

QATAR UNIVERSITY

COLLEGE OF HEALTH SCIENCES

THE ASSOCIATION BETWEEN DEPRESSIVE SYMPTOMS AND WEIGHT LOSS

STAGES IN QATAR: A CROSS-SECTIONAL GENERAL POPULATION

INVESTIGATION

BY

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## ABSTRACT

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Title: THE ASSOCIATION BETWEEN DEPRESSIVE SYMPTOMS AND WEIGHT  
LOSS STAGES IN QATAR: A CROSS-SECTIONAL GENERAL POPULATION  
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Background: Depression and overweight obesity (OO) have well-established bidirectional associations and are comorbid with other medical conditions. To date, the impact of weight management interventions remains small. Further research into the complex relationship between depression and body weight is warranted using the Transtheoretical model of behavior change (TTM) - an evidence-based dynamic framework for conceptualizing weight change.

Aims: The present study aims to explore the association between weight loss stages of change (WLSC) as per TTM and depressive symptoms while identifying sociodemographic and health-related variables that are associated with both in the context of Qatar.

Methods: A cross-sectional phone survey (n=2,131) sponsored by Qatar Diabetes Association was conducted by the Social and Economic Survey Research Institute at Qatar University in Spring of 2018. Data regarding sociodemographic, health-related, and behavioral variables were collected.

Results: Age, gender, respondent type, ethnicity, education, employment, marital status, chronic conditions, OO, physical activity, smoking, and sleep were associated

with WLSC and depressive symptoms (p-value <0.3). Overall, non-significant association was found between WLSC and depressive symptoms (OR= 1.05, 95%CI= 0.82-1.34, p=0.7). Both contemplation (OR= 0.68, 95% CI= 0.25-1.89, p=0.46) and maintenance stages (OR=0.86, 95%CI= 0.33-2.22, p=0.76) were negatively associated with depressive symptoms. In contrast, preparation (OR=1.07, 95%CI=0.42-2.71, p=0.89) and no weight change/ relapse (OR=1.18, 95%CI=0.42-3.38, p=0.75) were positively associated with depressive symptoms. Finally, evidence emerged of effect modification by Body Mass Index (BMI) of associations between WLSC and depressive symptoms.

Conclusion: Individuals in maintenance and contemplation stages of weight change experienced reduction in depressive symptoms compared to pre-contemplation stage. Moreover, the odds of depressive symptoms were higher among individuals in preparation stage and those who experienced no weight change or relapse compared to pre-contemplation stage. Furthermore, BMI appears to be an important variable in explaining differences in depressive symptoms across different WLSC as per TTM.

## DEDICATION

*I would like to dedicate this work to my parents, my backbone and brother Abdelrahman Abouzid who has never left my side and is very special, and to my spiritual sister and best cheerleader Maha Al-Yafie.*

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## LIST OF ABBREVIATIONS

Abbreviation	Meaning
NCDs	Non-communicable diseases
OO	Overweight and Obesity
TTM	Transtheoretical Model
PHQ-2	Patient Health Questionnaire (2 items)
QDA	Qatar Diabetes Association
SESRI	Social and Economic Survey Research Institute
WLSC	Weight Loss Stages of Change

## CHAPTER 1: INTRODUCTION

Due to the witnessed epidemic rise in non-communicable diseases (NCDs) around the world, closer attention needs to be paid to diseases that contribute to NCDs. Fortunately, NCDs can be prevented through effective interventions that tackle their corresponding risk factors (1). Both depression and Overweight-Obesity (OO) are significant NCDs that are widely spread and have major public health implications (2). Together, they contribute to the burden of diseases and substantial economic costs (2). Depression is increasingly a serious public health problem around the world which may come about by the interaction between biological, psychological, and social factors (3). Similarly, OO represents a rapidly rising risk to the population health in many countries affecting all societies (4) and contributing to the economic burden of health systems worldwide (5). In the state of Qatar, OO is among the top contributing risk factors for mortality in both males and females of all ages.

Depression and OO have well-established bidirectional associations with each other and are comorbid with other medical conditions (2, 6, 7). There are numerous possible mechanisms linking depression and OO including biological and genetic factors, behavioral as well as lifestyle factors (2). Individuals who are depressed may experience weight loss or gain due to increased sedentary lifestyle (8) and change in their appetite, sleep, or dietary patterns (9).

Depressed individuals are more inclined to favor carbohydrate-rich foods (10) and are at greater risk of binge eating (11), and disordered sleeping (12). All these factors may lead to an increased risk of OO in depressed individuals. On the other hand, OO individuals may experience stigmatization (13), poor body image and low self-esteem (14), which may increase their vulnerability to depression (13). Their behaviors and lifestyle, particularly poor dietary habits and sedentary activity in terms of reducing

physical activity as well as disordered sleep may also contribute to depression (15, 16). Other shared biological mechanisms that have been linked to the etiology of both depression and obesity included inflammation (17), impaired glycemc control (18), and dysregulation of the hypothalamic–pituitary–adrenocortical axis (19).

Numerous studies have also shown that most OO people attempt to lose weight, but face difficulties when trying to lose weight (20-22). The impact of weight management interventions remains small as most people with OO do not continue with weight loss programs and only a few of those who do, truly lose and maintain weight (23). To encourage weight loss and maintenance in OO people, effective weight management strategies and interventions that consider the psychological aspects and sequelae of weight loss are needed. Identifying potential pathways linking weight change with depression is particularly important for improving population-level obesity prevention and treatment efforts. Weight change is a complex phenomenon which calls for the application of an evidence-based dynamic framework for research in this area (24).

The transtheoretical model of behavior change (TTM) is a framework that describe stages of change a person may go through when deciding to change problematic behavior (25). The TTM has been broadly applied in health behavior modifications research (26-28). Recently, there has been growing interest in applying the TTM to improve weight management outcomes among OO patients (29). The present study aims to explore the association between weight loss stages per TTM and depressive symptoms and therefore, identify sociodemographic and health-related characteristics of individuals aiming to lose weight in relation to the TTM in the context of Qatar.

## CHAPTER 2: LITERATURE REVIEW

### **Non-Communicable Diseases (NCDs)**

Non-communicable diseases (NCDs) are diseases that have a long duration and slow progression and are the result of a combination of genetic, physiological, behavioral and environmental factors (1). Cardiovascular diseases (CVDs), chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), diabetes and cancer are the four main types of NCDs, and alone they account for over 80% of all premature NCD deaths (1). Globally around 71% of all deaths are due to NCDs that is equivalent to 41 million deaths per year. Although NCDs are more common among older age groups, about 15 million people die prematurely between the age of 30 to 96 (1). These rates will continue to grow as populations' age continue to increase. Furthermore, the health burden NCDs also have economic consequences(30).

According to WHO low-and middle-income countries' cumulative economic losses to NCDs are estimated to exceed \$7 trillion over the period 2011-2025, that is around an average of \$500 billion per year (30). Considering that NCDs affect all countries and regions, the Gulf Cooperation Council (GCC) countries are also affected, of which the State of Qatar is a member (31). In the region, Qatar has one of the highest burdens of NCDs among the GCC countries with an overall NCD-specific proportional mortality of 69% of the total deaths in the country (32).

According to the STEPwise approach to surveillance survey (STEPS), NCDs are causing a significant burden and threat in Qatar; more than half of the deaths registered per annum are due to NCDs (33). Among the Qatari population aged 18-64 years, the breakdown of the proportional mortality in 2012 was as follows: CVDs

- 24%, cancers -18.1%, respiratory diseases - 1.6% and diabetes mellitus 8.9% of all deaths (32). Although it is a commonly held view that high-income countries have better health outcomes considering the availability and access to a healthier lifestyle, diet, and health care services (31, 34); increased wealth can also have an undesirable influence on health as a result of poor lifestyle choices. This is perhaps linked to very high point prevalence of multiple risk factors in Qatar, that starts from poor nutrition among women accounting for 90.4% followed by obesity and overweight which together accounts for 70.1% (28.7% overweight and 41.4% obese), low physical activity at 44%, and finally, tobacco smoking prevalence that was estimated to be 31.9% among men and 1.2% among women (35). As per the economic burden for the four selected NCDs, the total direct and indirect costs estimated in 2013 was \$36.2 billion for the GCC region (31, 33). There are key components of response to NCDs that include; detection, screening and treatment of NCDs, as well as palliative care (1).

### **Overweight and Obesity (OO) and NCDs**

Overweight and Obesity (OO) are identified as a significant risk factor for many chronic diseases such as CVDs, diabetes, and cancer which are three of the leading top four NCDs (36). OO are defined as excessive or irregular fat accumulation in the body that introduces risk to people's health (36). Body Mass Index (BMI) is an index of weight to height ratio that is frequently used to identify and categorize obese and overweight adults. According to WHO, a person with a BMI value that ranges between 25-29.9 kg/m<sup>2</sup> is considered overweight and a BMI between 30-34.9 kg/m<sup>2</sup> is deemed to be obese (36). The rates of OO have been slowly increasing around the world in both developed and developing countries; this led OO to become a nationwide epidemic that contributes to lower quality of life, decreased life expectancy, cognitive dysfunction,

premature mortality, and higher healthcare costs because of their associations with life-threatening outcomes (36-39). In 2014, around \$1901 was attributed to the annual medical spending for one obese individual which accounts for \$149.4 billion at the national level (40).

Based on the Medical Expenditure Panel Survey that was conducted in the USA, obese patients had approximately 40% greater healthcare utilization compared to normal-weight patients as a result of increased medication, inpatient and outpatient hospital care (41). In addition, obese patients have a higher dependence on disability welfare, absenteeism, and earlier unemployment or retirement (39, 42). OO affects all members of society including males and females of all age groups. In 2016, around 1.9 billion adults (39%) aged 18 years and above were overweight, of these 650 million were categorized as obese (13%) (36). Similarly, in 2016, more than 340 million children and adolescents aged 5-19 and 41 million children under the age of 5, were considered overweight or obese (36). This introduces a substantial economic burden to health care systems around the world.

Unfortunately, most of the world's population lives in countries where OO kills more people than underweight (36). A similar situation exists locally in the state of Qatar where economic level has drastically increased during the past few decades, which makes it one of the world's wealthiest developing countries (43, 44). This rapid development is also a significant contributor to the practice of unhealthy lifestyles and increasing rates of OO of the population in Qatar. According to the Ministry of Public Health, high BMI is the first of the top five risk factors for mortality in Qatar where 70% of adults were OO in the country (45). Among those who are OO, 48% were males and 40% were females (45). These statistics suggest the need for weight loss interventions that are maintainable among OO people in Qatar. Fortunately, OO can be

avoided using accessible and attainable weight loss and maintenance strategies.

### **Weight Loss and Maintenance Strategies**

It is essential that a multipronged approach is taken to reduce the prevalence of OO, including intervention at the individual, family, community, and societal levels (46). Both behavioral and environmental changes at societal and community levels have a substantial impact on successful weight loss and maintenance outcomes. A systematic review(46) that aimed at identifying successful and healthy weight management strategies for weight loss and weight maintenance, found that 21% of successful weight loss interventions had a diet-related component with increased fiber.

The same review found that 88% of successful interventions included physical activity as a component, while 92% of interventions involved behavioral training such as self-monitoring for OO people (46). Similarly, it was reported that even the same combination of interventions was required for successful weight maintenance. Thus, we can conclude the need for a comprehensive approach, that includes low dietary intake, regular physical activity, and behavioral strategies to obtain successful weight-loss and weight maintenance results (46).

Although many studies have been able to persuade initial successful weight loss results among participants, the maintenance of these results was shown to be much more challenging (47, 48). One systematic review found that among weight-loss interventions that were able to induce on average a 9.5% weight loss from baseline weight; only 54% of this weight loss was maintained one year after these interventions (47). Thus, evidence-based recommendations are needed for cognitive and behavioral strategies that may contribute to weight change and can be applied at the individual level to induce weight loss and weight loss maintenance.

## **Depression**

Depression is a state of reduced psychological wellbeing marked by feelings of sadness, hopelessness, and loss of interest. Depression can also be defined as a “common and serious medical illness that negatively affects how persons feel, the way he thinks and acts” (3). Based on the stress-vulnerability model, depressive symptoms may develop when susceptible individuals experience a triggering life event or severe stress. Depressive symptoms appear commonly in critical periods of life such as childhood, adolescence, and early adulthood (49, 50) and may place a significant burden on families, societies, education, healthcare, and employment (50).

Depression is relatively common among individuals with chronic health conditions such as diabetes, hypertension and heart diseases and obesity (51, 52). This evidence suggests the need for public health efforts that target this problem to improve people’s overall mental health which in turn will affect other aspects of their lives. Statistically speaking, depression is the leading cause of disability and is a big part of the overall global burden of diseases. In other words, around the world, more than 322 million people of all ages suffer from depression (53).

WHO foresees that depression will continue to be a leading cause of disability, after cardiovascular diseases (39). According to the American Psychiatric Association (3), an estimated 1 in 15 adults (6.7%) are affected by depression in any given year. Additionally, 1 in 6 people (16.6%) will experience depression at some time in their life. Moreover, depression was found to be more common among females compared to males; around one-third of females experience depressive episodes in their lifetime (3). The situation is similar in Qatar, a study that was conducted in a sample of 1,660 people found that almost 25% of adults who attended a public health consultation in Qatar’s primary health care centers had at least one type of mental disorder (35). According to the WHO, the prevalence of depression in 2017 was 5.1% and accounted for 10% of

total years lived with disability (53).

Symptoms of depression can vary from mild to severe, which includes having a depressed mood or feeling sad, loss of interest or pleasure in activities that were enjoyable, sleep problems, and changes in appetite. These symptoms must last at least for two weeks to be considered for a clinical diagnosis of depression(3). In terms of assessment, many tools have been proposed to measure depression and were shown to be effective in doing so, such as Beck Depression Inventory (BDI), nine-item or two-item Physician Health Questionnaire (PHQ-9) and PHQ-2 (54).

PHQ-9 is a self-administered questionnaire that scores 9 of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The PHQ-9 total score can range from 0 to 27. In addition, each symptom has 4-point response options; 0 (not at all), 1 (several days), 2(more than half the days), and 3(nearly every day). Mild to major depression is diagnosed at a threshold score of 10 or higher, 15 or higher indicates “moderate major depression”, and 20 or higher indicates “severe major depression”. Some settings consider initiating treatment with antidepressants at a threshold score of 15 or more (55-57).

### **Depressive Symptoms and OO**

Depression and OO are associated with reduced quality of life, increased mortality, increased risk of disability, and are comorbid with conditions such as cancer, diabetes, and coronary heart disease(6). Furthermore, the prevalence of OO and depression is very high; together they contribute to the burden of different diseases and substantial economic costs (36, 49, 58). Many meta-analyses and epidemiological studies have confirmed that depression and OO are commonly “co-occurring medical conditions” (2, 6, 7). Studies that have examined the association between OO and depression found a linear association between BMI and depression (51, 59). Some

studies even found a significant U-shaped association between BMI categories (underweight, normal, overweight and obesity) and depression (49). Having a U-shaped association between the two variables indicated that both underweight and obesity are associated with depression and that levels of depression are not only associated with an increase in BMI but are also associated with its decrease. For example, a BMI ( $< 17.5$  kg/m<sup>2</sup>) suggests the presence of anorexia nervosa which is an eating disorder, was shown to be a risk factor for depression (16, 60). Similarly, higher odds of depression was associated with higher BMI, especially among women (61). Furthermore, mendelian randomization provided evidence of a partial causal association between higher BMI and depression(61). Obesity and depression may also be derived by a third underlying factor. For example, sociodemographic factors such as age, gender, education, race/ethnicity could moderate the association between depression and BMI or weight loss (2, 49, 59, 62, 63).

Many studies have established the bidirectional association between depressive symptoms and obesity, and it is now well-known through longitudinal studies that depression is a risk factor for obesity and vice versa (2, 6, 39). However, the literature was not consistent in the association between overweight and depression. For example, a systematic review examining association between OO and depression found that overweight was associated with increase in the risk of onset of depression at follow-up and this association was more significant among adults aged 20-59 years and  $\geq 60$  years.

In contrast, depressive symptoms were not predictive of overweight over time (2). Depression is associated with OO through reduced physical activity, altered appetite (39) or changing eating patterns (64, 65). Nonetheless, it is also possible that OO is associated with depression through negative body image (66) and poor weight management techniques (67, 68). Studies have shown that obesity is considered as a

crucial predictor of depressive symptoms (6), and individuals with obesity are at higher risk for depression (69). After reviewing ten longitudinal studies, Lupino et al. (2) concluded that individuals with depression have 58% increased risk of developing obesity compared to those without depression and that individuals with obesity have a 55% increased risk of developing depression; thus confirming the bidirectional association of obesity and depression.

### **Depressive Symptoms and Weight Loss and Maintenance**

Numerous studies have shown that most OO people attempt to lose weight, but face difficulties when trying to lose weight (20-22), with over 80% of those who lose weight, experience difficulties in maintaining their weight loss and regain a part of it or all of it back within the first year (20). Weight change is a complex phenomenon to study and may be influenced by genetic, physiological, cognitive, behavioral, and environmental factors (24) (Figure 1). Additionally, the cultural context is essential in terms of reinforcing existing weight and weight-management related behaviors through traditional beliefs, values, and practices around what constitutes “healthy” bodyweight and how to achieve it (24, 46, 68).

An elevated level of psychiatric symptoms as well as depression was observed among individuals seeking weight loss treatment (69). Prior studies conducted in developed countries also implicate depressive symptoms in unsuccessful weight loss outcomes, including lack of weight loss or poor weight loss maintenance following weight loss attempts (70, 71). However, little is known about the extent that depressive symptoms influence stages of weight change including decisions to lose weight in the first place, actual weight loss attempts, and outcomes of these attempts including maintenance of target weight loss. This is very important considering that only a minority (usually < 20%) of the population at risk is prepared to take action to lose their

weight at any given time and even lesser population at risk maintain their lost weight (38).

Furthermore, while guidelines for obesity prevention emphasize the importance of weight loss through sustainable dietary changes and exercise (72). Considering the complexity of weight change as health behavior and its bidirectional association with depression, it may be best to explore this association using a dynamic framework instead of focusing only on weight loss and maintenance as per current approach in the literature. Informing mechanistic models of the depression, weight-loss and maintenance relationship will help to identify modifiable targets for interventions designed to maintain weight loss and prevent weight regain by highlighting depression's contribution to control OO.



*Figure 1: Factors Influencing Weight Change as a Behavior*

### **The Transtheoretical Model (TTM)**

The Transtheoretical Model (TTM) is an evidence-based approach that was developed by Prochaska and DiClemente in the late 1970s. TTM provides a framework for the stages of progression when deciding to change problematic behavior. These are called stages of change and include: precontemplation, contemplation, preparation, action, maintenance, and relapse stage (73). Some constructs of the model are adapted from previous existing models including the Decisional Balance model (74), Self-

efficacy (75) and the Processes of change which is considered to be the core of TTM (73, 76).

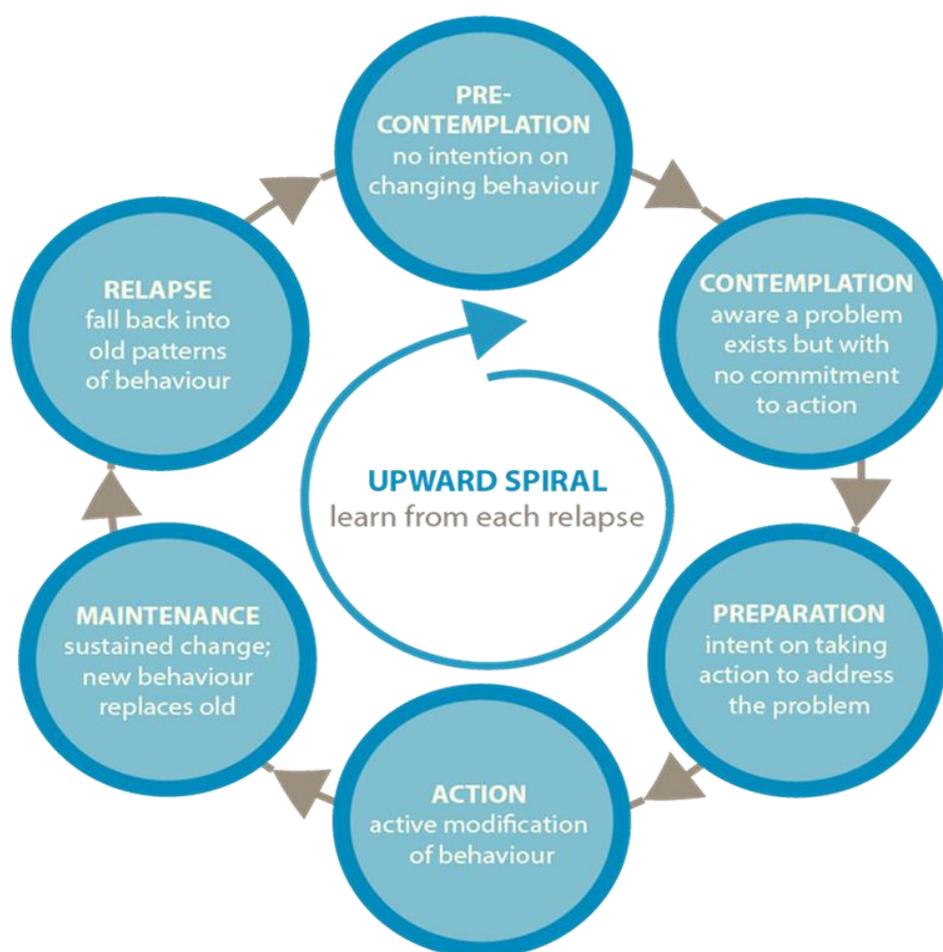
The TTM integrates and includes key ideas and constructs from other theories into one comprehensive theory of change that can be applied to a variety of behaviors, settings, and populations (76). Some studies find that people go through a series of stages when modifying old behaviors and adopting new ones. Additionally, predicting the time a person can spend in each stage is not easy. However, the required tasks and variables that predict transition between stages of behavior change are easier to identify. Additionally, certain variables can lower resistance to new behaviors change, accelerate progress, and prevent relapse for stages of change and these include self-efficacy, decisional balance, and stages of change (76).

As shown in Figure 2, the stages of change model include the following six stages: pre-contemplation (not ready), contemplation (getting ready), preparation (ready), action, maintenance, and relapse. First, the pre-contemplation stage people in this stage have no intention and are not planning to take action in the foreseeable future, because they are usually unaware of the problem or consequences of their current behavior. In this stage, people are often characterized as unmotivated, resistant, or not ready for help (76). Second, in the contemplation stage, people are aware that a problem exists and are willing to overcome it and are more aware of the advantages and disadvantages related to change. However, people in this stage are usually less ready for a real commitment comparing to other stages (76). Third, people in the preparation stage are willing to take action in the immediate future and should be recruited for action-oriented programs.

This stage is marked by a combination of intention and some small behavioral changes (25). Unlike the first two stages, people in this stage usually have an action

plan such as consulting a counselor or joining a gym etc.(76). Fourth, the action stage is a very important stage in the behavioral cycle of change because it is the stage in which people have to make obvious modifications in their lifestyle over a defined amount of time (six months). Finally, in the maintenance stage, people are not applying change process as frequently as do people in the action stage; it is the stage at which people have made specific overt modifications in their lifestyles, adopted the new behavior, and are less likely to relapse. This stage is characterized by the confidence and persistence of continuing behavioral change. When targeting behavior change, this stage is ideal for people to achieve the maintenance stage, which is very challenging considering that relapse (going back to the old habits) is possible.

