THE ROLE OF DOMESTIC ENVIRONMENT ON PHYSICAL ACTIVITIES
OF WOMEN ADULTS: COMPARISON OF SINGLE AND MULTI STOREY
HOUSES

A Master's Thesis

by

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Ankara
July 2016

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The Graduate School of Economics and Social Sciences
of
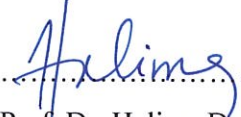İhsan Doğramacı Bilkent University

by

MELİS KOCAOĞLU

In Partial Fulfillment of the Requirements for the Degree of
MASTER OF FINE ARTS

THE DEPARTMENT OF
INTERIOR ARCHITECTURE AND ENVIRONMENTAL DESIGN
İHSAN DOĞRAMACI BİLKENT UNIVERSITY
ANKARA

July 2016

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of (Master of Fine Arts in Interior Architecture and Environmental Design).

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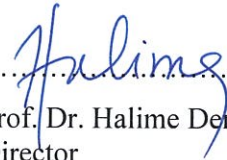Assist. Prof. Dr. Yasemin Afacan
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ABSTRACT

THE ROLE OF DOMESTIC ENVIRONMENT ON PHYSICAL ACTIVITIES OF WOMEN ADULTS: COMPARISON OF SINGLE AND MULTI STOREY HOUSES

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July 2016

This study explores the role of domestic environment on home-based physical activities (PAs) of women adults who live in single and multi storey houses. The aim of the study is to determine the design characteristics of specific spaces (kitchen, bathroom, corridor, staircase,garden/terrace and multi spaces) and theirelements that affect negatively or not on the domestic PAs of women adults live in each space of both house types and to determine the relationship between home-based PAs and PA level of the participants. This study was conducted with 120 young and middle-aged (19-64 years)Turkish women adults. Equal number of participants was selected from both house types. Two sets of survey were done for both house types and the PA level was determined using the International Physical Activity Questionnaire-Short Form (IPAQ-S).Using the qualitative content analysis method,women were found generally pleased with the design characteristics of spacesbut'frontal length of main working area' was found to be the most negatively affecting design characteristic for PA in kitchenin both house types. A significant difference was found in the amount of time spent in doing housework and bathing activity in both house types. The correlation analysis indicated that there is a low association in single storey houses and positive moderate association in multi storey houses between frequency of cooking and housework activities. According to multiple regression analysis, daily duration of cooking activity is mostly related PA level of women adults in multi storey houses. Additionally, no significant difference was found between PA levels of women who live inboth houses types and generally moderate PA level was reported.

Keywords: Design Characteristics, Domestic Environment, Physical Activity, Single and Multi Storey Houses, Women

ÖZET

EV ORTAMININ YETİŞKİN KADINLARIN FİZİKSEL AKTİVİTELERİ ÜZERİNDEKİ ROLÜ: TEK VE ÇOK KATLI EVLERİN KARŞILAŞTIRMASI

Kocaoğlu, Melis
İç Mimarlık ve Çevre Tasarımı Yüksek Lisans Programı
Tez Yöneticisi: Prof. Dr. Halime Demirkan

Temmuz 2016

Bu çalışma, ev ortamının tek ve çok katlı evlerde yaşayan yetişkin kadınların evde yapılan fiziksel aktiviteleri üzerindeki rolünü araştırmaktadır. Çalışmanın amacı, tek ve çok katlı evlerdeki belirlenen mekânların (mutfak, banyo,koridor, merdiven,bahçe/teras, çoklu mekanlar) vetasarım özelliklerinin, yetişkin kadınların fiziksel aktiviteleri üzerinde olumsuz etkisi olup olmadığını belirlemek ve katılımcıların evde yapılan fiziksel aktiviteleri ile fiziksel aktivite düzeyleri arasındaki ilişkiyi araştırmaktır. Çalışma, 120 genç ve orta yaşlı (19-64 yaş arası) Türk kadınları ile gerçekleştirilmiş. Tek ve çok katlı evlerden eşit sayıda katılımcı seçilmiştir. Her ev tipi için iki anket seti yapılmış ve katılımcıların fiziksel aktivite düzeyleri Uluslararası Fiziksel Aktivite Anketi Kısa Formu ile belirlenmiştir. İçerik analizi metodu sonucu kadınların genelde tasarım özelliklerinden memnun olduğu fakat her iki ev tipinde de mutfaktaki 'ana çalışma alanının uzunluğu' fiziksel aktivitelerini en çok olumsuz etkileyen tasarım özelliği olarak belirlenmiştir. Tek ve çok katlı evlerin aktivite süreleri karşılaştırmasında, ev işi yapma ve banyo yapma aktiviteleri arasında anlamlı bir farklılık bulunmuştur. Korrelasyon analizi sonucu, yemek yapma ve ev işi yapma süreleri arasında, tek katlı evlerde olumlu düşük düzey, çok katlı evlerde ise olumlu orta düzey ilişki belirlenmiştir. Çoklu regresyon testi sonucu ise çok katlı evlerde, yemek yapma aktivitesi süresinin fiziksel aktivite düzeyini en çok etkileyen faktör olarak belirlenmiştir. Her iki ev tipinde oturan kadınların fiziksel aktivite düzeyleri arasında önemli bir farklılık bulunmamış ve genelde orta aktiflik seviyesi belirlenmiştir.

Anahtar Kelimeler: Ev Ortamı, Fiziksel Aktivite, Kadınlar, Tasarım Özellikleri, Tek ve Çok Katlı Evler

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LIST OF ABBREVIATIONS

ADL: Activities of Daily Living

AL: Active Living

BADL: Basic Activities of Daily Living

IADL: Instrumental Activities of Daily Living

IPAQ: International Physical Activity Questionnaire

IPAQ-S: International Physical Activity Questionnaire Short Form

IPAQ-L: International Physical Activity Questionnaire Long Form

LAs: Leisure Activities

MET: Metabolic Equivalent of Task

PA: Physical Activity

PAs: Physical Activities

SB: Sedentary Behavior

U.S.: United States

WHO: World Health Organization

CHAPTER I

INTRODUCTION

By mechanization through the Industrial Revolution and the rapid development of technology, human beings have become more inactive than past. According to the World Health Organization (WHO) (2010), physical inactivity levels are increasing and physical inactivity is stated as the fourth cause of death in the world.

In the whole world, approximately 1.7 billion of human beings are overweight, and 475 million are obese (Design Council, 2014). Since 1980, this overall number of people who are overweight has more than doubled up. Moreover, in England, 68% of men and 58% of women are overweight or obese (Design Council, 2014). Center for Active Design (2013) estimated that if this trend continues, 86% of U.S. adults would be obese or overweight in 2030. In Turkey, inactive lifestyle has also gradually increased. According to the findings of Research of the Risky Factors of the Chronic Disease, conducted by the Turkish Ministry of Health; throughout the country, 87% of women and 77% of men do not do adequate physical activity (Türk Halk Sağlığı Kurumu, 2014).

According to the Design Council (2014) based on the findings of the Active by Design Program, inadequate physical activity (PA) has consequences on the most serious health issues such as; obesity, heart disease, stroke, type 2 diabetes, high blood pressure and dementia. The main reasons of obesity are stated as being inactive and having sedentary lifestyle. Sedentary behaviors (SB) (sitting or lying) of adults affect their health negatively; however, PA has positive health consequences (WHO, 2010; Türk Halk Sağlığı Kurumu, 2014). Besides, having benefits on serious health problems, it is also useful for mental health by improvement on well-being and the quality of life (Committee on Physical Activity, Health, Transportation and Land Use, 2005; Türk Halk Sağlığı Kurumu, 2014).

In recent years, universal accessibility and PA are the concepts that are current in many communities. In 2010, The City of New York published the Active Design Guidelines to promote active daily lifestyles, as a source for architects and urban designer for supporting them to create healthy buildings, streets and urban spaces. Active Living (AL) is a research area and practice that encourages more PA and less sedentary behavior that has been functioning since mid-1990s (Ahrentzen & Tural, 2015). (Active Living (AL) = decrease SB, increase movement, increase PA).

Ahrentzen and Tural (2015) emphasized that recent research focuses mostly on AL or PA of older adults in macro-scale environment. However, they claimed that micro-scale environment should also be considered because most of the older adults spend their time indoors at home. This situation is also valid for the study of PA of women adults. Moreover, when the age groups of women are investigated, physical

inactivity level increases as the age advances, for instance, at the age range 12-14 the inactivity measurement is 69.8%, at 15-18 is 72.5% and at 19-30 is 76.6% and above the age of 75 is at 88.0% (Türk Halk Sağlığı Kurumu, 2014). According to taken into consideration of to supporting being more active; architects and designers can support people by designing interiors of building (Design Council, 2014). There are various built environment projects at the building, street, neighborhood and community level (Kim, Lee & Pyke, 2014), also built environment standpoints are in active design are; residential buildings, schools and offices (Marmot & Ucci, 2015). However, limited research exists that analyze the domestic environment and activities. Domestic activities represent a substantial proportion of the total activity in women adults.

Dabrowska, Dabrowska-Galas, Naworska, Wodarska & Plinta (2015), emphasized that the effects of PA related to daily activities (work, transportation, housework) is little known. Moreover, limited research exists that analyze the relationship between domestic environment and PA of women as well as the analysis and comparisons of PA level conducted in single and multi storey houses.

Consequently, this study concentrates on the PAs of young and middle aged (19-64 years) women adults in domestic environments. As Savcı, Öztürk, Arıkan, İnce & Tokgözoğlu (2006) emphasized, the PA studies related to young age is important since young age is the vital period in gaining the healthy behavior for preventing risks in older age. Middle age is also significant because many middle aged women

spend most of their time at house. Furthermore, the number of stories in a house is the categorizing feature of this study for the comparison of different house types.

1.1. Aim of the Study

The main purpose of this study is analyzing the effects of domestic environment in enabling or preventing home-based PAs of women adults. The aim of the study is to determine the design characteristics that reduce the domestic PA level of women adults in each space of the single and multi storey houses. In addition, compare the relationship between domestic PAs and PA level of young and middle age women adults. In Turkey, there are some studies that research the PA level of Turkish society (Genç, Şener, Karabacak & Uçök, 2011; Savcı et al., 2006; Öztürk, 2005; Vatansever, Ölçücü, Özcan & Çelik, 2015) but limited research that exists analyzes the relationship between PA and residential area. This study may be a guide for interior architects/ designer and house designers who are interested in AL and active design in domestic environment.

