

Researcher Study Protocol

Official Title: The Effect of Mobile Software "Let's Move" Program Developed Based on Transtheoretical Model on Sedentary Life Behaviors of University Students

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SUMMARY and KEYWORDS:

Sedentary life means a physically inactive, sedentary life and is the fourth leading risk factor for global deaths. It is reported that 70% to 85% of young people between the ages of 15-24, who make up 15.6% of the population of our country, are sedentary. This rate does not meet the physical activity guidelines recommended by the World Health Organization for young people. Sedentary lifestyle causes physical, biological and mental problems, increases the prevalence of non-communicable diseases and negatively affects academic achievement. Integration of technology into human life in the health dimension; It aims to reduce the obstacles of individuals to change their unhealthy behaviors and to increase their motivation to gain healthy behaviors. The Transtheoretic Model (TTM) is an easy-to-use and proven effective model for changing the prevalence of activity. Schools are the most effective medium to reach young individuals. However, considering the density of the school population and the inadequacy of school health nurses in our country; New approach techniques and innovative strategies are needed to reduce costs and save time. Therefore, in the first stage of this two-stage research, it was aimed to develop the TTM-based 'Hadi Move' mobile software program and to test the effect of the mobile software program developed in the second stage on changing the sedentary life behaviors of university students. The universe of this research consisted of 290 students studying at a foundation university in Istanbul. The sample was calculated using the G-power (3.1.9.4) program. By taking 10% more of the sample, 97 students in the experimental group and 97 students in the control group will be randomly assigned through the SPSS program. TTM-based "Let's Move" mobile software program developed for the experimental group will be applied for 12 weeks. The effectiveness of the program will be evaluated with pre-test, post-test and follow-up test, International Physical Activity Questionnaire, daily step count smart bracelet and sedentary lifestyle TTM Sedentary Life Scales (Stages of Change, Change Process Scale, Self-Efficacy and Decisional Balance Scale). At the end of the research, the effectiveness of the 'Hadi Move' mobile software program developed in this research in changing the sedentary life will be tested. In addition, it is aimed to increase the number of steps, decrease in sedentary behaviors and make an active lifestyle permanent. All initiatives developed for TTM sedentary life behavior change stages will be made into a book and the results of the experimental research will be published, contributing and providing evidence to the international literature.

OBJECTIVE/REASON:

The aim of the project is to develop the "Let's Move" mobile software program based on the Transtheoretic Model (TTM) and to test the effect of the developed program on changing the sedentary life behaviors of its students.

Project Goals

- The developed TTM based 'Let's Move' mobile software program will be effective in changing the sedentary behaviors of students.
- The number of steps of the experimental group will increase.
- The physical activity Metabolic Equivalent (MET) scores of the experimental group will increase.
- The ratio of inactive and minimally active students in the experimental group will decrease, and the ratio of students in the very active category will increase.
- The percentage of students in the experimental group TTM behavior change preparation and action phase will increase.
- The cognitive change processes scores of the experimental group will increase.
- The behavioral change processes scores of the experimental group will increase.
- The self-efficacy score of the experimental group will increase.
- Decision-making utility perception score of the experimental group will decrease.
- The decision-making harm perception score of the experimental group will increase.
- The proportion of those with normal Body Mass Index (18.5-24.99) in the experimental group will increase.
- The International Physical Activity Questionnaire (IPAQ) scores of the experimental group will increase.
- Total body muscle ratio of the experimental group will increase.
- The body fat ratio of the experimental group will decrease.

SUBJECT and SCOPE

Sedentary lifestyle is an important behavioral problem that threatens health and is reported to be common among young people (WHO, 2020; Ceylan, 2020; Kim et al., 2020; Han et al., 2017; Prochaska et al., 2017). University years include adolescence and young adulthood. In order to reach the healthy adults of the future, it is very important to spend these periods active, to gain healthy lifestyle behaviors and to make them permanent. Adopting an inactive lifestyle of young people causes many non-communicable diseases (diabetes, hypertension, hyperlipidemia, etc.) in later ages (Kleis et al. 2022; Güler, 2022). For this reason, developing

an active lifestyle and changing an inactive lifestyle during the youth years are the most important components of reaching healthy societies.

When the studies are examined, it is seen that the majority of the studies conducted to reduce sedentary life focus on adults aged >30 years (Kleis et al., 2022; Fabio et al., 2020; Tanyeri, 2019; Menekli et al., 2019; Kim et al., 2018; Ya -Ke Wu&Nain-Feng Chu, 2015; Wang et al., 2015; Savcı et al., 2006; Andersan et al., 2006) and a limited number of experimental studies based on the Transtheoretic Model (TTM) for university students (Kim&Lee, 2022; Kim et al., 2021; Chen et al., 2020; Lee et al., 2020; Ceylan, 2020; Başakçı, 2019).

The Transtheoretic Model argues that change is a process, not a result, that the individual changes behavior by going through certain stages, and that in order to be successful in change, appropriate initiatives should be planned for the stage of change that the individual is in. The model recommends appropriate biopsychosocial and behavioral interventions by evaluating the individual's readiness for change with the stages of change questionnaire and the self-efficacy and determination levels with scales. It constantly monitors the stage of change that the individual has reached as a result of the initiatives, offers initiatives to prevent returns and to make the behavior permanent (Han et al., 2017; Procha et al., 2017; Başakçı, 2019; Kim et al., 2020; Ceylan, 2020; Lee et al., 2020).

LITERATURE REVIEW:

In the examination made with the keyword Transtheoretic Model (TTM) on the YÖK Thesis website; It has been observed that 34 theses based on TTM were conducted in our country between the years 2008-2021. One of these studies was the validity and reliability study of the transtheoretic model sedentary life scales (Tok, 2017), and seven of them aimed to increase physical exercise (Ünver, 2021; Sönmez, 2020; Ceylan, 2020; Tanyeri, 2019; Serin, 2017; Baysal, 2013; Kafalı). , 2009) was found to be oriented. It was determined that three of them were aimed at preventing obesity (Ceylan, 2020; Başakçı, 2019; Cangöl, 2016;), and 12 of them aimed at quitting smoking (Deniz, 2021; Sözer, 2020; Ersoy, 2019; Yalçinkaya, 2019; Avcı, 2018; Çavuşoğlu, 2018). ; Durmaz, 2017; Çamözü, 2017; Taş, 2015; Koyun, 2013; Prosecutor Minister, 2013; Güngörmüş, 2008). Others are sun protection (Duran, 2019; Aygün, 2012), reproductive health (Karatana, 2021; Aksoy, 2019), safe cycling (Erdem, 2021), diabetes education (Tosun, 2015), controlled internet use (Bayrak, 2021).), prevention of suicidal behavior (Bahar, 2021), education for patients with hypercholesterolemia (İncazlı, 2019), safe drug administration (Arslan, 2017) and nurse navigation program in cancer screening

(Temuçin, 2017). The results of all these studies show that TTM is an effective model for changing behavior.

As a result of the literature review, TTM-based mobile software program to increase physical activity could not be reached in the national and international literature. However, there are applications for changing exercise, physical activity, smoking, weight management and nutritional behaviors with TTM-based web-based platforms (Smith et al., 2014; Chen et al., 2017; Kenned et al., 2017; Jimoh et al., 2018; Ludwig et al., 2018; He et al., 2021; Choi et al., 2021; Allman-Farinelli et al., 2016; Hebden et al., 2014; Epton et al., 2014; Partridge et al., 2015; Peyman et al., 2018).

Choi et al. (2021) developed a smartphone application (AnSim) that sends messages based on a transtheoretical model for healthy eating, physical activity, stress relief and smoking cessation for individuals with coronary artery disease. They stated that health promotion approaches using mobile technology have great potential (Choi et al., 2021). Prochaska et al (2007) developed the TTM-based LiveWell program to improve healthy lifestyle behaviors such as exercise, eating and stress management in university students. The program is a computer online intervention program that plans dynamic initiatives suitable for each student and their readiness for behavior change, with personalized questions and feedback. At New York University, the LiveWell program was applied to all students with the motto of 'healthy campuses'. At the end of the program, it was shown that there was a significant increase in students' self-efficacy and quality of life values (Prochaska et al., 2017).