TTM is an evidence-based approach. It has been used many times and considered to be a useful interventional method in programs that target lifestyle modification such as smoking cessation (77, 78), alcohol consumption (79) and exercise (38). Moreover, the TTM has proven to be valuable interventional approach in programs targeting lifestyle modifications such as physical activity, diet, and weight management among OO people (38). However, its efficiency in producing weight loss outcomes that are sustainable among these individuals has been found to vary considerably (38, 46).



*Figure 2: TTM Stages of Change According to Prochaska & DiClemente*

This may suggest the need to incorporate other dimensions that can affect weight loss and weight maintenance such as depression instead of just focusing on dietary behaviors and other lifestyle changes. It is worthwhile to note that none of the studies that were reviewed in the course of writing this study investigated weight loss and weight maintenance relation to depression using the TTM. Applying the TTM might help us disentangle the bidirectional associations between depression and OO by identifying the individual's stage of change. Consequently, it will aid practitioners in designing interventions that are tailored to individuals' stage of change through proper

assessment of their readiness to make that change, which will ultimately reduce the likelihood of dropout in the context of weight loss and weight maintenance.

### CHAPTER 3: STUDY AIM

The current study aims to investigate the association between weight-loss stages of change using the TTM (pre-contemplation, contemplation, preparation, maintenance, no weight change, and relapse) and depressive symptoms. Moreover, the study aims to identify sociodemographic and health-related characteristics associated with weight-loss stages of change and depressive symptoms in individuals attempting to lose body weight in Qatar.

## CHAPTER 4: OBJECTIVES

Regarding the demography in Qatar, the median age is 31.6 years, and around 10% of its population are Qataris. Remaining (90%) is made up of a workforce that consists of over a hundred different nationalities most of which are young males (80, 81).

### **Primary Objectives**

1. To quantify the association between weight loss stages (per TTM) and depressive symptoms independent of other explanatory variables.
2. To quantify the point prevalence of depressive symptoms among individuals across different weight loss stages in Qatar's population as per TTM.
3. To describe the frequencies and corresponding proportions/percentages of the respondents against depressive symptoms and across different stages of weight loss as per TTM and their distribution across sociodemographic and health-related characteristics.
4. To explore potential effect modification between weight loss stages of change as per TMM and selected explanatory variables on depressive symptoms.

### **Secondary Objectives**

1. Identify lifestyle variables and health-related correlates of poor weight loss outcomes in this segment of the population and understand their associations with depressive symptoms, and weight loss stages of change.
2. Describe the frequency of different weight-loss strategies (nutrition, exercise, and other lifestyle-based modification) and their associations with poor weight loss and depressive symptoms outcomes in this segment of the population.

### **Research Questions**

This study is based on the following research questions:

1. Is there a significant association between WLSC and depressive symptoms?
2. What are the main characteristics of people with and without depressive symptoms?
3. What are the main characteristics of people at each stage of the weight loss cycle of change?
4. What are the main explanatory variables for depressive symptoms?
5. What are the main explanatory variables for each stage of the weight loss cycle of change?
6. What are the lifestyle factors and health-related variables that are associated with poor weight loss outcomes and depressive symptoms?
7. What is the prevalence of depression among those in the pre-contemplation/contemplation stages compared to those in the maintenance/ no weight change and relapse stages?
8. Do sociodemographic factors, physical activity, diet, and gender modify the association between weight loss action and maintenance stages of change and depressive symptoms?
9. Does the magnitude or direction of the association between weight loss (maintenance and no weight change/ relapse) stages of change and depressive symptoms as we adjust for potential confounders (age, gender, income, employment, chronic conditions...etc.)?

### **Hypotheses**

- 1 Overweight and obesity are associated with depressive symptoms.
- 2 Prevalence of depressive symptoms changes with weight loss stages of change
- 3 The intention to change weight, weight loss, and weight maintenance are negatively associated with depressive symptoms.

- 4 Individuals with higher depressive symptoms engage less in healthy weight loss behaviors, such as physical activity or dieting
- 5 The association between weight loss and maintenance and depressive symptoms is modified by sociodemographic factors, physical activity, diet, and BMI.
- 6 Variables such as age, gender, income, employment, chronic conditions...etc. confound the association between weight body loss, and maintenance and depressive symptoms.

## CHAPTER 5: METHODS

### **Study Design**

This study was based on a pre-collected secondary cross-sectional data that was collected by researchers from the Social and Economic Survey Research Institute (SESRI) at Qatar University. The original study survey was conducted on behalf of the Qatar Diabetes Association (QDA) of Qatar's population by SESRI.

### **Description of QDA and SESRI**

SESRI is a social scientific survey research initiative of QU and researchers at SESRI aim to provide reliable data to guide policy formulation, priority-setting, and evidence-based planning in the social, economic and health sectors (82). QDA is a member of Qatar Foundation for education, science, and community development. They work with partners in the health care field in Qatar to provide useful and up to date information about health education and diet as well as provide programs that target many segments of the society to help patients realize possible complications associated with diabetes, and become aware of the ways of living with it by abiding with appropriate care(83).

### **Study Sample**

The study sample included all participants who have completed a self-reported phone questionnaire with age greater than or equal to 18 years, including all nationalities (Qataris and non-Qataris). To minimize the effect of possible confounders, exclusion criteria included pregnant females due to the influence of pregnancy on body weight, weight-related behaviors, and depression (84, 85). We also excluded those who wanted to gain weight because we are interested in the association between weight-loss stages of change and depressive symptoms.

### **Data Collection Methods**

Our data was based on a cross sectional phone survey that was conducted using a sample assembled by SESRI in collaboration with cellphone providers in Qatar. The sample of participants was selected by probability-based stratified systematic sampling using listed dialing technique(86). The sample was designed to ensure good coverage of the target population considering that 98% of adults own a cell phone (87). Representation of the target population was further enhanced through a post-stratification procedure called raking, which adjusts the sample weights in a survey so that the adjusted weights add up to known population totals.

To improve survey response and reduce selection bias, each potential participant was contacted up to seven times at different times of the day and on different days of the week to ensure that each selected member of the sample was approached to participate in the study. Each case was assigned a final status in relation to their eligibility and participation in the study as per SESRI's phone survey protocol conduction.

The survey covered a broad range of health and social issues with allocation of up to 10 minutes for questions about mental health. Moreover, the data included variables such as age, gender, ethnicity, education level, employment, income, marital status and BMI; health-related information such as diabetes, blood pressure, high cholesterol, heart disease, and behavioral measures such as dieting, physical activity, smoking, and sleep duration; all of which were collected through phone survey. The survey was administered using nine different languages. Both English and Arabic versions of the questionnaire can be found in (APPENDIX A) and (APPENDIX B).

## Measurement

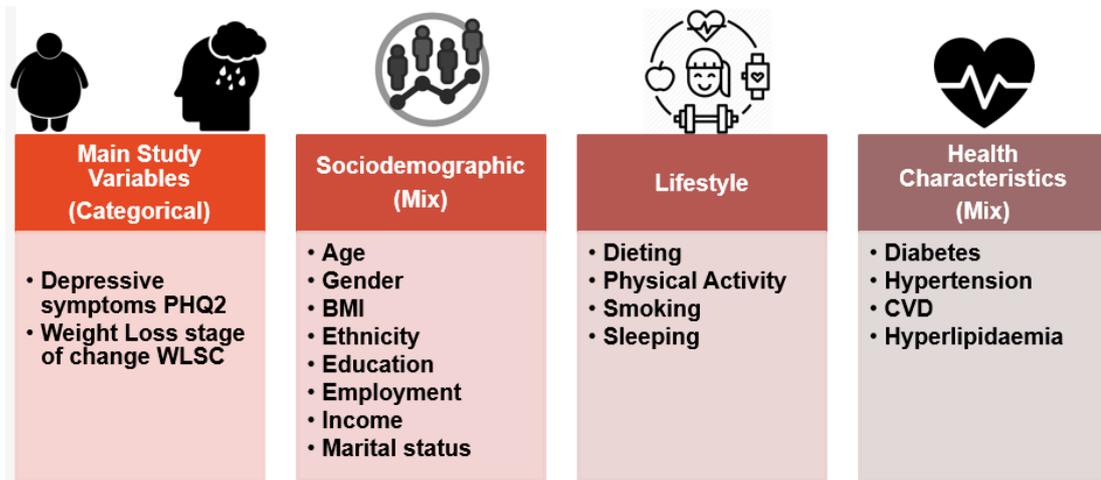


Figure 3: Summary of Study Variables

### Study Outcome Depressive Symptoms

The study's main outcome (dependent variable) depressive symptoms were measured using the two-item Physician Health Questionnaire (PHQ-2) which inquiries about the frequency of depressed mood and anhedonia over the past 2 weeks. Each item has a four-point response format scoring each as either 0 (not at all), 1 (several days), 2 (more than half of the days), and 3 (every day). Thus, total scores ranged from 0 to 6 and a cut-off value of  $\geq 3$  was used to identify people with depressive symptoms (57). PHQ-2 was administered across different ethnic groups and was proven to be a valid screening tool for measuring depression. In addition to English language PHQ-2 was translated to many languages such as Arabic, Bengali, Hindi, Malayalam and others (88). But, the cultural validity of most of them is unknown (88). Research findings investigating the tool validity found a difference in the tool specificity by age, sex, racial and ethnic groups. However, these differences were of little clinical significance

(89).

### **Main Study Explanatory Variable- Weight-Loss Stages of Change (WLSC)**

The study's main explanatory or independent variable was WLSC, which was categorized into six stages as per TTM including pre-contemplation, contemplation, preparation, and action stage. The action stage was further broken down into maintenance, no weight change, and relapse. The pre-contemplation stage was operationalized using the following criteria: respondents who are satisfied with their body weight and are not considering losing weight in the next six months.

The contemplation stage was operationalized to include respondents who are not satisfied with their body weight and are not considering losing weight in the next 6 months. On the other hand, the preparation stage included those who are seriously considering trying to lose weight in the next 6 months. As for the maintenance stage, it was operationalized as respondents who lost weight for 6 months or longer. Moreover, no weight change included those whose most recent effort to lose weight resulted in no change in their body weight. Finally, the relapse stage was operationalized by including individuals who lost weight but gained back the weight that they had lost. Table 1 summarizes the list of survey questions that were used to conceptualize each stage. Although "no weight change" is not part of the classic definition of the TTM model, we had to include it in our weight loss stages of change because some of those who tried to lose weight (in action stage) did not experience any change which is an outcome that cannot be neglected when studying weight loss and weight change. Evidence from the literature support of the differential association between maintenance, relapse and no weight change and depression.

Regarding the validity of the measures of TTM stages, the questionnaire was initially designed to capture the stages of change which then made it possible to

conceptualize them. In addition, considering the nature of phone surveys, all interviewers were professionally trained to avoid confusion that may occur from closely worded questions. For example, in the survey, words like "past month" or "past six months" were emphasized through voice tone of interviewers to avoid confusion between these close time periods.

Table 1: Main Explanatory WLSC (Precontemplation, Contemplation, Preparation, Action, Maintenance, No Weight Change and Relapse).

Stage	Question	Survey Code
1 Pre-contemplation	“How satisfied are you with your current body weight? Would you say you are...?”	SATWEIGHT=Yes
	“In the past month, have you been actively trying to lose weight?”	LOSEMNTH1=No
	“In the past six months, have you tried to lose weight?”	LOSEMNTH2=No
	“Are you seriously considering trying to lose weight in the next 6 months?”	LOSEMNTH3=No
2 Contemplation	“How satisfied are you with your current body weight? Would you say you are...?”	SATWEIGHT=No
	“How much would you like to weigh?”	LOSEMNTH1=No
	“In the past month, have you been actively trying to lose weight?”	LOSEMNTH2=No
	“In the past six months, have you tried to lose weight?”	LOSEMNTH3= No
3 Preparation	“Are you seriously considering trying to lose weight in the next 6 months?”	LOSEMNTH1=No
	“Are you seriously considering trying to lose weight in the next 6 months?”	LOSEMNTH2=No
Action	“In the past month, have you been actively trying to lose weight?”	LOSEMNTH3=Yes
	“In the past month, have you been actively trying to lose weight?”	LOSEMNTH1=Yes
	“In the past six months, have you tried to lose weight?”	LOSEMNTH2=Yes
	“What are you currently doing to lose weight?”	DIETING= Yes (1,2 or 3)

Stage	Question	Survey Code
4 Maintenance	“Think about your most recent effort to lose weight. How would you describe the results? Would you say...?”	Action = Yes
4 Maintenance	“Thinking again of the most recent effort to lose weight. How would you describe the results? Would you say...?”	DESRESULT1=lost weight
5 No-weight change	“Thinking again of the most recent effort to lose weight. How would you describe the results? Would you say...?”	Action = Yes DESRESULT1=Weight didn't change
6 Relapse	“Thinking again of the most recent effort to lose weight. How would you describe the results? Would you say...?”	Action=yes DESRESULT1=gained it back

### **Sociodemographic and Anthropometrics**

Age was measured in the survey as the year of birth. Therefore, to derive an age variable for each respondent, the original age variable was subtracted from 2018, which was the year when the survey was conducted. For the purpose of our analysis and to compare between different age groups, the derived age was then grouped into four categories: 18-24, 25-34, 35-44,  $\geq 45$  years

The ethnicity variable was defined using two main questions in the survey. The first question was the type of respondent or the population group they belong to, which included the following categories Qataris, high-income, and low-income expatriates. These categories were not decided based on a direct question rather they were created based on the following criteria: Qataris (if participant was Qatari citizen and was holding a Qatari passport), high-income (non-Qataris with high income), and low-income expatriates (non-Qataris and had a total house income less than 2000 or 4000 QAR/month). The second question which was asked of low-income expats only was a direct question about the person's nationality and answered by reporting country phone codes. All Qatari participants were directly coded as Arabs. However, high-and low-income expatriates were categorized into different ethnic categories based on their country of origin into Arabs (90), South/East Asians (91, 92) ,and African/others (93).

BMI was measured as weight (in kilograms or pounds) divided by height (in cm or inches) squared and was derived from self-reported weight and height recorded in the interview. Later, this variable was classified into four categories: “underweight (BMI  $< 18.5$  kg/m<sup>2</sup>), normal weight (BMI 18.5–24.9 kg/m<sup>2</sup>), overweight (BMI 25.0–29.9 kg/m<sup>2</sup>) and obesity (BMI  $> 30.0$  kg/m<sup>2</sup>)” based on WHO criteria (4).

Other sociodemographic variable such as gender in the analysis was also collected. Furthermore, employment status was obtained by asking a direct question about current employment (yes/no). Moreover, education level was a direct question about the highest level of completed education and the variable was originally categorized into 10 categories, ranging from never attended school to Ph.D., others. For the purpose of our analysis, we decided to create a new education level variable with three categories (no education, less than college, college or more). Finally, marital status was obtained by asking a direct question about current marital status. This variable was originally categorized into five main categories but was recategorized into single/was married and married. The decision of recategorizing education level and marital status was made for the purpose of presenting more informative results and to make easier comparisons.

### **Lifestyle Variables**

Lifestyle variables such as diet (yes/no) were obtained by asking a direct question regarding current activity that was used to lose weight (dieting, exercise, lifestyle improvement or something else). Participants were considered ‘dieting only’ if they selected yes for dieting and no otherwise. Physical activity was obtained by asking participants a direct question about current and frequency of engagement in activities such as walking briskly, jogging, team sports, or other activities that lead to stronger breathing or feeling warm. Participants were considered ‘physically active’ if they answered "yes" regarding current engagement in physical activity on a regular basis and frequency of engagement in these activities was daily or 3-4/week or 1-2/week. Low physical activity was defined if the participant answered "no" regarding current engagement in physical activity on a regular basis or was engaged in these activities on a basis of 1 to 2 /month or <1 per month.

Other lifestyle variable included in the analysis was smoking which was obtained by asking participants about their current cigarette smoking status and it was categorized as daily, occasionally and not at all. Also, sleeping was obtained by asking participants about their average night sleeping hours which was categorized into <7 hours/night, 7-9 hours/night or > 9 hours/night.

### **Health-Related Variables**

All health conditions such as diabetes, blood pressure, high cholesterol, and heart disease were obtained directly by asking participants if they have been diagnosed or told by a doctor that they have these conditions. For the purpose of this analysis, a new variable named ‘comorbid conditions’ was created to show the total number of these four main conditions that a person might have.

Some variables were recategorized during model building step such as education (yes/no), marital status (married/not married), BMI (<25/≥25), smoking (yes/no), sleeping (7-9 hours/more or less) and WLSC (combined no weight change and relapse together). This was done to get more informative results and avoided small ends that can affect the model building process.

### **Statistical Analysis**

Secondary data (n= 2,523) was used to investigate the association between WLSC and depressive symptoms. Statistical analyses were conducted in STATA statistical software and the analytical steps taken are summarized in Figure 3.

First, a descriptive analysis of the study sample was conducted and the results from this stage were expressed as mean ( $\pm$  SD), frequency, and percentages (%). Second, Chi-square test of proportions and bivariate analysis in logistic regression models were used to examine the association between the main explanatory variable i.e. WLSC and other independent variables; the same method was followed for our outcome depressive symptoms and all other study variables. A liberal p-value of <0.3

was used so as not to miss important associations (94). At this stage, all the variables that were not associated with the main explanatory variable or the outcome at p-value  $\geq 0.3$  were excluded from subsequent analyses as per classic epidemiological definition of a confounder

Third, logistic regression models were fit to the data and each of the remaining variables was used to calculate % change in the odds ratio (OR) between WLSC and depressive symptoms. We started this stage of the analysis with age and gender-adjusted model (reference model). All variables with p-value  $< 0.3$  were entered manually and separately into our reference model, then we calculated % change in OR relative to the reference model, using the following formula (95, 96):

$$\text{OR} > 1: [(\text{OR}_{\text{model x}} - \text{OR}_{\text{full model}}) / (\text{OR}_{\text{basic model}} - 1) \times 100]$$

$$\text{if OR} < 1: [(\text{OR}_{\text{full model}} - \text{OR}_{\text{model x}}) / (\text{OR}_{\text{basic model}} - 1) \times 100]$$

Calculating % change in OR was performed twice; once, between each stage of change and depressive symptoms (in STATA we used ‘i’ before WLSC) and another time, with collapsed OR between WLSC and depressive symptoms (in STATA we did not use ‘i’ before WLSC). All variables that resulted in a 10% change or greater (96) in collapsed OR between WLSC and depressive symptoms were considered as confounders and retained in our final adjusted model.

Moreover, testing for potential effect modification using variables like age, gender, education, and BMI (59, 62) was performed using statistical interaction terms (##) between WLSC and potential modifiers. Significant interactions were then presented using margins plots for informative interpretations (97). Lastly, a sensitivity analysis was performed to assess the robustness of our findings. This was done by bringing variables with a p-value  $> 0.3$  that were removed at step 2 or those that had a

less than 10% OR change from step 3 and run a fully adjusted model with all study variables included. Results from the fully adjusted model were then compared with results from our final (partially adjusted) model. Additionally, to illustrate clinical relevance of these findings we decided to re-run our final adjusted model using depressive symptoms as a continuous score instead of a categorical outcome variable.

All presented data was weighted using survey weights computed by the SESRI research team using three components: base weights accounting for sample selection probability, adjustment factors to account for non-response; and a calibration method so that survey results are in line with the population numbers. Using survey weights in our analysis allows us to make inferences about the population from which the study sample was drawn.

Survey data analysis is usually used when a simple random sampling method is not used to consider the differences between the design that was used for data collection and simple random sampling. This is important because both point estimate calculation and standard errors of those estimates are affected by the sampling design. As a result, not taking sample design into account will result in an inaccurate calculation of point estimates and their standard error (97). Therefore, we use *svy* commands in STATA when running most of our analyses.

### **Ethical Approval and Ethics**

The data are fully collected and extracted by the SESRI department with processes involving minimal risk for participants. Moreover, ethical clearance was obtained from the Institutional Review Board (IRB) of Qatar University under approval number QU-IRB 1116-E/19 and was supported by QDA for collaborative research work. All data used for this study was anonymized (i.e. personal identifiers were de-

identified) that were accessed by the student using Secure File Transfer Protocol including a secure password to access the data.

### **Timeline and resources**

This study was supported by the Qatar university's student grant (QUST-2-SESRI-2019-1).

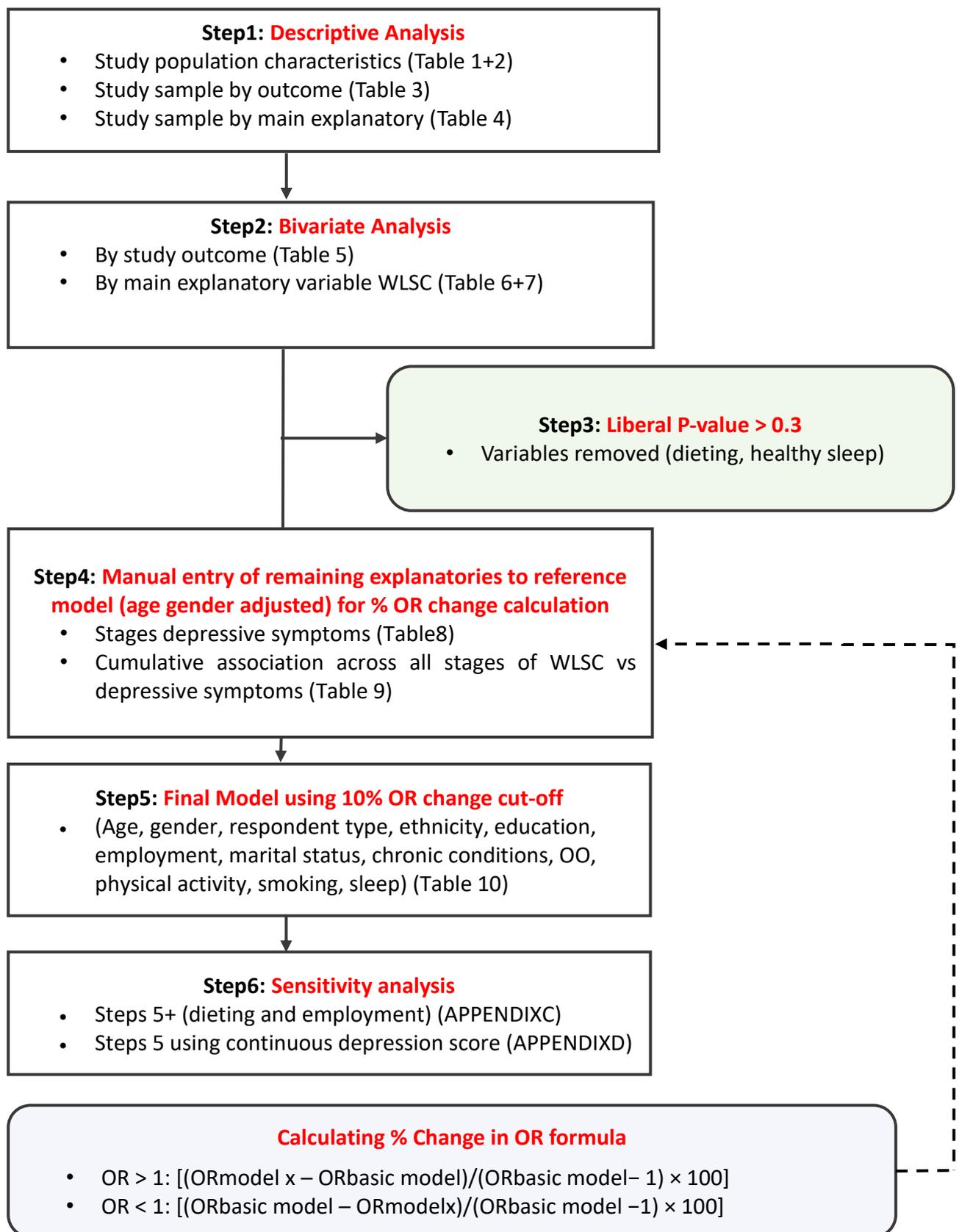


Figure 4: Flow Chart of Analysis Steps

## CHAPTER 6: RESULTS

### **Descriptive Analysis Results**

Our main study sample consisted of 2,523 people who have completed a phone questionnaire. Individuals chosen were of age greater than or equal to 18 years old and from all nationalities (Qataris and non-Qataris). The mean age of participants was 37 years old. The prevalence of depressive symptoms in the past two weeks was found to be 13%, while prevalence of OO was 59%. Similar to the context of Qatar described earlier under objectives section (chapter 4), majority of the respondents in our sample were males (82%) and non-Qataris (92%). Moreover, the majority of our study sample were low-income migrant workers, which explains the high proportion of males versus females as well. Furthermore, Other sample characteristics are summarized in (APPENDIX C).

