

T.C.
YEDİTEPE UNIVERSITY INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF NUTRITION AND DIETETICS

**EFFECTS OF ONLINE VS. FACE TO FACE
NUTRITION CONSULTANCY ON BODY WEIGHT
MANAGEMENT**

MASTER THESIS

MELTEM PIRIL ŞENOL

SUPERVISOR
Asst. Prof. Dr. Binnur OKAN BAKIR

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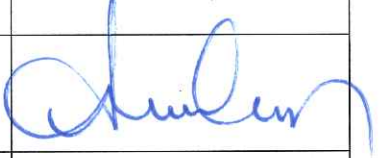

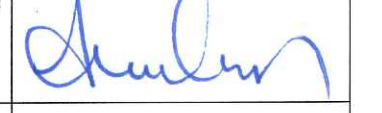


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	Unvanı, Adı-Soyadı (Kurumu)	İmza
Jüri Başkanı:	Yrd. Doç. Dr. Arzu Durukan	
Tez danışmanı:	Yrd. Doç. Dr. Binnur Okan Bakır (Yeditepe Üniversitesi)	
Üye:	Yrd. Doç. Dr. Arzu DURUKAN (Yeditepe Üniversitesi)	
Üye:	Yrd. Doç. Dr. Binnur OKAN BAKIR (Yeditepe Üniversitesi)	
Üye:	Yrd. Doç. Dr. Elif DİNÇERLER (Üsküdar Üniversitesi)	

ONAY

Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 15./12./2017 tarih ve 2017/25-03 sayılı kararı ile onaylanmıştır.

Prof. Dr. Bayram YILMAZ
Sağlık Bilimleri Enstitüsü Müdürü

DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

MELTEM PIRIL ŞENOL

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LIST OF SYMBOLS AND ABBREVIATIONS

BMI	Body Mass Index
TUBER	Türkiye Beslenme Rehberi
EFSA	European Food Safety Authority
ICT	Information and Communications Technology

ABSTRACT

Şenol, M.P. (2017). Effects of online vs. face to face nutrition consultancy on body weight management. Yeditepe University Institute of Health Sciences, Department of Nutrition and Dietetics, Master Thesis. Istanbul, 2017. Obesity is a global health problem in the world and nutritional therapy is one of the effective treatment method for it. In this study, we aimed to determine if online nutrition consultation can be as effective as traditional face to face consultation. Telenutrition can be defined as, the application of telemedicine principles by dietitians with or without other health and solution professionals. The study was conducted in Pirilla Consultancy Center in Karaman-Turkey and over Internet. Consultation periods were 1,2 and 3 months. Patients in both groups (online and face to face) continued to take consultation as it was determined in their first meetings. Drop out rates were very low for both groups; 2 people out of 88 participants. Weight loss success was determined by dropped BMI and waist circumference values, since these two health criteria (BMI, waist circumference) was used to determine obesity risk and levels of people. When dropped BMI values were compared for two groups for all periods of counseling periods, it was concluded that there was no significant difference between the dropped values. For 1 and 3 months periods, there was no significant difference between online vs. face to face groups (t: 0,760; p:0,521 and t:-0,981; p:0,330; p>0,05 respectively). For 2 months there is slightly greater difference in online group (t:2,242; p:0,029; p<0,05). It is very well known that, traditional face to face consultancy applications can help people for weight management. It is believed that, Telemedicine and Telenutrition approaches will be also developed in future and can be used for its advantages by removing the barriers.

Key words: Telenutrition, Obesity, Nutrition Therapy, Weight Loss, Online Nutrition Consultancy

ABSTRACT (TURKISH)

Şenol, M.P. (2017). Beden Ağırlığının Denetimi İçin İnternet Üzerinden ve Yüz Yüze Yapılan Beslenme Danışmanlıklarının Etkilerinin Kıyaslanması. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Bölümü, Master Tezi. İstanbul 2017. Obezite global bir sağlık sorunudur. Beslenme tedavisi bu hastalık için kullanılan önemli bir tedavi yöntemidir. Bu çalışmada, online olarak verilen beslenme danışmanlığının, yüz yüze kadar etkili olup olmadığı araştırılmıştır. Telenütrisyon, teletıp ilkelerinin, diyetisyenler tarafından, tedavi yöntemi olarak uygulanması olarak tanımlanabilir. Çalışma, Karaman'daki, PIRILLA Danışmanlık Merkezi'nde ve İnternet üzerinden yapılan görüşmelerle yürütülmüştür. 88 katılımcıdan sadece 2 tanesi çeşitli sebeplerden çalışma dışı bırakılmıştır. 1,2 ve 3 ay danışmanlık alan bireylerin, azalan BMI ve bel çevresi değerleri karşılaştırılmıştır. 1 ve 3 aylık danışmanlık alan online ve yüz yüze grubun başarısında büyük fark görülmemiştir (t: 0,760; p:0,521 and t:-0,981; p:0,330; p>0,05). 2 aylık danışmanlık alan gruplardan, online gruptaki bireylerin, yüz yüze danışmanlık alan gruba göre biraz daha başarılı olduğu gözlemlenmiştir (t:2,242; p:0,029; p<0,05). Geleneksel yüz yüze beslenme danışmanlıkları ile ilgili bir çok bilgiye ulaşılmıştır. İleride, Online-Telenütrisyon yönteminin avantajlarını kullanmak adına, bu sistemin de gelişimi olacağına inanılmaktadır.

Anahtar Kelimeler: Telenütrisyon, Obezite, Beslenme Tedavisi, Ağırlık Kaybı, Online Beslenme Danışmanlığı

1.INTRODUCTION

Obesity is an important health problem affecting large amounts of the world's population (1). In 2016, about 1.9 billion people that aged from 18 years and older were overweight (1). In Turkey, the prevalence of obesity has also raised over the past 20 years (2). In 1990, 18.8% of the adult population was found to be obese (28.5% among women and 9% among men), and it was increased to 36% in 2004 (44% among women and 27% among men) (2). This epidemic does not only effect Turkish population. For example, in U.S., in 1998, 28% of overweight men and 49% of overweight women were trying to lose weight in 1998 (1). Among obese, these numbers are showed as 50% and 58%, respectively. The most widely used weight-loss strategies in U.S are; reducing caloric intake, increasing physical activity and cognitive behavioral therapy (3). However, the people combining different diet and exercise methods, (diet and no exercise, very low caloric diet with walking, Atkins, step aerobic and low carbohydrate intake) almost 75% of the lost weight is regained within 4–5 years (4).

In general, weight management aimed to reach three goals: The first point needs some behavioral change in the individual but also a changing the environment to reaching to goal (5). The second needs individual behavioral changes, mainly in food restriction or moderations and adding physical activity (5). The third aspect, maintaining the achieved weight loss, mostly about what this person learned and changed throughout the process (5). Nutritional therapy that is supported by Registered Dietitians, is one of the most effective methods for treating obesity (6). For reaching weight management goals, people generally take support from Dietitians to change their nutritional status for having better health status (7).

Since communication technologies are progressing fast, people started to use these technologies also for having health services (8). Telehealth or according to World Health Organization's definition of this term, as Telemedicine, is used to name this system generally (8). Like in many areas in health, Telenutrition / Online Nutrition Consultancy is used by many people all over the world to get Nutrition Consultancy wherever and whenever they are by using communication technologies (9).

Both the aim of Online or Face to Face Nutrition Consultancy is to help people to manage obesity or other medical issues, to learn how to manage their ideal body weight throughout their life and to meet their nutritional requirements for achieving their goals to become healthier individuals (9).

2.LITERATURE REVIEW

2.1 Obesity

Obesity is a global health problem in the world, with significant medical, (e.g. type 2 diabetes mellitus, cardiovascular, gastrointestinal and digestive system problems, respiratory disorders, and even some types of cancers) psychosocial and also economical problems (2).

2.1.1 Reasons of Obesity

Obesity was defined as excess fat accumulation in the body that leads chronic diseases and unwanted consequences that effects patient's life quality (1). Weight gain is the normal physiologic response that occurs when energy intake exceeds energy expenditure (7). Obesity will result when this energy imbalance persists (7). There are many reasons of obesity, included excess caloric intake, reduced physical activity, and poor dietary habits (10). It was also thought that, obesity may be linked with genetics and cultural differences (11). More than 20 genes have been discovered that may be linked to body fat in humans (11). However, the exact mechanism of how body fat accumulation was affected and what was their exact interaction with other environmental factors is still not found (11). Cultural differences about body size preferences and acceptances have been offered as one explanation of prevalence of obesity in terms of culture (12). The main reason behind might be; preference of overweight figures (12). Researchers found that, compared with white population, African Americans are heavier but experiencing less dissatisfaction with their bodies (12). African American women have high overall self-esteem and perceive themselves to be thinner than their actual size (12).

2.1.2 Diagnosis of Obesity

For treatment of obesity, assessment of the patient should include the evaluation of body mass index (BMI), waist circumference, and overall medical risk (11). To estimate BMI, multiply the individual's weight (kg) by, then divide by the height (in cm) squared. This number indicates the BMI in kilograms per meter squared (kg/m²).

Although there are many classification for overweight and obesity, the primary way for classification is assessment of BMI (11).

According to WHO (World Health Organization), normal weight, overweight or obese people are defined as: Normal weight; body mass index (BMI) of 18.5–24.9 kg/m²; overweight; BMI of 25–29.9 kg/m²; obese; BMI of ≥ 30 kg/m² (10).

Obesity levels of patients can also be evaluated. According to another guideline, the body mass index (BMI) of 30–34.9 kg/m²; class 1 obesity, body mass index (BMI) of 35–39.9 kg/m²; class 2 obesity and ≥ 40 is accepted as extreme obesity or class 3 obesity (11).

Excess abdominal fat is an important risk factor of obesity (10). The evaluation of waist circumference to assess obesity and overweight is supported by research (11). This indicator is particularly useful in patients who are classified as normal or overweight (11).

A high waist circumference is related with an increased risk for diabetes, hypertension and cardiovascular in patients with a BMI between 25–34.9 kg/m² (2). If a patient's BMI is 35 or higher than that, measuring waist circumference is not a necessary, since it adds little to predictive power of the disease risk factors (11). According to WHO, people with waist circumferences higher than 102cm and 88cm in men and women respectively, indicate high-risk for chronic diseases that was mentioned (1). In Table 1, Classification of Overweight and Obesity by BMI, Waist Circumference and Associated Disease risk can be seen (11). It should be also noted that, the relationship between BMI and disease risk may vary among individuals and different populations (11).