In a study conducted by Başakçı (2019) to determine the effect of TTM-based initiative enriched with whatsapp messages on weight management; It has been determined that there is an increase in the physical activity levels of individuals, a decrease in the Body Mass Index values and a positive change in the nutritional behaviors in the desired direction (Başakçı, 2019). According to the results of the study; They suggested that more work should be done by developing whatsapp messages suitable for TTM change stages and adding mobile health applications. Ceylan (2020) conducted a TTM-based quasi-experimental research by sharing trainings, messages, videos and images to increase physical activity in adolescents via WhatsApp. According to the research findings, it was found that the adolescents progressed in the exercise change stages, increased their self-efficacy and benefit perception scores, and decreased their harm perception scores. He also stated that individuals continue physical activity despite the pandemic conditions (Ceylan, 2020). Lee et al. (2017) developed a smart

phone program containing special nutritional information messages based on a transtheoretical model to prevent and manage obesity in primary school students.

ORIGINAL VALUE

The difference of the 'Let's Move' mobile software program, which is planned to be developed in this research, is that it provides ease of use and includes special initiatives for the behavior change stage of the individual (not thinking, thinking, preparation, acting, continuing). The mobile software program includes five stage-specific educational videos that increase the individual's motivation for change and self-efficacy, appropriate physical activity visuals, stimulating or motivating messages, and daily step counts. In addition, students will complete the International Physical Activity Questionnaire once a week through the program, and the program will calculate students' weekly activity status (inactive, minimally active and very active). Students will be able to send messages to the researcher through the program.

The most basic literature gains of the research; It provides an accessible, effective and technologically innovative program prepared by health professionals to reduce sedentary life. The program is evidence-based; It will include practices that are entertaining, interesting, encouraging, empowering individuals to live actively and enabling/supporting them to take responsibility. It is thought that if the program, which is created with a multidisciplinary perspective, can be delivered to young individuals free of charge, it will be effective in increasing physical activity. In addition, all initiatives developed for TTM sedentary life behavior change stages will be made into a book and the results of the experimental research will be published, contributing and providing evidence to the international literature.

This experimental research consists of two stages. In the first stage of the research, it was aimed to develop TTM-based 'Let's Move' mobile software program and to test the effect of the mobile software program developed in the second stage on changing the sedentary life behaviors of university students.

WIDE IMPACT/ADDED VALUE

Effect Type	Effect	Projected Time to Achieve the Effect
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Social/Cultural Impact: <ul style="list-style-type: none"> • Contribution to Quality of Life, • Contribution to Sustainable Environment and Energy, • Contribution to the Improvement of Welfare or Education Level, • Solutions to an Important Social Problem at Country or World Level, etc. 	<ul style="list-style-type: none"> • If the developed mobile application program is found effective, the program link will be shared free of charge via the apple store. • It will contribute to the development of active living habits of young people. • The program, created with a multidisciplinary perspective, will contribute to young individuals getting accurate information about physical activity and adopting this information. • It is thought that it will contribute to the prevention of obesity, which is an important problem in the world and in our country. 	<ul style="list-style-type: none"> • 0-18 months
Academic Impact: <ul style="list-style-type: none"> • New R&D Decisions, • National/International R&D Collaborations, • Change in Number and Qualification of Researchers, • Contribution to University-Industry Cooperation etc. 	<ul style="list-style-type: none"> • The program content tested in the research can be adapted to different age groups by working with software engineers. • Research can be done by other researchers using it on different university students. • If the program is found effective, it can be adapted to different languages and opened to international use. • The program can be developed and expanded on the basis of the Android operating system by working with software engineers. 	<ul style="list-style-type: none"> • 6-12 months
Economic Impact: <ul style="list-style-type: none"> • Potential Sectoral Application Areas, • Global Market Forecasts, • Employment Contribution, • Competitiveness (Effect on Export, Import Substitution, Formation of New Firms, Triggering Foreign Capital Investment, etc.) 	<ul style="list-style-type: none"> • It will be cost effective by saving time and personnel to reduce sedentary life behaviors in young people. • Health expenses will decrease due to the prevention of physical and mental diseases caused by sedentary life. • Since it is a mobile software that students use constantly, its use will be easier, faster and can be expanded. 	<ul style="list-style-type: none"> • 12-18 ay months
Long Term Effects	<ul style="list-style-type: none"> • If the program is effective in reducing sedentary lifestyles, it will be cost-effective by reducing chronic diseases (diabetes, hypertension, etc.) that increase health costs in adulthood. 	<ul style="list-style-type: none"> • 5-10 years

MATERIALS AND METHODS:

1. **Type of research;** The research will be conducted with methodological and experimental research design.
2. **The place and time of the research;** The research was planned to be carried out between September 2021 and September 2023 with university students studying in Istanbul Beykent University Vocational School health program.
3. **The universe of the research;** The universe of the research consists of Anesthesia Program (n=57), Operating Room Services Program (n=64), Oral and Dental Health Program (n=89), Medical Imaging Techniques (n=27) and First and Emergency Aid Program at Istanbul

Beykent University Vocational School. (n=53) university freshman students studying in departments with a high number of students and meeting the criteria for inclusion in the research constituted N=290. Students who meet the inclusion criteria and volunteer to participate will be included.

- 4. Sample;** The sample of the study was calculated with the G-power (3.1.9.4) program, means: difference between two independent means analysis. When the effect size was 0.5, type error $\alpha = 0.05$, power $1 - \beta = 0.95$, the sample size was found to be 176 (experimental group 88, control group 88). Considering the sample loss that may occur due to various reasons, it was decided to include 194 (experimental group 97, control group 97) more than 10% of the sample. The groups will be randomly assigned to the experimental control groups through the SPSS program.

5. Inclusion, Exclusion, and Exclusion Criteria

5.1. Inclusion criteria for the study;

- First year students studying in Istanbul Beykent University Vocational School health program between September 2021 and September 2023,
- 18-25 years old,
- Being in the inactive (category 1) and minimally active (category 2) categories according to the International Physical Activity Evaluation Questionnaire,
- Not included in any physical activity program,
- Do not have any physical (orthopedic, chronic diseases, etc.) and mental problems diagnosed by a doctor,
- Accepting the measurement of body weight, height, body fat and muscle ratio and calculation of BMI before starting the research, at the 12th week and at the 6th month after its completion,
- Agreeing to use pedometer (pedometer),
- Having an iPhone, iPod touch and android based smart phone,
- Have an active internet connection on their phone,
- Students who voluntarily agree to participate in the research will be formed.

5.2. Exclusion and Exclusion Criteria;

- Willingness to leave the research.

6. Data Collection Tools and Format

- **Data Collection Tools;** Data of the study, Socio-demographic characteristics questionnaire (Appendix 1), Transtheoretic Model (TTM) Sedentary Life Stages of Change (Appendix-2), TTM Sedentary Life Change Process Scale (Appendix 3), TTM

Sedentary Life Self-Efficacy Scale (Appendix- 4), TTM Sedentary Life Decisional Balance Scale (Annex-5) and International Physical Activity Questionnaire (IPAQ) (Annex-6). The height of the students will be measured with a telescopic height meter and a scale that measures body weight, fat and muscle ratios. Step counts will be collected with the Smart Bracelet.

- **Data Collection Path;** Students in the universe will be contacted through class representatives and informed about the right to research, and they will be invited to apply the data collection forms. Ethics committee permission, institutional permission document, voluntary consent form, socio-demographic questionnaire form, TTM Sedentary Life Scales and International Physical Activity Questionnaire will be sent to the accepted participants in the form of online forms via Google Drive.

6.1.Socio-demographic Questionnaire Form (Annex 1)

The sociodemographic characteristics diagnosis form was created by examining the relevant literature (Han et al, 2017; Tok, 2017; Baysal, 2013; Tanyeri, 2019; Ceylan, 2020). The form consists of 32 questions. In the questionnaire, there are research-oriented questions that question socio-demographic characteristics and participation in physical activity.