Of this sample, 2,131(84.5%) met our inclusion criteria, thus they were included in the analysis (Figure 5). The mean age of the study sample was 37.5 years (SD [standard deviation] = 10.5 years). The majority (33.4%) of the participants were between 25-34 years old, and about 31.2% and 27.4% of participants were  $\geq 45$  years and between 35-44 respectively. The majority of the study sample were non-Qatari nationals (91%), were of South/East Asian ethnicity (68%) and were males (81%). Moreover, it was found that the majority (63.4%) of the sample were low-income expatriates, possessed less than a college-level education (67.8%), employed (87%), and married (79%) at the time of the survey.

The study's anthropometry and lifestyle-related variables' distribution indicated that 38.0% and 28.0% were classified as overweight and obese, respectively. This means that around 66.0% of our sample were OO. Further investigation of lifestyle and

behavioral factors showed that 62.6 were not physically active and 68% were not doing any diet to lose weight. Similarly, 76% were none smokers and around 56% were sleeping <7 hours per day.

The prevalence of depression in our sample was 12.0% (95% CI: 9.7-13.8). As for the main explanatory variable distribution, 17% were in the pre-contemplation stage, 5.7% were in contemplation stage, 14% were in preparation stage, and 44% in maintenance stage. Meanwhile, approximately 16% and 3% were in the 'no weight change' and 'relapse stage', respectively (Table 2).

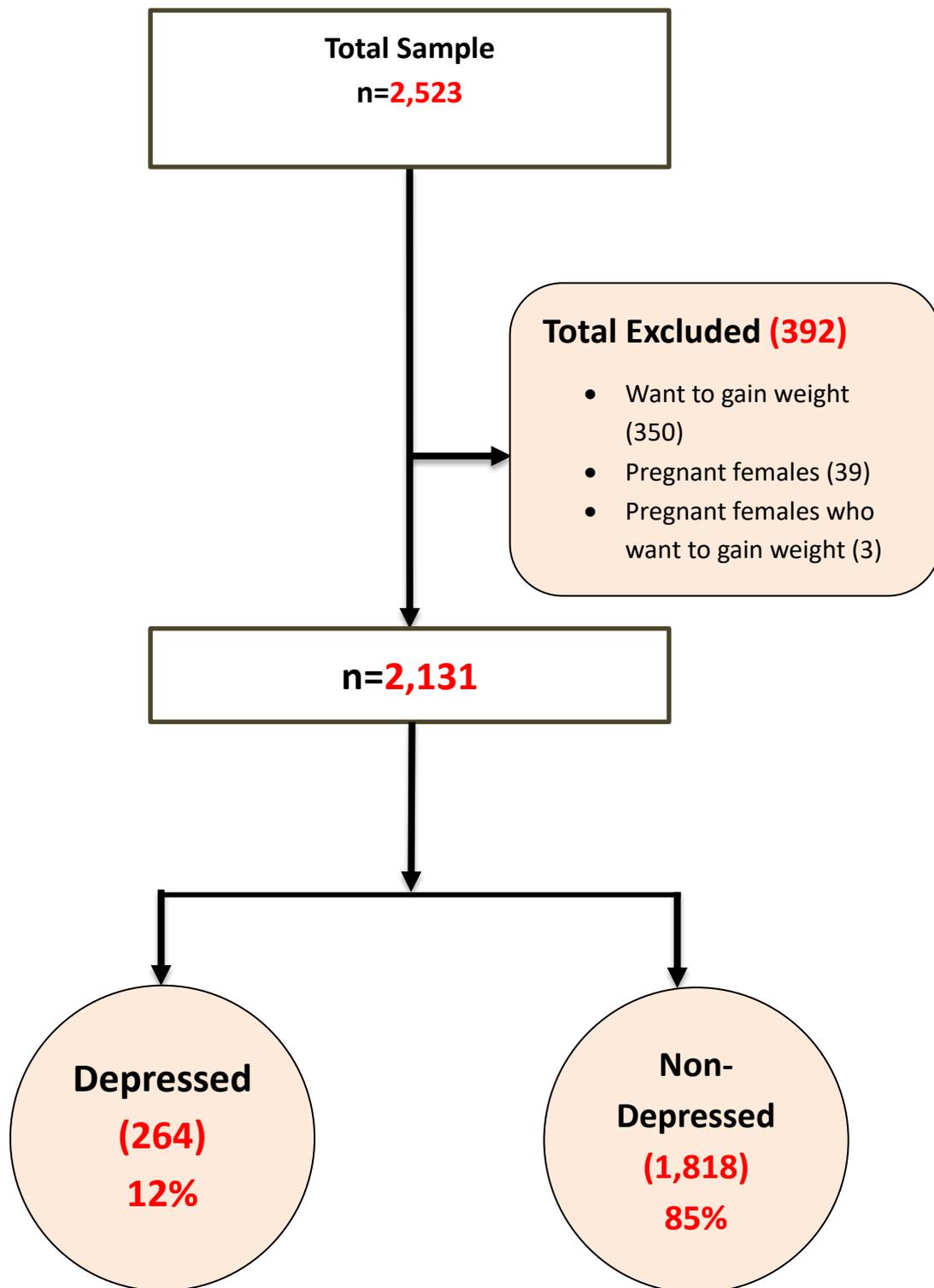


Figure 5: Flowchart of Study Sample (N=2,131)

Table 2: Characteristics of the Study Sample (N=2,131)

Variable	n/N	%	95% CI
Age (years)	37.5±10.5	NA	36.8-38.12
Age (years)			
18-24	(210/2131)	8.0	6.4-10.0
25-34	(681/2131)	33.4	30.2-36.7
35-44	(576/2131)	27.4	24.4-30.6
+45	(664/2131)	31.2	28.1-34.5
Missing	0	0	
Gender			
Male	(1528/ 2131)	81.0	79.2-83.5
Female	(603/ 2131)	19.0	16.5-20.8
Missing	0	0	
Nationality			
Qatari	(746/ 2131)	8.9	8.0-9.9
Non-Qatari	(1385/ 2131)	91.0	90.1-92.0
Missing	0	0	
Ethnicity*			
Arab	(1346/2119)	27.0	24.7-29.2
South/East			
Asia	(635/2119)	67.4	65.0-70.2
African/others	(138/2119)	5.5	4.4-6.8
Missing	12	0.48	
Respondent type			
Qataris	(738/ 2131)	8.4	7.6-9.3
Hight income	(813/2131)	28.2	25.7-30.7
Low income	(580 /2131)	63.4	60.6-66.2
Missing	0	0	
Education*			
No education	(70/ 2118)	5.3	3.8-7.3
Less than collage	(1181/ 2118)	67.8	64.8-70.7
Collage or more	(867/ 2118)	26.9	24.4-29.5
Missing	13	0.53	
Employment*			
No	(485/ 2127)	13.0	11.7-15.3
Yes	(1642/ 2127)	87.0	84.7-88.3
Missing	4	0.07	
Marital status*			
Single	(476/2125)	17.0	15.0-19.5
Previously married <sup>1</sup>	(115/2125)	3.9	2.8-5.4
Married	(1534/2125)	79.0	76.4-81.4
Missing	6	0.22	

Variable	n/N	%	95% CI
<b>BMI<sup>2</sup> (kg/m<sup>2</sup>)</b>			
Underweight	(26/ 2131)	2.2	1.3-3.7
Normal	(579/ 2131)	32.0	28.6-35.1
Overweight	(849/ 2131)	38.0	34.7-41.3
Obese	(677/ 2131)	28.0	25.2-31.2
Missing	0	0	
<b>Physical Activity</b>			
No	(1245/2123)	62.6	59.2-65.7
Yes	(878/2123)	37.4	34.3-40.8
Missing	8	0.15	
<b>Dieting*</b>			
No	(899/1279)	30	63.3-71.9
Yes	(380/1279)	14	28.1-36.7
Missing	852	55.0	
<b>Smoking*</b>			
Daily	(340/2128)	15.0	12.6-17.4
Occasionally	(169/2128)	9.0	7.6-11.8
Not at all	(1619/2128)	76.0	72.5-78.4
Missing	3	0.063	
<b>Sleep (hrs./night)<sup>3</sup></b>			
<7	(1136/2131)	56.0	52.3-59.1
7-9	(951/2131)	43.0	39.7-46.4
>9	(44/2131)	1.0	0.8-1.9
Missing	0	0	
<b>Depressive symptoms<sup>4*</sup></b>			
No	(1818/2082)	88.0	86.2-90.3
Yes	(264/2082)	12.0	9.7-13.8
Missing	49	1.7	
<b>WLSC<sup>5</sup></b>			
Precontemplation	(151/1492)	17.0	13.6-20.8
Contemplation	(73/1492)	5.7	4.0-8.1
Preparation	(249/1492)	14.0	11.8-17.1
Maintenance	(735/1492)	44.0	40.2-48.4
No weight change	(236/1492)	16.0	13.0-19.0
Relapse	(48/1492)	3.0	2.0-4.7

Note: All percentages are based on weighted proportions calculated using survey weights and therefore differ from the raw percentages. \*refers to variables that have missing values based on recoding those who refused to answer or responded with don't know as an answer to questions when asked about these variables

1. Separated, divorced, and widowed

2. BMI categorized using WHO criteria

3. Recommended hours of sleep by WHO

4. Measured using two items of the Physician Health Questionnaire (PHQ-2)

5. WLSC: Weight-loss stages of change among all BMI categorized

Table 3 presents the comorbidities existing in the study sample. Hypertension was the most prevalent comorbidity i.e. 15% along with high cholesterol and diabetes constituting 12% and 11%, respectively. Only 2.7% reported being diagnosed with cardiovascular or heart disease. For the total number of comorbid conditions, the majority of participants (72%) had none while 18% had only one of them and around 10% had two or more comorbid conditions.

*Table 3: Distribution of Comorbidities in the Study Sample (n=2,131)*

Variable	n/N	%	95% CI
<b>Hypertension (mmHg)*</b>			
Yes	(316/ 2129)	15.0	13.0-18.1
No	(1813/ 2129)	84.0	81.9-87.0
Missing	2	0.26	NA
<b>High cholesterol (mg/dL) *</b>			
Yes	(342/ 2124)	12.0	10.5-14.8
No	(1782/ 2124)	87	85.2-9.5
Missing	7	0.8	NA
<b>Diabetes (mmol/L) *</b>			
Yes	(272/ 2129)	10.8	9.0-13.2
No	(1857/ 2129)	88.8	86.8-91.0
Missing	2	0.4	NA
<b>CVD/ heart disease *</b>			
Yes	(75/ 2128)	2.6	1.8-3.9
No	(2053/2128)	97.0	96.1-98.2
Missing	3	0.4	NA
<b>Comorbid conditions<sup>1*</sup></b>			
None	(1457/2119)	71.0	68.8-74.9
one	(414/2119)	18.0	15.5-20.8
≥two	(248/2119)	10	8.2-12.3
Missing	12	1	NA

All percentages are based on weighted proportions calculated using survey weights and therefore differ from the raw percentages.

1. Comorbid conditions (diabetes, hypertension, cholesterol, heart disease)
2. star\* refers to variables that have missing values based on our choice to recode those who refused to or chose don't know as an answer to questions when asked about these variables
3. CVD = Cardiovascular disease

Prior modeling to test the hypothesis on the association between WLSC and depressive symptoms, it was essential to examine the distribution of selected sociodemographic, health-related and behavioral factors among people with and without depressive symptoms. As shown in Table 4, most of the participants did not have depressive symptoms (88%) compared to 12% who had depressive symptoms that may be clinically significant. Thus, the proportion of non-depressive symptoms was higher among all variables.

Both preparation and no weight change stage had a higher proportion of people with depressive symptoms, at approximately 16%. The prevalence of depressive symptoms among other stages was 11% and 12% for both contemplation and maintenance respectively and 10% for precontemplation and relapse. Furthermore, age distribution revealed that proportion of depressive symptoms was similar i.e. 12% for age groups of 25-34, 33-44 and 45+. Additionally, females had a higher proportion of depressive symptoms (14%) compared to males (11%). In addition, the proportion of depressive symptoms among OO was 12%, which was nearly similar in non-OO participants as well (11%).

Interestingly, high-income expats had the highest proportion of people with depressive symptoms (16%) compared to 11% among Qataris and 9.5% among low-income expats. Depressive symptoms were distributed among lifestyle behaviors as follows: unemployed (17%), those with low physical activity (13%), current smokers (15%) and those sleeping less or more than WHO recommended sleeping hours i.e. 12%.

Table 4: Study Sample by Depressive Symptoms (n=2,082)

Variable	Yes	No	P-value
	n=264 (12%) N (%)	n=1818 (88%) N (%)	
<b>WLSC<sup>1</sup></b>			
Precontemplation	16 (10)	130 (90)	0.4811
Contemplation	14 (12)	57 (88)	
Preparation	38 (16)	203 (84)	
Maintenance	86 (11)	642 (89)	
No weight change	40 (16)	191 (84)	
Relapse	9 (10)	38 (90)	
<b>Age (years)</b>			
18-24	21 (7.2)	185 (93)	0.5685
25-34	99 (12)	573 (88)	
35-44	68 (12)	496 (88)	
+45	76 (12)	564 (88)	
<b>Ethnicity*</b>			
Arab	176 (15)	1137 (85)	<b>0.0774</b>
South/ East Asia	75 (11)	550 (89)	
African/ others	12 (9.5)	120 (91)	
<b>Gender *</b>			
Male	175 (11)	1319 (89)	<b>0.1735</b>
Female	89 (14)	499 (86)	
<b>Overweight/obese (kg/m<sup>2</sup>)</b>			
Yes ≥25	199 (12)	1289 (88)	0.7235
No <25	65 (11)	529 (89)	
<b>Respondent type*</b>			
Qataris	80 (11)	639 (89)	<b>0.0021</b>
Hight income	124 (16)	669 (84)	
Low income	60 (9.5)	510 (90)	
<b>Education</b>			
Yes	252 (11)	1756 (89)	0.9842
No	9 (11)	53 (89)	
<b>Employment*</b>			
Yes	199 (11)	1408 (89)	<b>0.0242</b>
No	65 (17)	406 (83)	
<b>Marital status</b>			
Married	194 (12)	1307 (88)	0.9507
Not Married	70 (12)	505 (88)	
<b>Chronic disease</b>			
None	173 (67)	1255 (73)	0.4909
One	56 (20)	347 (18)	
≥ Two	34 (12)	205 (9.7)	

Variable	Yes	No	P-value
	n=264 (12%) N (%)	n=1818 (88%) N (%)	
Physical Activity*			
Yes	81 (8.9)	788 (91)	<b>0.0445</b>
No	181 (13)	1026 (87)	
Dieting			
Yes	46 (13)	330 (87)	0.8880
No	128 (13)	754 (87)	
Smoking*			
Yes	72 (15)	423 (85)	<b>0.0502</b>
No	191 (10)	1394 (90)	
Sleep (hrs./night)			
Between (7-9)	93 (10)	839 (90)	0.3659
More or less	171 (12)	979 (88)	

All percentages are based on weighted proportions calculated using survey weights and therefore differ from the raw percentages.

**\*Bold: P-value<0.3 (ethnicity, gender, respondent type, employment, physical activity, smoking status)**

Note: The total is not adding to 2,131 because 49 observation were coded as missing as they either answered don't know or refused to answer one of the PHQ-2 questions

Table 5 below illustrates the distribution of our study's explanatory variables across WLSC. What stands out in Table 5 is the statistically significant association between WLSC and age, gender, OO, respondent type, education, marital status, and physical activity at p-value <0.3. Distribution of our study outcome against WLSC revealed that preparation and relapse stages had the highest proportion of depressive symptoms (16%) each compared to the other stages. The proportion of people with depressive symptoms in other stages was distributed as follows: 10% for precontemplation stage, 12% for contemplation stage, 11% for maintenance stage, and 10% for relapse stage (p-value= 0.48).

Moreover, the contemplation stage had the highest proportion (56%) of people with  $\geq 45$  years. Similarly, 50% of people in relapse stage were between 35-44 years old. Majority of the people aged 35-44 were in preparation and maintenance stage and their percentage was 34% in each stage. Participants at the maintenance stage and those who reported no weight change had the highest proportion (35%) of people aged 25-34 years old. The proportion of males, OO, educated, employed, married, non-smokers, nondieting and non-physically active people was higher across all the stages.

Interestingly, when looking at sleeping patterns across all stages, we found that the majority were sleeping more or less than WHO recommended sleeping hours (7-9). Furthermore, investigation of other explanatory indicated that both preparation and relapse stages had the highest proportion of high-income expats compared to other WLSC stages. In contrast, the proportion of lower income expats was higher among preparation, contemplation, maintenance and no weight change stage (Table 5).

Table 5: Study Sample by Weight-Loss Stages of Change (n= 1,492)

Variable	Precont. n=151	Cont. n= 73	Prep. n=249	Maint. n=735	No weight changes n=236	Relapse n= 48	P-value
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Depressive symptoms							
Yes $\geq$ 3	16 (10)	14 (12)	38 (16)	86 (11)	40 (16)	9 (10)	0.4811
No <3	130 (90)	57 (88)	203 (84)	642 (89)	191 (84)	38 (90)	
Age (years)*							
18-24	10 (7)	1 (1)	19 (6)	78 (7)	17 (7)	5 (9)	<b>0.0210</b>
25-34	49(29)	17(28)	69 (29)	222 (35)	73 (36)	21 (33)	
35-44	37 (31)	20 (15)	85 (34)	221 (34)	66 (24)	14 (50)	
+45	55 (33)	35 (56)	76 (31)	214 (24)	80 (33)	8 (8)	
Gender *							
Male	122 (93)	46 (76)	161 (75)	486 (72)	141 (78)	29 (63)	<b>0.0025</b>
Female	29 (12)	27 (22)	88 (32)	249 (27)	95 (31)	19 (36)	
Ethnicity*							
Arab	77 (18)	52 (34)	190 (49)	544 (41)	164 (37)	31 (30)	<b>&lt;0.001</b>
South/ EastAsia	63 (78)	19 (60)	40 (45)	129 (51)	58 (56)	13 (60)	
African/ others	11 (4)	2 (6)	15 (6)	58 (8)	13 (7)	4 (10)	
Overweight/obese(kg/m <sup>2</sup> )							
Yes $\geq$ 25	104 (67)	66 (92)	217 (89)	611 (81)	194 (84)	45 (97)	<b>&lt;0.001</b>
No<25	47 (33)	7 (8)	32 (11)	124 (19)	42 (16)	3 (3)	

Variable	Precont. n=151	Cont. n= 73	Prep. n=249	Maint. n=735	No weight changes n=236	Relapse n= 48	P-value
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Respondent type*							
Qataris	35 (4)	29 (10)	91 (13)	302 (14)	96 (12)	20 (14)	
Higher-income	58 (19)	23 (24)	123 (52)	322 (41)	97 (41)	19 (45)	<b>&lt;0.001</b>
Lower-income	58 (77)	21 (67)	35 (35)	111 (45)	43 (50)	9 (41)	
Education							
Yes	140 (90)	66(85)	243 (97)	724 (98)	229 (98)	77 (97)	<b>0.003</b>
No	11 (10)	7 (15)	5 (3)	9 (2)	4 (2)	3 (3)	
Employment*							
Yes	122 (91)	52(84)	176(72)	564 (85)	167 (78)	37 (83)	<b>&lt;0.001</b>
No	28(9)	21(16)	73 (28)	171 (15)	69 (22)	11 (17)	
Marital status*							
Married	115 (84)	56 (80)	197 (84)	534 (77)	168 (80)	23 (51)	<b>0.013</b>
Not Married	36 (16)	17 (20)	52 (16)	200 (23)	66 (20)	25 (49)	
Chronic disease*							
None	112 (77)	38 (66)	149 (64)	472 (65)	146 (60)	33 (79)	
One	23(15)	22(28)	59(22)	162 (22)	59(18)	9(17)	<b>0.0813</b>
≥ Two	16(8)	12(6)	39(14)	97 (13)	31 (22)	5(4)	
Physical Activity							
Yes	49(29)	11 (16)	47 (17)	396 (57)	92 (37)	19 (44)	<b>&lt;0.001</b>
No	101 (71)	61 (84)	201 (83)	338 (43)	144 (63)	29 (56)	
Dieting							
Yes	NA	NA	59(30)	239 (32)	70(37)	10 (20)	
No	NA	NA	190(70)	496 (68)	166 (63)	38(80)	0.4297

Variable	Precont. n=151	Cont. n= 73	Prep. n=249	Maint. n=735	No weight changes n=236	Relapse n= 48	P-value
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Smoking							
Yes	35(22)	22(39)	67(27)	156 (20)	60(27)	12(19)	0.2203
No	116 (78)	50(61)	182(73)	578 (80)	176 (73)	36(81)	
Sleep (hrs./night)							
(7-9)	74 (49)	26 (29)	104(40)	326 (45)	106 (41)	17(39)	0.4186
More or less	77(51)	47(71)	145(60)	409 (55)	130 (59)	31(61)	

Note. All percentages are based on weighted proportions calculated using survey weights and therefore differ from the raw percentages.

NA: not applicable because people are in precontemplation stage

Precont= pre-contemplation stage, cont= contemplation stage, prep= preparation stage, maint= maintenance stage, depressive symptoms measured using PHQ-2

**\*Bold: P-value <0.3 (age, gender, ethnicity, OO, Respondent type, education, employment, marital status, chronic conditions, physical activity)**

## **Bivariate Analysis Results**

Bivariate analysis results in Table 6 showed no statistically significant association between WLSC and depressive symptoms (p-value =0.55). Although the odds of being depressed were 17% higher among people in contemplation stage and 65% higher among people in preparation stage; in addition, it was 2% higher among people in maintenance stage and 52% higher among people in no weight change/relapse stage, all in comparison to precontemplation stage. The table also shows no statistically significant (p-value >0.25) association between depressive symptoms and age, OO, education, chronic conditions, dieting and sleeping hours at night.

However, a significant association was found between depressive symptoms and gender and ethnicity (p-value <0.25). Similarly, a significant association (p-value <0.05) was found between depressive symptoms and each of the following variables: respondent type, employment, physical activity, and smoking. Closer inspection of Table 5 shows that the odds of depressive symptoms was lower among all ethnic groups compared to Arab ethnicity (the reference group). Furthermore, the odds of depressive symptoms were 1.6 times higher for high-income expats compared to Qataris, while odds were 0.85 times lesser among low-income expats compared to Qataris.