Table 1: Classification of Overweight and Obesity by BMI, Waist Circumference and Associated Disease Risk (11)

	BMI (kg/m ²)	Obesity Class	DISEASE RISK* (Relative to Normal Weight and Waist Circumference)	
			Men ≤102 cm Women ≤88cm	> 102 cm > 88cm
Underweight	< 18.5		-	-
Normal	18.5-24.9		-	-
Overweight	25-29.9		Increased	High
Obesity	30.0-34.9	1	High	Very High
	35.0-39.9	2	Very High	Very High
Extreme Obesity	≥ 40	3	Extremely High	Extremely High

*Disease risk for type2 diabetes, hypertension, and CVD.

2.1.3 Treatment Methods and Techniques for Weight Management

It is very well known that, ideal weight management is the main goal in treatment of obesity (6). A combination of increased physical activity, behavioral therapy and diet modification might be effective (11). The management of weight includes caloric restriction with a healthy, balanced diet, increased physical activity, and if it is needed additional, surgery, pharmacotherapy and behavioral therapy may help (10). Effective weight control techniques and strategies including; dietary, physical, behavior, pharmacotherapy and surgery as well as combination of these techniques (11). A guide to select treatment was shown in Table 2 (11).

Table 2: A Guide to Selecting Treatment (11)

BMI category					
TREATMENT	25-26.9	27-29.9	30-34.9	35-39.9	40
Diet, physical activity, and behavioral therapy	with comorbidities	with comorbidities	+	+	+
Pharmacotherapy			with comorbidities	+	+
Surgery			with comorbidities	with comorbidities	with comorbidities

-The + represents the use of indicated treatment regardless of comorbidities.

-Prevention of weight gain with lifestyle therapy indicated in any patient with 25 or more than 25 kg/m², even without comorbidities, while weight loss is not necessarily recommended for those with a BMI of 25-29.9 kg/m² or a high waist circumference, unless they have two or more comorbidities.

-Combined therapy with a LCD, behavioral therapy and increased physical activity provide the most successful intervention for weight loss and weight maintenance.

-Consider pharmacotherapy only if the patient has not lost 1 pound per week after 6 months of combined lifestyle therapy.

Turkey has its own healthy diet, weight management, obesity treatment, physical activity handbook for obese people (13,15). Both Turkish and European weight management guidelines mainly focused to healthy diet and physical activity. European guidelines mainly focus the need for follow-up and supervision even after weight loss to maintain healthy weight ranges and well-being (14,16).

Moreover, some global organizations publish datas and suggestions periodically to guide all people around the world such as World Health Organization, American Heart Association and National Heart, Lung and Blood Organization (11,16,17).

2.1.3.1 Dietary Therapy for Weight Management

Dietary treatment is one of the important components of Weight Management Strategies (11). When people combine dietary changes with increased physical activity, behavioral greater changes are achieved (10). To lose weight and maintain the healthy weight ranges are the main goal of Dietary Treatment (10).

In Table 3, American Academy of Nutrition and Dietetics Nutrition Care Process is shown (10). In Turkey, these steps should be also followed, according to TUBER 2015 (15).

Table 3. American Academy of Nutrition and Dietetics Nutrition Care Process (10)

Nutrition Assessment	The dietitian collects and documents information such as food or nutrition-related history, biochemical data, medical tests and procedures, anthropometric measurements, nutrition-focused physical findings, and client history.
Diagnosis	Data collected during the nutrition assessment guides the dietitian in selection of the appropriate nutrition diagnosis (i.e. naming the specific problem).
Intervention	The dietitian selects the nutrition intervention that will be directed to the root cause (or etiology) of the nutrition problem and aimed at alleviating the signs and symptoms of the diagnosis.
Monitoring and Evaluation	The final step of the process is monitoring and evaluation, which the dietitian uses to determine if the patient has achieved, or is making progress toward the planned goals.

2.1.3.1.1 Energy:

To lose excess body weight, it is important to determine the amount of daily energy expenditure of the person (TEE) (11) . The daily energy intake of the individual should be reduced to provide a weight loss of 0.5 - 1 kg per week (13) .This level can often be achieved with a reduction of 500-1000 kcal from the energy that the individual needs to get daily (17). According to Dietary Guidelines of American, this reduction should be between 500-750 kcal/day (17).

The caloric deficit is important but, diets lower than 800 kcal/day have been found to be no more effective than low-calorie diets in producing weight loss (11). They should not be used periodically (11). Successful weight loss is observed, when Low Calorie Diets (LCD) are applied (11).

In general, calories of LCD for women and men are 1200kcal/day, and 1600kcal/day respectively(10). When LCD is thought to be planned, it should be taken to ensure that all of the recommended dietary allowances of a patient are met (11). For this, dietary education should be offered to patient (11). For instance; it should be told to the patient; what are daily macro nutrient percentages, how much fiber the patient should take, how the patient replace food groups according to occasions and more (11).

Indirect calorimetry remains a gold standard in measuring energy expenditure in the clinical settings(18). Out of the various equations validated, it is widely recommend using the Mifflin St. Jeor equations to predict total energy expenditure (18).This equation was thought to be an accurate predictor of energy expenditure in non-obese and obese individuals compared to direct calorimetry (18). The more commonly used Harris Benedict equation has a tendency to overestimate energy expenditure, especially in obese individuals (18). The gender specific Mifflin equations are as follows; Males: $BMR = 10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (y)} + 5$ and for females: $BMR = 10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (y)} - 161$ (18).

2.1.3.1.2 Proteins

Approximately 16% of the adult human body is composed of protein (19). The amount of protein storage is very small in the body, which makes up the largest part of the cells that work and perform certain tasks such as producing of enzymes and hormones (19). Proteins are divided into amino acids that form building blocks in the digestive system (19). It is transported through the blood to the liver and other tissues and organs then again, they join together in a certain plane and take part in tissue and organ structures (19). Some are stored in the reserve amino acid pool in the liver (19).

Proteins are used for growth and development and renewal of cells in tissues and organs. It is also necessary for the hormones and enzymes involved in regulation of the immune system and the body processes (3). In the daily diet, it is recommended that 10-20% of the energy should be sourced from the proteins (15).

About 30-40% of the total protein consumption should be supplied from animal sources to meet the requirement for B12 (15). For protein intake, many guidelines suggests that, 0.8-1g of protein in gram for per kg of body weight should be taken in general (15,17).

2.1.3.1.3 Fats

The average adult human body has 15-20% of fat (13). Even the body percentage levels have different healthy ranges for many variables, such as sex, age, medical conditions and more, the average percentage of body fat in women is 25% and in men it is 15% (15).

The fats are absorbed in the digestive system which separates them into fatty acids that form the building blocks and some are used for energy, while others are used as fat storages and others for some hormones and cholesterol that are active in the regular operation of the body (13).

If the daily energy supplied from the food is greater than the energy spent daily, the fat percentage in the body increases, and vice versa (10). The fat is the main energy store and this store is used when there is lack of enough energy. It is recommended that 20-35% of daily dietary energy sourced from fats.

Recommended distribution of total fat consumption is offered to supplied; 7-8% from saturated fats (butter, tallow, coconut oil in animal nutrients), 12-15% from monounsaturated fats (olive oil, hazelnut oil, Canola oil) and 7-10% from polyunsaturated oils (n-6 fatty acid containing corn, soybean, sunflower and cottonseed oil and n-3 fatty acid fish, fish oil, walnuts, flaxseeds) (13). Today, with positive changes in industrial technologies most of the soft (bowl) margarines do not contain trans fats (15). Even it is safe on paper, they are still industrial products that, useage of them is still considered in many houses (15). Frying foods and baking products and trans fat intake are increasing (15). Dietary intake of trans fats should be less than $\leq 1\%$ of daily energy (15).

2.1.3.1.4 Carbohydrates and Glycemic Index

According to the numbers of sugar molecules that they contain, carbohydrates are classified into two groups as; Simple and Complex (13).

Simple carbohydrates contain one or two molecules of sugars (13). Single molecule sugars are glucose or fructose and galactose (13). The two molecular sugars are sucrose, lactose and maltose (13). Simple sugars give the food a sweet taste (13). Naturally, they are found in fruits, milk, sodas, cold tea drinks, fruit drinks, confectionery and desserts as added sugar. Simple carbohydrates are also referred to as glycemic carbohydrates (15).

After digestion carbohydrates break down into simple sugars in the body (15). Pancreatic insulin is secreted by the passage of blood glucose (15). The insulin is used for glucose uptake to create energy for body to use (13). Blood insulin and glucose levels increase after carbohydrates are consumed (13). After consuming some foods, insulin and glucose levels are rapid, some are moderate, others are late (13) .

Foods that provide a rapid increase in blood glucose are accepted as high glycemic index (14). The carbohydrate type of food determines the glycemic index of the foods. Foods that increase blood sugar levels are named as foods with high glycemic index (GI), and the foods that elevate blood sugar levels more gradually are named as low GI foods (14).

Maturation or storage, processing and preparation methods of food affects the glycemic index too (13) . It is recommended to eat foods that have lower GI levels to regulate the blood sugar regulation (14).

Carbohydrates are stored as glycogen in the liver and muscles. It is the most economical and fast energy source for the body (15). Muscle and liver glycogen is used as an energy source in severe working conditions and endurance exercises (15).

Daily excess carbohydrates are converted to glycogen and then stored and stored. For this reason, it is recommended that 45-60% of total daily energy should be sourced from carbohydrates (14). An adult individual with a 2000 kcal energy requirement should have approximately 250-300 g carbohydrates in her/his diets (14).

2.1.3.1.5 Vitamins and Minerals

The vitamins and minerals are named as micro nutrients that have essential roles in the body (15). Vitamins among themselves are divided; as fat soluble vitamins (A, D, E and K) and in water soluble (B group and C) (13). Vitamin B and C group, involve in energy metabolism in the body, in blood production and in the immune system which are vitamins of group B and vitamin C. Vitamin D is essential for bone formation (13). Vitamins A, E and C prevent damage to body cells, help maintain normal functioning and reduce the effects of certain harmful substances (as antioxidants). Folic acid, B6, B12 and C vitamins are involved in blood production (15).

An average of 6% of the adult human body is consisted of minerals (15). Minerals such as calcium, phosphorus, magnesium are found in skeleton and tooth structure (15). Minerals such as iron and cobalt are important for blood production, while zinc is important for the immune system (11).

For weight management, the blood level of Vitamin D, calcium, zinc, has greater impacts. These micronutrients can affect weight management because, when the levels are decreased in the body, appetite control may become more difficult (11).

Vitamins and mineral deficiencies should not be a concern in balanced diets for which the energy is not too low, in terms of nutrients (6). Daily dietary supplementation might be needed for diets lower than 1200 kcal for female subjects and 1500 kcal for male subjects (5).

Otherwise, extra multivitamin supplementation is not required, if the individual meets with their micro nutrient requirements via dietary intake and follow a balanced, healthy diet, on daily basis (17).

2.1.3.1.6 Dietary Fiber

It is widely believed that, increasing dietary fiber is effective in preventing obesity as in many chronic diseases and preventing weight gain (10).