6.2.TTM Sedentary Life Scales

TTM sedentary life scales were developed by Han et al. (2015), and Turkish Validity and Reliability study was conducted by Tok (2017) with young people aged 18-24. The scale consists of 4 different parts. These; Stages of Change, Process of Change, Self-efficacy and Decisional Balance Scale (Han et al., 2015; Tok, 2017).

6.2.1. Sedentary Life Stages of Change (SL-SC) (Annex 2);

Sedentary life change stages constitute the core structure of the Transtheoretic Model. It reflects the individual's attitudes, intentions and behaviors during the change phase. Behavior change; It is a situation assessment consisting of five options and two questions: precontemplation, contemplation, preparation, action and maintenance.

- 1. Precontemplation (PC);** The individual is either unaware of the problem or has little awareness of it. He has no intention of changing his problematic behavior within 6 months. Despite trying, he has failed and is reluctant. The social environment is aware of his problematic behavior and the individual feels the situation as pressure. The individual should be informed about health behavior and encouraged to think.
- 2. Contemplation (C);** The individual considers the positive and negative aspects of his/her problematic behavior and is the stage where he/she thinks to change within 6 months. The individual is willing to acquire information and is ready for open

communication. However, this period consists of chronic thinking, delaying behavior and procrastination.

3. **Preparation (P);** The individual intends to change their problematic behavior within 30 days. He has made previous attempts at behavior change, but has been unsuccessful. There are action plans such as receiving training and counseling and doing research, but they are not regular.
4. **Action (A);** The individual changed his problematic behaviors within 6 months. It is a critical period when acquired behaviors need to be reinforced, and a return to old behaviors (relapse) may occur. At this stage, individuals need to be taught and supported skills to cope with difficulties.
5. **Maintenance (M);** The individual has changed his unhealthy behavior 6 months ago at this stage. The individual is less affected by sedentary stimuli. Risky behaviors are less likely to recur. The individual's self-confidence has increased (Han et al., 2015).

6.2.2. *Transtheoretic Model Sedentary Life Change Process Scale (SL-CPS) (Annex 3);*

The process of change defines the experiences through which the individual changes behavior such as thinking, preparation, movement and maintenance. The scale consists of 40 items and two sub-dimensions, cognitive change processes and behavioral change processes. The change process scale is a 5-point Likert type. The answers to the questions are given by ticking one of the options 1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always (Tok, 2017).

6.2.2.1. Cognitive Change Processes Scale; They are structures that evaluate the cognitive information content that the individual needs to be conscious of in order to change behavior. Individuals use cognitive change processes more in stages such as not thinking about change, thinking and preparation. The scale consists of 20 items and five sub-dimensions. These;

- **Consciousness Raising;** It is the increase of the individual's awareness of the problematic behavior, its negative sides, consequences and solutions. Training and conferences etc. There may be events. It consists of items 3, 15, 25, and 36 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version was found to be 0.81.
- **Dramatic Relief;** It refers to being warned with negative experiences related to problematic behavior. Obesity experience with sedentary life can be given as an example. It consists of items 2, 16, 21, and 31 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version is 0.81.
- **Self-Reevaluation;** The individual re-evaluates healthy and unhealthy behaviors in

himself. Weighing values, using imagination, and re-evaluating healthy role models can prompt the individual to take action. It consists of items 1, 19, 26, and 38 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version is 0.80.

- **Environmental Reevaluation;** It is the individual's cognitive and emotional thinking about the effects of unhealthy behaviors on his/her physical and social environment. It consists of items 7, 14, 28, and 34 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version was specified as 0.73.
- **Social Liberation-environmental opportunities;** It is an increase in the awareness of the opportunities provided in the society against the risky behaviors of the individual. For example; Creating areas for sports in parks and gardens. It consists of items 6, 13, 22, and 32 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version is 0.74 (Tok, 2017).

6.2.2.2. Behavioral Change Processes Scale; It defines the behaviors that the individual chooses during the change phase. Individuals use the processes of preparation, movement and continuation more during the behavioral change phase. The scale consists of 20 items and five sub-dimensions (Tok, 2017). These;

- **Helping relationships;** It includes relationships that provide trust, support and acceptance. For example, receiving counseling support, having friends and social support groups that support positive behavior. It consists of items 8, 18, 23, and 33 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version is 0.82.
- **Counter Conditioning;** It is the individual's choosing healthier behaviors to replace unhealthy behaviors. For example, exercising instead of playing computer. It consists of items 5, 20, 27, and 39 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version was specified as 0.85.
- **Reinforcement management;** It refers to self-reward as the individual changes unhealthy behaviors. It consists of items 10, 17, 29, and 40 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version was specified as 0.81.
- **Stimulus Control;** The individual controls the stimuli and replaces it with a healthy behavior in order to reduce the risk of relapse of the problematic behavior. For example, removing objects that support immobile behavior. It consists of items 9, 12, 24, 37 of the scale and the Cronbach Alpha reliability coefficient of the Turkish version was specified as 0.86.
- **Self-Liberation;** It is the individual's revealing his belief in change and adapting to change. For example, making decisions for sedentary behavior and making a promise

to himself. It consists of items 4, 11, 30, and 35 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version was stated as 0.74 (Tok, 2017).

6.2.3. *Transtheoretic Model Sedentary Life Self-Efficacy Scale (SL-SES) (Appendix 4);*

Self-efficacy Scale; It is an individual's belief about himself/herself that he/she can perform a certain behavior successfully, reflecting self-confidence (Han et al., 2015; Tok, 2017). The scale consists of 6 items that include self-confidence in quitting sedentary behavior. It is a five-point Likert type. It ranges from 1: Not at all trusting to 5: Very confident. The Cronbach Alpha reliability coefficient of the Turkish form of the scale was stated as 0.75 (Tok, 2017).

6.2.4. *Transtheoretic Model Sedentary Life Decisional Balance Scale (SL-DBS) (Annex 5)*

The decision-making scale consists of two sub-dimensions that measure the benefits and harms of making a behavior change decision. The sedentary life decision-making scale consists of 12 items containing the positive and negative aspects of sedentary life.

6.2.4.1. Decision-making utility sub-dimension; A high score on this sub-dimension indicates that they are aware of the benefits of behavior change and that they are more likely to change their behavior. The scale consists of 1, 3, 5, 7, 9, and 11 items, and the Cronbach Alpha reliability coefficient of the Turkish version is 0.87.

6.2.4.2. Decision making harm sub-dimension; A high score on this sub-dimension indicates that the harms of behavior change attract more attention and the probability of changing behavior is less. It consists of items 2, 4, 6, 8, 10, and 12 of the scale, and the Cronbach Alpha reliability coefficient of the Turkish version was stated as 0.73 (Tok, 2017).

6.2.5. *International Physical Activity Questionnaire (IPAQ) (Annex 6);*

The International Physical Activity Survey (IPAQ) was developed as a tool for international monitoring of physical activity and inactivity. It consists of seven questions to determine the average daily time spent sitting, walking, and moderate to vigorous activity over the past seven days. Between 1997 and 1998, an International Association Group developed four long and four short forms of IPAQ tools (phone call or self-administration, two alternate reference periods, "last 7 days" or "regular week" "remembered physical activity") (IPAQ research Committee Guidelines for data processing and analysis of International Physical Activity Questionnaire (<http://www.ipaq.ki.se>, accessed 28.04.2021).

Scoring and Scoring the IPAQ Questionnaire

Short form (7 questions); provides information on time spent walking, moderate and vigorous activities, and time spent sitting. Calculation of the total score of the short form includes the sum of the duration (minutes) and frequency (days) of walking, moderate-intensity activity, and

vigorous activity. The energy required for activities is calculated with the MET-minute score. Standard MET values have been established for these activities.