1.2. Structure of the Thesis

This thesis consists of six chapters. The first chapter titled as the introduction gives information about the thesis, PA, AL and their significance and the aim of the study is emphasized with relevant studies in the research field. Correspondingly, the

historical analysis of the PA in several countries is stated. Furthermore, the home-based physical activities that are related with the design characteristics of the specific spaces of the domestic environment are briefly designated. Additionally, the aim of the study and the structure of the thesis are presented.

The second chapter is about the definition and categorization of PA and its' measurement criteria and also analysis of PA of women adults. Moreover, the home-based physical activities are explained. Then, the domestic activities are categorized as basic activities of daily living (BADL), instrumental activities of daily living (IADL) and leisure activities (LAs).

The third chapter explores the domestic activity spaces (kitchen, bathroom, corridor, staircase, garden and terrace and multi spaces) that are categorized according to the domestic activities. In order to specify these spaces as enabling or preventing the domestic PA of young and middle-age women, the priorities of design characteristics for each space are determined.

In the fourth chapter, related to the aim of the study, the research questions and hypotheses are stated. The settings, participants and the instruments used in the study and the procedure of the research are explained in detail.

The findings of the study are statistically analyzed in the fifth chapter. Quantitative, qualitative and analysis of home-based physical activities are evaluated.

The six chapter consist of the results of this study are discussed and compared with the other studies conducted in PA domain and the conclusion of the study is explained. Also, implications of the study on interior architecture/design, limitations of the study and suggestions of further research areas are given.

CHAPTER II

PHYSICAL ACTIVITY AND HOME-BASED PHYSICAL ACTIVITIES

2.1 Physical Activity

WHO defines PA as "any bodily movement produced by skeletal muscles that requires energy expenditure- including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits" (WHO, 2016). It is the activity of using muscle and joint in daily life, it increases health and respiratory level and accomplish through different level of fatigue (Baltacı, Irmak, Kesici, Çelikcan & Çakır, 2008). Activities like playing game, housework, garden work, walking, climbing stairs, eating, bathing are the daily life activities of supporting our life. Daily life activities are also the physical activities as well as training and doing sport (Türk Halk Sağlığı Kurumu, 2014). According to WHO recommendations (WHO, 2016), adults aged 18-64 years should do 150 minutes/week of moderate-intensity PA or at least 75 minutes/week of vigorous PA or equal combination of moderate- and vigorous- intensity activity.

Much of the research about environment and the PA focus on community, urban planning, transportation, neighborhood, office and school environments and the relationship between those environment and PA has been comparatively well-researched. Additionally, there are researches about the PAs performed by the older women adults. "*Building Research & Information* has special issue (Vol.43 No: 5) that emphases the indoor built environment, especially home, occupational and educational settings, where further knowledge of activity levels and the possibilities for change are needed" (Marmot & Ucci, 2015: 561). The systematic research review paper by Ahrentzen and Tural (2015) studied the role of the buildings and interior-scale environmental factors of residences and residential developments such as retirement communities, assisted living, nursing home in encouraging or preventing older adults' (AL) and SB. Brookfield, Fitzsimons, Scott, Mead, Starr, Thin, Tinker & Thompson (2015) emphasized that household PAs are beneficial for older people to increase the PA level. Steps, space within the home, location and form of facilities, fixtures and fittings are the characteristics of the home that prevent or enable for being active. Zimring, Joseph, Nicoll & Taepas (2005) also focused on the role of the physical environment in AL and emphasize the urban design, site selection and design and building design and its elements. Also, the PA levels of university students were studied by Savcı, et al. (2006) and Öztürk (2005). In addition, PA and quality of life between young adults was studied by Genç et al. (2011) also Vatansever et al. (2015) study was related with the relationship among PA and life quality between middle aged people.

PA, one part of our normal lives, has been designed out for our daily routines (Center for Active Design, 2013). According to Horgas, Wilms & Baltes, (1998:

557); the differentiation of three types of everyday activities as "(a) basic activities as those pertaining to personal maintenance in physical survival terms; (b) instrumental activities as those referring to personal maintenance in cultural survival terms; and (c) work, leisure and social activities as those reflecting agentic, communal, and self- enriching activities." In this study, basic activities, instrumental activities and leisure activities of domestic environment were analyzed in detail.

2.1.1 Basic Activities of Daily Living (BADL)

Basic Activities of Daily Living (BADL) are the activities that people encounter in their daily routine. According to Horgas et al. (1998: 557), "western cultures, successful living requires different daily activities and engagement in those activities that ensure personal maintenance (e.g., eating, bathing, dressing) are considered a basic ingredient of a successful life." Those activities are considered obligatory activities.

Moreover, time spent for BADL can be changed person to person because those activities include personal care. In this study, basic daily activities of bathing and personal hygiene activities (washing hands, brushing teeth, hair etc.) were analyzed in detail with their weekly frequency and daily duration.

2.1.2 Instrumental Activities of Daily Living (IADL)

Many researches indicated that most women spend much of their time in their houses (Grandjean, 1973; Zimring et al., 2005) and there is a relationship between Activities of Daily Living (ADL), IADL and (AL). According to study of Ahrentzen & Tural, (2015; 583):

Activities of daily living (ADL) and instrumental activities of daily living (IADLs) used in the healthcare field encompass a number of non-sedentary behaviors that reflect the concept of AL, and are appropriate to residential activities *e.g* dressing oneself, preparing meals and clearing up, housework, care of pets, functional mobility, and other common household tasks.

According to Zimring et al. (2005), instrumental PAs might be the outcome of the everyday activities like; walking, housework.

Regular walking could have a positive effect on people's health. According to research about the environmental influences on indoor walking behaviors of assisted living residents, indoor walking for exercise or walk to other indoor destinations can increase PA levels of residents (Lu, Rodiek, Shepley & Tassinary, 2015). Indoor walking is not restricted through the weather and can be involved at any time of the day (Lu et al., 2015).

Most researches emphasized the importance of the stair using (climbing and retreating) in indoor environment to promote PA levels of individual. (Agarwal et

al., 2011; Design Council, 2014; The City of New York, 2010; Wells, Ashdown, Davies, Cowett, & Yang, 2007; Zimring et al., 2005). Stair climbing is one of the instrumental activities (Zimring et. al., 2005). In residential area, for multi storey houses, stair climbing could be the beneficial activity for occupants in order to increase their PA level and their health conditions.

In this study, involving home-based activities IADL during the day time, such as indoor walking (utilitarian walking), stair using, housework (cleaning, laundry etc.), cooking, kitchen activities, childcare activities are called as the IADL activities in domestic environment analyzed in detail.

2.1.3 Leisure Activities (LAs)

In the 21st century, based on rapid improvement of technology, the LAs in domestic environment like using technological devices, using computer, playing video games, watching TV etc., are increasing day by day. These activities could have done through lying or sitting, so people are more inactive and there is an increase in their SB that has negative effects on their health.

Garden and/or terrace activities are included as LAs of domestic environment but these activities could have a positive influence on well- being and could increase the PA level of adults. In this study, the LAs in domestic environment such as watching TV, reading and using computer etc., were analyzed in order to understand the amount of time spend of participants for SB when they were in their houses.

2.2 Measurements Criteria of Physical Activity Level

The PA level can be measured through subjective methods (observation, physical activity questionnaires, etc.,) and objective methods (using monitoring devices; accelerometer, pedometer etc.,). There are studies that use more different PA questionnaires. Also, there are many studies that use monitoring devices like; accelerometer- (a monitoring device that measures the intensity of an activity) or pedometer- (a monitoring device that counts steps and measures distance) (Committee on Physical Activity, Health, Transportation and Land Use, 2005). All these classify PAs according to the level of intensity in the groups such as; low/light intensity, moderate intensity and vigorous intensity.

International Physical Activity Questionnaire (IPAQ) is one of the questionnaires that assess the PA level of adults. The reliability and validity of this questionnaire in Turkey was tested by the Öztürk (2005). The IPAQ- S is used for only young and middle aged adults (age range of 15-69) and consists of seven questions integrated with PAs of daily life. The questions are interested in time, duration (in minutes) and frequency (days) of sitting, walking, moderate- intensity and vigorous intensity activities while individual spend last 7 days. There are four everyday domains in questions, these are; leisure time activities, domestic and gardening (yard) activities, work-related activities and transport-related activities. Lastly, there are three levels of PA that categorize populations; low, moderate and high.

2.3 Physical Activities of Women Adults

Many research findings indicated that women are more inactive than men (Genç, et al., 2011; Savcı et al., 2006; Öztürk, 2005; Vatansever et al., 2015). For instance, according to the study of Savcı et al. (2006) and Öztürk (2005) which are related with the PA level of university students', male student's PA level is significantly higher than female students. According to Vatansever et al.'s (2015) study, middle aged male participants' PA level is statistically higher than women participants'. Lastly, Genç et al. (2011) study also found that there is a statistically significant difference between PA level of young men and women participants' and men participants' PA level is higher than women.

Certainly both outdoor and indoor designs of the house affect the level of activity of women. However, domestic environment is so vital for women because most women spend much time in their houses with doing the IADLs like; housework (cooking/cleaning/ laundry, etc.). Most older women adults spend between 80% and 90% of their time indoors at home (Ahrentzen & Tural, 2015). So, indoor environment should be taken into account accordingly for making women being more active. Therefore, the house design and environment are so vital for women as well as their PAs. Women could be more physically active through doing domestic activities since there is considerable energy consumption in domestic activities. According to Grandjean (1973: 15), "domestic energy consumption is thus comparable with a moderately hard occupation outside the home, particularly heavy calls upon energy being made when making beds, scrubbing and washing floors, cleaning windows, ironing and going up and down stairs". Also, Grandjean

(1973) stated that many researchers agreed that housewife's working hour is very long starting from morning (7 a.m.) to evening (9 p.m.) hours. Women in working outside spend much less time than working in the house however; their total working hours per week is much more than a housewife (Grandjean, 1973). Therefore, they need a professional person or a helper as a close relative (their daughter or, mother/mother in law) for the household and childcare activities (if they have little child/children). According to the Committee on Physical Activity, Health, Transportation and Land Use (2005), PA associated with housework (time spent housework and other moderate-level activities) is on the decline because of changes like increasing women in labor force and technology improvements in the houses. Furthermore, systematic review of Mackay, Schofield & Oliver (2011) emphasized that women with young children (aged 1-5 years) are not so active than women who have no children.