Fiber generally works as slowing the rate of gastric emptying, reducing bile acid and fatty acid absorption, preventing constipation by increasing bowel movements and fecal volume, and reducing insulin secretion by increasing insulin secretion (11). The amount of fiber recommended to be taken daily for adults is 20 to 30 grams (15).

Vegetables, fruits, legumes, whole grain products, whole wheat flour and whole wheat products are the recommended sources of natural fiber (11).

2.1.3.1.7 Water

For every 1 kg of body weight, approximately 30ml water should be taken for general health (14). When the liquid especially, water consumption is less, constipation, edema and other medical conditions may occur.

Constipation affects the individual's weight loss in the negative direction (14). For general health, water consumption is important, not only weight management, but also to promote our health (11). If the person consume other beverages, specially diuretics like coffee and tea, or exercising rigorously, water consumption should be increased (6).

2.1.3.1.8 Salt

Salt restriction should be made in the nutrition program applied to obese individuals with heart failure or other causes of edema and hypertension (15). If these problems are not present, salt restriction is not necessary (11). Nevertheless, salt intake should not exceed 5 grams per day for all healthy individuals in general population to promote health (17).

2.1.3.1.9 Meal Frequency

According to TUBER 2015 (15), nutrition programs should be organized as 4-6 meals per day. The meal between meals should be 3-4 hours. Frequent feeding prevents excessive feeding, delays hunger and reduces nutrient intake the next day (15).

If the individual does not have diabetes or other medical problems, but still weight management is required, snacks should be planned according to the nutrient requirements of the individuals (14).

2.1.4 Physical Activity on Weight Management for Obesity Treatment

Physical activity is one of the aspects of weight management and sustainment of weight loss (14). Physical activity supports very well fat loss (19). EFSA proposed that, to promote health, people should undertake 30-60 minutes of physical activity of moderate intensity on most of the days of the week (14,16).

TUBER also suggests that 10,000 steps per day should be our aim to live a healthy life (15). In order to maintain the weight loss, after active or high proportion weight loss is done, it is recommended that daily exercise goal should be 60-90 min/day (16). It is also highlighted that, physical activity is not enough to achieve weight loss, without balanced dietary energy restriction (16).

Both TUBER and EFSA emphasized that, exercise strategy must be planned individually. Individual's current weight, height, medical conditions, age, sex, and abilities are important for application and programming of the exercise plan (14, 15). According to American Heart Association (AHA), increased aerobic physical activity (such as brisk walking) for 150 min/week (equal to 30 min/day 5 days in a week) improved the achievement of weight loss (17). Higher levels of physical activity, approximately 200 to 300 min/week, are recommended to maintain lost weight or minimize regaining of the weight that was lost in more than 1 year ago (17). According to another U.S. guideline, physical activity has direct and indirect benefits (17). As its direct benefits, suggest that, increased physical activity is an important to increase energy expenditure and weight maintaining (17).

As indirect benefits; increased physical activity, reduces the risk of heart disease and chronic diseases; such as diabetes and hypertension (17). For the obese people, activity should be increased slowly to prevent injuries (17). It is suggested that, all adults should perform at least 30 minutes of moderate-intensity exercise all days of the week to prevention of treatment and also prevention of obesity (17).

2.1.5 Surgical Weight Management Treatment

Surgical treatment in obesity, in other words, bariatric surgery, is more preferred nowadays (20). Pruritic procedures lead to weight loss by causing malabsorption or by limiting food intake. There are also combined surgery methods that use both methods together (21). There are typically three separate or combined mechanism of obesity surgery (20). Firstly, restricting food intake (restricting method) by reducing the upper part of the resection, with bypass so the capacity is reduced (21). The person has less place to storage foods on their stomach so, starts to eat less (20).

Vertical band gastroplasty (VGB) and laparoscopic adjustable gastric band (LAGB) are restrictive surgical procedures. There is no change in the absorption function of the small bowel (20).

The second way is done for malabsorption (20). Absorption can be reduced by shortening the small bowel length of absorption, by bypassing the absorbing area, or by detecting the biliopancreatic secretions that facilitate absorption (20).

Jejunallyal bypass (JIB) and duodenal switch (DS) are such operations. However, when malabsorption is severe, protein-calorie malnutrition and some micronutrient deficiencies may arise (21).

The third way is combination of restrictive and malabsorbative operations (20). Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion (BPD) and biliopancreatic diversion / duodenal switch (BPD / DS) are examples of operations for this method (20). Restrictive with small stomach tongue in RYGB; Malabsorption is also provided by small bowel reconstruction (21).

The indications for surgery are; BMI > 40 kg / m², BMI > 35 kg / m² and obesity-related comorbidities (type 2 diabetes, severe hypertension etc.) can not be controlled by medical treatment and lifestyle changes, previously applied non-surgical methods but failed (21). The aim of the treatment of surgery is to reduce obesity-related morbidity and mortality, improve metabolic functions (20).

Although there are huge advances in technical, maintenance and follow-up in bariatric operations, risk and perioperative complications have not been reduced to zero (20). For that reason, the choice of appropriate patient and appropriate technique is very important (21).

2.1.6 Pharmacological Weight Management Treatment

Although there are many attempts to reduce body weight, it is difficult to maintain weight loss that both, physicians and patients to be interested in pharmacotherapy (22) .

An ideal obesity drug; (22) :

- Should provide dose-related weight loss
- Should help to achieve the continuity of the target weight achievement
- Must be reliable also, for even long-term use
- Should not develop tolerance
- Should not be abusive or addictive

Unfortunately, there are no medications that meet all of these properties on a daily basis (23). Together with lifestyle changes, the patient should be told that life-long treatment should be needed and life-long medication may be used (22).

In this sense, obesity is analogous to diabetes and hypertension, where chronic drug treatment is the accepted treatment modality to achieve metabolic control and full healing is not anticipated (23). Obesity drugs are never primary and almost always complementary in weight-loss programs (23). Under no circumstances they should be used alone as a means of treatment because power and efficiency are pretty low, when they are used alone (22).

2.1.7 Behavioral Therapy for Obesity Treatment

Obese patients' biographies are filled with failing diets and exercise attempts, repetitive number changes on the scale, frustrations, school, and discriminatory stories that they are exposed to in their work and social lives (24).

It is very important that, obese patient should be ready for a new weight control program even, she/he has suffered a severe psychological trauma due to all of this or is still living in. (24).

Prosecuting patients or provoking their guilt does not lead success in the treatment of obesity. Providing motivation for them can help them to join a lasting and effective weight control way (25).

In order to support an obese patient, it is necessary to learn the history of success and failure in the past, to identify the sources of problems, to determine the factors affecting eating behaviors, and then to reveal methods that can overcome all these problems (25). Among the most common causes of failures are non-realistic goal setting and not being aware of wrong attitudes and behaviors (25). In the treatment of obesity, the physician and the patient should be monitored periodically to determine whether a consistent, reachable goal should be achieved (24).

Essentially, the patient himself/herself should follow and record exercise, food intake and weight on a daily basis. It has been shown that those who hold records of weight changes lose significantly more weight than those who do not record (24).

One of the most important factors determining the success of obesity treatment is frequent control, effective and long-term social support (6). Each patient's polyclinic application will provide an effective follow-up of the patient's weight, measuring changes in weight according to previous applications, questioning exercise intensities, nourishment habits during this time, and taking notes. It is important for the patient to feel that he is not alone in this process, to be able to see himself as part of a team (25).

The creation of treatment groups and the periodic meetings may enable obese patients to motivate each other to come together (24) . These sessions can usually be administered by groups of 10 to 15 people in sessions of 1-2 hours per week under the supervision of a therapist (24) .

It should be known that obesity is often a genetically transmitted disease and can not be controlled without changing the way of life (1). For this reason, precautions should be taken not only to regulate the obesity patient but also to regulate her/his social environment (5).

For instance, in order to treat an obese patient who has an excessive weight and living with his/her family, it is necessary to provide nutrition education also to her/his family to promote healthy lifestyle habits (10). Otherwise, the path to the patient will be

limited and after a while she/he will adapt to the neighborhood she/he lives in and return to her/his old eating habits. (10).

One of the important factors determining success is stimulus control (26). The effect of environmental stimuli on eating behavior is well known (24). For this reason, removing any visual stimuli that trigger eating behavior is important in weight control (18). Shopping is the way to consume more raw fruits and vegetables, not buying energy-intensive calorie-based foods. It is also necessary to follow some rules to make some changes in home life and to ensure the permanence of these changes (18).

These include minimizing dishes that are eaten and ensuring that there are no televisions in the dining room (18). This prevents the perception of eating as an action unwittingly (18). Since eating behavior is centered, people have to focus on eating (26).

In conclusion, the most important point to be aware of for obesity treatment is that no form of nutrition and physical activity change only can help the maintaining weight loss or a healthy life (26). It is not suitable for the natural flow of life to be permanent, unless you give some effort for it and it is wanted to find combined strategies that will permanently change obese patient's life in order to make permanent changes her/his life (26).

2.1.8 Nutrition Education Techniques and Methods for Weight Management

The prevention of diseases through the development of healthy eating and healthy lifestyle is of great importance to the society (18). In order to achieve the expected quality of life in the globalization process, it is necessary to increase the nutrition awareness of all individuals and the society and to transform the healthy nutrition into a lifestyle (17). The healthy life of the society and its development in the economic direction depends on the health of the individuals constituting it (3).

The basis of health is, adequate and balanced diet, in other words healthy eating (7). In this direction, nutrition education is the aim to promote the improvement and development of health for all individuals throughout life, to increase the life quality and to adopt the healthy life style (healthy eating and physical activity habits, prevention of alcohol and tobacco use) (7).

For people who are obese, nutrition education is very important. The methods that are applied to weight management is not enough to maintaining the weight. In the light of evidence-based scientific data, it is necessary to prepare dietary guidelines appropriate to the conditions of the country, and to develop dietary recommendations appropriate to age, sex, and physiological conditions (17). Nutritional guidelines are based on foods rather than nutrients and are often referred to as “Foods Based Nutrition Guidelines” (15). The nutritional guidelines should be in accordance with the nutritional habits of the countries, the cultural structure of the country and the region, and the environmental differences (14).

Nutritional guidelines prepared according to the outputs of evidence based data to educate the public, policy makers, nutrition and health professionals and to share messages related to healthy nutritional recommendations (13).

Every single weight management patient should ask for nutrition education to improve her/his health and the way to look healthy eating (27). The professionals should also guide their patients by telling what, why and how they are planning their own personal weight management diets (27). By this way, continuity in balanced diet, weight management and a healthy life can be aimed and achieved (15).

2.1.8.1 Dietitian as Mentor

Mentor was defined as a person who teaches other individuals particular skills by role-modeling and demonstration of these particular activities and skills (27).