*Table 6: Weighted Unadjusted Odds Ratios and 95%CI for Depressive Symptoms and Potential Explanatory Variable Using Bivariate Logistic Regression*

Variable	OR	95% CI	P-value
<b>WLSC</b>			<b>0.49</b>
Precontemplation	REF		
Contemplation	1.17	0.41-3.38	0.77
Preparation	1.65	0.67-4.07	0.28
Maintenance	1.02	0.44-2.37	0.96
NWC <sup>1</sup> /relapse	1.52	0.63-4.25	0.37
<b>Age (years)</b>			<b>0.34</b>
18-24	REF		
25-34	1.83	0.94- 3.56	0.07
35-44	1.73	0.85- 3.50	0.13
+45	1.67	0.84- 3.34	0.14
<b>Gender</b>			<b>0.17*</b>
Male	REF		
Female	1.31	0.89- 1.92	0.17
<b>Ethnicity</b>			<b>0.06*</b>
Arab	REF		
South/East Asia	0.68	0.47-0.97	0.03
African/others	0.60	0.28-1.30	0.20
<b>Overweight/obese (kg/m<sup>2</sup>)</b>			<b>0.72*</b>
No <25	REF		
Yes≥25	1.08	0.70-1.67	0.72
<b>Respondent type</b>			<b>&lt;0.05*</b>
Qataris	REF		
Higher-income	1.6	1.14- 2.24	0.01
Lower-income	0.85	0.57- 1.28	0.44
<b>Education</b>			<b>0.98</b>
No	REF		
Yes	1.01	0.37-2.74	0.98
<b>Employment</b>			<b>0.03*</b>
No	REF		
Yes	0.6	0.39-0.94	0.03
<b>Marital status</b>			<b>0.95</b>
Not married	REF		
Married	1.01	0.65-1.57	0.95
<b>Chronic disease</b>			<b>0.49</b>
None	REF		
One	1.24	0.75-2.05	0.39
≥ Two	1.39	0.71-2.71	0.34

Variable	OR	95% CI	P-value
Physical Activity			<b>0.05*</b>
No	REF		
Yes	0.65	0.42- 0.99	0.05
Dieting			<b>0.89</b>
No	REF		
Yes	0.96	0.54-1.71	0.89
Smoking			<b>0.05*</b>
No	REF		
Yes	1.57	1.00-2.46	0.05
Sleep (hrs/night)			<b>0.37</b>
No	REF		
Yes	0.83	0.55-1.25	0.37

**1. NWC= No Weight Change**

**Bold= Overall P-value representing the overall significance of variable in the model**  
**Bold\* = P-value<0.3 (gender, ethnicity, respondent type, employment, physical activity, smoking, sleep)**

Table 7 and 8 present results of unadjusted odds ratios for each stage individually against sociodemographic, behavioral, and health-related variables. In Table 7, we can see that any variables were found to be significantly associated with contemplation stage at p-value <0.3 including: age (p-value=0.001), gender (p-value=0.22), OO (p-value=0.09), respondent type (p-value=0.10), education (p-value=0.03), chronic disease (p-value=0.08), physical activity (p-value=0.01), smoking (p-value=0.06) and sleeping (p-value=0.09). Moreover, preparation stage was significantly associated with the following variables: gender (p-value=0.12), OO (p-value=0.02), respondent type (p-value= 0.01), employment (p-value=0.001), marital status (p-value=0.1), and physical activity (p-value <0.001).

Furthermore in Table 8, the association between the maintenance stage and other explanatory variables revealed a significant association between this stage of weight-loss with each of the following variables: age (p-value= 0.08), ethnicity (p-value= 0.05), respondent type (p-value= 0.004), education (p-value=0.03), employment (p-value= 0.13), physical activity (p-value<0.001) and smoking (p-value=0.08) (Table 8). Finally, no weight change/relapse stage was significantly associated with gender (p-value=0.06), OO (p-value= 0.14), education (p-value= 0.23), employment (p-value= 0.11), marital status (p-value= 0.22) and chronic conditions (p-value= 0.15).

*Table 7: Weighted and Unadjusted Odds Ratios and 95% CI for Contemplation and Preparation stages of Change and Potential Explanatory Variables Using Bivariate Logistic Regression*

Variable	Contemplation			Preparation		
	OR	95% CI	P-value	OR	95% CI	P-value
Age (years)			<b>0.00</b>			<b>0.78</b>
18-24	REF			REF		
25-34	5.34	0.65-43.00	0.12	0.94	0.44-1.99	0.87
35-44	2.87	0.36-22.53	0.32	1.21	0.57-2.54	0.62
+45	12.79	1.63-100.38	0.02	1.18	0.55-2.54	0.68
Gender			<b>0.22</b>			<b>0.12</b>
Male	REF			REF		
Female	0.81	0.41-1.61	0.55	1.39	0.92-2.10	0.12
Ethnicity			<b>0.89</b>			<b>0.02</b>
Arab	REF			REF		
South/East Asian	1.18	0.61-2.30	0.62	0.55	0.35-0.87	0.01
African/other	1.03	0.17-6.24	0.97	0.62	0.30-1.25	0.18
Overweight and obesity			<b>0.09</b>			<b>0.02</b>
No	REF			REF		
Yes	2.84	0.85-9.54	0.09	1.97	1.13-3.44	0.02
Respondent type			<b>0.10</b>			<b>0.01</b>
Qataris	REF			REF		
Higher-income	0.71	0.38-1.31	0.27	1.30	0.93-1.82	0.13
Lower-income	1.56	0.80-3.04	0.19	0.59	0.35-0.99	0.04
Education			<b>0.03</b>			<b>0.70</b>
No	REF			REF		
Yes	0.22	0.06-0.86	0.03	1.38	0.26-7.35	0.70
Employment			<b>0.86</b>			<b>0.00</b>
No	REF			REF		
Yes	1.07	0.52-2.20	0.86	0.47	0.30-0.74	0.00
Marital status			<b>0.87</b>			<b>0.10</b>
Not married	REF			REF		
Married	1.08	0.45-2.55	0.87	1.49	0.92-2.40	0.11
Chronic disease			<b>0.08</b>			<b>0.81</b>
None	REF			REF		
One	1.38	0.56-3.43	0.48	1.15	0.68-1.94	0.61
≥ Two	0.47	0.21-1.06	0.07	1.17	0.62-2.23	0.63
Physical Activity			<b>0.01</b>			<b>0.00</b>
No	REF			REF		
Yes	0.27	0.10-0.74	0.01	0.25	0.15-0.41	0.00

Variable	Contemplation			Preparation		
	OR	95% CI	P-value	OR	95% CI	P-value
Dieting						<b>0.58</b>
No	NA	NA	NA	REF		
Yes	NA	NA	NA	0.87	0.52-1.44	0.58
Smoking			<b>0.06</b>			<b>0.38</b>
No	REF			REF		
Yes	2.18	0.97-4.92	0.06	1.25	0.76-2.04	0.38
Sleeping (hrs./night)			<b>0.09</b>			<b>0.44</b>
No	REF			REF		
Yes	0.51	0.24-1.10	0.09	0.85	0.55-1.29	0.44

**Bold= Overall p-value**

*Table 8: Weighted and Unadjusted Odds Ratios and 95% CI for the Association Between Maintenance and Relapse (Including No Weight Change) and Potential Explanatory Variables Using Bivariate Logistic Regression*

Variable	Maintenance			No weight change/relapse		
	OR	95% CI	P-value	OR	95% CI	P-value
Age (years)			<b>0.08</b>			<b>0.87</b>
18-24	REF			REF		
25-34	0.96	0.51-1.81	0.90	1.13	0.52-2.46	0.76
35-44	0.99	0.52-1.87	0.97	0.90	0.41-1.98	0.79
+45	0.61	0.32-1.15	0.13	1.00	0.45-2.20	1.00
Gender			<b>0.47</b>			<b>0.06</b>
Male	REF			REF		
Female	1.13	0.81-1.56	0.47	1.48	0.99-2.22	0.06
Ethnicity			<b>0.05</b>			<b>0.82</b>
Arab	REF			REF		
South Asian	0.69	0.50-0.94	0.02	1.05	0.71-1.57	0.80
East Asian	1.08	0.63-1.85	0.77	1.23	0.63-2.41	0.54
Other						
Overweight and obesity			0.95			<b>0.14</b>
No	REF			REF		
Yes	0.99	0.64-1.53	0.95	1.48	0.88-2.51	0.14
Respondent type			<b>0.00</b>			<b>0.84</b>
Qataris	REF			REF		
Higher-income	0.83	0.64-1.00	0.15	1.01	0.72-1.40	0.96
Lower-income	0.56	0.40-0.78	0.00	0.89	0.58-1.36	0.59
Education			<b>0.03</b>			<b>0.23</b>
Not educated	REF			REF		
Educated	3.95	1.15-13.62	0.03	1.94	0.65-5.79	0.24
Employment			<b>0.13</b>			<b>0.11</b>
No	REF			REF		
Yes	1.30	0.92-1.82	0.13	0.70	0.45-1.08	0.11
Marital status			<b>0.23</b>			<b>0.22</b>
Not married	REF			REF		
Married	0.80	0.55-1.16	0.23	0.75	0.48-1.19	0.22
Chronic disease			<b>0.60</b>			<b>0.15</b>
None	REF			REF		
One	1.23	0.81-1.86	0.33	0.92	0.56-1.53	0.75
≥ Two	0.99	0.58-1.68	0.97	1.80	0.96-3.38	0.07

Variable	Maintenance			No weight change/relapse		
	OR	95% CI	P-value	OR	95% CI	P-value
Physical Activity			<b>0.00</b>			<b>0.61</b>
No	REF			REF		
Yes	3.44	2.42-4.89	0.00	0.89	0.58-1.37	0.61
Dieting			<b>0.97</b>			<b>0.60</b>
No	REF			REF		
Yes	0.99	0.67-1.48	0.97	1.13	0.71-1.82	0.60
Smoking			<b>0.08</b>			<b>0.60</b>
No	REF			REF		
Yes	0.70	0.47-1.05	0.08	1.14	0.69-1.88	0.60
Sleeping (hrs./night)			<b>0.42</b>			<b>0.60</b>
No	REF			REF		
Yes	1.15	0.82-1.60	0.42	0.89	0.59-1.36	0.60

**Bold= Overall P-value**

### **Multivariate Analysis Results**

The following variables were associated with both outcome and main explanatory variables at p-value <0.3: age, gender, respondent type, ethnicity, education, employment, marital status, chronic conditions, OO, physical activity, smoking, and sleep. Thus, these variables were considered as potential explanatories and were adjusted for, in multivariable logistic regression models as shown in Table 9. All variables identified were first added separately to the reference (age and gender) adjusted model to examine their relative contribution to the magnitude and direction of the association between WLSC and depressive symptoms.

As shown in Table 8, we found that adjusting for age and gender alone resulted in a positive association between depressive symptoms and each of contemplation (OR=1.11, p-value=0.84), preparation (OR=1.54, p-value=0.35), and no weight change/relapse (OR=1.38, p-value=0.50) stages compared to precontemplation stage. A negative association was found between maintenance stage and depressive symptoms (OR=0.95, p-value=0.91) compared to preparation stage. The corresponding percentage change in odds ratios relating each of the contemplation, preparation, and no weight change/relapse stages to depression were an increase of 11%, 54%, 38% respectively. In contrast, a 5% decrease was found in the odds of depression for those in the maintenance stage compared to those in the precontemplation stage.

This pattern of direction between WLSC stages and depressive symptoms remained the same when we separately added ethnicity, respondent type, education, employment, marital status, chronic conditions and sleep duration to our reference model. However, interestingly, both physical activity and smoking had different effects on the direction of the association between some of the stages and depressive symptoms.

In fact, the direction of the association with depressive symptoms became negative (OR=0.92, P-value=0.88) for the contemplation stage and positive (OR=1.14, P-value=0.79) for the maintenance stage when adjusting for physical activity. Similarly, the association between those in the contemplation stage and depressive symptoms became negative (OR=0.86, p-value=0.79) when we adjusted for smoking status. Another important finding in (Table 9) pertains to the raw change in the magnitude of OR and % OR change. These findings can be summarized as follows: ethnicity, respondent type, employment, OO, smoking, and sleep all resulted in a reduction in the OR for contemplation, preparation and no weight change/relapse stages. Moreover, marital status and physical activity resulted in an increase in OR for maintenance stage. Furthermore, the greatest % change in OR for contemplation stage was seen in models with smoking (-223%), physical activity (-171%) and OO (-81%).

Moreover, ethnicity resulted in a -71% change in OR in contemplation stage and -161% in maintenance stage. Also, adding respondent type to the reference model resulted in a -34% change in OR in preparation stage and a -167% change in maintenance. As for no weight change/relapse stage, the greatest % change was found in models with OO with -28% change in OR and physical activity with 29% change.

*Table 9: Study Variables Associated with Increase/Decrease in the Association Between Stages of Weight-Loss and Depressive Symptoms*

Model	OR	(95%CI)	OR % Change	p-value	Overall OR
<b>Basic model gender and age-adjusted</b>					
Precontemplation	REF				
Contemplation	1.11	0.40-3.05	N/A	0.84	1.03
Preparation	1.54	0.63-3.76	N/A	0.35	
Maintenance	0.95	0.40-2.25	N/A	0.91	
No weight change/relapse	1.38	0.54-3.54	N/A	0.50	
<b>Ethnicity</b>					
Precontemplation	REF				
Contemplation	1.03	0.39-2.73	-71	0.95	1.02
Preparation	1.35	0.54-3.35	-35	0.52	
Maintenance	0.87	0.36-2.07	-161	0.75	
No weight change/relapse	1.32	0.51-3.42	-17	0.57	
<b>Respondent type</b>					
Precontemplation	REF				
Contemplation	1.08	0.40-2.92	-27	0.88	1.02
Preparation	1.35	0.56-3.29	-34	0.50	
Maintenance	0.86	0.36-2.09	-167	0.75	
No weight change/relapse	1.28	0.49-3.35	-26	0.61	
<b>Education</b>					
Precontemplation	REF				
Contemplation	1.12	0.41-3.07	11	0.82	1.03
Preparation	1.49	0.60-3.67	-9	0.39	
Maintenance	0.94	0.39-2.25	-16	0.89	
No weight change/relapse	1.41	0.55-3.65	8	0.48	
<b>Employment</b>					
Precontemplation	REF				
Contemplation	1.10	0.40-3.00	-13	0.86	1.03
Preparation	1.45	0.60-3.54	-16	0.41	
Maintenance	0.95	0.40-2.24	3	0.91	
No weight change/relapse	1.36	0.54-3.43	-7	0.52	
<b>Marital Status</b>					
Precontemplation	REF				
Contemplation	1.12	0.41-3.10	10	0.83	1.04
Preparation	1.53	0.63-3.74	-2	0.35	
Maintenance	0.96	0.40-2.28	-19	0.92	
No weight change/relapse	1.43	0.55-3.68	11	0.46	

Model	OR	(95%CI)	OR % Change	P-value	Overall OR <sup>1</sup>
<b>Chronic conditions</b>					
Precontemplation	REF				
Contemplation	1.10	0.41-2.99	-8	0.85	1.01
Preparation	1.56	0.62-3.89	4	0.34	
Maintenance	0.88	0.36-2.13	139	0.77	
No weight change/relapse	1.34	0.51-3.52	-11	0.55	
<b>Overweight/Obesity</b>					
Precontemplation	REF				
Contemplation	1.02	0.38-2.76	-81	0.97	1.01
Preparation	1.42	0.59-3.42	-23	0.44	
Maintenance	0.89	0.38-2.08	-117	0.79	
No weight change/relapse	1.28	0.51-3.22	-28	0.61	
<b>Physical Activity</b>					
Precontemplation	REF				
Contemplation	0.92	0.33-2.58	-171	0.88	1.09
Preparation	1.43	0.58-3.54	-19	0.43	
Maintenance	1.14	0.46-2.83	366	0.79	
No weight change/relapse	1.49	0.57-3.89	29	0.41	
<b>Smoking</b>					
Precontemplation	REF				
Contemplation	0.86	0.29-2.54	-223	0.79	1.03
Preparation	1.44	0.58-3.56	-18	0.43	
Maintenance	0.94	0.40-2.19	-13	0.89	
No weight change/relapse	1.30	0.50-3.38	-20	0.58	
<b>Sleep</b>					
Precontemplation	REF				
Contemplation	1.06	0.39-2.87	-47	0.91	1.03
Preparation	1.50	0.61-3.66	-7	0.37	
Maintenance	0.93	0.40-2.21	-28	0.88	
No weight change/relapse	1.35	0.53-3.45	-8	0.53	

All variables were entered manually one by one into the basic model and the % of the change in OR was estimated (OR% change) relative to the basic model.

1.Overall OR is cumulative OR between WLSC and depressive symptoms when combining all of Contemplation, Preparation, Maintenance and Relapse stages and comparing them against Precontemplation stage.

Table 10 illustrates the results of cumulative increase/decrease in association between WLSC and depressive symptoms. As can be seen from Table 10, all following variables except employment were associated with a  $\geq 10\%$  change in WLSC cumulative % OR. Variables associated with decrease in magnitude of reference (age and gender) adjusted model were ethnicity (OR=1.02, -19% change), OO (OR=1.01, -58% change), respondent type (OR=1.02, -39% change), chronic conditions (OR= 1.01, -66% change) and sleep (OR= 1.03, -10% change). In contrast, other variables were also associated with increase in the magnitude of cumulative OR% such as marital status (OR=1.04, 24% change), physical activity (1.09, 192% change) and smoking (OR= 1.04, 192% change). What stands out the most in Table 10 is the highest 192% and lowest -66% cumulative OR change that was seen in models with physical activity and chronic conditions, respectively.

We found that adjusting for all the variables that resulted in a  $\geq 10\%$  change in cumulative OR (age, gender, ethnicity, respondent type, education, marital status, chronic conditions, OO, physical activity, smoking, and sleep) resulted in an overall effect of (OR=1.05) 70% change which is another important finding in Table 10.

Overall, effect 2 represent our sensitivity analysis results after running a fully adjusted model with all study variables irrespective of their p-values or % OR change which has all overall effect 1 variables in addition to dieting and employment which resulted in a cumulative OR of 1.08 and a 177% change (APPENDIX D).

*Table 10: Study Variables Associated with Cumulative Increase/Decrease in Association Between WLSC and Depressive Symptoms*

Model	Overall OR	OR% change	95% CI	p-Value
Basic model (gender and age adjusted)	1.03	N/A	0.83-1.27	0.79
Ethnicity	1.02	-19	0.82-1.27	0.83
Respondent type	1.02	-39	0.82-1.27	0.88
Education	1.03	13	0.83-1.29	0.77
Employment	1.03	2	0.83-1.28	0.79
Marital Status	1.04	24	0.84-1.29	0.75
Chronic conditions	1.01	-66	0.81-1.26	0.90
Overweight/Obese	1.01	-58	0.82-1.25	0.91
Physical Activity	1.09	192	0.87-1.36	0.47
Smoking	1.04	29	0.84-1.29	0.73
Sleep	1.03	-10	0.83-1.27	0.81
Overall effect1 <sup>1</sup>	1.05	70	0.82- 1.34	0.70
Overall effect2 <sup>2</sup>	1.08	177	0.73-1.60	0.69

All factors were entered manually one by one into the basic model and the % of the change in OR was estimated (OR% change).

1. Adjusting for (age, gender, ethnicity, respondent type, education, marital status, chronic conditions, OO, physical activity, smoking, and sleep) at P-value <0.3 from bivariate analysis and 10% OR change.

2. Adjusting for all Overall effect1 variables+ (diet and employment) irrespective of P-value and OR% change

Table 11 shows our final adjusted model using multivariable logistic regression compared to unadjusted results we had got earlier using bivariate analysis (Table 6). As we can see from the table adjusting for confounders, changed the direction and magnitude of our main explanatory (WLSC) stages. As a result, was can now draw more informative findings in terms of the association between WLSC and depressive symptoms. From Table 6, we can see that the direction of association between contemplation stage and depressive symptoms has changed to negative.

This indicates that odds of depressive symptoms are 32% less among people in contemplation stage of weight-loss compared to precontemplation stage holding other variables in the model constant.

Moreover, being in preparation stage increase the odds of depressive symptoms by 7% compared to precontemplation stage. Furthermore, the direction of the association between maintenance stage and depressive symptom have also become negative after adjusting for confounders. This means that odds of depressive symptoms are 14% times less among people in maintenance stage compared to people in precontemplation stage. Also, the magnitude of the association between no weight change/relapse and depressive symptoms have decreased when adjusting for other confounders. This means that people in no weight change/relapse stage have 1.18 times the odds of depressive symptoms compared to people in precontemplation stage.