In the study of Dabrowska, et al. (2015), the PA level of 400 healthy midlife menopausal Polish women in various domains were analyzed. The study by Dabrowska et al. (2015) found that - based on the result of IPAQ long form (IPAQ-L), PA (in four different domains; work/active transportation/domestic and garden/leisure time) level of most 400 midlife women is moderate PA level. The study also specified that in domestic and gardening domains; the PA level of women was found overly moderate (n=173, 51.48%), and the high level (n=78, 23.21%) was less than other levels (low=85, 25.3%). According to results of Dabrowska et al.'s (2015) study, there was a correlation between the PA level-domestic and gardening domain (low/moderate/ vigorous) and body mass index (BMI)- (normal body mass/overweight/obese) of the midlife women. Also, this

study supports the idea of women could be active not only in their leisure time but also in everyday activities such as commuting to work, housework and gardening. Another study related to PAs among women was conducted by Brownson, Eyler, King, Brown, Shyu & Sallis (2000), they analyzed the PA patterns and the correlations among different PAs (no leisure, regular activity, vigorous activity, occupational activity, housework and composite) and socio-demographic and behavioral intentions of 40 years and older U.S. women.

This chapter defined and emphasized the importance of PA and active design in individual's life with indicating previous studies. Additionally, domestic environment's significance on women's PA was indicated. The domestic activities in daily life were explained in BADL, IADL and LAs. Also, measurements criteria of PA level were explained. In the next chapter, the design characteristics of specific domestic spaces as (kitchen, bathroom, corridor, staircase, garden/terrace and multi spaces) and their elements will be analyzed with respect to enabling or preventing PAs of women adults.

CHAPTER III

DOMESTIC ACTIVITY SPACES AND DESIGN CHARACTERISTICS OF EACH SPACE AND THEIR ELEMENTS

Enabling the house to encourage active building between women adults is also essential. Residential type is another crucial part of the enabler PA. Another spatial structure of contributing AL is dwelling size; larger homes required with taking more steps per day and it means more steps including exercise as represents AL (Ahrentzen & Tural, 2015). Also, when analyzing the characteristics of two types of the residential building in detail; size, number and type of room should be determined and measured. Moreover, PA spaces like corridors (variety of corridors, length of corridors, corridor design, location and proximity of rooms), bathroom, kitchen etc., should be analyzed as the floor plan characteristics of the houses (Bjornsdottir, Arnadottir & Halldorsdottir, 2011). In this study, kitchen, bathroom, corridor, staircase, garden and terrace and multi spaces were analyzed in detail with their design recommendations according to determine negatively affecting design characteristics of each spaces.

3.1 Kitchen

Many women spend much of their daily time in kitchen and they encounter several accessibility problems in their kitchen utilization. This situation affects their kitchen activities negatively and anticipates them from kitchen. So, a kitchen should be well designed while taking into consideration issues such as comfort, accessibility of the users as well easily adjustment of domestic appliances, storage and cabinets. In addition, adequate spaces should be provided for all types of kitchen activities. Also, Joyce & Swift (1988) emphasized that as priorities in kitchen design, layout of kitchen should need to be decided accordingly the basic work triangle. The work triangle was explained as "the key to any efficiently designed kitchen is its 'work triangle'. This is the logical inter-relationship of the cook's three main aids: the cooker, the refrigerator and the sink" (Joyce & Swift, 1988: 14) (see Figure 1). Moreover, location of cabinets and storage is other important design characteristics for enhancing PA in kitchen. According to Maguire, Peace, Nicolle, Marshall, Sims, Percival & Lawton (2014) study about older people's ergonomic problems in kitchen, it is recommended that storage space should be at an appropriate height and also adjustable wall cupboards and open storage items are suitable.

In the literature, it is recommended that kitchen design should be considered with the spatial and storage requirements accordingly with the relevant activities (Demirkan & Kutlusoy, 1998; Grandjean, 1973). The findings of Demirkan & Olguntürk's study (2014) pointed out that in order to ease use of kitchen appliances; all the appliances with applicable sizes should be fixed with a space providing for approach, reach,

manipulation and use. The size of a kitchen is another important issue for efficient kitchen activities. Women commonly desire a larger size of kitchen even if they have a standard size kitchen. According to Demirkan and Kutlusoy (1998) the existing size of the kitchen of the participants has a significant effect on the demand of a larger kitchen. The result of their study showed that 66 out of 100 respondents indicated that they desire to have a larger kitchen although 54 of them had a kitchen greater than 8-meter squares that is the minimum space requirement according to Grandjean (1973). Moreover, the kitchen layout affects user's utilization. The basic layout types are; one-sided, two-sided, L -shaped, U-shaped and aisle (see Figure 1).
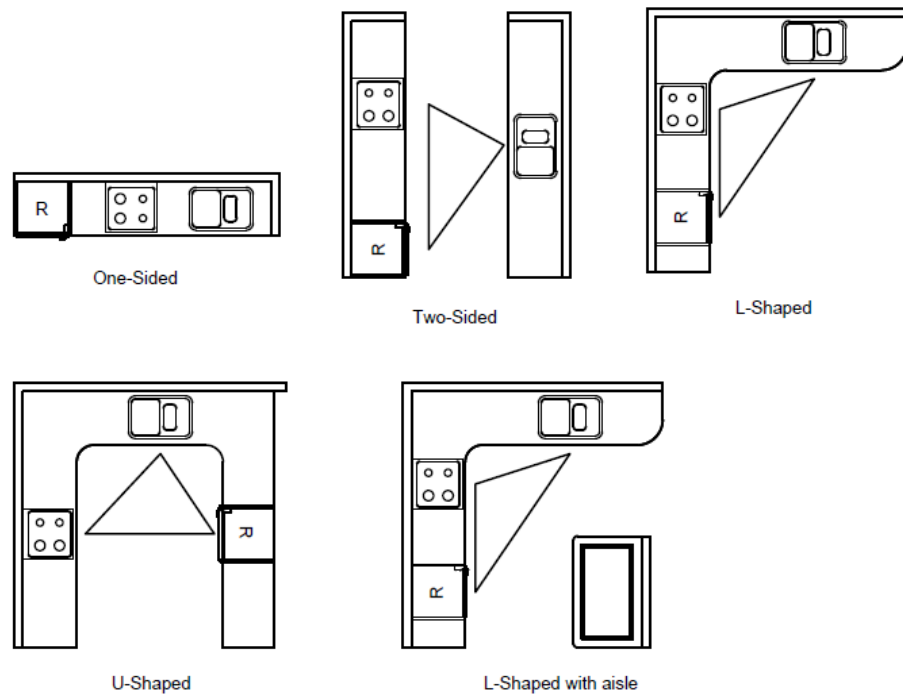
Figure 1. Sketch Drawings of Kitchen Layout Types (drawn by author, 2016).

Proper design of working areas is another significant issue for efficient kitchen activities. Grandjean (1973) stated that, in the kitchen the arrangement of work

stations from 'left to right in the order: sink- main work surface- oven- somewhere to put things down' has to be provided for efficient work without needless movements. According to scientific research, the recommendation for the frontal length of the main working surface is minimum 80 cm and desirable is 100-120 cm. Another design characteristic in kitchen is height of reach; according to Grandjean (1973:148) "the most convenient height of reach- which lies between 65 and 150 cm from the floor-extends only the lowest shelf of the upper cupboard and to the front half of the top shelf of the lower cupboard".

According to Demirkan & Kutlusoy's (1998) study, there is no significant effect of age on the performance of housewives'. Yet, they stated that further analysis indicated that the older the housewife is, she does more kitchen activities. In this study, kitchen floor area, frontal length of main working area, height of reach, cupboard space, location of cabinets and storage, location of sink, location of domestic appliances, layout of kitchen are the design characteristics that are analyzed if they affected negatively or not on the PAs of women adults.

3.2 Bathroom

The bathroom is one of the significant space of the house because of involve relaxing and some PAs of daily living like of washing, brushing teeth, performing ablution etc. So, the functional efficiency of bathroom is vital for those activities. The location of a bathroom is a significant issue that affects the bathroom activities. According to Grandjean, (1973) location of bathroom should be entered, straight

from the corridor and provide entrance to adults' bedroom. If bathroom is used also for laundry activities, the floor area is a critical issue to be considered while analyzing the activities. Therefore, if there is a laundry activity, the bathroom should be larger than an ordinary bathroom to provide area for washing machine, direr and storage for dirty clothes (Grandjean, 1973). The location, dimension and design of fixtures and fittings are another significant issue for bathroom activities. For instance, according to Brookfield et al.,'s (2015) study introduce older people's difficulty into activities like washing which is one of the BADL in domestic environments

In ergonomic researches, there are basic recommendations for washbasin, bath and toilet. For instance, Pheasant & Haslegrave (2006; 190) stated that:

The criteria are relatively simple: it should be possible to wet the hands without water running down to forearms and bending should be minimized. Hence, a basin rim that is at about the elbow height of a short user would be appropriate (5th %ile woman: 930 mm unshod).

In addition, they stated that (2006:189) "The width of the bath must at least accommodate the maximum body breadth of a single bather (95th ile man: 580 mm)." In this study, location, dimension and/or design of toilets, washbasin and baths/showers that affect negatively individual's PA in a bathroom (usually use) are considered.

3.3 Corridor

According to The City of New York, *Active Design Guidelines* (2010: 68), "the circulation system provides opportunities for walking, the most popular type of physical activity." Corridor is part of the circulation system of building and has a relationship between indoor walking.

In the literature, there is limited research about the indoor corridor and its relation to PAs in domestic environment. Most of the researches about corridors are related to promoting older people for indoor walking in retirement communities. To illustrate; in the study related with the retirement communities' circulation paths by Kerr, Carlson, Sallis, Rosenberg, Leak, Saelens, Chapman, Frank, Cain, Conway & King (2011), there is a negative association among number of corridors and sedentary time, it means that number of indoor corridors increase sedentary time of older people decrease. In this study, length and width of corridors, the location and proximity of rooms of the corridors are analyzed in domestic environment.

3.4 Staircase

The other circulation system of building element is staircase. In literature, there are many studies about promoting staircase using in public buildings for instance in study of The City of New York's (2010) *Active Design Guidelines*, there are several strategies of increase staircase use. PA could be incorporated into daily activities in

indoor of the buildings through use of design strategies that encourage stair use (Agarwal et al., 2011, The City of New York., 2010; Zimring et al., 2005). Use of staircase could be hinder when considering the health condition of older adults and could restrict their everyday activities inside the house to a single floor because they could avoid using staircase (Brookfield et al., 2015) but using of staircase provide real benefits of their health conditions (Wells et al., 2007; Zimring et al., 2005) as well as increase their PA level. However, locating staircase visible from the main entrance could associate with decrease sedentary time. Therefore, stair using could reduce if its settlement is in complicated locations (Wells et al., 2007). According to Brookfield et al. (2015:7) "the tread, rise and number of steps; handrails, lighting and landings; and pitch and orientation of stairs (straight, spiral etc.) provided particularly important". In this study, the relationship PA and some design characteristics of staircase such as; dimension of tread and rise, number of steps, handrails, and proximity of the building entrance, material and type were analyzed in detail as well as amount of time for staircase using.

