. Ioannis Karis Assistant Professor, for being the External Examiner & Prof Zoe Rouba for being the Internal Examiner and the Chair of the Viva Committee, Dr Christoforos Giannaki, Associate Professor.

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71

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UNIVERSITY of NICOSIA

74

75