Interestingly, the direction of the association between age categories 35-44 and 45+ with depressive symptoms became negative when adjusting for other variables. This means that people aged 35-44 and 45+ years old have 0.87 and 0.96 times the odds of depressive symptoms, respectively compared to people aged (18-24) years old. Similarly, the direction of association between low income and depressive symptoms has changed to positive. This indicated that odds of depressive symptoms among low-income people are 10% higher compared to Qataris. Additionally, to illustrate clinical relevance of these findings, we decided to re-run our final adjusted model using depressive symptoms as a continuous score instead of a categorical outcome variable. (APPENDIX E)

*Table 11: Weighted and Fully Adjusted Model Using Multivariable Analysis (n= 1,436) Compared to Unadjusted Models Using Bivariate Analysis*

Variable	Adjusted			Unadjusted		
	OR	95% CI	P-value	OR	95% CI	P-value
<b>WLSC</b>						
Precontemplation	REF			REF		
Contemplation	0.68	0.25-1.89	0.46	1.17	0.41-3.38	0.77
Preparation	1.07	0.42-2.71	0.89	1.65	0.67-4.07	0.28
Maintenance	0.86	0.33-2.22	0.76	1.02	0.44-2.37	0.96
No weight change/ relapse	1.18	0.42-3.38	0.75	1.52	0.63-4.25	0.37
<b>Age (years)</b>						
18-24	REF			REF		
25-34	1.20	0.53-2.73	0.66	1.83	0.94- 3.56	0.07
35-44	0.87	0.34-2.22	0.78	1.73	0.85- 3.50	0.13
45	0.96	0.37-2.51	0.94	1.67	0.84- 3.34	0.14
<b>Gender</b>						
Male	REF			REF		
Female	1.57	0.94-2.64	<b>0.09</b>	1.31	0.89- 1.92	0.18
<b>Ethnicity</b>						
Arab	REF			REF		
South/ East Asian	0.65	0.36-1.19	0.17	0.68	0.47-0.97	0.03
African/others	0.71	0.31-1.62	0.41	0.60	0.28-1.30	0.20
<b>Respondent type</b>						
Qataris	REF			REF		
Higher income	1.52	0.99-2.33	<b>0.06</b>	1.6	1.14- 2.24	0.01
Lower income	1.10	0.51-2.37	0.82	0.85	0.57- 1.28	0.44

Variable	Adjusted			Unadjusted		
	OR	95% CI	P-value	OR	95% CI	P-value
Education						
No	REF			REF		
Yes	1.03	0.32-3.33	0.97	1.01	0.37-2.74	0.98
Marital status						
Not married	REF			REF		
Married	1.37	0.75-2.51	0.31	1.01	0.65-1.57	0.95
Chronic conditions						
None	REF			REF		
One	1.08	0.57-2.03	0.82	1.24	0.75-2.05	0.39
>=2 Two	1.15	0.47-2.84	0.76	1.39	0.71-2.71	0.34
Overweight/obesity						
No	REF			REF		
Yes	1.25	0.61-2.55	0.54	1.08	0.70-1.67	0.72
Physical Activity						
No	REF			REF		
Yes	0.56	0.32-0.99	<b>0.05</b>	0.65	0.42- 0.99	0.05
Smoking						
No	REF			REF		
Yes	1.94	1.03-3.64	<b>0.04</b>	1.57	1.00-2.46	0.05
Sleep						
More/less (7-9)	REF			REF		
	0.77	0.46-1.28	0.31	0.83	0.55-1.25	0.37

**Bold= marginally significant p-value**

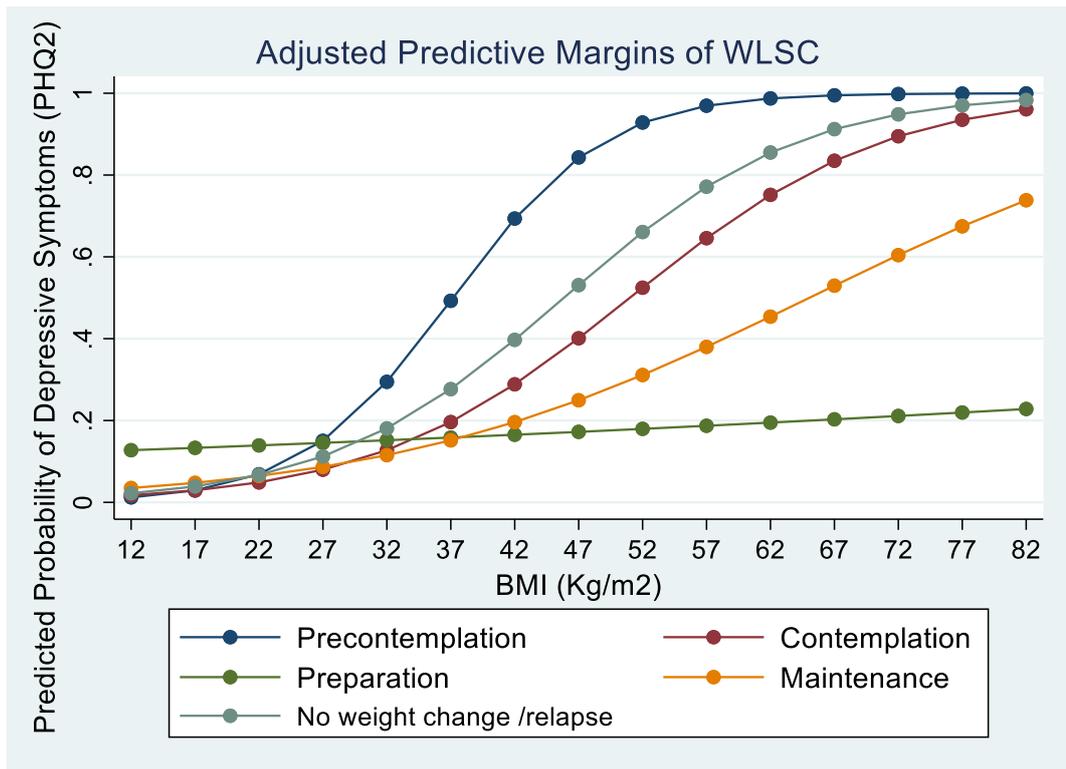


Figure 7: A plot of the average predictive margins for WLSC and BMI on depressive symptoms (unadjusted)

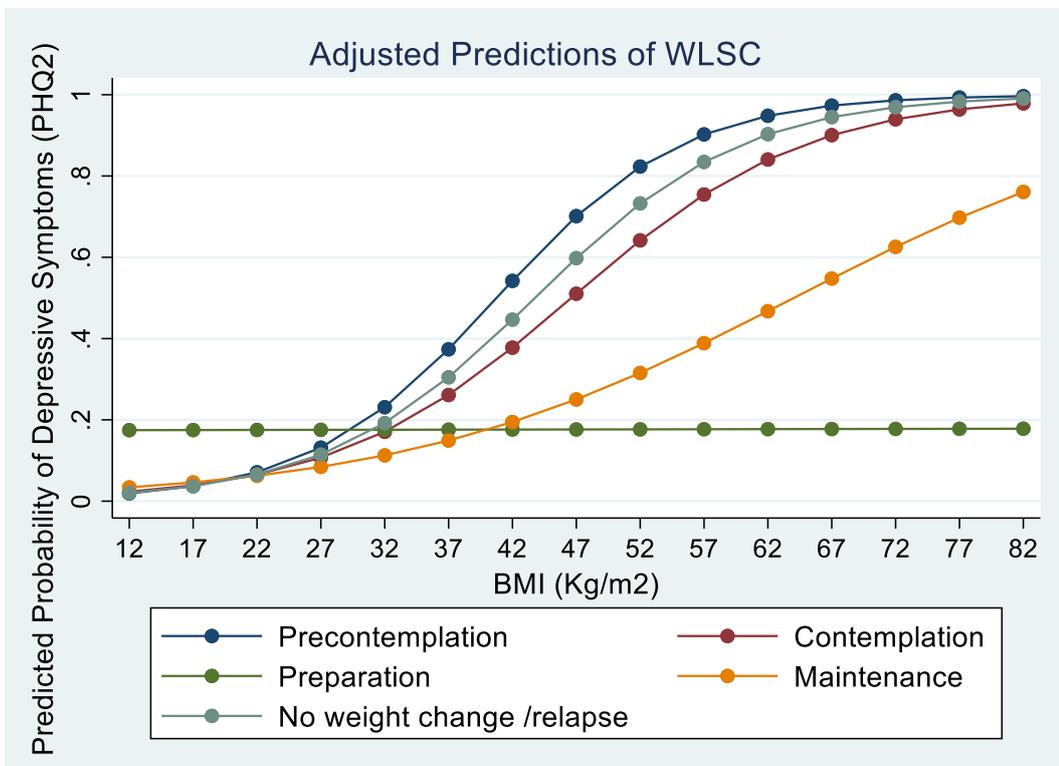


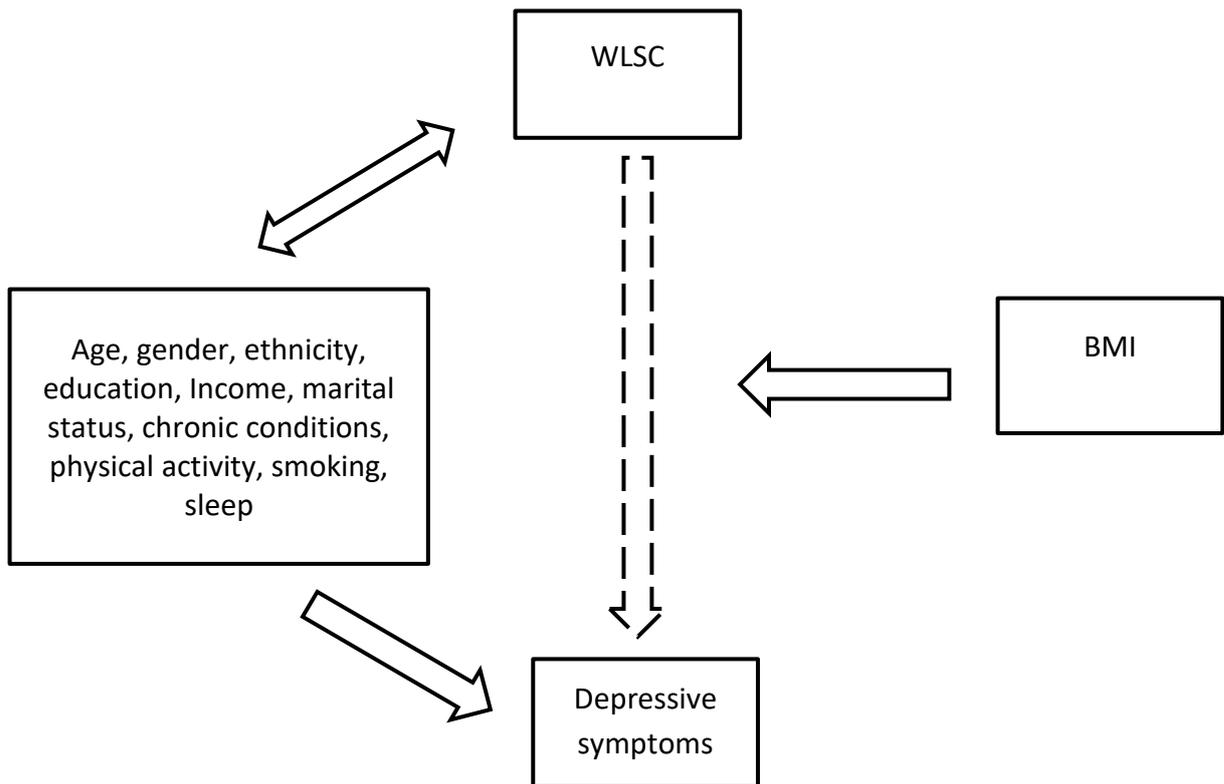
Figure 6: A Plot of the Average Predictive Margins for WLSC and BMI on Depressive Symptoms (Adjusted)

### **Interaction Between WLSC and BMI**

Figures 6 and 7 are plots of the population average predicted probability of depressive symptoms as a function of BMI among different WLSC.

Unlike contemplation (AMEs=-0.039, p-value=0.606) and maintenance stage (AMEs=-0.788, p=0.714), the average predicted probability of depressive symptoms as a function of one unit change in BMI scale was close to zero for people in preparation stage (AMEs = -0.001, p-value =0.991). Considering the nonlinear association between BMI and depressive symptoms, the decision of interpreting the results as (one-unit increase in BMI was associated with statistically significant increase in the predicted probability of depressive symptoms) would not be informative.

Overall, we can see that all WLSC had low depressive symptoms for low BMI values that are less than 27 kg/m<sup>2</sup>. However, this trend started to gradually increase for BMI values between 27 to 62 kg/m<sup>2</sup>. This is relevant among people in precontemplation, contemplation, maintenance and no weight change/relapse stage but not the preparation stage. Nevertheless, this gradual increase in predicted probability of depressive symptoms reached a peak at BMI >62 kg/m<sup>2</sup>. Moreover, visual inspection of the graphs shows highest predicted probabilities for depressive symptoms was experienced among people in precontemplation stage followed by no weight change/relapse and contemplation stage. In Figure 6, the small change observed among people in preparation stage stands out. However, this has changed after adjusting for potential confounders (Figure 7) as the predicted probabilities of depressive symptoms started to slowly increase with higher levels of BMI. Unadjusted Table of interaction is shown in (APPENDIX F).



*Figure 8: DAG Representing Association Between WLSC and Depressive Symptoms while Adjusting for Potential Confounders and Accounting for the Presence of the Potential Effect Modifiers*

Figure 8 is a visual representation that summarizes our study findings regarding variables confounding or mediating the association between our study outcome, depressive symptoms and main explanatory variable, WLSC.

WLSC was clinically but not statistically significantly associated with depressive symptoms. However, this association can be modified by BMI at different stages of weight-loss. Moreover, age, gender, ethnicity, education, income, marital status, chronic conditions, physical activity, smoking, and sleep are all factors that influence (associated with) both the exposure and the outcome but may not necessarily be in the direct pathway leading to depression (confounders). This is relevant to populations sharing similar characteristics to our study sample.

## CHAPTER 7: DISCUSSION

The aim of this study was to investigate the association between WLSC and depressive symptoms using the TTM framework among the general population in Qatar (n=2,131) participants. Using PHQ-2 cut-off  $\geq 3$ , the prevalence of depressive symptoms was 12% (95% CI: 9.7-13.8).

The relationship of stage and processes of change with depressive symptoms is not only restricted to the field of addictions (98, 99), but its impact lies beyond that such as the case of weight management (100, 101). As a result, more studies are needed to generalize the stages and processes of change models in this field.(25). To our best knowledge, our study is the first to examine the association between WLSC and depressive symptoms using TTM framework in a representative sample of adults in Qatar, which is an important extension of past findings. Non-significant association was found between WLSC and depressive symptoms (OR= 1.05, 95%CI= 0.82-1.34, p-value=0.7).

This finding is consistent with another study that was done among adults in US (102) where no association was found between depressive symptoms and the odds of attempting to lose weight in the past year (OR=1.03, 95%CI=1.00–1.06, p-value=0.074). Yet, this was contrary to findings from a large meta-analysis that examined changes in symptoms of depression reported on trials of weight-loss interventions. The study found an overall reduction in depressive symptoms among obese individuals in weight loss trials (68).

There are two possible explanations for our findings that contradict the results of this meta-analysis. First, the design of our study is cross-sectional thus, the issue of causality might arise while studying association between exposure and outcome. Second, the demography of our sample mainly consists of low-income migrant males

whose characteristics are quite different from the general population and they might not necessarily be interested in attempting to lose body weight.

Existing literature supports the association between OO and depressive symptoms. Despite the high proportion of OO we had in our sample (66%), BMI was measured using self-reported data. Previous literature shows that people tend to overestimate their height and underestimate their weight. Consequently, this could affect the validity of the results (103, 104). Additionally, the result of a meta-analysis of cross-sectional studies revealed an overall positive link between obesity and depression. However, subgroup analyses showed that the relationship between both conditions was statistically significant for females and not significant for males, which is close to the results of our study (105).

Basing conclusions on statistical significance alone is insufficient. Measures of the size of the association (clinical significance) are also necessary. Our findings extend to the existing literature by investigating weight-loss and weight maintenance in relation to depressive symptoms using the TTM. This helps to disentangle the bidirectional association between depressive symptoms and body weight by identifying the individual's stage of change. That is why it was important to look at associations between stages of weight loss individually and depressive symptoms without just looking at the overall association.

When investigating the individual association between the contemplation stage and depressive symptoms, the odds were found to be 32% less among people in this stage compared to precontemplation stage. A person in contemplation stage is defined as one who is aware of an existing problem but is not willing to take actions to fix it in the near future. When we look at this definition, we find that the proportion of people who are not satisfied about their body weight is low, comparing to high proportion of

OO (66%). The high proportion of people (73%) who are satisfied about their body weight in our sample leads us to believe that it could be the reason behind this negative association. This is consistent with other studies that have found a negative association between body weight satisfaction and depressive symptoms (66, 69).

For example, a study that was investigating appearance satisfaction including body weight and its effect on the association between obesity and depressive symptoms, was found to be negative among both men and women. The study also found that men tend to report higher satisfaction with appearance and less depressive symptoms compared to women (69). Another longitudinal study (66) investigated the role of body weight and body shape dissatisfaction in predicting increases in depressive symptoms and disordered eating behavior from adolescence to early adulthood. The study found that bodyweight dissatisfaction was associated with higher depressive symptoms among both females and males.

Maintenance stage was also negatively associated with depressive symptoms and positively associated with no weight change/relapse stage. These results are in line with other study findings that have investigated factors associated with weight loss maintenance and relapse (106-108). A study that was investigating the role and contribution of weight stigma to weight-loss maintenance, found that overlooking psychosocial factors like weight stigma can hinder weight loss and maintenance(107). Each unit increase in internalized weight stigma was associated with a decrease in the odds of maintaining weight loss by 28% (107). Similarly, from the literature, we know that weight stigma is associated with factors such as mental health, anxiety and depressive symptoms (13). In other words, weight stigmatization could increase negative effect on people's mental health which decreases weight-loss maintenance.

Additionally, weight regain has sometimes been associated with depression. A

study aiming to identify predictors of weight gain identified higher level of depression as one of the risk factors for weight regain (109). Moreover, psychiatric diagnoses seem to hinder long-term weight control (110). Furthermore, persons recovering from weight relapse reported lower degrees of depression. Hence, lower level of depressive symptoms is associated with successful body-weight-control among those maintaining weight loss (111).

Another study that was comparing between those who maintained their weight-loss and those who regained weight in relation to social support found that positive, rather than instructive support, appears to help in weight-loss maintenance (108). Other variables that have been associated with weight maintenance were, self-efficacy, social support, autonomy, better coping strategies, and overall more psychological strength and stability (106). Other factors that may pose a risk for weight regain included negative emotions and stress, passive reactions to problems and depressive symptoms (106). This evidence suggests that maintenance stage is positively associated with body satisfaction or less weight stigma and the reverse is true for depression which is similar to our study findings.

In our study, all ethnicity groups were inversely associated with depressive symptoms. These findings were different from another study that was conducted in Qatar and had a very similar sample to the ones we had (52) and it found a significant positive association between ethnic groups and depressive symptoms. However, this study was investigating subthreshold and Major Depressive Episode using PHQ-9 which is different from our tool PHQ-2. In other words both tools have different sensitivity and specificity (55). Moreover, the ethnic groups' categories were different from that of our study and the results were based on adjusting for different variables, which might explain these differences.

Furthermore, our results found a positive association between OO and depressive symptoms. Literature investigating this association supports our finding; for example, results from a systematic review examining association between OO and depression, found that overweight was associated with increase in the risk of onset of depression at follow-up and was found to be more significant among adults aged 20-59 years and  $\geq 60$  years (6). Furthermore, obesity is considered a crucial predictor of depressive symptoms (6) and individuals with obesity are at higher risk of depression (69).

Moreover, physical activity was inversely associated with depressive symptoms. Our results are in line with findings from other studies that showed an inverse association between engaging in physical activities and depressive symptoms (102, 112). With regard to smoking, smokers had 1.94 times the odds of depressive symptoms compared to non-smokers after controlling for other variables. Our results are also consistent with findings from a large study that was done among Canadian general population to investigate association between cigarette smoking stages of change and prevalence of major depression (77). The prevalence of major depression was found to be higher among former smokers and lowest among those who never smoked (77).

Our results showed that adjusting for both physical activity and smoking affected the direction of the association between some of the weight-loss stages and depressive symptoms. This suggests that the association between WLSC and depressive symptoms is confounded by these variables; therefore, they need to be taken into consideration when investigating this association.

Finally, a significant interaction was found between WLSC and BMI in relation to depression. The population average predicted probability of depressive symptoms

was increasing for higher BMI values across all weight-loss stages of change except for preparation. This is consistent with other studies that have found a strong association between higher BMI and depressive symptoms (59, 61).

### **Limitations**

Our study has limitations that are worth noting. First, our main study outcome (depressive symptoms) was measured using PHQ-2. This tool was validated for the screening of major depressive symptoms and was shown to have high sensitivity and specificity for detecting cases of major depression (55, 57). However, the use of PHQ-9 would have given us a better insight into the investigated association considering that dimension four of PHQ-9 inquires about poor appetite or overeating, both of which are related to weight change (16).

Second, our study results were based on a cross-sectional data, thus, we were unable to determine the directionality of the observed associations (temporality). Although, our findings are presented in the direction of WLSC leading to depressive symptoms, reverse causality is possible. Third, our study is based on a self-reported phone survey data, so the absence of visual cues on the phone might compromise probing and rapport which might cause response and information bias, thus, affecting our results (113). Fourth, majority of our sample were low-income migrant workers whose conditions and health beliefs are likely to be substantially different from the rest of the population.. Their exclusion would have potentially resulted in more statistically robust estimates for the main study question. This is because of two things; they increase heterogeneity in our sample, which may have contributed to the null association that we have found. This heterogeneity may have also resulted in confounding issues by unmeasured variables that we could not account for in the analysis. Thus, their inclusion through increased heterogeneity may have limited the

interpretability of our findings.

### **Strengths**

One of our study strengths is the large sample size of the participants (2,131) that included a representative sample of main population groups including low-income migrants who are not always convenient to reach (114). Moreover, all reported proportions were calculated using survey weights which allow for generalizability of our study findings to the population in Qatar. Furthermore, survey questionnaires were available in nine different languages which limits response bias considering the diverse ethnic backgrounds that our sample comes from. Also, the data had few missing values and the levels of missing values reported was based on our decision to code responses of individuals who refused to answer some of the survey questions.

### **Significance and implication**

Identifying the underlying pathways between WLSC and depressive symptoms is essential for improving prevention and treatment efforts that target people who want to lose their body weight. Collectively, the current literature supports the association between higher BMI, poor weight management outcomes and depressive symptoms. Although a considerable number of studies provided evidence that support association between weight-loss, weight maintenance, and depressive symptoms (68, 115), none have been done to assess this association as per TTM. Moreover, most of the available literature comes from studies that have been conducted in European and other Western countries. Similarly, most of these studies were conducted among college student populations or clinical populations.

To our best knowledge, no prior studies have explored this association in the general population of Qatar or other Arab countries. Thus, this study most likely fills this gap by providing valuable information about association between WLSC and

depressive symptoms as per TTM in a representative sample of Qatar's non-clinical population.

Findings from this study can aid practitioners in designing interventions that are tailored to individuals' specific weight-loss stage of change in relation to emotional health. In addition, our findings could also help to identify modifiable targets for interventions aimed at managing depression's contribution to OO in the healthcare setting of Qatar. As such, this could help nutritionists in designing plans and interventions that focus on specific treatment modules using TTM framework. This may support future research for better weight-loss results that are maintainable among individuals aiming to lose body weight in Qatar by using the cross-cultural setting in Qatar as a backdrop.

### **Recommendations**

Future studies are needed for better weight-loss results that are maintainable among individuals aiming to lose body weight in Qatar. Interventions targeting weight-loss and maintenance should move beyond the focus on dieting and physical activity towards other psychological factors that affect body weight.

To further investigate this association in future studies, the use of detailed tools to assess depressive symptoms such as PHQ-9 is advised. Moreover, longitudinal studies would complement and extend our cross-sectional findings as well. Also, taking into consideration income backgrounds of participants is vital when assessing associations between WLSC and depressive symptoms.

## CHAPTER 8: CONCLUSION

Our study is one of the first to investigate the nature of association between WLSC and depressive symptoms as per TTM in the Qatari context using a representative sample of adults living in the community. The present results indicate that, although WLSC were not associated with depressive symptoms as per TTM, individuals in weight-loss maintenance and contemplation stages experienced reduction in depressive symptoms compared to pre-contemplation stage. Moreover, the odds of depressive symptoms were higher among individuals in preparation and no weight change/ relapse stage compared to pre-contemplation stage. Furthermore, BMI appears to be an important variable in explaining differences in depressive symptoms across different WLSC as per TTM.

Similarly, covariates such as age, gender, ethnicity, education, income, marital status, chronic conditions, physical activity, smoking and sleeping duration appear to confound this association. Of these, physical activity, chronic conditions and smoking variables were found to be associated with the largest % change in association between WLSC and depressive symptoms. In sum, interventions targeting weight-loss and maintenance should move beyond the focus on dieting and physical activity towards other psychological factors that affect body weight.

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## APPENDIX

### Appendix A: QDA English questionnaire

#### PREFACE: RESPONDENT SELECTION

{Q: INTRO}

Good morning/afternoon/evening, Qatar University's Social and Economic Survey Research Institute is conducting a survey to measure health and diabetes awareness in Qatar. You have been selected at random to be part of our sample. Your assistance will help us better understand health behaviors and issues related to diabetes. Collecting this information is considered priority for improving health services and developing programs tailored for all communities in Qatar.

My name is \_\_\_ and if you have no questions we can get started!

{Q: REINTRO}

Good morning/afternoon/evening,

My name is \_\_\_\_\_ and I'm calling from Qatar University's Social and Economic Survey Research Institute about our survey to measure health and diabetes awareness in Qatar. We started this survey with you but were unable to complete it at the time. Would this be a good time to talk?