The relationship of mentoring is between counselor and the patient for nutrition intervention (27). Mentoring has three components; internal trust to each parties, patient leadership and time commitment and emotional maturity (27).

Benefits shown to arise from effective mentoring include the following; Increased job skills and status, a proactive approach to tasks, an eagerness to learn and teach, an attitude of willingness to tutor and others and more (27).

2.1.8.2 Dietitian as Coach

Coach was defined as one who inspires and motivates others (27). Coaching is thought to be similar to reflective teaching in that the teacher show a skill or procedure and the learner listens and learns (27).

When the learner performs, the coach responds with advice and criticism (28). The learner reflects and compares the new information to his or her previous knowledge about the specific skill or procedure (28).

Coaching role thought to be effective if, trust was created between coach and the patient, actions are challenging and achievement was rewarded (27).

2.1.8.3 Dietitian as Counselor

The role of counselor has two parts: Interviewer and counselor (28). Counseling process was defined as a process that, listening, accepting, clarifying and helping patients to form conclusions and develop action plans (28). The dietitian guides the patients for coping their dietary problems (28).

Motivational interviewing is an important part of counseling. Behavioral change of the patients such as dealing with addictive behaviors can be learned by the patients with motivational interviewing. This type of counseling approach is also known as directive, client-centered counseling (28).

A cognitive interview method is also used to understand how individuals process information that are given by the dietitians (28).

Patient centered counseling facilitates change by assessing patient needs and subsequently shaping the intervention to patient's stage in the process of change, specific goals, and unique challenges (29). Four steps are followed: assessment, advising, assisting and follow up (20). In step 1, dietitian asks questions to understand the patient's behavior (29). In Table 4, examples of open ended questions for each stage of the counseling process are shown (29).

Table 4: Examples of open ended questions for each stage of the counseling process (29)

Questions for Assessing Stage of Change and Motivation	Questions about strategies to cope with challenges or barriers to change
How do you feel about your current diet?	What could you do when you face this challenge?
What problems have you had because of your diet?	What else could you do in the face of this challenge or barrier?
What would you like to change about your diet now?	What could you help you cope with this challenge? How?
What concerns do you have about changing your diet now?	What has been helpful in the past to deal with this barrier?
What reasons might you have to want to maintain your current diet?	Questions for goal setting
Questions for Past Dietary Experiences with Dietary Change	What are you willing to change in your diet?
What changes have you made to your diet? How long did you maintain?	When? How often do you do this?
How did you make changes in your diet? What helped?	Where will you do this?
What difficulties did you encounter? How did you handle them?	What will you have to in advance to ensure that you are able to make and maintain this change?
Questions about Anticipated Challenges or Barriers to Change	How confident are you of your ability to make and maintain this change?
What could you get in your way of attaining your goal?	Questions for follow up
What situations will make it hardest for you to achieve goal?	How did you do it for your plan?
What other situations might make it difficult for you to maintain your change?	What helped you stay on target?
	What difficulties did you encounter?
	Questions for assessing lapse and relapse?
	What made it difficult for you to stay with your plan?
	What else could you have done to stay on track?
	How did you feel after that?
	What would you like to do now?

In the second step, personalized advisement based on the assessment is given toward helping the client make changes in her/his life (29). In the third stage, motivational statements and encouragement are involved. Goals and specific skills such as self-monitoring and other problem solving will also be discussed. In the last step, follow-up toward maintaining changed dietary habits will be presented. Again, open-ended questions are used (29).

2.1.8.4 Dietitian as Communicator

Communication between the dietitian and the patient is one of the most important component of a nutrition counseling (27). Dietitian who develops verbal and written skills along with listening skills, establish stronger relationships with patients (27). There are seven components of the communication process as follows (27) :

- 1.The source is the starting point for information exchange.
- 2.The message is the idea or information transmitted verbally or nonverbally.
- 3.The channel is the pathway for messages between the sender and the receiver.
- 4.The receiver takes in the message, assigns meaning, interprets, and the responds to the message
- 5.Feedback refers to the response from the receiver to the sender.
- 6.The environment is the context in which the message occurs, such as physical surrounding, cultural and historic or attitudinal factors.
- 7.Noise in any aural, visual or internal factor that can distract from the meaning of the message.

Dietitians who provide nutrition information to the public or individual will choose methods such as television, Internet, or printed materials (27). The action model of dietary guidance to groups and individuals was developed by Borra as consumer message development model, which was showed in Figure 1 (27).

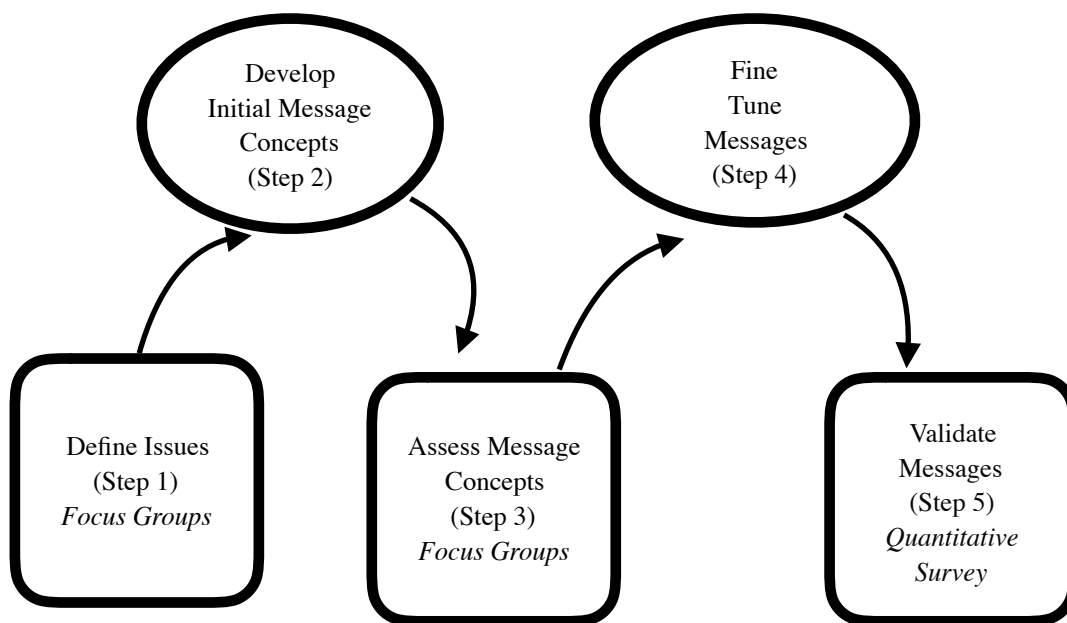


Figure 1: Consumer Message Development Model (27)

In another study, it was aimed to determine the means of communicating nutrition education for elderly adults (30). They included limiting educational messages to one or two; reinforcing and personalizing messages; providing purposeful activities and incentives; providing access to health professionals; and using appropriate theories of behavior change (30). A model was developed that is shown in Figure 2 (30). It demonstrates the application of this model to design a nutritional education intervention for older adults (30).

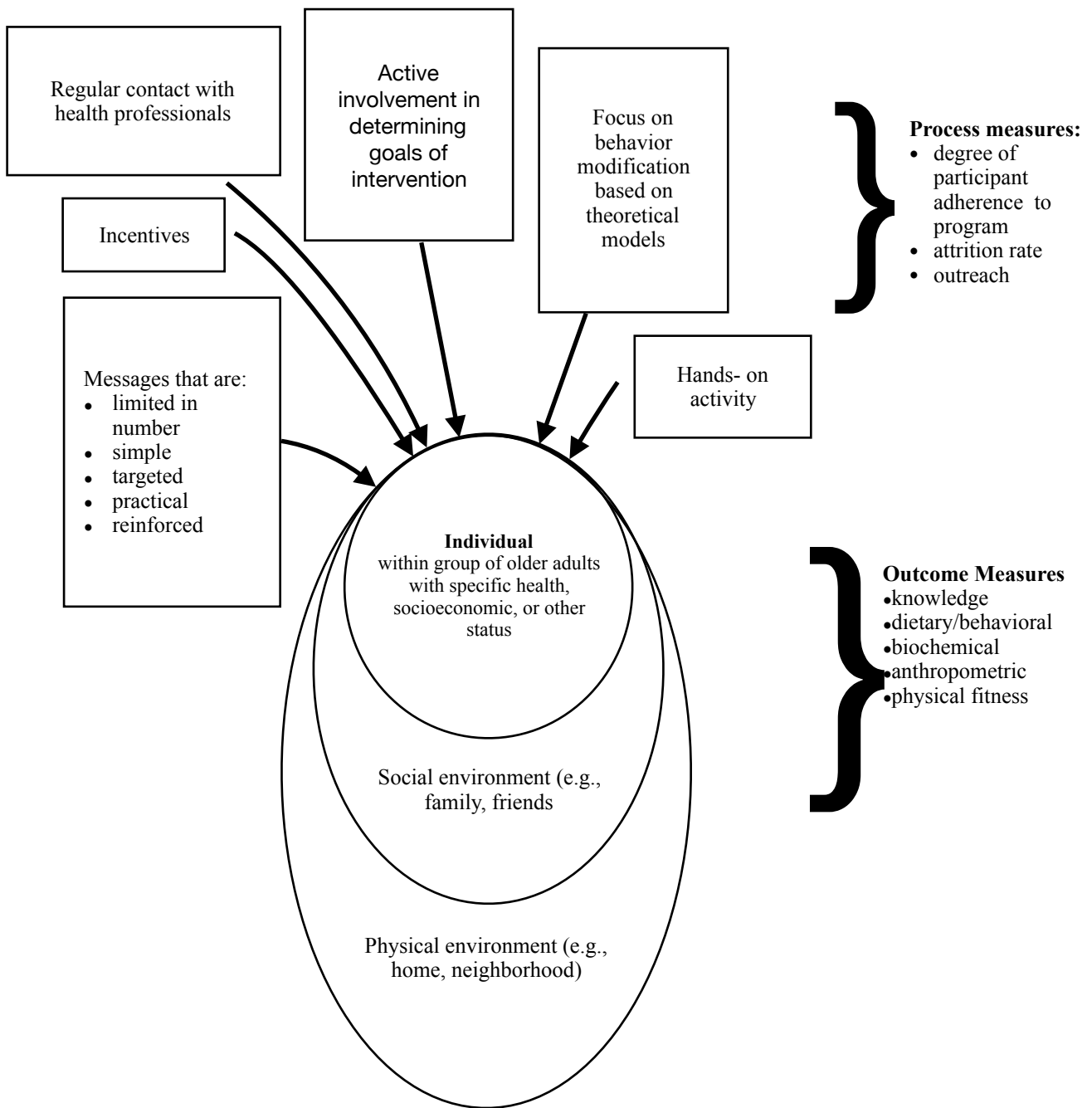


Figure 2: A Framework for Designing a Nutrition Education Intervention for Older Adults (30)

2.2 Telemedicine

Telemedicine was defined as “healing from a distance” (8). The main goal of telemedicine is basically; Promote health of individuals by using information and communication technologies (ICT), such as mobile phones, the Internet, computers and other smart devices (8).