3.5 Garden/Terrace

Garden and terrace activity could be included as LAs of domestic environment and could have a relationship with enhancing well-being. In literature, there are studies that analyze the relationship between garden work and well-being of older adults. However, there are limited studies that analyze the impact of garden/terrace work on PA level of adults. Actually there could be positive association between garden work and PA level because garden/terrace work requires moderate or vigorous intensity

activities. According to findings of Dabrowska et al.'s (2015) study in different

domains, in gardening domain, 23.21% of women have a high PA level.

In this study, the association among PA and location/area/design of garden/terrace

and daily duration of garden/terrace activities (moderate intensity activities like;

irrigating, raking etc.,) were analyzed and compared for single ad multi storey

houses' participants in detail.

3.6 Multi Spaces

Multi spaces of domestic environment included the LAs such as watching TV,

reading, using the computer etc., and IADLs like cleaning the house. LAs in

domestic environment are generally conducted in living room. Especially in evening

time, the living room becomes the focal point for LAs and watching TV is the

dominant activity in those hours (Grandjean, 1973). In Turkey, living room is the

space that is used for entertainment of guests as well as for daily activities of the

Turkish family members (Demirkan & Kutlusoy, 1998). In today's world, family

members play video games in living room, as well. However, other spaces like

bedroom, balcony etc., of the domestic environment could also include as the spaces

of the LAs which require SB.

In this chapter, the specific domestic activity spaces and design characteristics of

each space and their elements were determined with emphasizing some ergonomic

recommendations. In addition, analyze the how those spaces and elements could promote women for more AL in domestic environment. The next chapter will be related with the aim and method of the study. The aim of the study will be explained with research questions and hypotheses. The method will be analyzed with participants, settings, the stages and instruments of the study.

CHAPTER IV

METHODOLOGY

This chapter includes the aim of the study with the related research questions and hypotheses to be tested. Also, the method of the study is explained with the participants, selected setting and research instruments. Furthermore, the three stages of the study are explained in detail.

4.1 Aim of the Study

This study explores the design characteristics of domestic environments that either enable or prevent the domestic PAs of women adults. The aim of the study is to determine the design characteristics that enhance the domestic PA of women adults in each space of the single and multi storey houses in addition to evaluating the relationship between home-based physical activities and PA level of young and middle age women adults.

4.1.1 Research Questions

1. Is there any difference in the level of physical activities of women adults in

    single and multi storey houses?

2. What are the consequences of design characteristics for enabling or preventing

    domestic physical activities of women adults?

4.1.2 Hypotheses

1. Designed spaces' characteristics have a significant impact either in enabling or

    preventing on the domestic physical activity level of women adults.

2. There is a difference in the level of physical activities of women adults in

    single and multi storey houses.

4.2 Method of the Study

This study consisted of three main stages (see Figure 2). In the first stage, the basic

activities of daily living (BADLs), instrumental activities of daily living (IADLs) and

leisure activities (LAs) of young and middle aged women in single and multi storey

houses were identified. The second stage consisted of two steps; firstly, the domestic

spaces (according to domestic PAs) that enable or prevent PA were categorized.

Secondly, the design characteristics of spaces (according to domestic spaces and

PAs) were categorized. In third stage, design characteristics of spaces that enable or

prevent PAs of women adults were analyzed and the design characteristics related to

each activity in each space to enhance PA level of women adults were specified.

Each activity in the related space was analyzed in terms of its weekly frequency (days) and daily duration (in minutes). In addition, the PA level of the participants was determined.
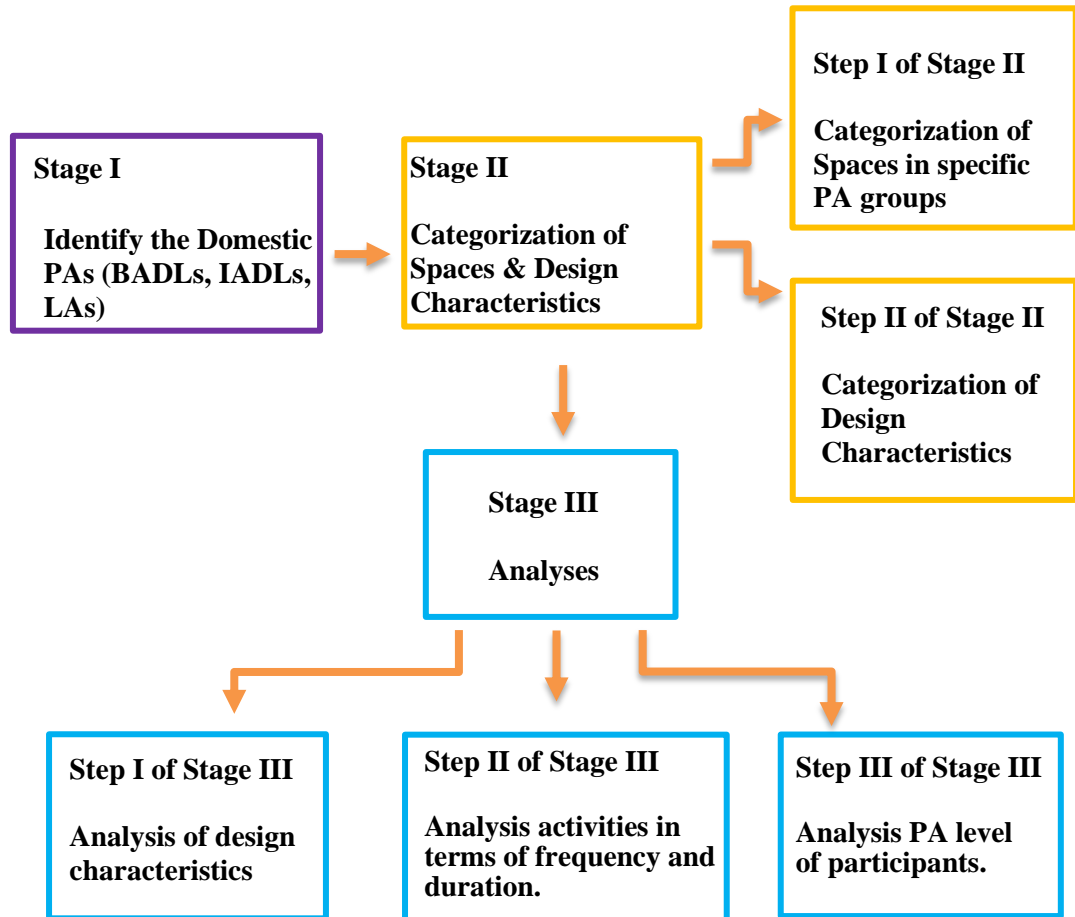
Figure 2. The Stages of the Study

After the categorization of the stages, it is important to analyze in detail of stage II that consists of 2 steps. Firstly, Step consists of the categorization of design spaces according to the domestic activities' (see Figure 3).

BADLs
- Bathing (Bathroom)
- Personal Hygiene (Bathroom)

IADLs
Indoor walking (Corridor)
Climbing stairs (Staircase)
Housework
- Cooking (Kitchen)
- Kitchen activities (Kitchen)
- Cleaning (Multi spaces)
Childcare activities
- Feeding (Kitchen)
- Bathing (Bathroom)

LAs
- Watching TV
- Reading   (Multi spaces)
- Using the computer
- Garden/terrace activities (Garden/terrace)

Step I of Stage II

Categorization of spaces in specific PA groups

Kitchen
Bathroom
Corridor
Staircase
Garden/Terrace
Multi Spaces

Figure 3. Step I of Stage II

Step II is related with the categorization of design characteristics of the spaces and

its elements. These were categorized after the classification of spaces. Also, the

domestic activities of women were considered while determining (See Figure 4).

Stage II Step II: Design Characteristics of Spaces and Elements			
Kitchen • Frontal length of main working area • Height of reach • Cupboard space • Location of cabinets and storage • Location of sink • Location of domestic appliances • Layout	**Bathroom** • Location, dimension, design of toilets • Location, dimension, design of washbasin • Location, dimension, design of baths/shower	**Corridor** • Length of corridors • Width of corridors • Location of corridors • Proximity of rooms	**Garden/ Terrace** • Location • Area • Design

Staircase
- Dimension of tread and rise
- Number of steps
- Handrails
- Proximity of the building entrance
- Material
- Type

Figure 4. Step II of Stage II

4.2.1 Settings of the Study

In this study, there are two types of houses; single (n=60) and multi storey (n=60). The location of the houses was not concerned because the study focused on only indoor environmental features and immediate surroundings of the houses included garden or terrace.

Single storey houses are generally in apartment flat or in site. The total floor area of houses is 60 m^2 to 330 m^2, type of house is categorized from two bedrooms to

five bedrooms, the corridors number include none to three, layout of kitchen is observed as one sided, two sided, L and U shaped and few houses detected that have a garden.

Multi storey houses are either in an apartment flat or villa. The total floor area m^2 range is 100 m^2 to 520 m^2. Type of multi storey is observed as 2-storey, 3-storey, 4 storey with having three bedrooms to six bedrooms. Corridors are analyzed with numbers as one corridor to three corridors, layout of kitchen is observed as one sided, two sided, L-shaped and U-shaped and the type of staircase is straight, L and U shaped, curved and spiral and lastly, having garden and/or terrace and having both garden and terrace is observed in multi storey houses.

4.2.2 Participants

The study was conducted with 120 young and middle-aged (19-64 years) Turkish women adults who were not using any assisting devices. Equal number of participants was selected from single or multi storey houses. Cluster sampling method was used for choosing the participants. "Cluster sampling is a probability sampling procedure in which elements of the population are randomly selected in naturally occurring groupings (clusters)" (Daniel, 2012:151). (The Following section presents demographics of participants in detail.)