Physical Activities	MET value (min.)	Weekly MET score calculation (min*day)
Walk	3.3 MET	Walking MET-min/week = 3.3 x walking minutes x number of walking days
Moderately Vigorous Physical Activity	4.0 MET	Moderate-intensity MET-min/week = 4.0 x minutes of moderate-intensity activity x number of days of moderate-intensity activity
Severe Physical Activity	8.0 MET	Severe MET-min/week = 8.0 x minutes of vigorous activity x number of days of vigorous activity
Total MET score per week		Total MET-min/week = walking + moderate + severe (MET-min/week)

By using these values, daily and weekly physical activity level is calculated. These;

For example; The walking MET-min/week score of a person walking for 3 days and 30 minutes is calculated as $3.3 \times 3 \times 30 = 297$ MET-min/week.

Physical activity categories according to total MET scores according to UAFA;

- ✓ **Inactive Level;** 599 MET and below
- ✓ **Minimal Level;** Between 600 MET-3000 MET
- ✓ **Very Active Level;** 3001 MET and above.

The IPAQ residency question is an additional determinant. It is not part of the scoring of physical activity. Residence data is not reported with medians and quartiles. There is little data on sedentary (sitting) behaviors and there is no accepted threshold value shown as a categorical level (Öztürk, 2005).

6.2.6. Measurement of Body Weight, Fat and Muscle Ratios, Height and Body Mass Index (BMI) (Annex 7)

6.2.6.1. Standardization of body weight measurements; Body weight will be measured with a digital scale.

- ✓ Not doing any sports, not eating and not drinking liquids at least 3 hours before the measurement,
- ✓ Before the measurement, shoes, heavy clothing and jewelry are removed.
- ✓ When the person is standing, both feet are in the middle of the scale, the arms are comfortably at the sides and the head is facing,

- ✓ The bladder is empty,
- ✓ Absence of menstrual cycle one week before in women,
- ✓ All measurements will be made in the same environment, at the same standard, at the same time and with the same tools.

6.2.6.2.Measurement of fat and muscle ratios: It will be evaluated with a digital scale during weight measurement.

6.2.6.3.Standardization of height measurements (stadiometer); will be measured with a telescopic height meter.

- ✓ Height measurement will be made without shoes, with heels together, head and back in an upright position, eyes facing forward, arms at your sides comfortably, heels against the tape measure and leaning back.
- ✓ The measurement will be made with a portable stadiometer (height meter).
- ✓ During deep inspiration, the distance between the thin bar parallel to the ground in contact with the head and the sole of the foot and the highest point of the head will be measured with an accuracy of 0.5 cm.
- ✓ All measurements will be made in the same environment, at the same standard, at the same time and with the same tools.

6.2.6.4.Body mass index (BMI); calculated by dividing the body weight by the square of the height.

- ✓ According to the World Health Organization body mass index data, those below 18.5 kg/m² are "thin", 18.5-24.99 range values are "normal", 25.0-29.9 kg/m² are "slightly obese" and 30.0 kg/m² or more is considered as "obese". When the study is completed, participants will be evaluated for body mass index (WHO, 2021).

Measurements;

All measurements will be made by the researchers. Measurements (T.C. Ministry of Health Patient Follow-up Guide; https://hsgm.saglik.gov.tr/depo/birimler/saglikli-bebek-hareketli-hayat-db/Haberler/Diyetsenler-Izlem-rehberi/Dietisyen_icin_hasta_izleme_rehberi.pdf, access date; 27.04.2022) was made using the source. In addition, the opinions of dietitians and physical therapists working in this field were taken.

6.2.7. Use of Pedometer (Smart Wristband) and Classification of Daily Step Count (Appendix 8)

A smart bracelet is a device used to monitor physical activity, showing how many steps are taken during the day. Step count measurement will be made with the Smart Bracelet. The smart bracelet has a Global Positioning System (GPS), that is, a global positioning system.

The smart bracelet is compatible with Android and iOS devices. The smart bracelet has a colorful, large and aesthetic display for blood pressure, pedometer, notification and message reading. It automatically records the number of steps and calculates the calories burned. The bracelet will vibrate slowly and give a warning when sitting or standing still for a long time. Charging time is one hour. On average, there is a need for a charge once a week. It has many features such as stopwatch, calendar, alarm clock.

Smart Wristband Usage:

Students will wear smart wristbands on their arms outside of sleep and shower. The smart bracelet will stay on the wrist for an average of 16 hours.

Number of Steps per Day: Tudor-Locke et al. divided the individuals into categories according to the number of steps. These;

Number of Steps Taken per Day	Category
less than 2500 steps	“basal activity”
2500-4999 steps	“limited activity”
Those who take 5000-7499 steps	“low active”
7500-9999 steps	“somewhat active”
10000-12499 steps taken	"active"
Those who take more than 12500 steps	“high active”

He/She defines individuals who take less than 5000 steps a day as “sedentary” (Tudor-Locke et al. (2009)). The severity and duration are as important as the pedometer values. It emphasizes that the number of steps taken in 1 minute can be a criterion for determining the intensity of the step number. In young healthy adults, the mean number of steps for both sexes was stated as 100 steps/min or 300 steps/30min as 3 METs (Tudor-Locke et al (2004)., Tudor-Locke et al. 2009), Marshall-Levy et al. et al (2009)).

7. “Let's Move” Mobile Software Program Based on Transtheoretic Model

This program has two phases. The first stage is the creation of the software of the program and the second stage is the implementation of this program.

Software of the Program: This program will be developed for iOS and Android compatible devices using JavaScript programming language and technologies. Source codes written during development will be kept in a private repository on github. After the development of the application based on the design template is completed, it will be published on the app store and google play. Users will be able to download and use this application on their Android and iOS compatible devices from the app store and google play. The user data that will use the

application will be kept on the cloud-based MySQL Database. Notifications can be sent to users via OneSignal, video can be uploaded and broadcast to users, and users will be able to download the data obtained.

Additional information;

Minimum iOS and Android version: iOS 14 and Android 13

Data Storage: A page will be created by the researcher over the cloud and the data storage will remain on the researcher's self-defined page (Cloud can store data up to 10 GB). The data will be stored via mysql Database.

Data Security: User name (school number) and password (his/her own) will be logged into the system and only the researcher will be able to follow up.

Software completion time: 2 months (160 hours)

Internet Usage: Internet connection is required in order to follow the users of the researcher and to receive data for research purposes. In addition, after users install the program, using the internet connection, "Let's Move" Program's message, message, etc. must be allowed to share. If it is not confirmed, the screen will appear in red.

Program Design:

“Let's Move” Program, which is a computer software program and planned as a phone application;

Content and Features of the Software	
1.screen	<ul style="list-style-type: none">✓ Participants will set the school number as their username and will create their own passwords.✓ There will be an article explaining that the program is suitable for those who are minimally active and inactive, and it will include a video about using the "Let's Move" mobile software program.
2.screen	<ul style="list-style-type: none">✓ Participants will enter their body weight, muscle and fat ratios, and height into the system.✓ The program will calculate the Body Mass Index and display your avatar (Female/Male).
3.screen	<ul style="list-style-type: none">✓ The experimental group (n=97) will fill in the Sedentary Life Change Stages questionnaire, the International Physical Activity Questionnaire, and the Sedentary Life Scales through the Program.✓ According to IPAQ, those who are minimally active and inactive will be directed to the appropriate intervention program according to their sedentary

	life change stage.
4.screen	<ul style="list-style-type: none"> ✓ Students will enter the module system prepared according to five different stages of change [precontemplation ⁽¹⁾, contemplation ⁽²⁾, preparation ⁽³⁾, action ⁽⁴⁾, maintenance ⁽⁵⁾] of Sedentary Life. ✓ There will be 12 different initiatives specific to each stage/module in the program. ✓ There will be a total of 60 different initiatives for all phases. ✓ Initiatives are aimed at increasing change self-efficacy and decision-making, prepared by using TTM change processes specific to the TTM change stage in which the individual is in order to accelerate behavior change. ✓ Initiatives; The harms of sedentary life, the benefits of active life, how to be physically active, physical activity categories (inactive, minimally active and very active), trainings on physical activity types (light, moderate, vigorous) and related multiple choice questions, specific exercise for the change phase proposal (recipe), change plan schedule, physical activity/exercise videos that can be done at home, at school, in hot/cold weather, with and without tools, photos, daily step count, breathing exercises, exercise diaries, weekly informative message about the progress in physical activity categories , recommendation messages on how to deal with barriers to change, information, empowerment and motivation messages about support groups (cycling groups, running groups, nature trips, etc.) (Resources are shown in Appendix 1). ✓ Participants will be able to repeat all the initiatives (training, video and others) in the change phase as many times as they want. ✓ It will be recorded how long the participants participated in which initiative. ✓ Summarizing and reinforcing questions will be added at the end of each attempt. If the participants do not answer the questions, they will not be able to continue the next week's initiative. A warning will appear that the system does not answer your questions. ✓ At all stages, daily warning/reinforcing messages related to the initiative of that week will be sent. ✓ Students will apply the program prepared for the exchange phase they are