It was recognized that, there was no proper definition of telemedicine so, WHO adopted a definition of Telemedicine, from a study which was conducted in 2007 (31). This broad definition is : “The delivery of health care, where distance is an important factor, by all health care professionals using communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, assessments and evaluations of individuals and their communities” (31).

There is also another term called Telehealth that different term from Telemedicine. Actually Telemedicine, covers Telehealth, because, Telehealth is defined as providing health care information from physicians only (8).

Today, Telemedicine is used almost all over the world (9). In developed countries, it is known that, this method is used for, cancer screening, maternal health care, nutrition and more (9). Today, some developed countries and organizations are trying to find the best methods to reach more people with help of technology. For this, many surveys, datas are collecting to find the best possible opportunities to promote as many people as possible from all over the world (31).

2.2.1 Telenutrition - Online Nutrition Consultancy

Telenutrition can be defined as, the application of telemedicine principles by dietitians with or without other health and solution professionals such as physicians, psychologists, and exercise experts to deliver nutrition therapy via ICT (32).

Since home care solutions are becoming a response to the need for decreasing the health care costs of the populations, advantages of distance health care become popular. ICT are the key components of the development of telemedicine solutions (8).

This medical care system is becoming an industry and it has been reducing the health care costs of many countries, which we are talking about billions of dollars (28).

It become a need to provide nutrition consultations also like telemedicine, with a universal approach that will focus on humans' exercise, eating habits, body perception, and weight management (8). Even cultural, socio-economical and demographic components are important to set some certain rules, we need to give credit to science and global approaches in certain areas too (9). By creating appropriate system to work well to help people to provide healthy weight management, life style and dietary patterns, countries will be more healthy and will be on a better position to protect their populations to prevent chronic diseases such as obesity and diabetes (31).

According to The National Network of Telehealth Resource Centers in U.S., basic requirements of telenutrition are; strong internet connection via, smart phones or other internet connectable ICT, proper location for make conversation for both side, and basic knowledge about distance phone or web conversation applications (33).

Three aims of Telenutrition are; improvement of the health of the population, lower costs for health care systems for both physical and disease related costs, and improvement of patient's experience, distance consultancy has many usages (34).

In many countries such as America and Canada, there are organizations for Telenutrition Services (35,36). Yet, these countries are still trying to improve the application methods, and make it global to help their populations all around the world (35).

2.2.1.1 Nutrition Care Process with Telenutrition

According to the U.S. guideline, Medical Nutrition Therapy (MNT) involves an individualized nutrition assessment and a required Nutrition Care Process to manage disease (35).

MNT is recognized as an important part of healthcare and aimed to assist individuals with a variety of diseases or conditions that are effected by nutrition, to improve the patient's health and quality of life (35).

It is also focused on prevention and management of diseases following by nutrition care; hypertension, dyslipidemia, CVD, Type 1 and 2 diabetes, gastorintestinal diseases, food allergies, celiac disease, cirrhosis, HIV and more (36).

Telenutrition model was standardized intended to guide the dietitian in providing high-quality nutrition care (37). In U.S., this model serve as a framework to individualize care, for patient's requirements and values by using ICT (35). The Nutrition Care Process is a systematic approach to providing high-quality nutrition care and consists of four, interrelated steps which the dietitian applies (38).

First step is nutrition assessment that the dietitian collects information about medical background, eating behaviors, nutrition-focused physical findings and anthropometric measurements (38). The second step is diagnosis that, the dietitian assessed the collected patient data to provide required treatment (38). On the third step which is Intervention, the dietitian selects the intervention that will be helped the patient's root causes of weight management problems (38). Monitoring and evaluation is the last step that the dietitian uses to determine goals and possible progressive outcomes according to achievement of the program on the patient (38).

3. SUBJECTS AND METHOD

The study was conducted between 1st of January - 1st of April 2017. 91 people applied voluntarily to PIRILLA Nutrition Consultancy Center, for the purpose of taking nutritional consultation by online or traditional face to face consultation. Ethical approval was given by Yeditepe University Clinical Researches Ethical Committee with the number 37068608-6100-15-1352 on 23rd of May in 2017. One online and two face to face patients quitted from the consultation program on their first week. Therefore, their datas were excluded from the study. Other 88 patients continued to take consultation for the period of time that was planned for them.

Informed consent form was given to all the patients. The study was based on willingness. Therefore, the patients only who wanted to take part in the study were included. Patients were excluded from the study if they were younger than 18 years old or older than 65 years old.

People who were taken nutritional assessment via online way, applied for consultation from a web site (www.pirilla.com) . On the other hand, the face to face group's sessions were done in PIRILLA Nutrition Consultancy Center in Karaman, Turkey where they came to apply for consultation.

The study was conducted among 46 online and 42 face to face patients. All patients took consultation from the same dietitian. The number of sessions varied according to consultation period. People who take, 1 month of consultation had; 4 sessions, 2 months of consultation have; 8 sessions, and 3 months of consultation had; 12 sessions. The period of consultations were planned and grouped according to their excess amount of weight to lose. Patients could reach the consultant-dietitian via email, message or phone call, if they had any questions or problems with the diet program or the procedure for both of the groups. People who were taken to the online service started to sign up on the web site. After they signed up the procedure, an automatic email with and attachment (Appendix 1) were sent to their inbox.

After the patients filled the forms, an online appointment set for each of them.

Before the first session, it was asked to them to measure their waist circumference, weight and height.

Online patients were instructed and taught before in their first in-person consultation how to measure and read waist and weight scales. Face to face patient's waist circumference and weight were measured by the dietitian.

At the first meeting of online consultations, patients' nutritional status were assessed. After that, a basic nutrition education was given, which was 90 minutes. A healthy, personalized, weight loss diet plan was programmed for each of them according to their health goals and lifestyle. After every session, the diet programs were sent to each of them via email. Every week on the same day, other sessions were set. Before every session, it was asked again from the patients to measure their waist circumference and weight with the same scale and tape measure in the circumstances which were: Immediately after waking up, without eating or drinking anything, with the same clothes. In every session, their nutritional status and weight loss process were analyzed. A new diet program was prepared every week, for every participant.

People who took face to face consultation came or called the Consultancy Center to set their first appointment. In the first meeting, patients' nutritional status were assessed. Their weight, height and waist circumference was measured by the dietitian. Weight of the patients were measured by a digital scale (TANITA MC 780 body composition analyzer) . After that, a basic nutrition education was given, which was 90 minutes. A healthy, personalized, weight loss diet plan was programmed for each of them according to their health goals and lifestyle. After every session, the diet plans were given by hand as hard copies. Every week on the same day, other sessions were set. It was told to patients that, they should not have eaten and drank anything 2 hours before the session and asked to come with the same clothes to create the same conditions for measurements.

In this study, dropped values of BMI and waist circumference were used for comparison the success of each method for two different groups (face to face vs. online groups) for the periods of categorized consultation periods (1 month, 2 months and 3 months) . The data was evaluated using SPSS Statistics version 22.0 software, and checked for the relative risk.

In group comparisons chi-square test and independent t-test analysis was used. In the analysis of data, frequency and percentage distribution values were obtained.

In descriptive statics arithmetic average, standard deviation and maximum-minimum level values were used. A significance level of $p < 0.05$ was considered using U Mann-Whitney.

4.FINDINGS

This study was conducted with 88 patients. There were drop outs in the study in that waist circumstances and weight scales could not be measured for 2 face to face patients, because they left the city. Therefore, they could not continue to take consultation. Also, 1 online patient decided to dropped out the study with no known reason.

Figure 3 is showing the general distribution of the patients from all groups in terms of their gender. It was analyzed that, 20 of the 88 patients included in the study were men (23 %) and 68 of them were women (67 %).

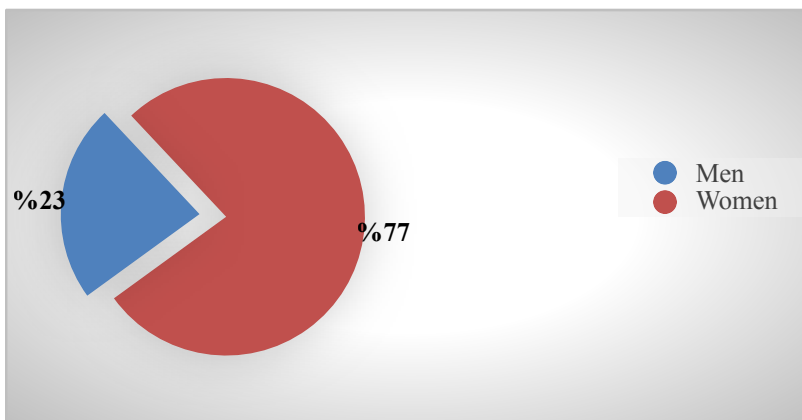


Figure 3. Distribution of All Patients in terms of their Gender

In Figure 4, the distribution of the age groups in percentages can be seen for all patients. When the age groups of the patients participating in the study were evaluated, it was seen that ; 60% (n = 53) of the participants were between the ages of 21-32, 33% (n = 29) of the participants were aged between 33-48 and 7% of the participants (n = 6) were aged over 49 years.

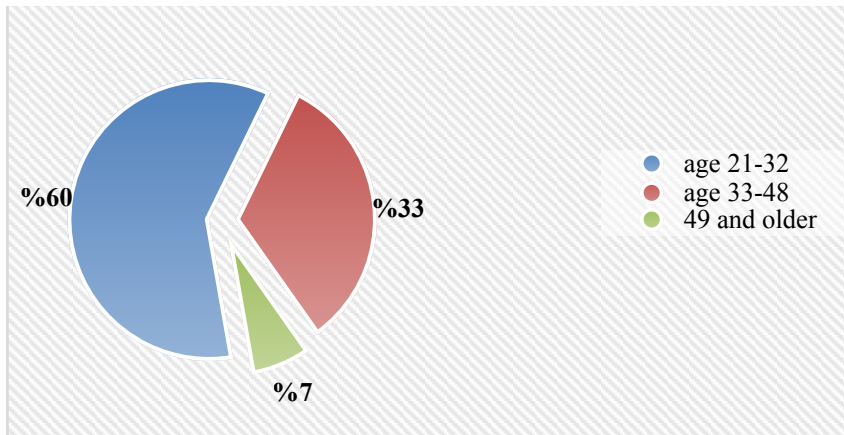


Figure 4. Distribution of All Patients in terms of their Ages

Participants education levels were also analyzed. Figure 5; ‘‘Education Level Distribution of All Patients’’ was showing, that, 15% (n = 13) of the participants were middle school graduated, 19% (n = 17) were in high school graduated, 57% (n = 50) were university graduated and 9% were post graduated.