4.2.3 Instruments of the Study

Two sets of survey were prepared for both single and multi storey houses. There were additional items and questions in 'Multi Storey House Type Survey'. The questionnaire was first established in English and translated into Turkish and complete Turkish version of the survey was then back translated into English. The instruments of the study consisted of; the observation sheet, the semi structured interview, the questionnaire and the International Physical Activity Questionnaire -Short Form (IPAQ-S)- Turkish translation (see Appendix A and B).

Firstly, *the observation sheet* includes two sections; first section consists of questions related to the personal information of the participants; age, education level, marital status, employment status, having a young- child at age range 1-5 or not. Second section is related with the physical features of single or multi storey domestic environment such as; total floor area of house, type of house, number of corridors, type of staircase, total floor area of kitchen and bathroom, layout of kitchen, having garden/terrace or not (see Appendix A and B).

Secondly, *the semi-structured interview* comprehends 15 questions based on the home-based activity spaces; kitchen, bathroom, corridor, multi spaces, staircase (if it is multi storey house type), garden and/or terrace and their design characteristics if they are affected negatively or not on domestic PAs of women adults. In this study qualitative content analysis technique, which is "one of the

numerous research methods used to analyze text data" (Hsieh & Shannon, 2005: 1278), was used. Responds and comments of participants in the semi-structured interview were categorized. The comments of participants on design characteristics of spaces' ergonomic features are affected negatively their PA or not were analyzed manually. And the highest count of comments was determined.

Thirdly, *the questionnaire* was designed to find out the amount of time participants spent while being physically active in doing the basic activities of daily living (BADLs- bathing, eating, personal hygiene etc.,), instrumental activities of daily living (IADLs- cooking, housework, childcare activities if having a young-child or children at aged 1-5 and leisure activities (LAs- watching TV, using computer etc.) in the last 7 days in their house. The questionnaire has two sections; first part includes four questions about the time participants spent doing general activities such as; housework, childcare or LAs in last 7 days inside their house. Second section, includes ten questions about the time participant spent while doing domestic activities in spaces such as kitchen, bathroom, circulation areas (corridor and staircase) and garden/terrace. The questionnaire was prepared accordingly to the IPAQ questioning format (see Appendix A and B).

Lastly, *The International Physical Activity Questionnaire (IPAQ) - Short Form (IPAQ-S):* version August 2002 (IPAQ, www. ipaq.ki.se) Turkish translation (see Appendix A) was used. According to IPAQ Research Committee (2005), the aim of the IPAQ questionnaires is contributing researchers to common

instruments because they provide universal and comparable data on health-related PA. The reason for using the IPAQ in this study was to categorize the PA levels and sitting time (sedentary behavior) of women adults. Six questions were asked to the participants about the amount of time they spend being physically active and last question is about the time spent sitting within the last 7 days. (see Appendix A and B).

The IPAQ Research Committee (2005) indicated that the data collected could be reported as a continuous score. Also, the IPAQ-S items arranged to deliver separate scores for walking, moderate-intensity activity and vigorous intensity activity. The IPAQ Scoring Protocol Short Forms (The IPAQ Research Committee, 2005:13) stated that these activities calculate with the specific MET levels; "(walking=3.3 METs, moderate intensity= 4.0 METs, vigorous intensity= 8.0 METs, expressed as MET-in per week: MET level x minutes of activity/day x days per week)". "Metabolic Equivalent of Task (MET): A unit used to estimate the metabolic cost (oxygen consumption) of physical activity" (Committee on Physical Activity, Health, Transportation and Land Use, 2005). The total score involves summation of the duration (in minutes) and frequency (days) of those activities. Yet, the sitting time question does not include in this calculation, it needs to be calculated separately. Assessment of the all activities requires that each activity include at least ten minutes at a time. There are three levels of PA categorization these are; low, moderate and high, and those categories include several requirements (IPAQ Research Committee, 2005).

CHAPTER V

FINDINGS

In this chapter, the findings related to demographic characteristics of the participants and the physical features of the houses are presented. Then, a qualitative analysis of the negatively affecting design characteristics of spaces and their elements is conducted. Frequency and duration of domestic activities namely as BADL, IADL, and LAs in each space are analyzed. Then, the low, moderate and high activity levels of participants are calculated. Also, the sitting times are found and compared for each participant live in different house types. In the second section, PA level of participants are analyzed. Then the correlation analysis of among the specific PAs and PA level and correlation of the PAs and design characteristics in each space are analyzed. In the last section, a comparison of PA distribution in single and multi storey houses is done. Lastly, the comparison of PA levels of participants in two types of houses tested.

Statistical Package for the Social Sciences (IBM Corp. SPSS 19 version) was used to analyze the data and graphics were produced by Microsoft Word, version 2016. The statistical methods included descriptive statistics, the two-sample *t*-test, regression

and correlation analyses. Besides, the qualitative content analysis technique is used to categorize and analyze the semi-structured interviews and participants' comments.

5.1 Quantitative Analysis

5.1.1 Demographic Characteristics

The young and middle aged women adult were classified between the age range of 19-64 years that were titled by the Department of International Economic and Social Affairs (1982). The mean age of women adults in this study was 38.73. Also, the mean age of participants from single storey house was 37.75 and for multi storey was; 39.71. The highest count was obtained for university graduates (single storey house participants; n=33, 55.0%, multi storey participants; n=37, 61.7%), the following highest amount were found for high school graduates (single storey house participants; n=12, 20%, multi storey house participants; n=10, 16.7%), and not employed participants were seen (single storey house participants; n=41, 68.3%, multi storey house participants; n=42, 70.0%) (see Table 1).

Table 1. Demographic Characteristics of Participants (n=120)

Characteristics	Single Storey Houses (n=60)		Multi Storey Houses (n=60)	
	Frequency	Percentage	Frequency	Percentage
Age (years)				
19-24	19	31.7	11	18.3
25-44	21	35.0	22	36.7
45-64	20	33.3	27	45.0
Marital Status				
Single	30	50.0	27	45.0
Married	30	50.0	33	55.0
Education Level				
Primary School	6	10.0	4	6.7
Middle School	1	1.7	1	1.7
High School	12	20.0	10	16.7
University	33	55.0	37	61.7
Master Degree	7	11.7	7	11.7
Doctoral Degree	1	1.7	1	1.7
Employment Status				
Yes	19	31.7	18	30.0
No	41	68.3	42	70.0
Having Young Child/Children				
Yes	10	16.6	4	6.6
No	50	83.3	56	93.3

5.1.2 Physical Features of the Houses

The total floor area of single storey houses' is commonly between 100-199 m^2 (n=43, 71.7%) with three-bedroom houses (n=34, 56.7%) and having one corridor (n=38, 63.3%) are seen mostly. The floor area of the kitchen is typically greater than 15 m^2 (n=34, 56.7%) and the bathroom is greater than 5m^2 (n=57, 95.5%). One sided

kitchen layout is generally seen (n=30, 50%) and only seven single storey houses have a garden (11.7%) (see Table 2).

In multi storey houses, total floor area is frequently between 200-299 m^2 (n=23, 38.3%), two-storey houses are mostly seen (n=40, 66.7%) with five bedrooms (n=23, 38.3%), and generally having one corridor at each storey (1st floor; n=35, 58.3%, 2nd floor; n=33, 55.0%, 3rd floor; n=8, 13.3%), connected with a curved shaped staircase (n=17, 28.3%). The floor area of kitchen is typically greater than 15 m^2 (n=39, 65.0%) and the bathroom is greater than 5 m^2 (n=55, 91.7%). L-shaped (n=16, 26.7%) and one sided (n=15, 25%) kitchen layouts are mostly preferred. Many of the two-storey houses have a garden (n=26, 43.3%) some have a terrace (n=11, 18.3) and 22 multi storey houses have both garden and terrace (36.7%) (see Table 3).

Table 2. Physical Features of Single Storey Houses (n=60)

	Frequency	Percentage
Total floor area (m^2)		
60-99	10	16.7
100-199	43	71.7
200-299	6	10
300-330	1	1.7
Types of house		
Two bedroom	6	10.0
Three bedroom	34	56.7
Four bedroom	19	31.7
Five bedroom	1	1.7
Number of corridors		
No corridor	2	3.3
One corridor	38	63.3
Two corridors	19	31.7
Three corridors	1	1.7
Kitchen (x= area in m^2)		
x < 10	7	11.7
10 ≤ x < 15	19	31.7
15 < x	34	56.7
Bathroom (x= area in m^2)		
x < 5	3	5.0
5 ≤ x	57	95.5
Layout of kitchen		
One sided	30	50.0
Two sided	13	21.7
L-shaped	14	23.3
U-shaped	3	5.0
Having a garden		
Yes	7	11.7
No	53	88.3

Table 3. Physical Features of Multi Storey Houses (n=60)

	Frequency	Percentage
Total floor area (m^2)		
100-199	20	33.3
200-299	23	38.3
300-399	7	11.7
400-520	10	16.7
Type of Multi Storey		
Two-storey	40	66.7
Three-storey	17	28.3
Four storey	3	5.0
Types of house		
Three bedroom	13	21.7
Four bedroom	13	21.7
Five bedroom	24	40
Six or more bedroom	10	16.7
Number of corridors (1st floor)		
No corridor	21	35.0
One corridor	35	58.3
Two corridors	3	5.0
Three corridors	1	1.7
Number of corridors (2nd floor)		
No corridor	25	41.7
One corridor	33	55.0
Two corridors	2	3.3
Number of corridors (3rd floor)		
No corridor	12	20.0
One corridor	8	13.3
Two corridors	1	1.7
Missing	39	35.0

Table 3. (cont'd), Physical Features of Multi Storey Houses (n=60)

	Frequency	Percentage
Kitchen (x=area in m^2)		
x < 10	9	15.0
10 ≤ x < 15	12	20.0
15 < x	39	65.0
Bathroom (x=area in m^2)		
x < 5	5	8.3
5 ≤ x	55	91.7
Layout of kitchen		
One sided	15	25.0
Two sided	11	18.3
L-shaped	16	26.7
U-shaped	11	18.3
Type of staircase		
Straight	11	18.3
L-shaped	9	15.0
U-shaped	11	18.3
Curved	17	28.3
Spiral	12	20.0
Having a garden /terrace		
Garden	26	43.3
Terrace	11	18.3
Both Garden and Terrace	22	36.7

5.1.3 Home-Based Activity-Duration Analysis

In order to analyze if there is a significant difference or not in the amount of time
spent for each domestic activity in single and multi storey houses, the two-sample
independent *t*-test was done. Based on the result of *t*-test, there is no significant

difference in the amount of time spent for many of the activities conducted in single and multi storey houses. Thus, significant difference was found in the amount of time spent in doing housework (min. /day) as IADL and bathing activity as BADL in single and multi storey houses (see Appendix C, Table 16).