	<p>in for six weeks. At the end of the sixth week, students will fill out the Sedentary Life Change Stages questionnaire, the International Physical Activity Questionnaire, and the Sedentary Life Scales through the Program.</p> <p>✓ According to the results of the survey and scale, the students of the program will be directed to the modules again according to the stage of change they have reached.</p>
5.screen	<p>✓ The student will be able to see the number of steps taken daily, the activity category according to the number of steps, and their activity category ranking within the whole group.</p> <p>✓ At the end of the sixth and 12th weeks, a certificate of success will be sent to the first three students with the highest number of steps in each exchange phase.</p>
6.screen	<p>✓ Start date, end date etc. dates will be displayed</p>
7.screen	<p>✓ There will be a calendar and notepad screen.</p> <p>✓ Participants will be able to record their daily step counts on the smart bracelet to the 'Let's Move' mobile software program.</p>
8.screen	<p>✓ There will be an interactive messaging screen with the researcher.</p>

Module Titles

1. Precontemplation

Aim; The aim of the initiatives at this stage is to make the participants think about changing their sedentary life behaviors. In order to achieve this goal, there are initiatives that include training presentations, videos, photographs, messages and learning questions to raise awareness (Tudor-Locke et al., 2004; Öztürk, 2005; Bearman et al. 2006; Tudor-Locke et al. (Tudor-Locke et al., 2004; Öztürk, 2005; Bearman et al., 2006). 2009); Marshall-Levy et al (2009); Buettner, 2011; Gürkan et al. 2012; Bucchianeri et al., 2013; Bulut, 2013; Çam, H. H., 2014; Ersoy, 2016; Ersoy, 2016; Aydın et al., 2016; Bressa et al., 2017; Ünlü, 2017; Arıkan et al., 2018; Yıldırım, 2018; Turkey Nutrition and Health Research, 2019; Alp, 2019; Yılmaz, 2019; TUIK, 2019; Önal et al., 2019; Taş & Akyol, 2019; Genç & Zorba, 2019; Çiçek, 2020; WHO, 2020; Demir, 2020; WHO, 2021; WHO, 2022).

TTM Processes to be Used:

Sedentary Life TTM Cognitive Change Processes Scale: Interventions were prepared using the processes of raising awareness, emotional arousal, and self-reappraisal.

Decisional Balance Scale: Initiatives have been prepared to increase the harm perception of sedentary life.

Self-Efficacy Scale: Attempts to increase self-efficacy were prepared to change sedentary life behavior.

NOTE: 12-week interventions related to the not thinking phase are shown in Appendix 1. Content preparations for initiatives for other phases continue.

Stimulating Learning Questions That Promote Thinking (Clicking on each question will direct the student to the initiative)	
Week 1	What is a sedentary lifestyle (inactive lifestyle)? (Awareness)
Week 2	Who is a sedentary individual? (Awareness)
Week 3	Let's get to know ourselves (who is an active, inactive, minimally active individual?) Self-Reassessment What do our step counts tell us? (Emotional Arousal)
Week 4	Shall we get to know our body with measurements and determine our body type? (Awareness/Self-Re-evaluation)
Week 5	Shall we get to know our body with our vital signs? (Awareness/Self-Re-evaluation)
Week 6	Do you know how a sedentary lifestyle affects your movement system (muscles, bones, joints) and skin system? (Awareness/Self-Re-evaluation)
Week 7	Do you know the effect of sedentary life on mental health (stress, depression, etc.)? (Awareness/Emotional Arousal)
Week 8	Do you know how sedentary life affects the circulatory and respiratory system? (Awareness/Emotional Arousal)
Week 9	Do you know how sedentary life affects the digestive and excretory system? (Awareness/Emotional Arousal)
Week 10	Do you know the effect of sedentary life on your immune system? (Awareness/Emotional Arousal)
Week 11	Do you know what physiological pains a sedentary life causes and how it affects your sleep quality? (Awareness/Emotional Arousal)
Week 12	Do you know how sedentary life affects your brain health and academic success? (Awareness/Emotional Arousal)

2. Contemplation

Aim; The aim of the initiatives at this stage is to make the participants think about change by increasing their motivation and self-confidence that they can change. It is the application made to activate the obese individuals who lead a sedentary life, those with muscle wasting,

individuals with chronic diseases, to re-evaluate themselves by recognizing them, and to learn the parks and activity areas around them that provide social liberation by perceiving their future situation. It is to increase the self-efficacy of the individual that will change the sedentary life (İnceoğlu, 2000; Ersoy, 2016; Bayramlı, 2017; Yıldırım, 2018; Arıkan et al., 2018; Alp, 2019; TUIK, 2019; Ünal, 2019; Pınar, 2020; Çiçek, 2020; WHO, 2020; WHO, 2021; Adolescent, 2021; WHO, 2022).

TTM Processes to be Used:

TTM Sedentary Life Cognitive Change Process Scale; Initiatives were prepared by using/utilizing sub-dimensions of awareness, emotional stimulation, self-reappraisal, social liberation-environmental opportunities.

Sedentary Life Decisional Balance Scale: Initiatives have been prepared to increase the perception of the harms of sedentary life.

Sedentary Life Self-Efficacy Scale: Attempts to increase self-efficacy were prepared to change sedentary life behavior.

Stimulating Learning Questions That Promote Thinking (Clicking on each question will direct the student to the initiative)	
Week 1	Do you know the relationship of sedentary lifestyle with our hematology and hormone values? (Awareness)
Week 2	Do you know the relationship between the sedentary lifestyle and the elements in our body? (Awareness)
Week 3	Do you know how sedentary life affects the risk of chronic diseases such as obesity, diabetes, hypertension and cancer? (Awareness/Emotional Arousal)
Week 4	Do you know the effect of a sedentary lifestyle on our senses (sight, hearing, taste, smell, etc.) and its relationship with our personality traits (temperament)? (Awareness/Self-Re-evaluation)
Week 5	Do you know the relationship between sedentary lifestyle and culture (our country/global) (biological, social, social and psychological)? (Social Liberation-Environmental Opportunities)
Week 6	Do you know how an active lifestyle will affect vital signs (respiration, pulse, blood pressure, fever)? (Awareness/Self-Re-evaluation)
Week 7	What obstacles do you face to lead an active life? (Awareness/Self-Re-evaluation)
Week 8	Do you know how lifestyle will affect physical, social and communication skills

	when you are an active individual? (Awareness/Self-Re-evaluation)
Week 9	Do you know the importance of being an active individual in diseases? (Awareness/Emotional Arousal)
Week 10	What can you do to lead an active life? What are the environmental opportunities? (Social Liberation-Environmental Opportunities)
Week 11	What goals can you have for leading an active life? (Awareness/Self-Re-evaluation)
Week 12	Do you wonder how active individuals cope with their sedentary lifestyle? (Social Liberation-Environmental Opportunities)

3. Preparation Phase

Aim; The purpose of this phase is the attempts made for the participants to prepare a change plan so that they can be physically active.

It is the activation of the individual for an active life. It is the stage where individuals determine what physical activities they should do for their own body, what activities they can do during the day, what activities they can do during the day, make a schedule for change, from whom they can get counseling, and buy sports clothes for themselves (İnceoğlu, 2000; Öz & Roizen, 2005; Güney, 2006; Ergen, 2012; Bilge, 2013; Ersoy, 2016; Bayramlı, 2017; Arıkan et al., 2018; Yıldırım, 2018; Alp, 2019; TUIK, 2019; Ünal, 2019; Pınar, 2020; Çiçek, 2020; WHO, 2020; WHO, 2021; Adolescent, 2021; WHO, 2022).