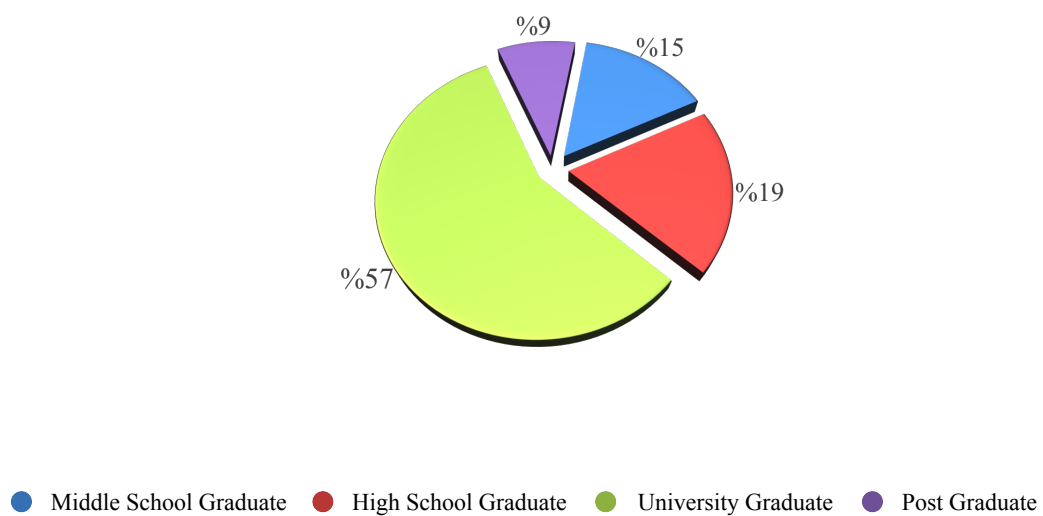


Figure 5: Education Level Distribution of All Patients

In this study, online group’s gender distribution can be seen in Figure 6. For this group, 17% of the participants were men, and 83% were women.

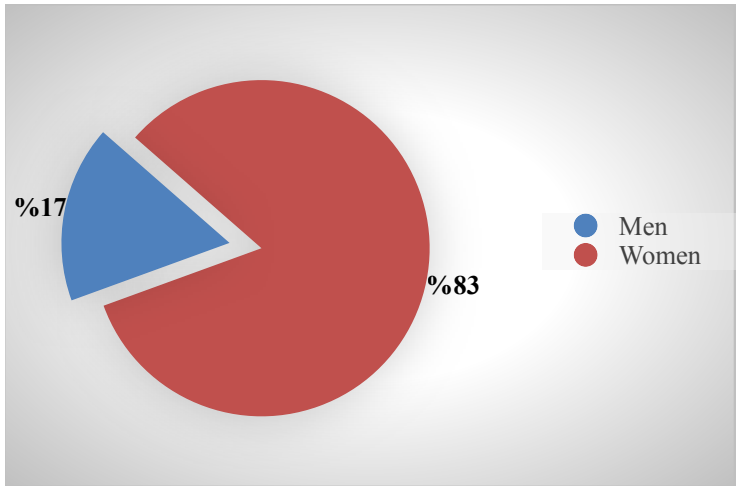


Figure 6: Gender Distribution of Online Group

In this study, face to face group's gender distribution can be seen in Figure 7. For this group, 29% of the participants were men, and 71% were women.

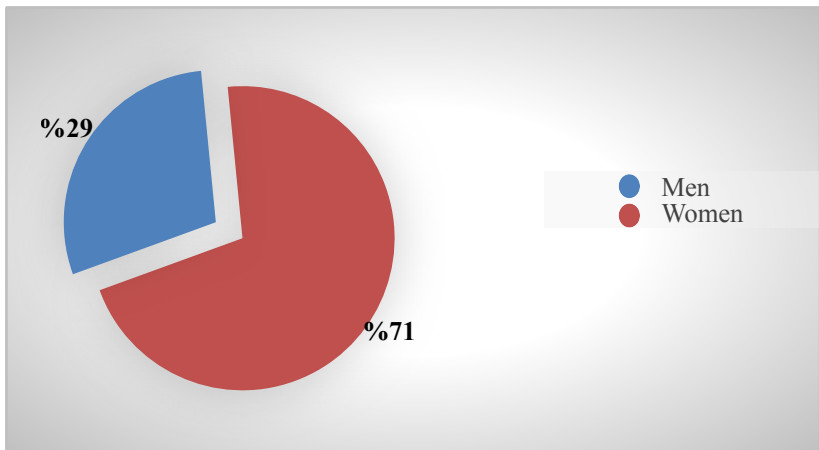


Figure 7: Gender Distribution of Face to Face Group

Figure 8 is showing the distribution of the online participants age groups. When the age groups of people participating in online consultation were evaluated, it was found that; 65% of the participants were (n = 30) between 21-32 years of age; 33% of the participants were (n = 15) aged between 33-48 years and 2% of the participants were (n = 1) aged 49 or over 49 years old.

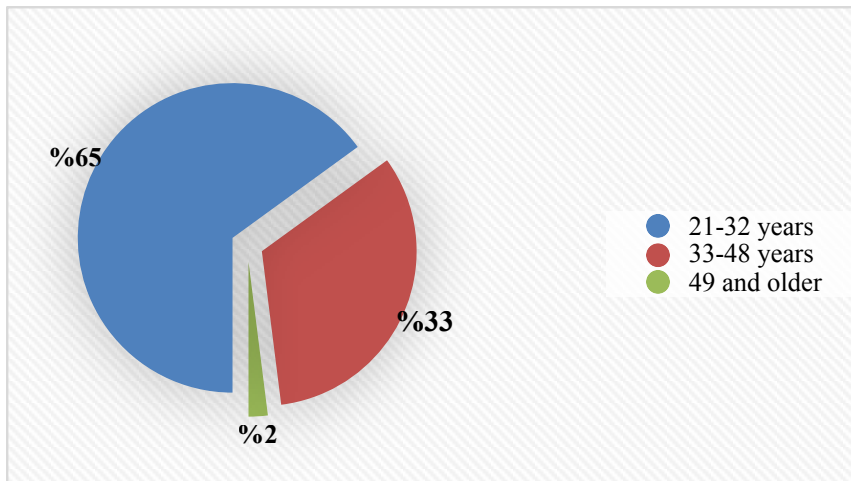


Figure 8: Age Distribution of Online Group

Figure 9 is showing the distribution of the face to face participants' age groups. When the age groups were categorized, it was found that; 55% of the participants were (n = 23) between 21-32 years of age; 33% of the participants were (n = 14) were aged between 33-48 years and 12% of the participants were (n = 5) were aged 49 or over 49 years old.

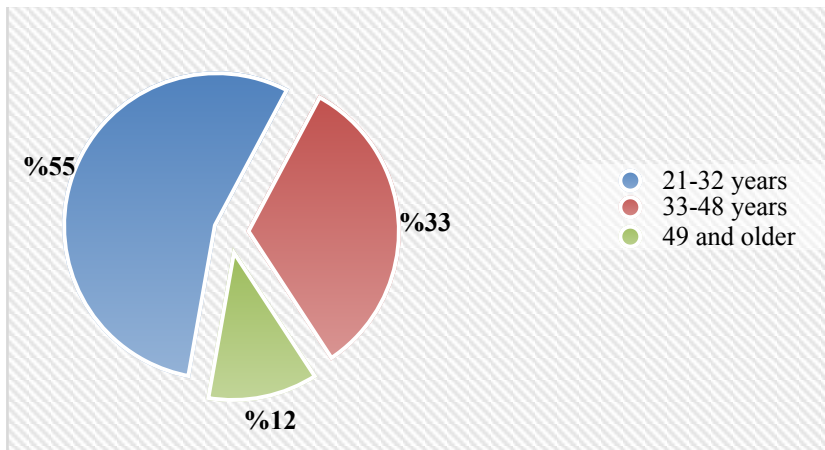


Figure 9: Age Distribution of Face to Face Group

Online participants' education levels were analyzed. Figure 10 ; 'Education Level Distribution of Online Group' was showing that, 7% of the participants (n = 3) were middle school graduated, 15% (n = 11) of the participants were high school graduated, 67% of the participants (n = 31) were university graduated and 11% of the participants (n = 5) were post graduated. Face to face groups' education levels were also analyzed.

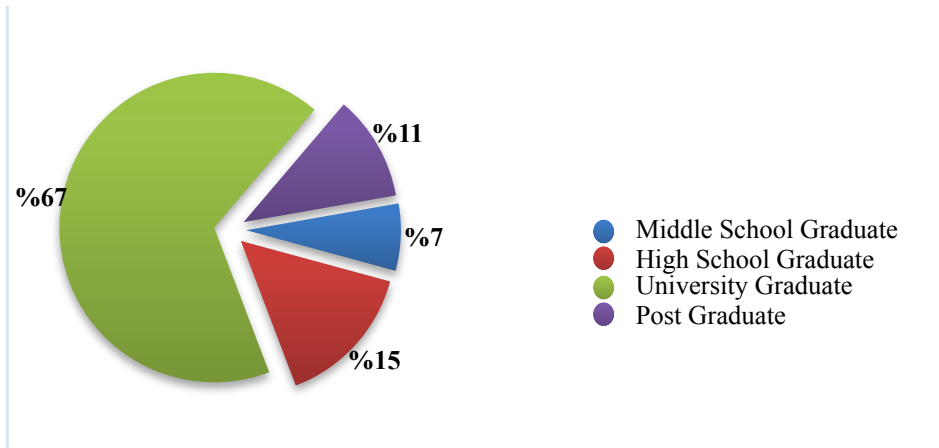


Figure 10: Education Level Distribution of Online Group

Face to face groups' education levels were also analyzed. Figure 11 ; 'Education Level Distribution of Face to Face Group' was showing that, 24% of the participants (n = 10) were middle school graduated, 24% (n = 10) of the participants were high school graduated, 45% of the participants (n = 19) were university graduated and 7% of the participants (n = 3) were post graduated.