Consequently, there is a significant difference in the one of the IADLs called 'housework (min. /day)' duration in two types of houses at the alpha value is 0.05 level ($p= 0.032$, $t= 2.718$, df=92). The mean difference of time spent for doing housework is 42.720 min. between the two types of houses. In single storey houses, 51 participants out of 60 responded this question (M=167.25 min.) others chose 'No housework activity'. In multi storey houses, 43 participants responded (M=124.53 min.), 17 participants chose 'No housework activity' (see Table 4 and Appendix C, Table 16).

Secondly, there is a significant difference in one of the BADL called 'bathing (week/day)' duration in two types of houses at alpha value 0.05 level (p=0.000, t= -3.816, df=118). All participants (n=120) answered that question, the mean time spent for bathing activity is -1.217 min. higher in multi storey houses (see Table 4 and Appendix C, Table 17).

Although, the mean time for the activities called 'indoor walking in corridors', leisure time activities' and 'childcare activities' are seeming to have differences as seen in Table 4, there was no statistically difference when two-sample independent *t-*

test was done. Participants who live in multi storey houses spent more time for indoor walking in corridors than the ones who live in single storey houses (single storey (M= 4.17 min.), multi storey (M= 7.17min.). Single storey house participants' spent more time in leisure activities (M=201.83 min. /day) than multi storey house participants (M=176.50 min. /day). Lastly, there is a distinction in time spent for childcare activities in two type of houses, where single storey house participants spend more time than multi storey house participants (M=45.00 min./day, M=15 min/day) (see Table 4).

Lastly, in this study, lack of PA culture among women adults was observed. Especially, middle-aged women adults realized how they were inactive in their home while answering the questions related with the activity weekly frequency and daily duration.

Table 4. Home-Based Physical Activity-Frequency Analysis   *: **NA Not Applicable**

Main Category	Activity	Mean Value (Single Storey Houses)	Mean Value (Multi Storey Houses)
(BADLs)	Bathing (days per week)	4.47	5.68
	Personal Hygiene (min./day)	43.00	52.08
(IADLs)	Cooking (days per week)	4.60	3.97
	Cooking (min./day)	95.35	89.26
	Kitchen Activities (min./day)	90.83	80.18
	Housework (days per week)	2.00	2.17
	Housework (min./day)	167.25	124.53
	Childcare Activities (min./day)	45.00	15.00
	Indoor Walking in Corridors (min./day)	4.17	7.17
	Staircase Using (min./day)	NA*	36.00
(LAs)	Watching TV, Reading, Using computer etc. (min./day)	201.83	176.50
	Garden Activities (min./day)	30.00	48.94
	Terrace Activities (min./day)	NA*	13.45
	Garden and Terrace Activities (min./day)	NA*	36.00

5.2 Qualitative Analysis of the Negatively Affecting Design Characteristics of Spaces and Their Elements

According to qualitative content analysis, generally responses were as "not affected PA negatively" so that women were pleased with the design characteristics of spaces and thought that specified design characteristics do not affect their PA negatively. However, even if the few responses, some design characteristics were found as negatively affected on PA.

According to the results of the descriptive statistics the frontal length of the main working area in the kitchen affects PA level of the participants negatively in single (18 out of 49 responses) and multi storey (18 out of 51 responses) houses. The women explained that the main working area is important for many kitchen activities for efficient work with an ease of use. The location of sink was the less negatively effecting design characteristics for PA (n=2, 3.3% for single storey houses) and no participants comment that question as negatively affecting their PA in multi storey houses. Participants generally were pleased with the location of sink/s in their kitchen and though it was not effective in their PA (see Figure 5 and Appendix C, Table 18).

Frequency (each *n*=60)	frontal length of main working area	height of reach	location of cabinets & storage	location of sink	location of appliances	layout of kitchen
Single Storey Houses	18	13	13	2	6	9
Multi Storey Houses	18	11	14	0	3	15
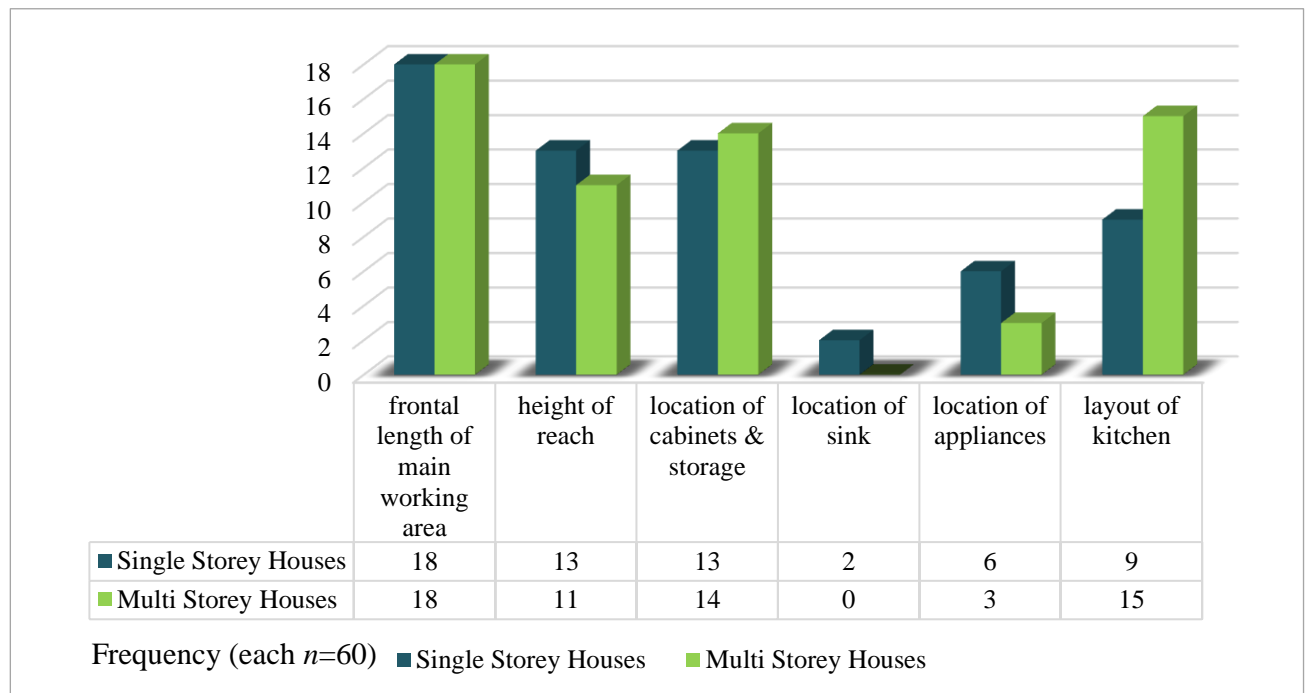
Figure 5. Graph Showing Negatively Affecting Design Characteristics of Kitchen

In bathroom, participants generally were pleased with their bathroom design characteristics (see Figure 6 and Appendix C, Table 19). Nevertheless, in single storey houses, 7 (8.3%) out of 46 responses live in single storey houses were affected very negatively by the height and width of shower/bath and general design characteristic of shower/bath. In the multi storey houses, location of shower/bath and toilet were the two very negatively affecting design characteristics for PA (n=10, 16, 7%) In multi storey houses, 10 (16, 7%) out of 49 women thought that the location of shower/bath is negatively affecting design characteristics for their PA level (see Figure 6 and Appendix C, Table 19). Also, there was a question in order to identify an issue that causes limitation in bathroom activities. In single storey houses, they stated that 'the area of bathroom is narrow' (n=8, %13.3) and the floor surface of bathroom is slippery (n=1, 1.7%), in multi storey houses, participants stated that 'the

area of bathroom is very narrow' (n=15, 25%) and 'there is a threshold at bathroom

door' (n=1, 1.7%).

Frequency (each *n*=60)	locatio n of toilet	height & width of toilet	design of toilet	locatio n of washb asin	height of washb asin	design of washb asin	locatio n of shower /bath	height & width of shower /bath	design of shower /bath
Single Storey Houses	5	4	4	0	5	2	6	7	7
Multi Storey Houses	10	2	3	5	2	2	10	5	5

Figure 6. Graph Showing Negatively Affecting Design Characteristics of Bathroom

The design characteristics of the corridor, length and width of corridor are the design

features that affect PA level negatively in single storey (9 out of 50 responses) and

multi storey (11 out of 47 responses) houses (see Figure 7 and Appendix C, Table

20). Also, they stated that 'corridors are very narrow' (n=4, 6.7%) and 'there are

some goods on the floor in corridors' (n=4, 6.7%) that influence their PA negatively.

In multi storey houses only one participants said that 'there is an illumination

problem in the corridor' (n=1, 1.7%) (see Figure 7 and Appendix C, Table 20).
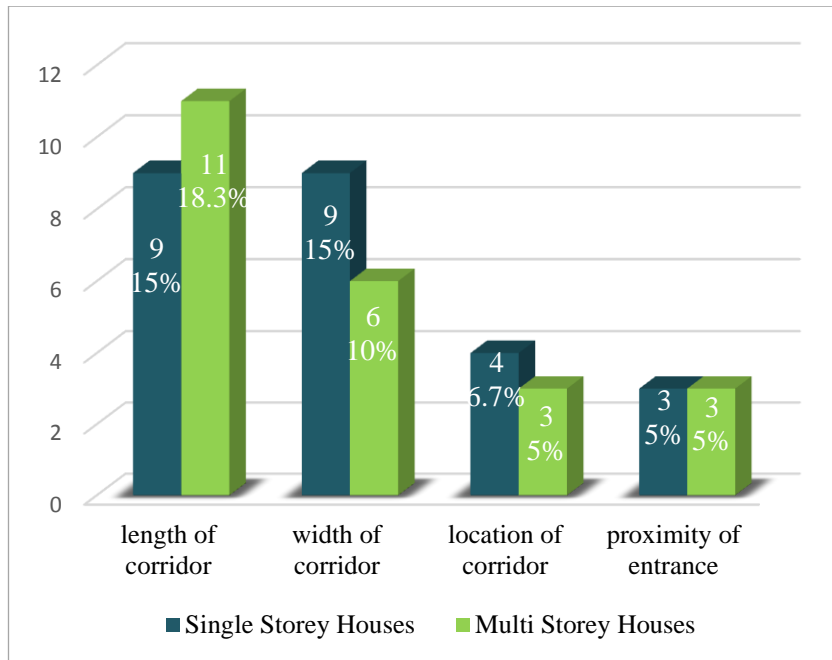
Figure 7. Graph Showing Negatively Affecting Design Characteristics of Corridor