TTM Processes to be Used:

Sedentary Life Change Process Scale; Interventions were prepared by using/utilizing the sub-dimensions of self-re-evaluation, social liberation-environmental opportunities, supportive relationships, counterconditioning, self-conciliation.

Sedentary Life Decisional Balance Scale; Initiatives aiming to increase the perception of harm of a sedentary life and to reduce the perception of benefit from a sedentary life are included.

Sedentary Life Self-Efficacy Scale; Initiatives have been planned to increase self-efficacy in changing behavior.

Stimulating Learning Questions That Promote Thinking (Clicking on each question will direct the student to the initiative)	
Week 1	How do you prepare a change plan to start a regular active life? (Self-Reassessment/Self-Compromise)

Week 2	Using what criteria methods (direct observation, direct calorimetry, indirect calorimetry, and double-layer water method) can you assess that you are physically active enough on a weekly basis? (Self-Reassessment)
Week 3	Which subjective methods (diaries, records, reminder surveys, retrospective historical data, global surveys) can you use to assess your weekly physical activity? (Self-Reassessment)
Week 4	Which objective methods (heart rate monitoring, pedometer, accelerometer) can you use to evaluate that you are physically active enough on a weekly basis? (Self-Reassessment)
Week 5	How can you organize the work or home environment so that you can continue to engage in regular physical activity? (Social Liberation-Environmental Opportunities)
Week 6	What physical activities can you do with tools to reduce inactive time at home? (Counter Conditioning/ Social Liberation-Environmental Opportunities)
Week 7	What physical activities can you do without tools to reduce inactive time at home? (Counter Conditioning/ Social Liberation-Environmental Opportunities)
Week 8	What physical activities can you do to reduce the inactive time at school? What physical activities can you do at school? (Counter Conditioning/ Social Liberation-Environmental Opportunities)
Week 9	Where are the areas where you can do physical activity in the area you live in? (Social Liberation-Environmental Opportunities)
Week 10	What are the motivation sources and methods of your active friends? (Supporting Relationships)
Week 11	How can you be physically active even when you don't have time? (Deal with Yourself)
Week 12	Shall we prepare a change plan chart for active living? (Deal with Yourself)

4. Action Phase

Aim; The aim of the initiatives to be made at this stage is for the participants to review the exercise plan in order to maintain the movement stage and to gain the ability to cope with obstacles (İnceoğlu, 2000; Ergen, 2012; Bilge, 2013; Ersoy, 2016; Bayramlı, 2017; Yıldırım, 2018; Arıkan et al., 2018; Alp, 2019; TUIK, 2019; Ünal, 2019; Pınar, 2020; Çiçek, 2020; WHO, 2020; Pınar, 2020; WHO, 2021; Ergen, 2021; WHO, 2022).

TTM Processes to be Used:

Sedentary Life Change Process Scale; Initiatives prepared using the sub-dimensions of supportive relationships, counterconditioning, stimulus control, reinforcement (reward), and self-conciliation are included.

Sedentary Life Decisional Balance Scale; Initiatives have been planned to decrease the perception of benefit and increase the perception of harm in sedentary life.

Sedentary Life Self-Efficacy Scale; Initiatives have been planned to increase self-efficacy that sedentary life can change behavior.

Stimulating Learning Questions That Promote Thinking (Clicking on each question will direct the student to the initiative)	
Week 1	What can you do to reach your daily target physical activity level (10,000 steps, moderate or vigorous physical activity, etc.)? (Agreement Himself)
Week 2	How can you do breathing exercises during and after physical activity? (Agreement with Himself)
Week 3	What warm-up exercises can you do before physical activity and how? (Agreement with Himself)
Week 4	What cool-down exercises can you do after physical activity and how? (Agreement with Himself)
Week 5	What physical activity movements, how and where can you do in a hot environment? (Strengthening)
Week 6	What physical activity movements, how and where can you do in a cold environment? (Strengthening)
Week 7	What physical activities can you do that provide mobilization and stabilization? (Agreement with Himself)
Week 8	What physical activities can you do that increase strength? (Agreement with Himself, Counterconditioning)
Week 9	What physical activities can you do that provide strength to your body? (Agreement with Himself)
Week 10	What physical activities can you do to increase balance and coordination? (Agreement with Himself)
Week 11	What physical activities can you do to strengthen your body's muscles and bones? (Agree with Himself)
Week 12	What physical activities can you do to strengthen your body's cardiovascular system? (Agreement with Himself)

5. Maintenance Phase

Aim; This stage includes the practices made to find a solution to the motivation losses that may occur and to support the success of the participants (İnceoğlu, 2000; Güney, 2006; Bilge, 2013; Ersoy, 2016; Bayramlı, 2017; Yıldırım, 2018; Arıkan et al., 2018; Alp, 2019; TUIK, 2019; Ünal, 2019; Pınar, 2020; Çiçek, 2020; WHO, 2020; WHO, 2021; Ergen, 2021; WHO, 2022).

TTM Processes to be Used:

Sedentary Life Change Process; Attempts to prevent relapse and to make behavior change permanent are included by making use of the dimensions of supportive relationships, counterconditioning, stimulus control, reinforcement (rewarding), and self-conciliation.

Sedentary Life Decision Making; Preventive interventions are planned to reduce the perception of benefit in sedentary life and to maintain a high perception of harm.

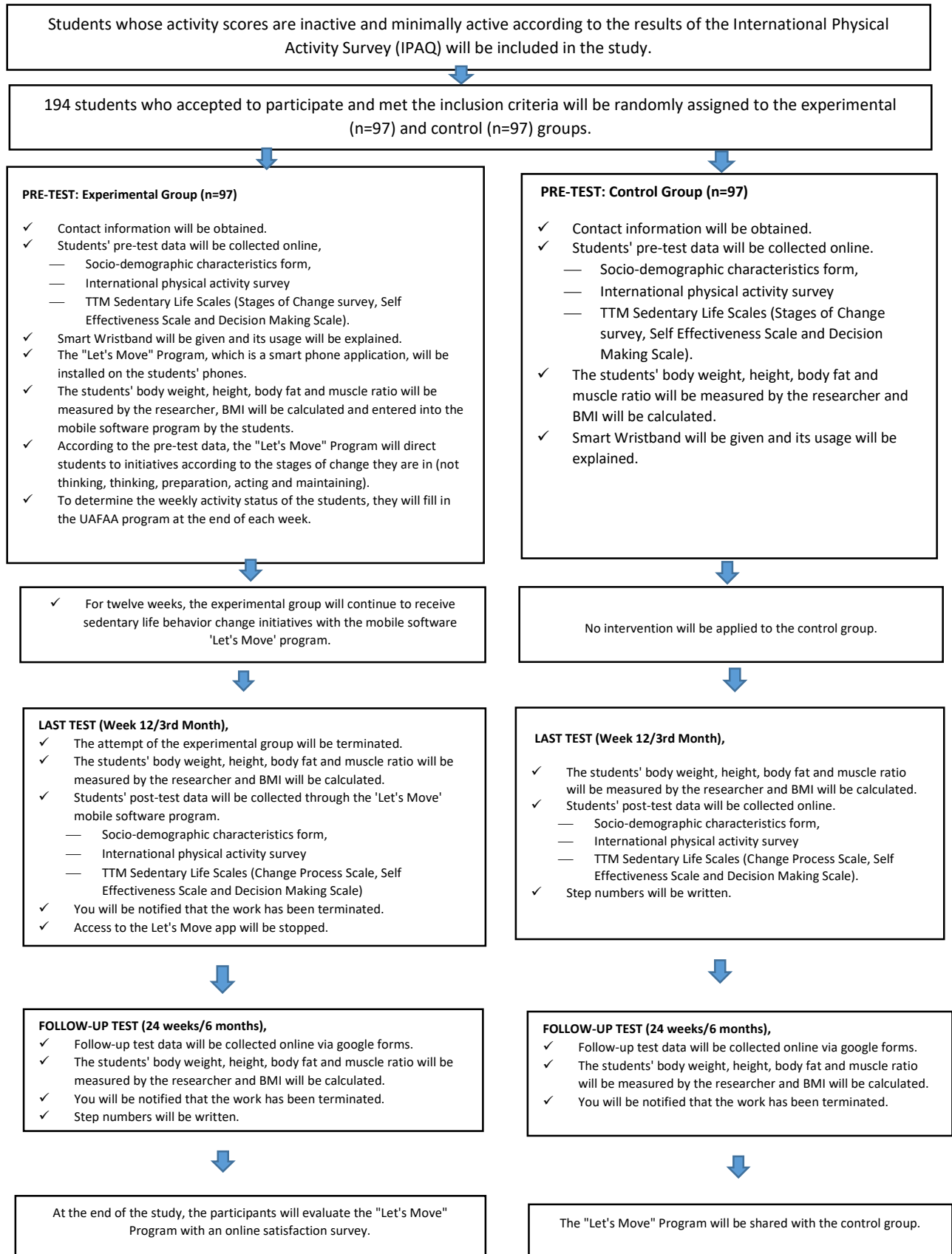
Sedentary Life Self-Efficacy; Initiatives to increase self-efficacy are planned for lifelong continuation of active life.