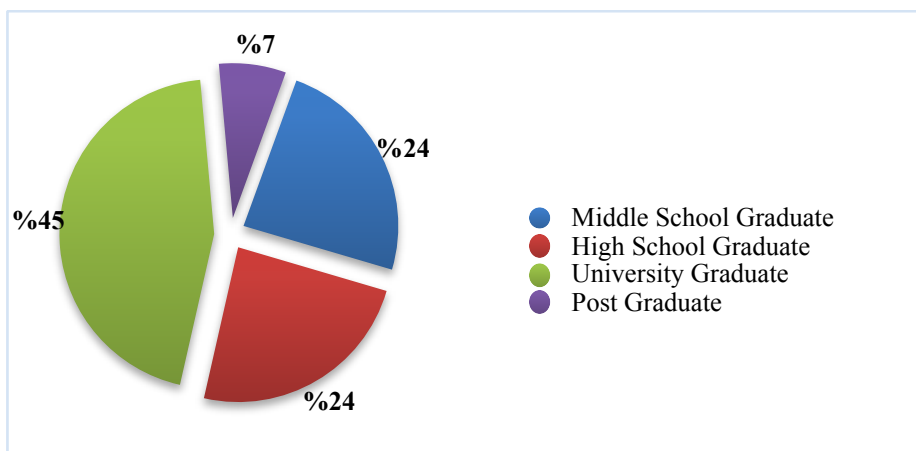


Figure 11: Education Level Distribution of Face to Face Group

For 1 month of online vs. face to face consultations, dropped BMI values differences were analyzed and shown in Table 5. There was no significant difference in the dropped BMI values between online patients and group and the face-to-face patients groups for 1 month consultation period (t: 0,760, p: 0,463, p> 0,05).

Table 5: Online vs. Face to Face Groups' BMI Values Differences for 1 month of Consultation

Measure	Groups	Number of the patients (n)	A.O.±S.S.	t	p*
Dropped BMI Value	Online	10	1,46 ± 0,29	,760	,463*
	Face to Face	3	1,30 ± 0,44		

* p<0,05 accepted as statistically significant

For 1 month of online vs. face to face consultations, dropped waist circumference (in cm) values were analyzed and shown in Table 6. There was no significant difference in dropped waist circumference values between online patients and the face-to-face patients groups for 1 month consultation period (t:0,760; p:0,521; p>0,05) .

Table 6: Online vs. Face to Face Groups' Dropped Waist Circumference Values Differences for 1 month of Consultation

Measure	Groups	Number of the patients (n)	A.O.±S.S.	t	p*
Dropped Waist Circumference (cm)	Online	10	4,60 ± 0,81	,760	,521*
	Face to Face	3	3,67 ± 2,08		

* p<0,05 accepted as statistically significant

For 2 months of online vs. face to face consultations, dropped BMI values differences data were analyzed and can be seen in Table 7. There was no significant difference in the dropped BMI values between online patients and group and the face-to-face patients groups for 2 months consultation period (: -0,012; p:0,991; p>0,05) .

Table 7: Online vs. Face to Face Groups' Dropped BMI Values Differences for 2 months of Consultation

Measure	Groups	Number of the patients (n)	A.O.±S.S.	t	p*
Dropped BMI Value	Online	28	2,35 ± 0,59	-,012	,991*
	Face to Face	31	2,35 ± 0,70		

* p<0,05 accepted as statistically significant

For 2 months of online vs. face to face consultations, dropped waist circumference (in cm) values were analyzed and shown in Table 8. There was a significant difference in dropped waist circumference values between online patients and the face-to-face patients groups for 2 months consultation period (t:2,242; p:0,029; p<0,05) . Online group had greater dropped values.

Table 8: Online vs. Face to Face Groups' Dropped Waist Circumference Values Differences for 2 months of Consultation

Measure	Groups	Number of patients (n)	A.O.±S.S.	t	p*
Dropped Waist Circumference (cm)	Online	28	8,57 ± 2,01	2,242	,029*
	Face to Face	31	7,36 ± 2,11		

* p<0,05 accepted as statistically significant

You may find the online vs. face to face groups dropped BMI values after 3 months of consultation in Table 9. There was no significant difference in the dropped BMI values between online patients and group and the face-to-face patients groups after 3 months consultation period (t:-0,611; p:0,551; p>0,05) .

Table 9: Online vs. Face to Face Groups' Dropped BMI Values Differences for 3 months of Consultation

Measure	Groups	Number of patients (n)	A.O.±S.S.	t	p*
Dropped BMI Value	Online	8	3,45 ± 0,80	-,611	,551*
	Face to Face	8	3,73 ± 0,99		

* p<0,05 accepted as statistically significant

Patients who took 3 months of online vs. face to face consultations, dropped waist circumference (in cm) values were analyzed and shown in Table 10. There was no significant difference in dropped waist circumference values between online patients and the face-to-face patients groups for 3 months consultation period (t:0,698; p:0,497; p>0,05) .

Table 10: Online vs. Face to Face Groups' Dropped Waist Circumference Values Differences for 3 months of Consultation

Measure	Groups	Number of patients (n)	A.O.±S.S.	t	p*
Dropped Waist Circumference (cm)	Online	8	13,13 ± 4,19	,698	,497*
	Face to Face	8	11,88 ± 2,85		

* p<0,05 accepted as statistically significant

When the data was collected from all 88 participants who joined this study, regardless of all the different periods of consultations (1, 2, or 3 months) , it can be seen in Table 11 that, there was no statistically significant difference in dropped BMI values, between the online vs. face-to-face consulting groups. This comparison was categorized for only consultation methods which were online vs. face to face (t:-0,981; p:0,330; p>0,05) .

Table 11: Online vs. Face to Face Groups' Dropped BMI Values Differences for All Periods of Consultation

Measure	Groups	Number of patients (n)	A.O.±S.S.	t	p*
Dropped BMI Value	Online	46	2,35 ± 0,85	-,981	,330*
	Face to Face	42	2,54 ± 0,97		

* p<0,05 accepted as statistically significant

When it is compared two groups of people; online vs. face to face, regardless of all different periods of consultation (1, 2, 3 months) , it is shown in Table 12 that, there was no statistically significant difference in dropped waist circumference in cm, between two groups of patients (t:0,762; p:0,448; p>0,05) .

Table 12: Online vs. Face to Face Groups' Dropped Waist Circumference Values Differences for All Periods of Consultation

Measure	Groups	Number of patients (n)	A.O.±S.S.	t	p*
Dropped Waist Circumference (cm)	Online	46	8,50 ± 3,53	,762	,448*
	Face to Face	42	7,96 ± 3,08		

* p<0,05 accepted as statistically significant

5.DISCUSSION

Increase in obesity prevalence is especially concerning issue since it directly increases risk of many chronic health conditions (17). It was thought that, weight loss programs may help to reduce this risk factors (5). If these weight loss programs include nutrition education and dietary self monitoring, positive behavioral changes in eating habits also improved (5). There are other alternative overweight and obesity treatments which are very popular, but even they are used nowadays, they have not been shown to be as effective, sustainable and safe as an healthy and balanced diet program (7).

For nutrition counseling, telenutrition is another option that has been using in some countries (35,36). Based on previous study, ICT-based telenutrition can support or sometimes replace with face to face counseling for treatment of obesity (9).

This study was conducted to determine if online nutrition consultation can be as effective as traditional face to face consultation. Patients in both groups continued to take consultation as it was determined in their first meetings. Drop out rates were very low for both groups; for online group only 1 participant out of 47 people (2.12%) quit from the program on her first week, and for face to face group it was only 2 participants out of 44 (4.5 %). For both groups (online and face to face), women population was higher than men population which were 77% and 23% respectively. It was known that, similar distribution rates was seen widely in weight loss programs and studies that women are more willing to take nutrition consultation (1). Weight loss success was determined by dropped BMI and waist circumference values, since these two health criteria (BMI, waist circumference) was used to determine obesity risk and levels of people (7).

When the age groups of people participating in online consultation were evaluated, it was found that; 65% of the participants were between 21-32 years of age; 33% of the participants were aged between 33-48 years and 2% of the participants were aged 49 or over 49 years old. This may be the because of internet use distribution of Turkish population in Turkey (39). It might be concluded that, younger populations more likely to take online consultation, since they use internet more than elderly people (39). In this current study, the age distribution was categorized as three groups.

Interdigit intervals was set according categorization of age groups for internet use in Turkish population (39).

In an assessment, it was showed that, in Turkish population who ages between 16 -74 ages use the internet has dramatically increased since 2008 to 2016, from 32.2% to 58.3% respectively, according to Turkish Statistical Institute's report in August 2016 (39) .

Table 13 is showing the distribution of internet use by age groups in August 2016 in Turkey (39). The age distribution of the population use internet and take online consultations showed parallel results.

Table 13: Internet use of Turkish population by age (39)

AGE	%
15-17	11.9
21-32	22.4
33-48	30.4
49-59	18.8
+59	16.5

In this current study it was concluded that, people who choose online counseling had higher education levels. In online group 67% of the patients were university graduated, where face to face group patients 45% were university graduated. This was not thought be a criteria to take online consultation but, this results may be also given a clue for preferences of people nutritional counseling choice according to their education levels. In another study, it was pointed that Telemedicine was also thought to be a good way to reach rural places, where people's education levels are lower, comparing with cities (46). In U.S., about 20% of Americans live in rural areas without easy access to primary care or specialist medical services (35).When dropped BMI values were compared for two groups for all periods of counseling periods, it was concluded that there was no significant difference between the dropped values. People who took longer counseling dropped greater values, as it was expected for both groups.

For instance, one month online counseling vs. face to face counseling resulted with average dropped BMI values 1,46 and 1.30 while, for three months, they were 3,45 and 3,73 respectively.

For 1 and 3 months periods, there was no significant difference between online vs. face to face groups (t:0,760; p:0,521 and t:-0,981; p:0,330; p>0,05 respectively).

For 2 months there is slightly greater difference in online group (t:2,242; p:0,029; p<0,05) . Even the difference is not too much, it thought generally that the differences may be caused because of how two groups measurements were recorded. Online group clients measured their own waist circumferences, while face to face clients measurements done by the dietitian. Waist circumferences are an indicator of obesity and dropped values of it directly effects the risk of chronic health diseases (10).

There were some limitations of this study. First was the measurements. Patients who were in face to face group came to the consultancy center every week and the dietitian measured the weight and waist circumference values of the patients. On the other hand, online patients did their own measurements. Even the dietitian informed the online patients how to measure their weight and waist circumference values, still there could be some obstacles. The second limitation for the study was technical problems. For instance, weak internet connection, low battery, or any problem with the device that the patient or the dietitian connect to online meeting could be a problem. This problem could have been prevented at least by the dietitian, if he/she take some precautions such as by using additional batteries or a generator for internet connection and electricity.

It will be also interesting to know if these results will be similar in other populations in Turkey or world in regard to the limitations. In a similar study which was conducted with 233 obese women, researchers tried to determine if telenutrition could be more effective than the face to face consultation in the treatment of obesity in a Caribbean population (40). It was concluded that, this method can be replace with traditional consultation method sometimes but, this still has a failure or dropout risk factors therefore, it can not be said that online consultation has more success in the treatment of obesity (40).