INTERVIEWER, IF NECESSARY: We can assure you that all of your answers will be kept confidential and will be released only as statistics in which no individual can be identified.

- |                 |                           |
|-----------------|---------------------------|
| 1 QUESTIONNAIRE | 5 REFUSAL                 |
| 2 APPOINTMENT   | 6 ANSWERING SERVICE       |
| 3 NO ANSWER     | 7 WRONG NUMBER/DISCONNECT |
| 4 BUSY          | 8 INELIGIBLE / OTHERS     |

PROGRAMMER: PLEASE RECORD LANGUAGE OF INTERVIEW FROM BLAISE

{Q: SAFE}

For your safety if you are currently doing anything that would require your full attention, such as driving or operating heavy equipment, then I'll need to call you back at a time convenient for you.

IV: IF R SEEMS TO BE IN SITUATION WHERE CANNOT HEAR CLEARLY OR SPEAK WITHOUT INFLUENCE FROM OTHERS, ASK:

Are you able to answer questions without distraction and in conditions that comfortable to you?

- 1 GO ON
- 2 R CALLBACK
- 8 DON'T KNOW
- 9 REFUSED

{Q: CONFIRM}

Second, I need to confirm that you are at least 18 years of age and live in the State of Qatar. [IF NECESSARY SAY: Your answers are confidential, and we don't use anybody's name.]

- 1 R IS RESIDENT ADULT, PROCEED
- 2 R IS NOT ADULT
- 3 R IS NOT QATAR RESIDENT

If Answer>1 skip to Inelig

{Q: CONFIDENTIAL}

Before we begin let me reassure you that results from the survey will be presented as statistical summaries in which no individual can be identified, and you may choose not to answer any question at any time. If you have no further questions, let's get started!

IF NECESSARY: We are calling from Qatar University. This is an important study we conduct on a regular basis to track public opinion.

IF ASKED: The survey will take about 10 to 15 minutes and you can complete it in several parts if you need to leave at any time. All of your answers will be saved and we'll resume right where you left off at a time that is convenient for you.

IF NECESSARY: SOCIAL UTILITY MESSAGE:

The Social and Economic Survey Research Institute is a research unit of Qatar University providing scientifically valid survey research in Qatar and the region. We are subject to oversight by an institutional review board and comply with the standards of the survey research profession worldwide. We do not report any individual answers, and strictly protect your confidentiality. In addition, we randomly select respondents so that everyone has an equal chance of selection. Your participation is very important to provide the perspective of other people just like you. By answering a few questions you

can make this study more representative and therefore have more impact.

- 1 GO ON
- 2 R CALLBACK

#### I. RESPONDENT CLASSIFICATION

PROGRAMMER: Retrieve RespSample from the sample. Initialize Resptype=0.

{Q: CITIZEN}

Are you a Qatari citizen?

- 1 YES, QATARI CITIZEN
- 2 NO, NOT QATARI CITIZEN
- 3 HAS TEMPORARY QATARI "MISSION" PASSPORT
- 8 DON'T KNOW
- 9 REFUSED

***IF CITIZEN=1 AND RespSample=1 THEN SET RESPTYPE=1 SKIP TO NEXT***

***SECTION***

{Q:CHECKCIT}

***If CITIZEN = 1 AND RespSample <> 1 ASK***

INTERVIEWER: FOR CLARIFICATION PURPOSES, ASK: Do you have a Qatari

passport?

- 1 HAVE QATARI PASSPORT
- 2 DON'T HAVE QATARI PASSPORT
- 3 HAS TEMPORARY QATARI "MISSION" PASSPORT
- 8 DON'T KNOW
- 9 REFUSED

***IF CHECKCIT=1 THEN SET RESPTYPE=1 SKIP TO NEXT SECTION***

{Q: INCO1}

***IF RESPSAMPLE=3 ASK***

Do you yourself - or if you have a spouse or immediate family with you here in Qatar - do all of you together make more than 2,000 QAR per months with your monthly salary?

- 1 LESS THAN 2,000 QATARI RIYALS PER MONTH OR
- 2 2,000 QATARI RIYALS OR MORE PER MONTH?
- 8 DON'T KNOW
- 9 REFUSED

**IF ANSWER=1 THEN SET RESPTYPE=3 SKIP TO NATIONALITY**

{Q: INCO2}

Do you yourself - or if you have a spouse or immediate family with you here in Qatar - do all of you together make more than 4,000 QAR per months with your monthly salary?

- 1 LESS THAN 4,000 QATARI RIYALS PER MONTH OR
- 2 4,000 QATARI RIYALS OR MORE PER MONTH?
- 8 DON'T KNOW
- 9 REFUSED

**PROGRAMMER: IF Resptype=0 GO TO SALREF**

Resptype=1: Qataris; Resptype=2: higher income expats; Resptype=3: lower income expats

{Q: NATIONALITY}

What is your nationality? [PROGRAMMER: USE NUMERIC LIST OF COUNTRIES]

INTERVIEWER, ADD: Could you tell me the telephone country code number that you use to call that country?

ENTER NUMBER FROM YOUR COUNTRY CODE LIST. IF YOU CANNOT FIND IT ENTER '997' AND WRITE OUT THE COUNTRY NAME. CONFIRM SPELLING WITH RESPONDENT.

- 9998 DON'T KNOW
- 9999 REFUSED

INTERVIEWER, NOTE: Canada is 101.

{Q: NATIONCONF}

**IF NATIONALITY > 0 & < 9998, ASK**

INTERVIEWER: IS THE COUNTRY NAME DISPLAYED CORRECT?  
READ IT BACK TO THE RESPONDENT AND CONFIRM.

AFTER CONFIRMING SELECT 1 TO CONTINUE.  
IF NOT CORRECT GO BACK AND SELECT THE CORRECT COUNTRY FROM YOUR LIST.

**PROGRAMMER: IF Resptype=0 GO TO SALREF**

Resptype=1: Qataris; Resptype=2: higher income expats; Resptype=3: lower income

expats

**{Race}**

People living in Qatar come from many different backgrounds? Are you...

1. Arab or Middle Eastern
2. North African
3. Sub-Saharan African
4. South Asian (PROMPT if needed “such as Indian, Bengali, Nepalese, or Pakistani”)
5. East or North Asian (PROMPT if needed “such as Japanese, Korean, Chinese, Indonesian, Malaysian, or Thai”)
6. North or Latin American
7. European
8. OTHER, SPECIFY .....INSERT TEXT.....
9. Don't know
10. Refuse

## SECTION ONE: MEDICAL HISTORY AND FAMILY HISTORY

### Section 1 A: General information

{Q: BIRTH}

In what year were you born?

ENTER YEAR

8 DON'T KNOW

9 REFUSED

**PROGRAMMER: LIMIT number from 1900 to 2000**

{Q: AGE}

***IF BIRTH<0 ASK***

Could you tell us your general age group? Are you...

1 Less than 24 or

2 25 – 34

3 35 – 44

4 45 – 54

5 55+

8 DON'T KNOW

9 REFUSED

{Q: MARITAL}

What is your current marital status? Are you married, separated, divorced, widowed,

or have you never been married?

1 Married

2 Separated

3 Divorced

4 Widowed

5 Never married

8 DON'T KNOW

9 REFUSED

{Q: EDUC}

What is the highest level of education you have completed? [INTERVIEWER: PROBE FROM CATEGORIES IF NECESSARY]

1 NEVER ATTENDED ANY SCHOOL

2 PRIMARY (1-6)

3 PREPARATORY (7-9)

4 VOCATIONAL (AFTER PREPARATORY BUT NO SECONDARY)

5 SECONDARY (10-12)

6 DIPLOMA (AFTER SECONDARY BUT NO UNIVERSITY)

7 UNIVERSITY GRADUATE/BA/BCOM/BSC

8 MASTER'S DEGREE

9 PH.D.

10 OTHER (SPECIFY)

- 98 DON'T KNOW
- 99 REFUSED

{Q: GENDER}

[ENTER RESPONDENT'S GENDER] - IF UNCERTAIN, SAY:  
The survey requires you to tell me your gender.

- 3 MALE
- 5 FEMALE
- 8 DON'T KNOW/CAN'T TELL
- 9 REFUSED

{Q: HOWLONG}

*IF Resptype>1, ASK*

**PROGRAMMER: Drop down for month including month name and corresponding number- IF LONGER THAN 5 YEARS, WILL NOT GET THE MONTHS**

**~~IF HOWLONGA==97, SKIP SECTION A~~**

**~~IF HOWLONG A-BIRTH < 18, SKIP SECTION A (IF BIRTH IS MISSING DO NOT SKIP)~~**

In which year did you arrive in Qatar?

\_\_\_\_\_ YEARS \_\_\_\_\_ MONTHS IN QATAR

INTERVIEWER: IF IV SAYS "ALL MY LIFE" PUT 97.

{Q: JOBNOW}

Are you currently employed?

- 1 YES
- 2 NO
- 8 DON'T KNOW
- 9 REFUSED

{Q: PREGNANT}

**[Ask If Gender= Females and Marital =1 or 3, 4, 5]**

Are you pregnant?

- 1. YES
- 2. NO
- 3. DK
- 4. REF

Section 1 B: Weight Loss and Satisfaction

{Q: HEIGHT}

How tall are you in cm? \_\_\_\_\_

**PROGRAMMER: LIMIT number from 100 to 250**

**PROGRAMMER: NUMERIC CHARACTERS ONLY**

- 998. DON'T KNOW
- 999. REFUSE

**IF Q: HEIGHT=DK ASK**

{Q:HEIGHTF}

Can you tell me how tall are you in feet and inches? \_\_\_\_\_

**PROGRAMMER: LIMIT number from 3 to7**

{Q: HEIGHTIN}

\_\_\_\_\_

**PROGRAMMER: LIMIT number from 0 to11**

{Q: WEIGHTS}

Currently how much do you weigh? \_\_\_\_\_

1. \_\_\_\_\_
8. DON'T KNOW
9. REFUSE

**PROGRAMMER: NUMERIC CHARACTERS ONLY**

**PROGRAMMER: LIMIT number from 30 to 500**

{Q:WUNIT}

**Is this measurement in kilograms or pounds?**

1. Kilograms
2. Pounds
8. DK
9. REF

{Q: WEIGHTP}

[Ask if Pregnant=1]

How much do you weighbefore pregnancy? \_\_\_\_\_

**PROGRAMMER: NUMERIC CHARACTERS ONLY**

**PROGRAMMER: LIMIT number from 60 to 500**

{Q:PUNIT}

**Is this measurement in kilograms or pounds?**

- 1. Kilograms**
- 2. Pounds**
- 8. DK**
- 9. REF**

{Q: WMEASURED}

When was the last time you had your weight measured? Would you say...

1. Today
2. Few days ago
3. Last week
4. Last month
5. Last 3 Months
6. Last 6 Months
7. Last year
8. More than a year ago
998. DON'T KNOW
- 999. REFUSE**

{Q: WAIST}

What is your waist circumference? (We are asking about the widest part of your stomach)\_\_\_\_\_

998. DON'T KNOW
999. REFUSE

[If WAIST>0, Ask]

(92)

Is this measurement in centimeters or inches?

1. Centimeters
2. Inches

{Q: BODY}

On which part of your body do you carry most of your weight?

1. Abdomen or midsection
2. Thighs or lower body
3. Chest or upper body
4. All around

5. NOT APPLICABLE /I DON'T CARRY EXTRA WEIGHT

**Interviewer: enter 888 if Don't know, 999 if**

{Q: DESCRIBE}

How would you describe your current body weight? Would you say you are...

1. Very underweight
2. Slightly underweight,
3. About right
4. Slightly overweight
5. Very overweight
8. DON'T KNOW
9. REFUSE

{Q: SATWEIGHT}

How satisfied are you with your current body weight? Would you say you are...

1. Very satisfied
2. Satisfied
3. Dissatisfied
4. Very dissatisfied
8. DON'T KNOW
9. REFUSE

{Q:

WEIGHT1}

How much would you like to weigh ?

**PROGRAMMER: LIMIT number from 30 to 250**

**INTERVIEWER: IF RESPONDENT SAYS THEY WANT STAY THE SAME WEIGHT, PUT DOWN THE SAME NUMBER AS {Q:Weight}**

- 
998. DON'T KNOW
  999. REFUSE

{Q:WUNIT1}

**Is this measurement in kilograms or pounds?**

1. Kilograms
2. Pounds
8. DK
9. REF

Interviewer reads: The following questions are about any **recent efforts** that you may have made with respect to managing your weight

**SKIP to Section 1B IF WEIGHT1 >= WEIGHTS & WUNIT == WUNIT1**

{Q:LOSEMNTH1

}

In the **past month**, have you been actively trying to lose weight?

1. YES
2. NO
8. DON'T KNOW
9. REFUSE

**PROGRAMMER: IF Q:LOSEMNTH1==1, then GO TO Q: MOTIVATION**

**PROGRAMMER: IF Q:LOSEMNTH1==2, then GO TO Q: LOSEMINTH2**

{Q:LOSEMNTH2}

In the **past six months**, have you tried to lose weight?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

**If LOSEMINTH2=1, GO TO Q:MOTIVATION**

**If LOSEMINTH2=2, GO TO Q: Q:LOSEMNTH3**

{Q:LOSEMNTH3}

Are you seriously considering trying to lose weight in the next 6 months?

1. YES
2. NO
8. DON'T KNOW
9. REFUSE

**SKIP to Section 1B if LOSEMINTH2==2 & LOSEMINTH3==2**

{DIETING}

What are you currently doing to lose weight?

**[SELECT ALL THAT APPLY]**

1. Any type of dieting
2. Exercising
3. Lifestyle improvements-for example cooking healthier meals, eating smaller portions, eating out less, etc.
4. Something else: SPECIFY [TEXT ENTRY]

If DIETING, ask:

{Information}

Where are you getting your dieting information?

**[SELECT ALL THAT APPLY]**

1. The internet
2. A dietitian at a health center
3. Doctor
4. Family and friends
5. Social media
6. OTHER SPECIFY [TEXT ENTRY]

{Q: DESRESULT1}

Think about your most recent effort to lose weight. How would you describe the results?

Would you say...

1. You lost weight
2. You weight did not change
3. You gained weight

PROGRAMMER IF DESRESULT1==2, the GO to HISTORY]

[PROGRAMMER IF DESRESULT1==1, the GO to DESRESULT2a]

[PROGRAMMER IF DESRESULT1==3, the GO to DESRESULT2b]

{Q:DESR

ESUL2}

Thinking again of the most recent effort to lose weight. How would you describe the results? Would you say...

1. You Lost all you wanted to lose and kept it off
2. You Lost part of the weight you wanted to lose and kept it off
8. DON'T KNOW
9. REFUSE

3.

{Q: DESRESULT2a}

Thinking again of the most recent effort to lose weight. How would you describe the results? Would you say...

1. You Lost weight, but gained some of it back
  2. You Lost weight, but gained all of it back
  3. You lost weight, but gained back more than when you started
  4. You did not lose any, but gained more weight than when you started
  10. DON'T KNOW
  11. REFUSE
-

{Q: CONDITONINTRO}

Have you been diagnosed or told by your doctor that you have any of the following conditions:

	<b>Question</b>	<b>YES</b>	<b>NO</b>	<b>DK</b>	<b>R</b>
{Q: HYPERTENSION}	Hypertension or high blood pressure?	1	2	8	9
{Q: CHOLESTEROL}	High cholesterol?	1	2	8	9
{Q: TRIGLYCERIDES}	High triglycerides?	1	2	8	9
{Q: HEART}	Cardiovascular or heart disease?	1	2	8	9
{Q: DIABETES}	Diabetes?	1	2	8	9
{Q: GASTRO}	Gastrointestinal disorder?	1	2	8	9
{Q: DEPRESSION}	Depression?	1	2	8	9
{Q: PSYCH}	Other mental or Psychological Problems such as anxiety, or sleep problems?	1	2	8	9
Q:THYROID	Thyroid disorder?	1	2	8	9
{Q: OTHERCOND}	Any other condition not mentioned? Please specify [TEXT ENTRY]	1	2	8	9
ASK IF	I have never been diagnosed or told that I have any	1	2	8	9

HYPERTENSION- disease

OTHERCOND=2 or

8 or 9 {Q

:NOCOND}

{Q: SMOKE1}

At the present time, do you smoke cigarettes daily, occasionally or not at all?

1 Daily (Go to SMOKE2)

2 Occasionally (SKIP SMOKE2, GO TO SMOKE3)

3 Not at all (SKIP SMOKE2, GO TO SMOKE3)

8 DK (SKIP SMOKE2, GO TO SMOKE3)

9 RF (SKIP SMOKE2, GO TO SMOKE3)

{Q: SMOKE2}

### Section 3E: Exercise Questions

Now I would like to ask you some questions about physical activity or exercise. Physical activity or exercise includes activities such as walking briskly, jogging, team sports, or any other activity in which you breathe harder or feel warmer.

{Q:

ACTIVE1}

Thinking of the examples just mentioned, do you currently engage in physical activity on a regular basis?

1 YES

2 NO

8.DON'T KNOW

9.REFUSE

**PROGRAMMER: IF Q: ACTIVE1==2, SKIP TO ACTIVE5**

{Q: ACTIVE2}

How frequently do you do you engage in these activities? Would you say...

1. Daily
2. 3-4 times per week
3. 1- 2 times per week
4. 1-2 times per month
5. Less than once per month

{Q: ACTIVE3}

On average, about how many minutes do you spend on the activity?

1. from 10 minutes to less than 20 minutes
2. from 20 minutes to less than 30 minutes
3. More than 30 minutes

{Q: ACTIVE4}

How long have you been engaged in this routine?

1. Less than a month
2. 1-2 months
3. 3-4 months
4. 5-6 months
5. More than 6 months

{Q: ACTIVE5}

How do you describe your usual daily activity?

1. Sitting most of the day
2. Standing most of the day
3. Walking around most of the day

{Q: SLEEP}

Do you have trouble sleeping?

1. YES
2. NO
8. DK
9. REF

{Q: HSLEEP}

On an average night how many hours do you sleep? \_\_\_\_

### SECTION 3: EMOTIONAL HEALTH

**Administration Notes:** Please Administer this section to all Three groups: **QATARIS, WCMs AND LMs**

**PROGRAMMER:** all questions should have refuse and don't know option

Over the last **two weeks**, how often have you been bothered by any of the following problems?

{Q:LITPLEAS}

Little interest or pleasure in doing things? Would you say....

1 Not at all

2 Several days

3 More than half the days

4 Nearly every day

8. DON'T KNOW

9.

REFUSED

{Q:DOWNDEP}

Feeling down, depressed, or hopeless? Would you say....

1. Not at all

2. Several days

3. More than half the days

4. Nearly every day

8. DON'T KNOW

9. REFUSED

## Appendix B: QDA Arabic Questionnaire

تمهيد: اختيار المشاركين

{Q: INTRO}

السلام عليكم ورحمة الله وبركاته،  
صباح الخير/مساء الخير

تقوم جامعة قطر من خلال معهد البحوث الاجتماعية والاقتصادية المسحية بإجراء مسح لقياس الوعي لعوامل مرض السكري في قطر، وقد تم اختيارك بشكل عشوائي لتمثل جزءاً من العينة. بمشاركتك ستساعدنا على معرفت السلوكيات والقضايا الصحية المتعلقة بمرض السكري. جمع هذه المعلومات يعد من الأولويات في تحسين البرامج والخدمات الصحية المقدمة لكافت فئات المجتمع في قطر.

اسمي ... ويمكننا البدء إذا لم يكن لديك أي أسئلة!

{Q: REINTRO}

صباح الخير/ مساء الخير

اسمي ... وأحدثك من معهد البحوث الاجتماعية والاقتصادية المسحية التابع لجامعة بشأن الاستبيان الذي نجره حول الوعي الصحي والوعي بمرض السكري في قطر. لقد بدأنا هذا الاستبيان معك من قبل ولكننا لم نتمكن من استكماله آنذاك. هل الوقت مناسب للحديث؟

المحاور، إذا لزم الأمر: نطمئنك أن جميع إجاباتك ستظل سرية ولن يتم الكشف عنها إلا في شكل إحصائيات لا يمكن تحديد أي شخص فيها.

- |              |                             |
|--------------|-----------------------------|
| 1- استبيان   | 5 رفض                       |
| 2 تعيين      | 6 خدمة الإجابة              |
| 3 لا يوجد رد | 7 الرقم خاطئ/ الاتصال منقطع |
| 4 مشغول      | 8 غير مؤهل/ غير ذلك         |

المبرمج: يرجى تسجيل لغة الحوار من برنامج بليز

{Q: SAFE}

لسلامتك إذا كنت تقوم بأي شيء في الوقت الحالي يحتاج انتباه الكامل مثل القيادة أو تشغيل معدة ثقيلة، سأضطر الى معاودة الاتصال بك في وقت مناسب.

الباحث: إذا كان المشترك في موقف بحيث لا يستطيع أن يسمع بوضوح أو يتحدث بدون تأثير من الآخرين، أسأل: هل تستطيع الإجابة على الأسئلة بدون تشتت أو ازعاج أو في ظل ظروف مريحة لك؟

- |    |                  |
|----|------------------|
| 3  | نستمر            |
| 4  | الاتصال مرة اخرى |
| 10 | لا أعلم          |
| 11 | تمّ الرفض        |

{Q: CONFIRM}

ثانياً، أود التأكد من أن عمرك لا يقل عن 18 عاماً وأنت تعيش في دولة قطر. [ إذا لزم الأمر يمكنك القول: إجاباتك ستكون سرية، ونحن لا نستخدم أسماء الأشخاص]

- |   |   |
|---|---|
| المشارك شخص بالغ ومقيم بدولة قطر، استمرار | 4 |
| المشارك شخص غير بالغ                      | 5 |
| المشارك غير مقيم بدولة قطر                | 6 |

إذا كانت الإجابة <1، يُرجى الانتقال إلى قسم غير المؤهلين

{Q: CONFIDENTIAL}

دعني أؤكد لك مجدداً قبل البدء أنه سيتم عرض نتائج الاستبيان في شكل ملخصات إحصائية لا يمكن تحديد أي شخص فيها، ويمكنك رفض الإجابة على أي سؤال في أي وقت. فلنبدأ إذا لم يكن لديك أي أسئلة أخرى!

يمكن القول إذا لزم الأمر: نحن نكلمك من جامعة قطر. هذه دراسة هامة نجريها بشكل منتظم لمتابعة الرأي العام.

وإذا وجه المشارك سؤالاً حول مدة المقابلة، يمكن القول: سيستغرق الاستبيان من 10 إلى 15 دقيقة تقريباً ويمكن إتمامه على عدة مرات إذا أردت التوقف في أي وقت. سنُحفظ جميع إجاباتك وسنواصل لاحقاً من حيث توقفنا في وقت يناسبك.

عند الضرورة: رسالة تأكيد المنفعة العامة

يعد معهد البحوث الاجتماعية والاقتصادية المسحية وحدة بحثية تابعة لجامعة قطر تأخذ على عاتقها مسؤولية

إجراء بحوث مسحية قائمة على أسس علمية سليمة في كل من دولة قطر والمنطقة بأسرها. والجدير بالذكر أننا

نخضع لإشراف مجلس المراجعة المؤسسية ونمتثل لمعايير مجال البحوث المسحية في جميع أنحاء العالم. فلا

نفسح عن أي إجابات فردية، ونسعى إلى حماية خصوصية المشاركين حماية تامة. بالإضافة إلى ذلك، فإننا

نختار المشاركين بشكل عشوائي بحيث تتاح للجميع فرص متكافئة خلال عملية الاختيار. لذا فإن مشاركتك مهمة

للمغاية لتعكس وجهة نظر الآخرين مثلك. فمن خلال الإجابة عن بعض الأسئلة، يمكنك جعل هذه الدراسة أكثر

انعكاساً للواقع، وبالتالي تصبح أكثر تأثيراً.