In garden, there are no competent answers for single storey houses because only 7 participants had a garden. In single storey houses, 2 out of 7 participants said that 'the area and design of garden' affect PA negatively. In multi storey houses, 9 out of 26 participants (have a garden) answered the questions about garden. They found that, location of garden (n=5, 8.3%) affects their PA negatively (see Figure 8 and Appendix C, Table 21).
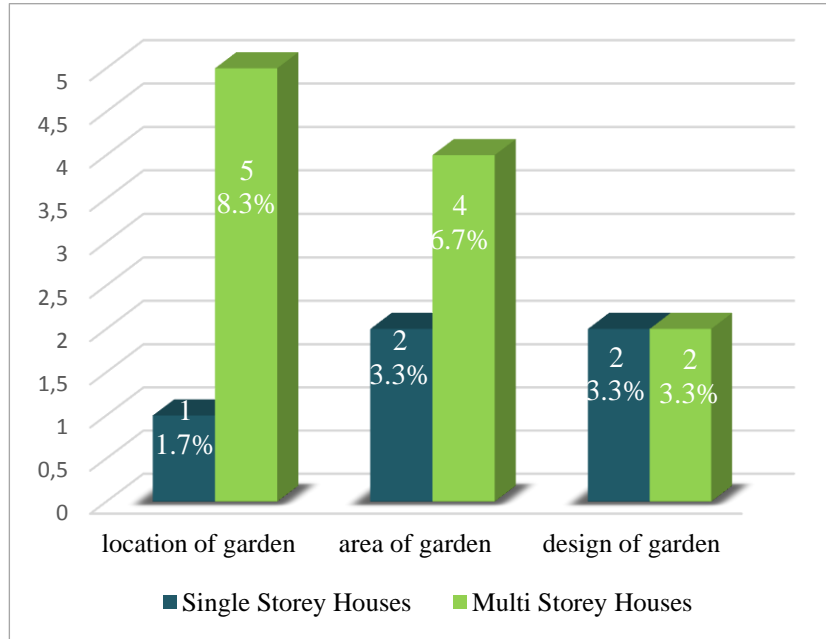
Figure 8. Graph Showing Negatively Affecting Design Characteristics of Garden

In multi storey houses, staircase design has a significant influence on PAs of women adults. In this study, the curved shaped (n=17, 28.3%) staircase is the most frequently seen type, then it is followed by the spiral shaped staircase (n=12, 20%). According to the answers of the participants in semi-structured interviews, 'dimension of tread and rise' of the staircase mainly has influence on PA negatively (n=19, 31.7%). Secondly, according to 18 participants (30%) material of staircase has an influence on PA negatively (see Figure 9). Among 18 participants, 11 stated that 'wood surface is slippery and makes sound'; and 4 participants though that 'marble is slippery.' Thirdly, type of a staircase (n=12, 20%) has a negative effect on PA. Six participants who have a spiral type of staircase said that, 'spiral type of staircase is dangerous, has a risk of falling'.
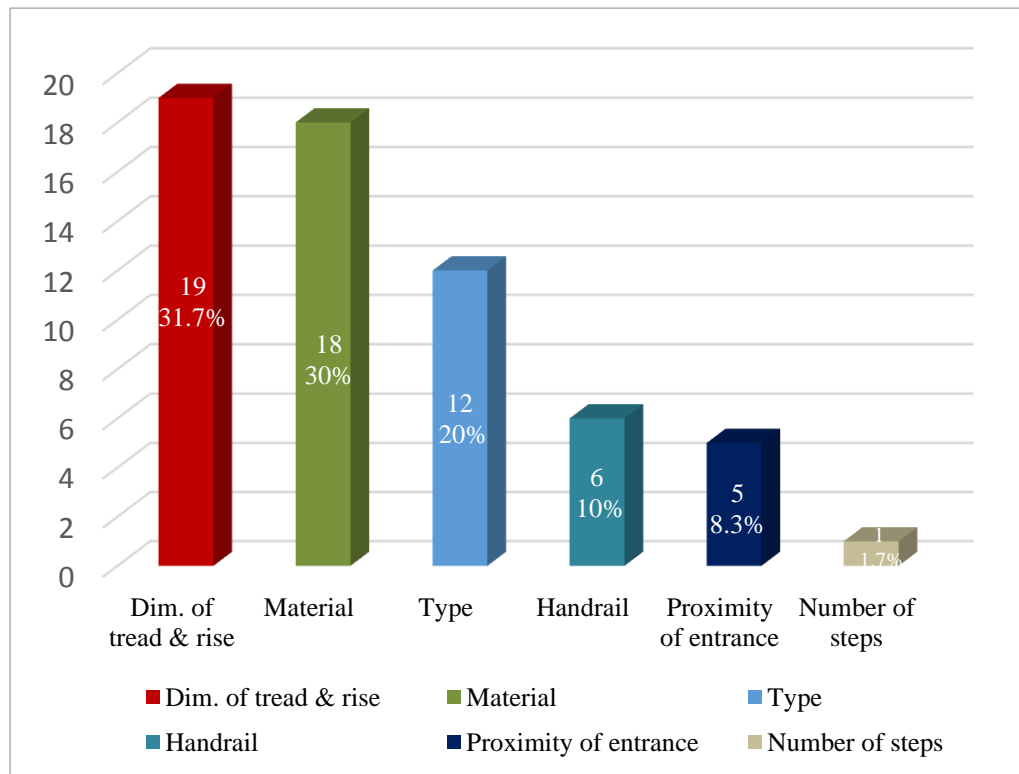
Figure 9. Graph Showing Negatively Affecting Design Characteristics of Staircase (n=60)

To summarize, in kitchen the number of participants who think that frontal length of main working area affects their PA negatively are equal in both house types (n=18 for each, see Figure 5). In single storey houses, the shower/bath's height & bathroom design are problematic. For the multi storey houses, location of toilet & shower/bath are problematic. Length of corridor is a common design characteristic for both type of houses that affect PA negatively (n=9, single storey, n=11 multi storey). Also, 9 participants in single storey houses thought that width of a corridor affects their PA negatively. In single storey houses area of garden (n=2) and for multi storey houses, location of garden (n=5) affects PA negatively. Lastly, in multi storey houses 'dimension of tread and rise' was found to influence PA negatively (n=19, 31.7%) (see Figure 10).
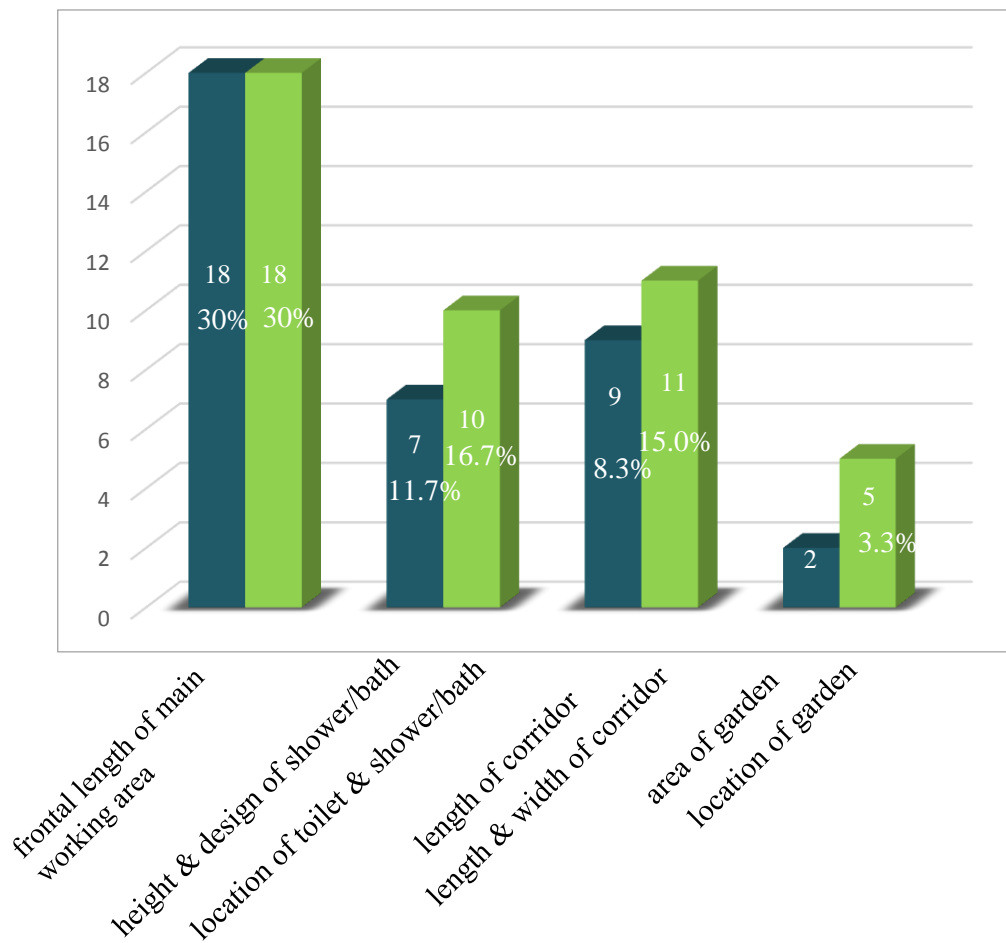
Figure 10. Graph showing Summary of Negatively Affecting Design
Characteristics of Spaces in Single and Multi Storey House