Stimulating Learning Questions That Promote Thinking (Clicking on each question will direct the student to the initiative)	
Week 1	Have you made plans for the future to maintain an active life for life? What could happen? (Agreement with Himself)
Week 2	How did you reward yourself for living an active life for more than six months? What other rewards are you considering? (Self Deal/Strengthen)
Week 3	What can you do when your motivation is lost? (Strengthening)
Week 4	Who are your friends that you can get support when your motivation is lost and how can you get support? (Supporting Relationships/Control of Stimuli)
Week 5	How can you get support from your family to continue physical activity? What activities can you do with family members? (Supporting Relationships)
Week 6	What support groups can you join to lead an active life? (Supporting Relationships)
Week 7	How can you deal with situations that prevent you from doing regular physical activity? (Stimulus Control)
Week 8	Have you planned to continue your physical activity by participating in group sports (football, basketball, volleyball, water polo, etc.) in your spare time? (Supporting Relations/Agreement with Himself)
Week 9	How can you continue to lead an active life with the individuals in your social circle you spend time with? (Supporting Relationships)

Week 10	How would you imagine yourself in 10/20 years if you stopped doing regular physical activity? (Deal with Yourself)
Week 11	If you continue to exercise regularly, how would you imagine yourself in 10/20 years? (Deal with Yourself)
Week 12	General repeat-important reminders (Stimulus Control)

Educational videos to be used in the mobile software program will be prepared in the form of animation. Opinions and suggestions of sports trainers/trainers, physiotherapists and physicians/psychiatrists were received on the contents of the "Let's Move" Program prepared by the researchers.

8. Intervention Plan of the Research



9. Independent, Dependent and Control Variables of the Study

- **The independent variable of the study;** Mobile Software “Let's Move” Program Developed Based on Transtheoretical Model
- **Dependent variables of the study;** Number of Steps per Day, Physical activity MET score categories, Transtheoretic Model sedentary life Stages of Change, SL-SES score, SL-DBS benefit perception score averages, SL-DBS harm perception score averages, Physical activity walking, moderate, severe and total MET score averages, Body Mass Index categories, fat and muscle ratio values.
- **Control variables of the study;** age, gender, socio-economic level, people who do sports in the family, weather conditions, environmental conditions (areas where sports can be done), previous sports status
- **Limitation of the research;** The inability to include students who do not have an active internet connection was accepted as a limitation of the study.

10. Analysis and evaluation of research data

- The analysis of the data will be carried out on the computer with the SPSS (Statistical Package for Social Sciences) 21 package program. In the statistical analysis of the data, descriptive analyzes will be given as percentage, mean and frequency. Chi-square will be used to evaluate the homogeneity of the Experimental and Control groups, and the t test or Mann Whitney U test will be used in the analysis of the data in the experimental and control groups. One Way Anova or Kruskal Wallis analysis of variance will be applied when comparing three or more groups. Statistical significance level will be accepted as $p < 0.05$.

11. Ethical Permissions

- In order to carry out the study, permission was obtained from the Clinical Research Ethics Committee of a state (X) University Faculty of Medicine (date 14.07.2022, protocol code: 09.2021.713). Permission was obtained from the institution where the research would be conducted (dated 11.08.2021, numbered E-61952817-044-21669). Permission to use the scale was obtained from the researchers who adapted the scales to be used in the study into the Turkish language. A voluntary consent form will be obtained from the participants.

12. Survey and Scales

Appendix 1. Socio-demographic characteristics diagnostic form

Your name and last name...

Your age...

Your gender:

() Female

() Male

1) Work status

1. () Working

2. () Not working

2) How would you rate your family's economic situation?

1. () Very bad-bad

2. () Average

3. () Good-Very good

3) Are you satisfied with your weight?

1. () Yes

2. () No

4) Do you smoke?

1. () Yes

2. () No

5) Do you drink alcohol?

1. () Yes

2. () No

6) On average, how much time do you spend on the phone per day?

1. () 0-59 minutes

2. () 1-2 hours 59 minutes

3. () 3-4 hours 59 minutes

4. () More than 5 hours

7) On average, how much do you watch TV per day?

1. () 0-59 minutes

2. () 1-2 hours 59 minutes

3. () 3-4 hours 59 minutes

4. () More than 5 hours

8) On average, how much time do you spend in front of the computer per day?

1. () 0-59 minutes
2. () 1-2 hours 59 minutes
3. () 3-4 hours 59 minutes
4. (...) More than 5 hours

9)	I don't do physical activity because I don't find time for it	1. () Yes	2. () No
10)	I don't do physical activity because I don't feel the need to do them	1. () Yes	2. () No
11)	I don't do physical activity because there is no suitable environment in my area where I live	1. () Yes	2. () No
12)	I don't do physical activity because I'm afraid of getting hurt	1. () Yes	2. () No
13)	I do not do physical activity because I don't have the financial means for the sport I am interested in.	1. () Yes	2. () No
14)	I don't engage in physical activity because I've have other plans for my free time	1. () Yes	2. () No
15)	I don't do it because my family and friends don't do physical activity	1. () Yes	2. () No
16)	I don't do it because I've been injured while doing physical activity before	1. () Yes	2. () No
17)	I don't do it because I feel pressured to do physical activity	1. () Yes	2. () No
18)	I don't do it because I don't know the health benefits of physical activities	1. () Yes	2. () No
19)	I don't do it because I don't have the motivation to do physical activity	1. () Yes	2. () No
20)	What are your other reasons for not being physically active? Write.....		

Appendix 2. International Physical Activity Questionnaire Short Form

We would like to know about the activities you do in your daily life. Below you will find questions about your physical activity in the last 7 days. Please answer all questions even if you do not consider yourself a very active person. Think about your housework and yard work, the activities you do at work, the things you do to get from one place to another, the activities you do in your free time such as exercise or sports.

Think of any vigorous, strenuous activity you have done for 10 minutes or more in the last 7 days.