- |                               |   |
|-------------------------------|---|
| تابع الحديث                   | 3 |
| إعادة الاتصال مجدداً بالمشارك | 4 |

.. تصنيف المشارك

PROGRAMMER: Retrieve RespSample from the sample. Initialize Resptype=0

{Q: CITIZEN}

هل أنت مواطن قطري؟

- |                                       |   |
|---------------------------------------|---|
| نعم، مواطن قطري                       | 4 |
| لا، لست قطرياً                        | 5 |
| أحمل جواز سفر قطري مؤقتاً "المهمة ما" | 6 |

10 لا أعلم  
11 تمّ الرفض

**IF CITIZEN=1 AND RespSample=1 THEN SET RESPTYPE=1 SKIP TO NEXT**

**SECTION**

{Q:CHECKCIT}

**If CITIZEN = 1 AND RespSample <> 1 ASK**

المحاور: يتم طرح سؤال عما إذا كان المواطن يحمل جواز سفر قطري وذلك لغرض التوضيح

- 4 يحمل جواز سفر قطري  
5 لا يحمل جواز سفر قطري  
6 أحمل جواز سفر قطري مؤقتاً "لمهمة ما"  
10 لا أعلم  
11 تمّ الرفض

**IF CHECKCIT=1 THEN SET RESPTYPE=1 SKIP TO NEXT SECTION**

{Q: INCO1}

**IF RESPSAMPLE=3 ASK**

هل تتقاضى أو تتقاضون مجتمعين - أو إذا كان زوجك أو عائلتك معك هنا في قطر- أكثر من 2000 ريال قطري شهرياً؟

- 3 أقل من 2000 ريال قطري شهرياً أو  
4 2000 ريال قطري أو أكثر شهرياً؟  
10 لا أعلم  
11 تمّ الرفض

**IF ANSWER=1 THEN SET RESPTYPE=3 SKIP TO NATIONALITY**

{Q: INCO2}

هل تتقاضى أو تتقاضون مجتمعين - أو إذا كان زوجك أو عائلتك معك هنا في قطر- أكثر من 4,000 ريال قطري شهرياً؟

- 3 أقل من 4,000 ريال قطري شهرياً أو  
4 4,000 ريال قطري أو أكثر شهرياً؟  
10 لا أعلم  
11 تمّ الرفض

**PROGRAMMER: IF Resptype=0 GO TO SALREF**

Resptype=1: Qataris; Resptype=2: higher income expats; Resptype=3: lower income expats

{Q: NATIONALITY}

[PROGRAMMER: USE NUMERIC LIST OF COUNTRIES] ما هي جنسيتك؟

المحاور يُرجى إضافة: هل يمكنك أن تخبرني عن رمز الهاتف الدولي الذي تستخدمه للاتصال بهذه الدولة؟

أدخل الرقم من قائمة رموز الهواتف الدولية التي بحوزتك. وإذا لم تعثر عليه في القائمة، أدخل الرقم "997" ثم

اكتب اسم الدولة. تأكد من التهجئة مع المشارك.

10000 لا أعلم  
10001 تمّ الرفض

المحاور، ملاحظة: رمز كندا هو 101

{Q: NATIONCONF}

*IF NATIONALITY > 0 & < 9998, ASK*

المحاور: هل تم كتابة اسم الدولة بشكل صحيح؟  
اقرأه مجددًا على المشارك وتأكد من صحته.

يرجى اختيار 1 بعد التأكد للمتابعة.  
وإذا لم يكن الاسم صحيحًا، يرجى الرجوع واختيار الدولة الصحيحة من القائمة التي بحوزتك.

PROGRAMMER: IF Resptype=0 GO TO SALREF

Resptype=1: Qataris; Resptype=2: higher income expats; Resptype=3: lower income

expats

*Ask IF Resptype= 2*

{Race}

ينتمي الأفراد الذين يعيشون في قطر إلى خلفيات مختلفة؟ هل أنت (تعتبر) ...

1. عربي أو من الشرق الأوسط
2. من شمال أفريقيا
3. من دول أفريقيا جنوب الصحراء الكبرى
4. جنوب آسيوي (مع التفصيل إذا لزم الأمر "مثل هندي أو بنغالي أو نيبالي أو باكستاني")
5. شرق أو شمال آسيوي (مع التفصيل إذا لزم الأمر "مثل ياباني أو كوري أو صيني أو إندونيسي أو ماليزي أو تايلندي")
6. أمريكا الشمالية أو اللاتينية
7. أوروبي
8. غير ذلك، حدد الجنسية ..... أدخل نص
- .....
9. لا أعلم
10. مرفوض

القسم الأول: التاريخ الطبي وتاريخ الأسرة

القسم الأول أ: معلومات عامة

{Q: BIRTH}

في أي عام ولدت؟

- أدخل العام  
10 لا أعلم  
11 رفض

PROGRAMMER: LIMIT number from 1900 to 2000

{Q: AGE}

*IF BIRTH<0 ASK*

هل يمكن أن تخبرنا بفتنك العمرية؟ هل عمرك ...

- 6 أقل من 24 عامًا أو  
7 25 – 34 عامًا  
8 35 – 44 عامًا  
9 45 – 54 عامًا  
10 أكثر من 55 عامًا  
10 لا أعلم  
11 رفض

{Q: MARITAL}

ما هي حالتك الاجتماعية حاليًا؟ هل أنت متزوج أو منفصل، أم مطلق أو أرمل، أم لم يسبق لك الزواج؟

- 6 متزوج  
7 منفصل  
8 مطلق  
9 أرمل  
10 لم يسبق لي الزواج  
10 لا أعلم  
11 رفض

{Q: EDUC}

ما هو أعلى مستوى تعليمي اكتملته؟ [المحاور: توجيه السؤال من بين الفئات المطروحة إذا لزم الأمر]

- 11 لم التحق بالتعليم  
12 الابتدائي (1-6)  
13 الإعدادي (7-9)  
14 المهني (بعد الإعدادي، ولكنه ليس ثانوي)  
15 الثانوي (10-12)  
16 دبلوم (بعد الثانوي، ولكنها ليست درجة جامعية)  
17 خريج جامعي/ بكالوريوس/ بكالوريوس في التجارة/ بكالوريوس العلوم  
18 درجة الماجستير  
19 الدكتوراه

20 درجة أخرى (يرجى تحديدها)  
100 لا أعلم  
101 رفض

{Q: GENDER}

[أدخل نوع جنس المشارك] - في حالة عدم التأكد يمكنك أن تقول:  
يتطلب الاستبيان أن تذكر جنسك

4 ذكر

6 أنثى

10 لا أعلم/ لا يمكنني الإفصاح

11 مرفوض

{Q: HOWLONG}

*IF Resptype>1, ASK*

**PROGRAMMER: Drop down for month including month name and corresponding number- IF LONGER THAN 5 YEARS, WILL NOT GET THE MONTHS**

في أي عام انتقلت إلى قطر؟

في قطر منذ ----- عامًا و ----- شهرًا

المحاور: يرجى وضع 97 إذا كانت الإجابة "طيلة عمري"

{Q: JOBNOW}

هل تعمل /تعملين في الوقت الحالي؟

3 نعم

4 لا

10 لا أعلم

11 مرفوض

{Q: CHILDREN}

If MARITAL<5, ASK

كم عدد أطفالك؟

98 لا أعلم

99 مرفوض

{Q: PREGNANT}

[Ask If Gender= Females and Marital =1 or 3, 4, 5]

هل أنتِ حامل؟

5. نعم

6. لا

8. لا أعلم

9. مرفوض

القسم الأول ب: وزن الجسم

{ Q: HEIGHT }

كم طولك بالسنتيمتر؟ \_\_\_\_\_

**PROGRAMMER: LIMIT number from 100 to 250**

**PROGRAMMER: NUMERIC CHARACTERS ONLY**

1000. لا أعلم  
1001. مرفوض

***IF Q: HEIGHT=DK ASK***

{ Q:HEIGHTF }

هل يمكن أن تخبرني ما مدى طولك بالقدم والبوصة؟

**PROGRAMMER: LIMIT number from 3 to7**

{ Q: HEIGHTIN }

**PROGRAMMER: LIMIT number from 0 to11**

{ Q: WEIGHTS }

حالياً كم يبلغ وزنك؟ \_\_\_\_\_

2.

10. لا أعلم

11. مرفوض

**PROGRAMMER: NUMERIC CHARACTERS ONLY**

**PROGRAMMER: LIMIT number from 30 to 500**

{Q:WUNIT}

هل هذا القياس بالكيلو جرام أم الباوند؟

3. بالكيلو جرام
4. بالرطل
8. لا أعلم
9. مرفوض

{Q: WEIGHTP}

[Ask if Pregnant=1]

كم كان وزنك قبل الحمل؟ \_\_\_\_\_

**PROGRAMMER: NUMERIC CHARACTERS ONLY**

**PROGRAMMER: LIMIT number from 30 to 500**

{Q:PUNIT}

هل هذا القياس بالكيلو جرام أم الباوند؟

1. بالكيلو جرام
2. بالرطل
8. لا أعلم
9. مرفوض

{Q: WMEASURED}

متى كانت آخر مرة قمت فيها بقياس وزنك؟

هل هي ...

9. اليوم
10. منذ أيام قليلة
11. الأسبوع الماضي
12. الشهر الماضي
13. منذ 3 أشهر
14. منذ 6 أشهر
15. العام الماضي
16. منذ أكثر من عام
1000. لا أعلم

1001. مرفوض

{Q: WAIST}

ما هو محيط خصرك؟ (نسأل عن الجزء الأوسع (الأكثر اتساعاً) من بطنك) \_\_\_\_\_

998. لا أعلم  
999. مرفوض

[If WAIST>0, Ask]

(92)

هل هذا القياس بالسنتيمتر أم بالبوصة؟

10. بالسنتيمتر

11. بالبوصة

12.

{Q: BODY}

أي جزء من أجزاء جسمك يحمل معظم وزنك؟

6. البطن أو الوسط

7. الفخذين أو الجزء الأسفل من الجسم

8. الصدر أو الجزء الأعلى من الجسم

9. في جميع أجزاء جسمك

10. لا ينطبق / أنا لا أحمل وزن زائد

المحاور: اكتب 888 إذا لم يكن المشارك يعلم، و 999 إذا

{Q: DESCRIBE}

كيف تصف وزن جسمك الحالي بالنسبة لما تعتبره الوزن المثالي لك؟ هل تقول إن ...

6. وزنك أقل جداً من الوزن المثالي

7. وزنك أقل بعض الشيء من الوزن المثالي

8. وزنك مناسب تقريباً

9. وزنك زائد بعض الشيء

10. وزنك زائد جداً

10. لا أعلم

11. مرفوض

{Q: SATWEIGHT}

ما هو مدى رضاك عن وزنك الحالي ؟ هل تقول إنك ...

5. راضٍ جدًا
6. راضٍ
7. غير راضٍ
8. غير راضٍ للغاية
10. لا أعلم
11. مرفوض

{Q: WEIGHT1}

كم تريد أن يكون وزنك؟

**PROGRAMMER: LIMIT number from 30 to 500**

**INTERVIEWER: IF RESPONDENT SAYS THEY WANT STAY THE  
SAME WEIGHT, PUT DOWN THE SAME NUMBER AS**

\_\_\_\_\_ {Q: Weight}

998. لا أعلم
999. مرفوض

{Q: WUNIT1}

هل هذا القياس بالكيلو جرام أم الباوند؟

1. بالكيلو جرام
2. بالرطل
8. لا أعلم
9. مرفوض

يقرأ المحاور: تدور الأسئلة التالية حول أي جهود قد تكون بذلتها مؤخرًا للتحكم في وزنك  
**SKIP to Section 1B IF WEIGHT1>=WEIGHTS & WUNIT== WUNIT1**

{Q: LOSEMNT1

}

هل حاولت بجدية تخفيض وزنك خلال الشهر الماضي ؟

- 3. نعم
- 4. لا
- 10. لا أعلم
- 11. مرفوض

**PROGRAMMER: IF Q:LOSEMNTH1==1, then GO TO Q: MOTIVATION**

**PROGRAMMER: IF Q:LOSEMNTH1==2, then GO TO Q: LOSEMINTH2**

{Q:LOSEMNTH2}

هل حاولت بجدية تخفيض وزنك خلال الأشهر الستة الماضية؟

- 3. نعم
- 4. لا
- 10. لا أعلم
- 11. مرفوض

**If LOSEMINTH2 =1, GO TO Q:MOTIVATION**

**If LOSEMINTH2 =2, GO TO Q: Q:LOSEMNTH3**

{Q:LOSEMNTH3}

هل تفكر بجدية في المحاولة لتخفيض وزنك خلال الأشهر الستة القادمة؟

- 3. نعم
- 4. لا
- 10. لا أعلم
- 11. مرفوض

**SKIP to Section 1B if LOSEMINTH2==2 & LOSEMINTH3==2**

{MOTIVATION}

ما هو السبب الرئيسي وراء رغبتك في فقدان وزنك؟

1. حدث اجتماعي قادم مثل الزواج أو عطلة.
2. لتحسين المظهر (لتحسين القوام أو اللباس)
3. لتحسين الصحة بشكل عام.
4. للسيطرة على حالة صحية مزمنة مثل الكوليسترول أو ضغط الدم أو آلام الظهر أو الركبة
5. سبب آخر (يرجى تحديده - إدخال النص)

{ DIETING }  
ماذا تفعل حاليًا لفقدان وزنك؟

[SELECT ALL THAT APPLY]

5. أي نوع من الحمية الغذائية
6. ممارسة الرياضة
7. تحسين نمط الحياة (على سبيل المثال إعداد وجبات صحية بشكل أكبر أو تناول كميات أقل من الطعام والتقليل من تناول الطعام بالخارج وما إلى ذلك).
8. أشياء أخرى يرجى تحديدها (إدخال النص)

If DIETING=1, ask:

{ Information }

من أين تحصل على معلوماتك المتعلقة بالحمية الغذائية

[SELECT ALL THAT APPLY]

7. الإنترنت
8. أخصائي تغذية في المركز صحي
9. طبيب
10. العائلة والأصدقاء
11. وسائل التواصل الاجتماعي
12. أماكن أخرى يرجى تحديدها (إدخال النص)

{ Q: DIFFICULTY }

هل واجهت أي صعوبة عند محاولتك فقدان وزنك؟

1. نعم
2. لا
8. لا أعلم
9. مرفوض

PROGRAMMER: If DIFFICULTY=1, ASK Q: CHALLENGE

{ Q: CHALLENGE1 }

ما هي الصعوبة الأكبر التي واجهتها عند محاولتك فقدان الوزن؟ يرجى التحديد

PROGRAMMER: OPEN ENDED

8. لا أعلم  
9. مرفوض

{Q: DESRESULT1}

- فكر في أكبر مجهود بذلته مؤخرًا للتخلص من الوزن الزائد . كيف تصف النتيجة؟ هل تقول إن...  
1. وزنك انخفض عما سبق  
2. وزنك لم يتغير وظل على ما هو عليه  
3. وزنك أزداد عما سبق

[PROGRAMMER IF DESRESULT1==2, the GO to HISTORY]  
[PROGRAMMER IF DESRESULT1==1, the GO to DESRESULT2a]  
[PROGRAMMER IF DESRESULT1==3, the GO to DESRESULT2b]

{Q: DESRESULT2a}

- فكر في آخر مجهود بذلته مؤخرًا للتخلص من الوزن الزائد . كيف تصف النتيجة؟ هل تقول إنك...  
1. تخلصت من كل الوزن الذي أردت التخلص منه، وحافظت على ذلك  
2. تخلصت من جزء من الوزن، وحافظت على ذلك  
8. لا أعلم  
9. مرفوض

{Q: DESRESULT2a}

- فكر في آخر مجهود بذلته مؤخرًا للتخلص من الوزن الزائد. كيف تصف النتيجة؟ هل تقول إنك...  
1. تخلصت من كل الوزن الزائد ولكنك استعدته كله مجددًا  
2. تخلصت من كل الوزن الزائد ولكنك استعدته بعضه مجددًا  
3. تخلصت من بعض الوزن الزائد ولكنه استعدته كله مجددًا أو أزداد وزنك عن ماسبق  
4. لم تتمكن من التخلص من الوزن الزائد عل الاطلاق، وأزداد وزنك عن ماسبق  
8. لا أعلم  
9. مرفوض

{Q: CONDITONINTRO}

هل تم تشخيصك أو اخبارك من طرف طبيبك أنك تعاني من أي من الحالات التالية:

R	DK	لا	نعم	سؤال	
9	8	2	1	ارتفاع ضغط الدم؟	{Q: HYPERTENSION}
9	8	2	1	ارتفاع نسبة الكولسترول؟	{Q: CHOLESTEROL}
9	8	2	1	ارتفاع نسبة الدهون الثلاثية؟	{Q: TRIGLYCERIDES}
9	8	2	1	أمراض القلب والأوعية الدموية؟	{Q: HEART}
9	8	2	1	السكري؟	{Q: DIABETES}
9	8	2	1	اضطرابات الجهاز الهضمي؟	{Q: GASTRO}
9	8	2	1	الاكتئاب؟	{Q: DEPRESSION}
9	8	2	1	مشاكل نفسية أو ذهنية أخرى مثل القلق أو مشاكل النوم؟	{Q: PSYCH}
9	8	2	1	اضطراب الغدة الدرقية؟	{Q: Q:THYROID }
9	8	2	1	أي أمراض أخرى غير المذكورة؟ يرجى تحديدها (إدخال النص)	{Q: OTHERCOND}
9	8	2	1	لم يتم تشخيصي أو إبلاغي بأني مصاب بأي مرض	ASK IF HYPERTENSION- OTHERCOND=2 or 8 or 9 {Q :NOCOND}

{Q: SMOKE1}

في الوقت الحالي، هل تدخن السجائر يومياً أم في بعض الأحيان أم لا تدخن على الإطلاق؟

1 يومياً (انتقل إلى التدخين 2)

2 في بعض الأحيان (انتقل إلى SMOKE3)

3 لا أدخن على الإطلاق (انتقل إلى SMOKE3)

DK 8 (انتقل إلى SMOKE3)

RF 9 (انتقل إلى SMOKE3)

{Q: SMOKE2}

كم عدد السجائر التي تدخنها يومياً في الوقت الحالي؟ \_\_\_\_\_

{Q: SMOKE3}

في الوقت الحالي، هل تدخن الشيشة يومياً أم في بعض الأحيان أم لا تدخنها على الإطلاق؟

1 يومياً

2 في بعض الأحيان

3 لا أدخنها على الإطلاق

DK 8

RF 9

{Q: EATOUTA}

خلال الأسبوع، كم عدد المرات التي تطلب فيها وجبات سريعة أو تتناول الطعام في مطاعم الوجبات السريعة

(مثل [أدخل نص من النصوص الواردة أدناه])؟

["الهامبرجر والبيتزا"] IF RESPTYPE=3

["الهامبرجر والبيتزا"] IF RESPTYPE<3

[RECORD NUMBER 0 to 30]

{Q: EATOUTB}

خلال الأسبوع، كم عدد المرات التي تتناول فيها الطعام في المطاعم أو تطلب أطعمة من المطاعم بخلاف

الوجبات السريعة؟

[RECORD NUMBER 0 to 30]

{Q: EATOUTC}

خلال الأسبوع، كم مرة كنت تطلب الأطعمة المطبوخة من المطاعم المحلية أو المعاصر الغير مذكورة سابقاً؟

[RECORD NUMBER 0 to 30]

القسم 3 هـ: أسئلة حول ممارسة الرياضة

أود أن أسألك الآن بعض الأسئلة عن النشاط البدني أو ممارسة الرياضة. يشمل النشاط البدني أو ممارسة الرياضة أنشطة

مثل المشي السريع أو الركض أو الرياضات الجماعية أو أي نشاط آخر (تتنفس خلال ممارسته بشكل أصعب أو ترتفع بها دقات قلبك).

{Q:

ACTIVE1}

بالنظر إلى الأمثلة المذكورة أعلاه، هل تشارك حاليًا في أي نشاط بدني بشكل منتظم؟

1 نعم

2 لا

8. لا أعلم

9.

أرفض

PROGRAMMER: IF Q: ACTIVE1==2, SKIP TO ACTIVE5

{Q: ACTIVE2}

كم عدد المرات التي تشارك فيها في هذه الأنشطة؟ هل تقول...

1. يوميًا

2. مرتين إلى ثلاث أسبوعيًا

3. من 3 إلى 4 مرات أسبوعيًا

4. من مرة إلى مرتين شهريًا

5. أقل من مرة شهريًا

{Q: ACTIVE3}

كم عدد الدقائق التي تقضيها في ممارسة هذا النشاط؟

1. أقل من 10 دقائق

2. 10 إلى 20 دقيقة

3. 20 إلى 30 دقيقة

4. أكثر من 30 دقيقة

{Q: ACTIVE4}

ما هي مدة حفاظك على هذا النمط؟

1. أقل من شهر

2. من شهر إلى شهرين

3. من 3 إلى 4 أشهر

4. من 5 إلى 6 أشهر

5. أكثر من 6 أشهر

{Q: ACTIVE5}

كيف تصف نشاطك اليومي المعتاد؟

1. الجلوس معظم اليوم
2. الوقوف معظم اليوم
3. التجول معظم اليوم

{Q: SLEEP}

هل تعاني من مشكلة في النوم؟

3. نعم

4. لا

DK .98

REF .99

{Q: HSLEEP}

خلال الليلة العادية، كم عدد الساعات التي تنامها ؟ \_\_\_\_\_

القسم الثاني: المعرفة المتعلقة بعوامل الخطر والوقاية وقابلية التأثر ودرجة الخطورة

القسم الثاني أ: تشخيص مرض السكري وتقييم المخاطر:

{Q: DIAGNOSE}

إذا كان جنس المشارك أنثى يتم توجيه السؤال التالي: هل أخبرك الطبيب أو غيره من الأخصائيين الصحيين بأنك

مصابة بالسكري . من فضلك لا تذكرى فترات الحمل.