Moreover, it would be great to know how the results would be if this study was conducted with different dietitians, with people who are living in different cities in Turkey. Further researches would be also beneficial to be conducted to improve application of online nutrition consultation method to use its benefits included; more flexible meeting hours in where ever dietitian or patients are, need of less financial requirements like transportation and office renting. It is thought to be also beneficial for the patients who are going to other countries but still want to take this health consultation support from a native speaker where ever they are living, working or traveling. It is also a good way for dietitians to start up their own business with less requirements like need for a office and other expenses with more flexible working hours. It is thought that, for patients who has too long working hours, working for moms, for patients who are working and studying at the same time may also take advantages of online nutrition consultation.

When it was asked to health care professionals, why they choose telemedicine? ; about 19% of surveyed health system respondents said it was the ability to provide round-the-clock care, and about 18.4% said it was the ability to provide remote consultations to patients (41). In another survey, 21% of patients said not having to travel to the doctor's visit was the top benefit of telemedicine, while 20% said it was the ability to be cared for from their homes (41).

All in all, it was thought that, Telemedicine and Telenutrition might have some advantages and disadvantages, when they are compared with the traditional face to face health services (35). A short summary of the cons and pros of the telenutrition can be seen in table 12 (35).

Table 14. The Cons and Pros of Telenutrition (35)

PROS	CONS
Dietitians can work from anywhere as long as she is licensed.	If there is a technical problem like bad connection, the consultation can be cancelled.
New revenue base for business. (for RDN)	More work for providing written materials for education. (for RDN)
Satisfaction from helping patients by your own, without and office or hospital with your degree. (for RDN)	Patients No-Shows are higher.
Patients can take consultancy where ever they are. Good for working moms, and people who need to travel a lot.	For some people, it's less personal contact for treatment.
The cost is less for patients, dietitians and the government if the service is given online, instead of from hospitals or clinics.	Not everybody can use ICT very easy.

On a similar study that was conducted in 2005, it was aimed to determine the effectiveness of telenutrition versus a traditional face to face consultation in a weight management program (40). The failure criteria was defined as the patient did not lose weight or did not lose by measures. The success criteria was, losing weight and stick with the meetings with the dietitians for 16 weeks (40). It was found that, online consultation group drop outs are slightly less, and both groups weight loss rates are similar (40).

It is very well known that, traditional face to face consultancy applications can help people for weight management (8). The gaps have been filled as time passed, and now, there is better applications for face to face consultancy (8). Little is known about how effective is Telenutrition and its better quality processes (41). It is believed that, Telemedicine and Telenutrition approaches will be also developed in future and can be used for its advantages by removing the barriers (41).

As it is known from current literature, In Turkey, there is no Telenutrition Service Organization like U.S. or Canada (36,37).

For this reason, it was thought that, the following literature of other countries' telenutrition systems requirements, application advantages, disadvantages and system improvement strategies will be lead and encourage Turkey, Nutrition and Health Care Professionals, and institutes to collaborate to apply scientific, applicable, sustainable and referable system for Turkish population.

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7. APPENDICES

7.1 Beslenme Öyküsü / Automatic reply mail

PIRILLA. 1.Adım / Beslenme Öyküsü Formu

Merhaba!

Lütfen formdaki boşlukları doldurup bana iletiniz.Ya da soruların cevaplarını düz yazı şeklinde gönderiniz.

Haydi Başlayalım!

Adınız:

Soyadınız:

Doğum Tarihi ve Yeri:

Adres:

Cep Telefonu:

E-mail adresiniz:

Boyunuz:

Kilonuz:

Bel Çevreniz:

Hedef Kilonuz:

Son 10 sene içindeki maksimum ve minimum kilonuz:

Kilo değişikliklerinizin sizce sebebi ne?

Günde kaç öğün yemek yersiniz ?

Aralarda atıştırır mısınız, neler ?

Fast-food türü besinleri ne sıklıkta tüketirsiniz? Tercihiniz ne olur?

Günde ne kadar su içersiniz?

Başka hangi içecekleri ne sıklıkla içersiniz?

Kahve/Süt şeker kullanır mısınız? :

Çay:

Diyet kola / Kola :

Hazır-Taze meyve suları:

Kahve Çay/ Bitki çaylar :

Maden suyu, Soda:

Gazoz, meşrubatlar:

Bira Şarap Rakı Viski, cin, vb.:

Unlu yiyecek ekmek/simit, light bisküvi, galeta, Wasa, (hamur işleri) tüketim sıklığı ve gün boyu tüketilen ekmek miktarı:

Meyve tüketim sıklığı ve miktar:

Sebze-salata tüketim sıklığı ve miktar:

Et grubu yiyecekleri tüketim sıklığı ve bir seferde tükettiğiniz miktar :

Kırmızı et

Balık:

Tavuk

Hindi

Yumurta

Şarküteri:

Kurubaklagil yemekleri:

Sakatatlar:

Ton balığı:

Süt grubu yiyecekleri tüketim sıklığı ve bir seferde tükettiğiniz miktar:

Süt: Peynir: Yoğurt : Cacık: Ayran: Kefir:

Probiyotik yoğurtlar:

Ne tür süt ürünü kullanırsınız? Yağlı, yarım yağlı, light ?

Ne tür peynir seversiniz? Tam yağlı, beyaz, lor?

Sevdiğiniz, sevmediğiniz ve alerjiniz olan yiyecekler:

Sevdiğiniz:

Sevmediğiniz:.....

Alerjiniz olan:

Vazgeçemediğiniz yiyecekler:.....

YEMEK HAZIRLAMA VE TÜKETİM ŞEKLİ:

Öğünlerinizi evde mi dışarıda mı yersiniz? Dışarıda ise nerde yediğinizi ve genelde ne tür şeyler yediğinizi belirtiniz.

Kahvaltı:.....

Öğle yemeği:.....

Akşam yemeği:.....

Çalışıyor-Okuyorsanız iş yerinize yemek götürebilir misiniz?

Hafta içi ve hafta sonu hangi saatlerde yemek yersiniz hangi yemekleri tercih edersiniz?

Hafta içi:

	SAAT	GENELDE TERCİH ETTİKLERİNİZ
KAHVALTI		
ÖĞLE		
AKŞAM		

Hafta sonu:

	SAAT	GENELDE TERCİH ETTİKLERİNİZ
KAHVALTI		
ÖĞLE		
AKŞAM		

KADINLAR İÇİN

Menstrasyonunuz düzenli mi?

Herhangi bir hormon tedavisi oldunuz mu?

Doğum yaptınız mı?

Menapoz durumu?

Menstrasyon döneminde beslenme alışkanlıklarınızda değişiklikler oluyor mu?

ERKEKLER İÇİN

Hangi durumlar beslenme alışkanlıklarınızda değişikliklere neden oluyor?Belirtiniz...

GENEL BİLGİLER

Ailenizde kilolu kişi var mı, kimler ?

Herhangi bir hastalığınız var mı / doktor kontrolünde mi ?

Kalp- damar hastalığı

Hipertansiyon

Mide

Böbrek hastalığı

Diyabet

Guatr

Hormonal sorunlar

Adet düzensizliği

Menapoz belirtileri

Polikistik Over

İnsülin Direnci

Tiroid

Yukardaki hastalıkların dışında doktor tarafından tanısı konmuş herhangi bir hastalığınız var mı?

Sindirim sistemi probleminiz var mı (kabızlık, ishal, ülser, bulantı, reflü, yutma güçlüğü vb) ?

Hormonal bir probleminiz var mı?

Yediğinizde midenize rahatsızlık veren yiyecek ya da içecekler var mı?

Herhangi bir operasyon geçirdiniz mi ? (ne/ ne zaman)

Kullandığımız ilaçlar ve/veya Vitamin,mineral var mı ?

Günlük uyku süreniz :

Sigara kullanıyor musunuz ? Miktar / sıklık

Alkol alışkanlığınız varsa neler olduğunu belirtiniz.

Alkol türü:

Miktar:

Ne sıklıkta tüketirsiniz:

ANTREMAN PROGRAMI:

Kaç gün?

Kaç saat?

Sakatlık geçmişi?

7.2 Ethical Approval



T.C. YEDİTEPE ÜNİVERSİTESİ

Sayı : 37068608-6100-15-1352
Konu: Klinik Araştırmalar
Etik kurul Başvurusu hk.

25/05/2017

İlgili Makama (Meltem Pırıl Duru)

Yeditepe Üniversitesi, Beslenme ve Diyetetik Bölümü Yrd. Doç. Dr. Binnur Okan Bakır'ın sorumlu olduğu "**Beden Ağırlığının Denetimi İçin, İnternet Üzerinden ve Yüz Yüze Yapılan Beslenme Danışmanlıklarının Etkilerinin Kıyaslanması**" isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KAEK) Başvuru Dosyası (1332 kayıt Numaralı KAEK Başvuru Dosyası), Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından **24.05.2017** tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isimi belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir (**KAEK Karar No: 728**).

Prof. Dr. Turgay ÇELİK
Yeditepe Üniversitesi
Klinik Araştırmalar Etik Kurulu Başkanı

8.CIRRICULUM VITAE

Kişisel Bilgiler

Adı	MELTEM PIRIL	Soyadı	DURU
Doğum Yeri	Mersin	Doğum Tarihi	22.06.1991
Uyruğu	TC	TC Kimlik No	45349264232
E-mail	pirilsenol@gmail.com	Tel	5396811632

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Doktora			
Yüksek Lisans	BESLENME&DİYETETİK	YEDİTEPE ÜNİVERSİTESİ	Halen
Lisans	BESLENME&DİYETETİK, PSİKOLOJİ (ÇİFT ANADAL)	YEDİTEPE ÜNİVERSİTESİ	2014
Lise	FEN	MERSİN DOĞA KOLEJİ	2009

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
İNGİLİZCE	ÇOK İYİ
ALMANCA	ÇOK AZ

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl - Yıl)
DİYETİSYEN	PIRILLA BESLENME DANIŞMANLIĞI	2016-Halen
DİYETİSYEN	SPORTS INTERNATIONAL MERSİN	2015-2016
DİYETİSYEN	OSMAN MÜFTÜOĞLU YAŞASIN HAYAT KLİNİĞİ	2015-2016
DİYETİSYEN	ÖZEL GÖZTEPE HASTANESİ	2014-2015
DİYETİSYEN	CROSSFIT 34	2014-2016

Bilgisayar Bilgisi

Program	Kullanma becerisi
MS OFFICE	ÇOK İYİ
FINAL CUT PRO X	İYİ

*Çok iyi, iyi, orta, zayıf olarak değerlendirin

Bilimsel Çalışmaları

SCI, SSCI, AHCI indekslerine giren dergilerde yayımlanan makaleler

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Diğer dergilerde yayınlanan makaleler

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Uluslararası bilimsel toplantılarda sunulan ve bildiri kitabında (*Proceedings*) basılan bildiriler

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Hakemli konferans/sempozyumların bildiri kitaplarında yer alan yayınlar

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Diğer (Görev Aldığı Projeler/Sertifikaları/Ödülleri)

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