1	<p>How many days in the past week did you engage in an activity that required heavy physical activity, such as heavy lifting, digging, aerobics, basketball, soccer, or fast cycling?</p> <ul style="list-style-type: none"><input type="radio"/> days per week<input type="radio"/> I did not do vigorous physical activity. (If you have ticked this option, proceed to Question 3)
2	<p>How much time did you usually spend doing vigorous physical activity on one of these days?</p> <ul style="list-style-type: none"><input type="radio"/> I don't know / I'm not sure<input type="radio"/>minutes per day<input type="radio"/> hours per day
3	<p>Think about moderate physical activities you've done in the past week. These are activities that last 10 minutes or longer, require moderate physical exertion, and cause shortness of breath somewhat more often than usual.</p> <p>How many days in the last week did you do moderate physical activity, such as carrying light loads, cycling at a normal speed, folk dances, dancing, bowling, or tennis? (other than walking)?</p> <ul style="list-style-type: none"><input type="radio"/> days per week<input type="radio"/> I did not do any moderate physical activity. (If you have ticked this option, proceed to Question 5)
4	<p>How much time did you usually spend doing moderate physical activity on one of these days?</p> <ul style="list-style-type: none"><input type="radio"/> I don't know/I'm not sure<input type="radio"/> minutes per day<input type="radio"/> hours per day
5	<p>Think about the time you spent walking in the past week. This could be walking at work, at home, to get around, or just for recreation, exercise, or as a hobby.</p> <p>In the past 7 days, how many days have you <u>walked for at least 10 minutes</u> at a time?</p>

	<ul style="list-style-type: none"> ○ days per week ○ I did not walk (If you checked this option, skip to question 7)
6	<p><u>How much time</u> did you usually spend <u>walking</u> on one of these days?</p> <ul style="list-style-type: none"> ○ I don't know / I'm not sure ○ minutes per day ○ hours per day
7	<p>This is about the amount of time you spent sitting during the past week. This includes the time you spent at work, at home, working, or resting. This also includes the time you spent sitting at your desk, visiting a friend, reading, sitting, or watching TV while lying down.</p> <p>How much time <u>per day have you spent sitting</u> in the past week?</p> <ul style="list-style-type: none"> ○ I don't know / I'm not sure ○ minutes per day ○ hours per day

Scoring and Scoring of the IPAQ Survey

Short form (7 questions); provides information on time spent walking, moderate and vigorous activities, and time spent sitting. Calculation of the total score of the short form includes the sum of the duration (minutes) and frequency (days) of walking, moderate-intensity activity, and vigorous activity. The energy required for activities is calculated with the MET-minute score. Standard MET values have been established for these activities. By using these values, daily and weekly physical activity level is calculated. These;

Physical Activities	MET value (min.)	Weekly MET score calculation (min*day)
Vigorous Physical Activity (questions 1 and 2)	8.0 METs	Vigorous MET-min/week = 8.0 x minutes of vigorous activity x number of days of vigorous activity
Moderate-Intensity Physical Activity (questions 3 and 4)	4.0 MET	Moderate-intensity MET-min/week = 4.0 x minutes of moderate-intensity activity x number of days of moderate-intensity activity

Walking (5th and 6th questions)	3.3 MET	Walking MET-min/week = 3.3 x walking minutes x number of walking days
Total weekly MET score		Total MET-min/week = walking + moderate + severe (MET-min/week)

For example; The walking MET-min/week score of a person walking for 3 days and 30 minutes is calculated as $3.3 \times 3 \times 30 = 297$ MET-min/week.

Physical activity categories according to total MET scores according to IPAQ;

- ✓ Inactive Level; 599 MET and below
- ✓ Minimal Level; Between 600 MET-3000 MET
- ✓ Very Active Level; 3001 MET and above

7. Evaluation of the Problem; The IPAQ residency question is an additional determinant. It is not part of the scoring of physical activity

TTM Sedentary Life Stages Of Change Scale (SL-SCS);

Sedentary behaviors; It is defined as sitting, leaning, or physical activities that burn less than 1.5 METs of energy other than rest time and sleep. For example: sitting, studying, watching TV, playing video games and using a computer, etc. Some people go for a walk or do stretching exercises to reduce their sedentary time. they do.

Consider your long-term sedentary behavior while answering the questions below. Please be sure to read the questions carefully and choose the one that best describes your opinion from the 5 sentences below while answering the questions.

1) Can you do enough physical activity almost every day?

Yes ()

No ()

2) Do you think you spend most of your day inactive?

1. () Yes, and I don't plan to give up my sedentary lifestyle (sitting all the time, etc.) these days. (Not Thinking Phase)

2. () Yes, but I plan to give up a sedentary lifestyle (sitting all the time, etc.) in the next 6 months. (Thinking Phase)

3. () Yes, but within the next 30 days, I plan to give up a sedentary lifestyle or reduce these behaviors by doing small exercises from time to time. (Preparation Phase)

4. () No, I am not inactive. In the last 6 months, I gave up my sedentary lifestyle and started doing physical activity frequently. (Movement Phase)

5. () No, I am not inactive. I gave up the sedentary lifestyle for more than 6 months and started doing frequent and regular physical activity. (Continuation Phase)

TTM Sedentary Life Self-Efficacy Scale (SL-SES)						
Self-Efficacy Scale		I don't trust at all	I trust a little	I am moderately confident	I trust so much	I am extremely confident
1.	I tell myself that I will not be inactive while doing my schoolwork.	1	2	3	4	5
2.	When I feel tired, I tell myself that I will not stay still.	1	2	3	4	5
3.	While playing a video game, using a computer, or watching TV, I tell myself that I will not stay still	1	2	3	4	5
4.	When I spend time with my friends or family who want to sit, I tell myself that I will not stay still	1	2	3	4	5
5.	When I'm on vacation or in my spare time, I tell myself that I won't be sedentary.....	1	2	3	4	5
6.	When I feel lazy, I to myself that I will not stay still.	1	2	3	4	5

Self-efficacy Scale; It is an individual's belief about himself/herself that he/she can successfully perform a certain behavior, and it reflects self-confidence. The scale consists of 6 items that include self-confidence in quitting sedentary behavior. It is a five-point Likert type. It ranges from 1: Not at all trusting to 5: Very confident. The minimum score to be taken from these scales will be '6' and the maximum score will be '30'. A high score on the self-efficacy scale indicates that the student's self-efficacy in changing sedentary life behavior has increased.

Appendix 7. TTM Sedentary Life Decision Balance Scale (SL-DBS)						
Decision Balance Scale						
This section examines the positive and negative aspects of sedentary behaviors.						
Read the following statements carefully and consider the degree of significance of these statements.						
In each statement, think about how you feel now, not how you felt or wanted to feel in the past. Please circle the number that best describes you.						
		Does not matter	Somewhat Important	moderately important	Very important	Highly important
1.	Reducing my sitting time allows me to have a more positive outlook on life.	1	2	3	4	5
2.	If I reduce the amount of time I sit, I will feel tired during the day.	1	2	3	4	5
3.	Avoiding inactivity will be beneficial for my health.	1	2	3	4	5
4.	When I do something to avoid inactivity, I feel like I'm wasting my time. For example, taking a walk instead of sitting and studying.	1	2	3	4	5
5.	If I avoid inactivity, I feel more industrious.	1	2	3	4	5
6.	When I take a break to move while studying, my concentration breaks down.	1	2	3	4	5
7.	I feel proud of myself when people see my effort not to be too inactive and accept me as a role model.	1	2	3	4	5
8.	Spending sedentary time is very convenient and comfortable for me.	1	2	3	4	5
9.	Avoiding inactivity makes me an active person.	1	2	3	4	5
10.	When I reduce the energy I spend by being inactive, I feel good.	1	2	3	4	5
11.	avoiding inactivity; It helps to regenerate both my body and my brain.	1	2	3	4	5
12.	It bothers me to move around where everyone is still. For example, getting up and moving while reading a book in the library or watching TV with friends.	1	2	3	4	5

Transtheoretic Model Sedentary Life Decision Balance Scale (SL-DBS) (Annex7)

The decision-making scale consists of two sub-dimensions that measure the benefits and harms of making a behavior change decision. The sedentary life decision-making scale consists of 12 items containing the positive and negative aspects of sedentary life.

- **Sedentary life behavior change decision-making benefit perception sub-dimension;** It consists of 1, 3, 5, 7, 9, and 11 items of the scale. The minimum score to be taken from these scales will be '6' and the maximum score will be '30'. A high score on this sub-dimension indicates that they are aware of the benefits of behavior change and that they are more likely to change their behavior.
- **Sedentary life behavior change decision making harm sub-dimension;** It consists of the 2nd, 4th, 6th, 8th, 10th, and 12th items of the scale. The minimum score to be taken from these scales will be '6' and the maximum score will be '30'. A high score on this sub-dimension indicates that the harms of behavior change attract more attention and the probability of changing behavior is less.