إذا كان جنس المشارك ذكرًا يتم توجيه السؤال التالي: هل أخبرك الطبيب أو غيره من الأخصائيين الصحيين في

أي وقت أنك مصاب بالسكري؟

1. نعم

2. لا

8. DK

9. REF

ASK if DIAGNOSE=1

{Q: DIAGNOSEAGE}

كم كان عمرك عندما أخبرك الطبيب أو غيره من الأخصائيين الصحيين للمرة الأولى أنك مصاب بالسكري؟  
يرجى أن تعطيني أفضل تقدير لك  
اكتب العمر بالسنوات

----- [أدخل النص] -----

PROGRAMMER: LIMIT 0 to 100

IF DIAGNOSE =1, ASK

{Q: TYPE}

قلت إن الطبيب أخبرك أنك مصاب بالسكري فما النوع الذي تعاني منه؟

1. سكري من النوع الأول

2. سكري من النوع الثاني

8. لا أعلم

9. REF

IF DIAGNOSE =1, SKIP TO Q: A1C

IF DIAGNOSE =2, 8 OR 9, ASK

{Q: PERCEIVE}

هل تعتقد بشكل شخصي أنك معرض للإصابة بمرض السكري؟

1. نعم
2. لا
8. DK
9. REF

{Q: PUBLIC}

هل سبق لك أن أجريت تقييمًا لاحتمالية إصابتك بمرض السكري؟

1. نعم
2. لا
98. DK
99. REF

[If Public=yes Ask]

{Q: WHOASSESS}

من الذي أجرى تقييم لاحتمالية إصابتك بمرض السكري؟

1. طبيب بمستشفى حمد أو أخصائي الرعاية الصحية
2. أخصائي الرعاية الصحية أو أخصائي الجمعية القطرية للسكري
3. طبيب أو أخصائي الرعاية الصحية بعيادة خاصة
4. أجرته بنفسه على الإنترنت أو عبر موقع إلكتروني
5. غير ذلك، حدد ..... أدخل نصًا .....
8. DK
9. REF

[If Public=yes Ask]

{Q: RISKASSESS}

ماذا تم إخبارك عن احتمالية إصابتك بمرض السكري المعرض لها؟

1. مرتفعة
2. متوسطة
3. منخفضة
4. غير ذلك، حدد الجنسية ..... أدخل نص .....

.8 DK

.9 REF

{Q: TEST}

هل سبق وأن أجريت تحليلاً للدم لمعرفة ما إذا كنت تعاني من السكري أو ارتفاع سكر الدم؟

.1 نعم

.2 لا

.9 مرفوض

IF TEST=1, ASK

{Q: TESTLONG}

منذ متى أجريت هذا التحليل؟ هل تقول:

1. أقل من عام واحد
2. منذ عام على الأقل ولكن أقل من عامين
3. منذ عامين على الأقل ولكن أقل من ثلاثة أعوام
4. منذ ثلاثة أعوام على الأقل ولكن أقل من خمسة أعوام
5. خمسة أعوام على الأقل أو أكثر

.8 DK

.9 REF

{Q: PREDIAB}

هل سبق وأن أخبرك طبيب أو غيره من الأخصائيين الصحيين أنك تعاني من أي من الحالات التالية؟ [يرجى اختيار كافة الخيارات التي تتبعها]

1. مرحلة ما قبل السكري

2. المرحلة الفاصلة لمرض السكري

3. ارتفاع السكر في الدم

4. اختلال أو ارتفاع في فحص السكري الصائم

5. ارتفاع في فحص السكري بعد الأكل

6. ارتفاع مخاطر الإصابة بالسكري

7. لا ينطبق

.8 DK

.9 REF

{Q: REFERED}

[If YES to any of the PREDIAB options]

هل أحالك طبيبك إلى أحد أخصائيي الرعاية الصحية لمتابعة حالتك؟

- 1. نعم
- 2. لا
- DK .98
- REF .99

ASK TO ALL

{Q: A1C}

هل أجرى أخصائي الرعاية الصحية خلال الاثني عشر شهرًا الماضية اختبار السكري التراكمي أو اختبار مخزون السكر؟ يقيس هذا الاختبار متوسط معدل السكر في الدم على مدار ثلاثة أشهر)

- 1 نعم
- 2 لا
- 8. لا أعلم
- 9. أرفض

Ask if AIC=1

{Q: AICB}

ما هي نتيجة أحدث اختبار أجريتها للسكري التراكمي أو اختبار مخزون السكر؟

(أدخل الرقم في خانة عشرية واحدة) \_\_\_\_\_

- 8. لا أعلم
- 9. أرفض

**IF AICB= DK ASK**

{Q:AICB1}

هل تعرف إذا كانت النتيجة؟

- 1. عاديّه أقل من 5.7

2. عالية ولكن ضمن المعدل الطبيعي من 5.7 إلى 6.5

3. أعلى بكثير من 6.5

8. لا أعلم

9. أرفض

{Q: GESTATIONAL}

**If Gender=Female and CHILDREN>0 Ask]**

هل سبق أن عانيت من سكري الحمل، أو ولادة طفل يزن أكثر من 4 كجم عند الولادة، أو ارتفاع السكر في الدم أثناء الحمل؟

1. نعم

2. لا

DK .98

REF .99

القسم الثاني ب: قابلية التأثر/ التوجهات

**ASK TO ALL**

{Q: SER}

ما درجة خطورة مرض السكري من وجهة نظرك؟ هل تقول إنه

1. خطير جدًا

2. خطير نوعًا ما

3. ليس خطيرًا جدًا

4. ليس خطيرًا على الإطلاق

DK .8

REF .9

{Q: SEROTHER}

من وجهة نظرك، ما مدى خطورة إصابة شخص في نفس عمرك بالسكري؟ هل تقول ...

1. خطير جدًا

2. خطير نوعًا ما

3. ليس خطيرًا جدًا

4. ليس خطيرًا على الإطلاق

DK .8

REF .9

**ASK TO ALL**

القسم الثاني ج: الوقاية من السكري من النوع الثاني

{Q: CAN}

هل تعتقد أنه من الممكن الوقاية من السكري من النوع الثاني؟

1. نعم  
2. لا  
7. هذا أمر بيد الله  
8. DK  
9. REF

{Q: DOCAN}

هل سبق وأن أخبرك أخصائي الرعاية الصحية أنه يمكنك الوقاية من السكري من النوع الثاني؟

1. نعم  
2. لا  
8. DK  
9. REF

القسم الثاني د: المعرفة بعوامل الخطر

{Q: RISTINTRO}

مقدمة: أود أن أقرأ عليك قائمة ببعض الأشياء التي أشار اليه أشخاص آخرون أنها مسببات محتملة للسكري. يرجى أن تخبرني فيما يتعلق بكل من هذه الأمور مصدر معرفتك أو سماعك عنها، وما إذا كنت تشعر أنها عامل مؤكد للإصابة بالسكري، أو أنها عامل خطورة محتمل، أو أنها ليست عامل خطورة على الإطلاق. [المحاور: يُرجى قراءة الخيارات حسب الاقتضاء]

R	DK	ليست عامل خطر	عامل خطر محتمل	عامل خطر مؤكد	العوامل	
9	8	3	2	1	العرق أو المجموعة العرقية مثل عربي أمريكي، آسيوي؟	{Q: RACE1}
9	8	3	2	1	زيادة الوزن؟	{Q: WEIGHT2}

9	8	3	2	1	وجود دهون حول البطن	{Q: BELLY}
9	8	3	2	1	إصابة أحد أفراد العائلة بالسكري	{Q: GENE}
9	8	3	2	1	تناول كميات كبيرة من الحلوى والأطعمة السكرية	{Q: SUGAR}
9	8	3	2	1	تناول كميات كبيرة من الملح أو الأطعمة المملحة	{Q: SALT}

9	8	3	2	1	تناول الكثير من الملح	{Q: SALT}
<p>الباحث يقرأ: يرجى تذكر أنه بالنسبة لكل من هذه العناصر ، فإنك تخبرني بما تعرفه أو سمعت عنه ، إذا شعرت أنه عامل محدد لمرض السكري ، أو عامل خطر محتمل ، أو ليس عامل خطر.</p>						
9	8	3	2	1	بعد الإصابة بسكري الحمل	{Q: GESTD1}
9	8	3	2	1	إذا كانت والدتك مصابة بداء السكري أثناء الحمل بك	{Q: GESTD2}
9	8	3	2	1	تناول الكثير من الأطعمة مع الكربوهيدرات المصنعة أو النشويات مثل الخبز الأبيض والأرز الأبيض	{Q: CARBS}
9	8	3	2	1	تقدم العمر	{Q: AGE1}
9	8	3	2	1	تناول الطعام والماكولات الدهنية	{Q: FAT}
9	8	3	2	1	عدم اتباع نمط حياة نشط	{Q: EXER}

#### {Q: HEALTHPROBS}

أي من المشاكل الصحية التالية برأيك قد ينتج عن السكري غير المنضبط؟ [يرجى اختيار كافة الخيارات التي تتبناها]

1. أمراض العين (إعتام عدسة العين، الجلوكوما)
2. فقد البصر
3. أمراض الكلى
4. البتر أو الغرغرينا
5. أمراض القلب
6. السكتة الدماغية
7. أمراض الأعصاب
8. الاكتئاب

DK .98

REF .99

القسم الثاني هـ: الإجراءات المُتخذة للحد من المخاطر

ASK if RESPTYPE<3

[PROGRAMMER NOTE: Export with order of selection preserved]

{Q: PREVENT}

ما هي أهم الإجراءات التي يمكن لشخص اتخاذها للوقاية من السكري؟ يرجى ذكرها بالترتيب مع البدء بأهمها والانتهاء بأقلها أهمية

المحاور: اختر من القائمة أدناه بناءً على إجابة المشارك ثم اقرأ فقط خيار الإجابة على المشارك بنفس الترتيب للتأكيد

[SELECT ALL THAT APPLY]

1. الحماية الغذائية: حمية غذائية صحية أكثر/ أفضل
  2. ممارسة الرياضة: ممارسة الرياضة بشكل منتظم
  3. مراقبة نسبة السكر في الدم
  4. الوزن: فقدان الوزن
  5. الأدوية: تناول الأدوية الواردة في الوصفات الطبية
  6. التدخين: الإقلاع عن التدخين
  7. نمط الحياة: اتباع نمط حياة صحي
  8. الفحوصات: إجراء الفحوصات بشكل منتظم
  9. الحد من التوتر
  10. غير ذلك، حدد الجنسية ..... أدخل نص .....
- DK .88  
REF .99

ASK IF RESPTYPE=3

{Q:WPREVENT}

- أي من هذه الخيارات التالية تعتبر من التصرفات المهمة التي يجب القيام بها للوقاية من مرض السكري؟
1. اتباع نظام غذائي صحي
  2. التوقف عن التدخين
  3. تناول الدواء
  4. إجراء فحوصات منتظمة
  8. لا أعلم

9. مرفوض

{Q: COMPLIANCE}

هل تتبع أيًا من هذه الإجراءات في حياتك اليومية؟

[في حال السؤال, أجب "أنا أتكلم عن أي من الخيارات المحددة فقط" وإعادة ذلك عند الضرورة.]

1. نعم، جميعها
2. نعم، بعضها
3. لا، لا أتبع أيًا منها على الإطلاق

DK .98

REF .99

{Q: ADHERE}

[If Compliance=1 or 2 ask]

في ظل وجود مقياس من 1 إلى 10 مع العلم أن 1 تعني عدم اتباع أيٍّ من هذه الإجراءات بينما تعني 10 اتباعها بشكل صارم. كيف تقيم التزامك اليومي بإجراءات الوقاية المذكورة في المتوسط؟

[أدخل نصًا] \_\_\_\_\_

{Q: HEALTHDIET}

أي من إجراءات الحمية الغذائية المذكورة أدناه من المرجح أن تساعدك على الحد من مخاطر إصابتك بالسكري؟

[يرجى اختيار كافة الخيارات التي تنطبق]

1. تقليل كمية الأطعمة الدهنية التي تتناولها
2. تقليل كمية السكر والحلوى التي تتناولها
3. تقليل كمية المشروبات المحلاة مثل العصائر والمشروبات الغازية ومشروبات الطاقة التي تتناولها
4. تقليل كمية النشا التي تتناولها (مثل الخبز والأرز والبطاطس أو المعجنات)
5. تقليل كمية الطعام التي تتناولها بشكل عام

DK .8

REF .9

**Administration Notes:** Please Administer this section to all Three groups: **QATARIS,**

**WCMs AND LMs**

**PROGRAMMER:** all questions should have refuse and don't know option

خلال الأسبوعين الماضيين، كم مرة عانيت فيها من أي من المشاكل التالية؟

{Q:LITPLEAS}

قلة الإهتمام أو قلة الإستمتاع بأشياء مختلفة أو القيام بأي عمل, هل تقول...؟ .

1. لم اشعر بذلك على الاطلاق

2. شعرت بذلك بعض الأيام

3. شعرت بذلك أكثر من نصف الأيام

4. شعرت بذلك تقريباً كل يوم بعض

8. لا أعرف

9. أرفض الإجابة

{Q:DOWNDEP}

الشعور بالحزن أو ضيق الصدر أو اليأس؟ هل تقول...

1. لم اشعر بذلك على الاطلاق

2. شعرت بذلك بعض الأيام

3. شعرت بذلك أكثر من نصف الأيام

4. شعرت بذلك تقريباً كل يوم بعض

8. لا أعرف

9. أرفض الإجابة

]

{Q:hhinco1}

**IF RESPTYPE=1, ASK**

نشكر لك تعاونك. لدينا فقط اثنان من الأسئلة المتعلقة بإجمالي الدخل الشهري لأسرتك.  
هل إجمالي الدخل الشهري لأسرتك أقل من 50,000 ريال قطري أم 50,000 ريال قطري فأكثر؟

- 1 أقل من 50,000 ريال قطري
- 2 50,000 ريال قطري أو أكثر
- 8 لا أعرف
- 9 أرفض الإجابة

{Q:hhinco1A}

**IF Resptype=1 & hhinco1 =1, ASK**

ثانياً، هل هو أقل من 30,000 ريال قطري، أم 30,000 ريال قطري فأكثر؟

- 1 أقل من 30,000 ريال قطري
- 2 30,000 ريال قطري أو أكثر
- 8 لا أعرف
- 9 أرفض الإجابة

{Q:hhinco1B}

**IF Resptype=1 & hhinco1 =2, ASK**

ثانياً، هل هو أقل من 70,000 ريال قطري، أم 70,000 ريال قطري فأكثر؟

- 1 أقل من 70,000 ريال قطري
- 2 70,000 ريال قطري أو أكثر
- 8 لا أعرف
- 9 أرفض الإجابة

{Q:hhinco2}

**IF Resptype=2, ASK**

نشكر لك تعاونك. لدينا فقط اثنان من الأسئلة المتعلقة بإجمالي الدخل الشهري لأسرتك في قطر.  
هل إجمالي الدخل الشهري لأسرتك أقل من 15,000 ريال قطري، أم 15,000 ريال قطري فأكثر؟

- 1 أقل من 15,000 ريال قطري
- 2 15,000 ريال قطري أو أكثر
- 8 لا أعرف
- 9 أرفض الإجابة

{Q: hhinco2A}

**IF RESPTYPE=2 & HHINCO2 =1, ASK**

ثانياً: هل هو أقل من 10,000 ريال قطري، أم 10,000 ريال قطري فأكثر؟

- 1 أقل من 10,000 ريال قطري
- 2 10,000 ريال قطري أو أكثر

- 8 لا أعرف  
9 أرفض الإجابة

{Q: hhinco2B}

**IF RESPTYPE=2 & HHINCO2 =2, ASK**

ثانياً: هل هو أقل من 25,000 ريال قطري، أم 25,000 ريال قطري فأكثر؟

- 1 أقل من 25,000 ريال قطري  
2 25,000 ريال قطري أو أكثر

- 8 لا أعرف  
9 أرفض الإجابة

{Q: hhinco3}

**IF RESPTYPE=3, ASK**

نشكر لك تعاونك. لدينا فقط اثنان من الأسئلة المتعلقة بإجمالي الدخل الشهري في قطر.  
هل إجمالي الدخل الشهري لأسرتك أقل من 1,400 ريال قطري، أم 1,400 ريال قطري فأكثر؟

- 1 أقل من 1,400 ريال قطري  
2 1,400 ريال قطري أو أكثر

- 8 لا أعرف  
9 أرفض الإجابة

{Q: hhinco3A}

**IF RESPTYPE=3 & HHINCO3 =1, ASK**

ثانياً، هل هو أقل من 1000 ريال قطري، أم 1000 ريال قطري فأكثر؟

- 1 أقل من 1,000 ريال قطري  
2 1,000 ريال قطري أو أكثر

- 8 لا أعرف  
9 أرفض الإجابة

{Q: hhinco3B}

**IF RESPTYPE=3 & HHINCO3 =2, ASK**

ثانياً، هل هو أقل من 1,800 ريال قطري، أم 1,800 ريال قطري فأكثر؟

- 1 أقل من 1,800 ريال قطري  
2 1,800 ريال قطري أو أكثر

- 8 لا أعرف  
9 أرفض الإجابة

### Appendix C: Characteristics of the study population (N=2,523)

Variable	n/N	%	95% CI
Age (years)	37±10.32	NA	36.1-37.3
Age (years)			
18-24	(284/2523)	9.5	7.9-11.4
25-34	(852/2523)	35	31.7-37.5
35-44	(671/2523)	27	24.7-30.3
+45	(716/2523)	29	25.8-31.5
Gender			
Male	(1817/ 2523)	82	79.8-83.7
Female	(706/ 2523)	18	16.3-20.2
Nationality			
Qatari	(857/ 2523)	8	7.6-9.2
Non-Qatari	(1666/ 2523)	92	90.8-92.4
Ethnicity			
Arab	(1545/2502)	25	23.5-27.4
South/East Asia	(793/2502)	69	66.7-71.3
African/others	(164/2502)	6	4.5-6.8
Respondent type			
Qataris	(849/ 2523)	8	7.3-8.7
Hight income	(938/2523)	27	24.8-29.3
Low income	(736 /2523)	65	62.5-67.5
Education			
No education	(80/ 2507)	5	3.7-6.8
Less than collage	(1418/ 2507)	69	65.9-71.1
Collage or more	(1009/ 2507)	26	24.1-28.8
Employment			
No	(1954/ 2519)	87	85.4-88.6
Yes	(565/2519)	13	11.4-14.6
Marital status			
Single	(630/2517)	19	16.9-21.2
Previously married <sup>1</sup>	(128/2517)	4	3.0-5.5
Married	(1759/2517)	77	74.5-79.2
BMI <sup>2</sup> (kg/m <sup>2</sup> )			
Underweight	(64/ 2523)	4	2.6-5.2
Normal	(824/ 2523)	38	34.9-41.1
Overweight	(896/ 2523)	33	29.9-35.6
Obese	(739/ 2523)	26	23.1-28.5
Physical Activity			
No	(1474/2515)	62	59.0-64.9
Yes	(1041/2515)	38	35.1-41.0

**Appendix C continued: Characteristics of the study population (N=2,523)**

Variable	n/N	%	95% CI
<b>Dieting</b>			
No	(927/1322)	68	63.5-71.9
Yes	(395/1322)	32	28.1-36.5
<b>Smoking</b>			
Daily	(422/2520)	16	14.1-18.7
Occasionally	(207/2520)	10	8.4-12.4
Not at all	(1891/2520)	73	70.6-76.2
<b>Sleep (hrs./night)</b>			
<7	(1314/2523)	54	51.4-57.6
7-9	(1145/2523)	44	40.8-46.9
>9	(64/2523)	2	1.1-2.6
<b>Depressive symptoms</b>			
No	(2141/2470)	87	85.3-89.2
Yes	(329/2470)	13	10.8-14.7

Note: All percentages are based on weighted proportions calculated using survey weights and therefore differ from the raw percentages.

1. Separated, divorced, and widowed
2. BMI categorized using WHO criteria
3. Recommended hours of sleep by WHO
4. Measured using two items of the Physician Health Questionnaire (PHQ-2)
5. WLSC: Weight-loss stages of change among all BMI categorized

## Appendix D: Multivariable Analysis Using All Study Outcomes

<b>PHQ2</b>	<b>OR</b>	<b>95% CI</b>	<b>P-value</b>
WLSC	1.08	0.73-1.60	0.69
Age (years)			
18-24	REF		
25-34	1.15	0.49-2.67	0.75
35-44	0.65	0.25-1.69	0.37
+45	1.17	0.44-3.07	0.75
Gender			
Male	REF		
Female	1.24	0.68-2.24	0.49
Ethnicity			
Arab	REF		
South/East Asia	0.69	0.34-1.41	0.31
African/others	0.90	0.38-2.13	0.81
Overweight/obese (kg/m <sup>2</sup> )			
No <25	REF		
Yes ≥25	1.32	0.63-2.74	0.46
Respondent type			
Qataris	REF		
Higher-income Expats	1.56	0.99-2.45	0.06
Lower-income Expats	1.21	0.51-2.89	0.67
Education			
Not educated	REF		
Educated	0.46	0.13-1.58	0.21
Employment			
No	REF		
Yes	0.76	0.38-1.53	0.45
Marital status			
Not married	REF		
Married	1.50	0.81-2.80	0.20
Chronic disease			
None	REF		
One	1.05	0.52-2.14	0.89
≥ Two	0.80	0.34-1.88	0.61
Physical activity			
No	REF		
Yes	0.45	0.26-0.77	0.0001

<b>Appendix D table</b>			
<b>PHQ2</b>	<b>OR</b>	<b>95% CI</b>	<b>P-value</b>
Dieting			
No	REF		
Yes	1.06	0.60-1.88	0.83
Smoking			
No	REF		
Yes	1.50	0.81-2.78	0.20
Sleeping (hrs./night)			
No	REF		
Yes	0.70	0.41-1.19	0.19

## Appendix E: Multivariable Analysis Using Continuous Depressive Symptoms

### Score

	Coeff	95% CI		P- value
WLSC				
Precontemplation	REF			
Contemplation	-0.44	-0.85	-0.03	0.03
Preparation	0.14	-0.26	0.54	0.49
Maintenance	0.12	-0.22	0.46	0.50
No weight change and relapse	0.21	-0.21	0.63	0.32
Age (years)				
18-24	REF			
25-34	-0.07	-0.47	0.32	0.71
35-44	-0.20	-0.62	0.23	0.36
+45	-0.22	-0.66	0.22	0.32
Gender				
Male	REF			
Female	0.26	0.04	0.48	0.02
Ethnicity				
Arab	REF			
South/East Asia	-0.39	-0.66	-0.12	0.00
African/others	-0.77	-1.10	-0.44	0.00
Overweight/obese (kg/m <sup>2</sup> )				
No <25	REF			
Yes ≥25	-0.03	-0.29	0.23	0.80
Respondent type				
Qataris	REF			
Higher-income Expats	0.27	0.06	0.48	0.01
Lower-income Expats	0.40	0.07	0.74	0.02
Education				
Not educated	REF			
Educated	0.06	-0.61	0.72	0.87
Marital status				
Not married	REF			
Married	0.08	-0.16	0.32	0.53
Chronic disease				
None	REF			
One	0.11	-0.18	0.39	0.47
≥ Two	0.05	-0.34	0.44	0.81

<b>APPENDIX E</b>				
	<b>Coeff</b>	<b>95% CI</b>		<b>P- value</b>
Physical activity				
No	REF			
Yes	-0.35	-0.56	-0.13	0.00
Smoking				
No	REF			
Yes	0.43	0.14	0.72	0.00
Sleeping (hrs./night)				
No	REF			
Yes	-0.03	-0.23	0.17	0.79

**Appendix F: Multivariable Analysis Using Interaction Terms (unadjusted)**

	<b>OR</b>		<b>95% CI</b>	<b>P-value</b>
<b>WLSC</b>				
Pre-contemplation	REF			
Contemplation	1.72	0.00	6810.48	0.897
Preparation	56.21	0.03	110267.50	0.297
Maintenance	4.31	0.00	5326.32	0.687
No weight change/relapse	1.27	0.00	2674.36	0.951
BMI kg/m <sup>2</sup>	1.15	0.90	1.47	0.278
<b>WLSC#BMI</b>				
BMI #Pre-contemplation	REF			
BMI #Contemplation	0.97	0.73	1.29	0.842
BMI #Preperation	0.87	0.67	1.14	0.314
BMI #Maintenance	0.93	0.72	1.20	0.571
BMI #No weight change/relapse	0.99	0.75	1.29	0.914