5.3 Analysis of the PA level of Participants and Sitting time

5.3.1 Analysis of the PA level of Participants

PA level of participants were analyzed by the IPAQ Scoring Protocol Short Forms
(IPAQ Research Committee, 2005). According to IPAQ Scoring results; among 120

participants, moderate PA level (57, 47.5%) were frequently seen in both house types (single storey; n=30, 50%, multi storey; n= 27, 45%) (see Figure 11). Participants were not highly active because, among 120 participants only 15 (12.5%) stated that they have high level of PA with low level was measured in 48 participants (40%).
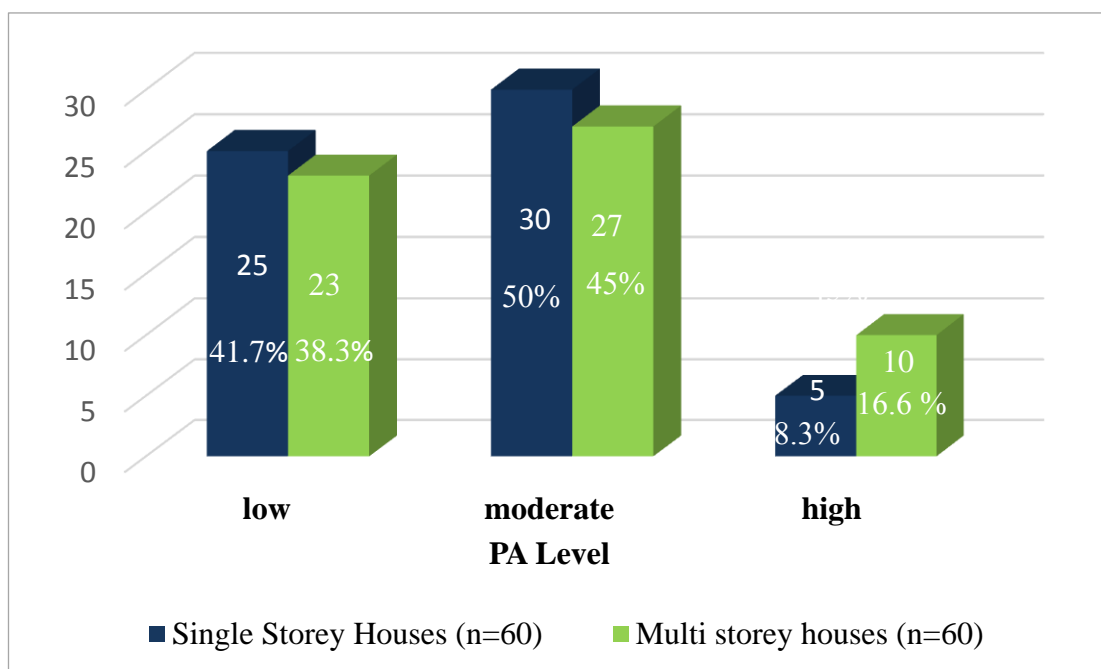
Figure 11. Differences between PA levels of participants (each n=60)

5.3.2 Analysis of Sitting Time

According to IPAQ Research Committee (2005), the IPAQ sitting question is an added indicator variable of time spent in sedentary activity and not involved as part of any summary score of PA level. Data on sitting should be described as median values and interquartile ranges.

All participants responded to this question; however 30 out of 120 women answered sitting time question as 'Don't Know/Not sure'; 10 participants from the single storey house and 20 participants from multi storey houses. Those 30 responses were reported as missing value of the data. Sitting time in median value (Md=240 min.) of single storey houses is greater than multi storey houses (Md=270 min.). It means that, sitting time (sedentary behavior) of women adults living in multi storey houses is greater than women living in single storey houses. Both values are in the second quartile (See Appendix C, Table 21-22).

5.4 Correlation Analysis of among the Home-Based Physical Activities and PA level

In this study, the daily duration and weekly frequency of activities correlated with the PA level of participants to see if some activities were more heavily correlated any of others. There is one ordinal scale (PA level as; low/moderate/high) and multi interval/ratio scale (activities in min./days, days/week) variables. Therefore, Spearman's rank-order correlation coefficient (also known as Spearman's rho), is used in order to describe an association among the variables (Argyrous, 2011). According to Argyrous (2011), the frequently accepted rule for classifying the associations; where $\lambda=0$ means there is no association between variables, $0< \lambda<0.2$ is very weak, negligible relationship, $0.2< \lambda<0.4$ means weak, low association, $0.4< \lambda<0.7$ is moderate association, $0.7< \lambda<0.9$ strong, high, marked association, $0.9< \lambda<1.0$ is very high strong relationship and lastly if $\lambda=1.0$, there is a perfect association between variables. Also, if the beginning of the number value is greater

than 0 (>0) it implies that there is a positive association among variables. However, if the beginning of the number is lower than 0 (<0), it identifies that there is a negative association between variables and also if the value is equal to 0, (=0) it means that there is no association among variables (Argyrous, 2011). Positive correlation shows that, amount of time or day spend in one activity type increase, the time spend or day for other activity increase also. Negative correlation shows that, when amount of time or day spend in one activity type increase, the time spent or day for other activity decrease.

5.4.1 Correlations among Single Storey Houses' Activities and PA level

In single storey houses, there is a positive weak, low association between cooking (days/week) and housework (days/week) (rho= .348, p=0.006) at 0.01 alpha level. Secondly, there is a negative weak association between garden activities (min. /day) and PA level of participants (rho=-.342, p=.008). Kitchen activities (min. /day) and cooking (days/week) have positive weak association (rho=.311, p=.016) at alpha value is 0.05 level. Though, there is a negative weak, weak association among walking in corridors (min./day) and housework (days/week) (rho=.271, p=.036) alpha value at the 0.05 level. Lastly, there is a positive weak association among kitchen activities (min./day) and housework (days/week) (rho=.271, p=.038) alpha value at 0.05 level (see Table 5).

Table 5. Correlations among Single Storey House Activities' and PA level

Activity Category	Among Activities	Spearman's rho	p	N (60)
IADL	Cooking (days/week) * Housework (days/week)	.348**	0.006	60
	Kitchen Activities (min./day) * Cooking (days/week)	.311*	.016	59
	Kitchen Activities (min./day) * Housework (day/week)	.271*	.038	59
	Walking in Corridors (min./day) * Housework (days/week)	.271*	.036	60
LAs	Garden activities (min./day) *PA level	-.342**	.008	60

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

5.4.2 Correlations among Multi Storey Houses' Activities and PA level

In multi storey houses, based on the results of the Spearman's rho correlation, there
is a positive moderate association between cooking days per week and housework
days per week (rho= .538, p=0.000) at 0.01 alpha level (Range 0.4-0.7). Similarly,
there is a positive moderate association among kitchen activities (min./day) and
cooking (min./day) (rho=.445, p=.001). Also, there is a positive moderate correlation
among cooking days per week and housework minutes/day (rho= .436, p=0.003) at
0.01 alpha level (2-tailed). Additionally, the association among leisure time activities
(min./day) and childcare activities (min./day) is negative and weak (rho=-.296,

p=.022) at the 0.05 level (2-tailed). Lastly, there is a positive and weak association among using staircase (min./day) and kitchen activities (min./day) (rho=.337, *p*=.013) at the 0.05 level (2-tailed) and there is also positive and weak correlation between using staircase (min./day) and PA level of participants (rho= .296, *p*=.024) at alpha value 0.05 level (see Table 6).

Table 6. Correlations among Multi Storey Houses Activities and PA level

Activity Category	Among Activities	Spearman's rho	*p*	N (60)
IADL	Cooking (days/week) * Housework (days/week)	.538**	.000	60
	Kitchen Activities (min./day) * Cooking (min./day)	.445**	.001	54
	Cooking (days/week) * Housework (min./day)	.436**	.003	45
	Using staircase (min./day) *Kitchen Activities (min./day)	.337*	.013	54
	Using staircase (min./day) * PA level	.296*	.024	58
LAs	Leisure time activities (min./day) *Childcare activities (min./day)	-.296*	.022	60

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

5.5 Correlation of the Home-Based Physical Activities and Design Characteristics in Each Space

5.5.1 In Kitchen

Correlation analysis was conducted among physical activities, design characteristics and features of a kitchen (see table 7). In single storey houses, according to the result of Spearman's rho, there is a positive strong association among- location of cabinets and storage and height of reach (rho=.869, *p*=.000) at alpha value 0.01 level (2-tailed). In multi storey houses, there is strong association among location of appliances and location of cabinets & storage (rho=.805, *p*=.000) and also among location of cabinet's storage and height of reach (rho=.802, *p*=.000) at alpha value 0.01 level (2-tailed) (See Table 7).

In single storey houses, location of cabinets and storage and frontal length of main working area has moderate association (rho=.629, p=.000) as the correlation among location of appliances and height of reach (rho=.620, *p*=.000) and location of appliances and location of cabinets and storage (rho=.620, *p*=.000) are equal and have a moderate association at alpha value 0.01 level (2-tailed). In multi storey houses, layout of kitchen (affected negatively) and frontal length of main working area (rho=.666, *p*=.000) correlation has a moderate association at alpha value 0.01 level (2-tailed) (see table 7).

Table 7. Correlations among Kitchen variables in Single and Multi Storey Houses

Single Storey Houses				Multi Storey Houses			
Correlations between variables	Rho	p	N (60)	Correlations between variables	Rho	p	N
Location of cabinets and storage * Height of reach	.869**	.000	42	Location of appliances * Location of cabinets & storage	.805**	.000	39
Location of cabinets and storage *Frontal length of main working area	.629**	.000	40	Location of cabinets storage* Height of reach	.802**	.000	45
Location of appliances *Height of Reach	.620**	.000	39	Layout of kitchen (affected negatively) * Frontal length of main working area	.666**	.000	49
Location of appliances*Location of cabinets and storage	.620**	.000	39	Location of cabinets storage* Frontal length of main working area	.544**	.000	44
Layout of kitchen (affected negatively)* Height of Reach	.505**	.000	44	Location of appliances * Frontal length of main working area	.497**	.001	39
Layout of kitchen (affected negatively) *Location of cabinets and storage	.500**	.001	42	Layout kitchen*Kitchen m²	.476**	.000	60
Kitchen m² * Cooking (days/week)	-.376**	.003	60	Layout kitchen*Height of reach	.423**	.003	46
Location of sink * Height of reach	.380*	.019	38	Height of reach* Frontal length of main working area	.389*	.011	42
Location of sink * Location of cabinets & storage	.380*	.019	38	Kitchen m²* Frontal length of main working area	.333*	.017	51
Layout kitchen * Cooking (days/week)	-.376**	.003	60				

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

5.5.2 Bathroom

In single storey houses, strong correlations are observed between shower/bath's design characteristics (see Table 8). To illustrate, there is a strong relationship among design of shower/bath and dimensions of shower/bath (rho=.883, p=.000) at alpha value 0.01 level. Moreover, dimensions of shower/bath and location of shower/bath has a strong association (rho= .855, p=.000) and design of washbasin also have a strong association with dimensions of washbasin (rho=.806, p=.000) at alpha value 0.01 level. The other strong relationship is among design of toilet and dimensions of toilet (rho=.724, p=.000) at alpha value 0.01 level.

In multi storey houses the strong correlations are differing from the single storey houses. The location of shower/bath and location of toilet has very strong relationship (rho=.931, p=.000) at alpha value .001 level. However, other relationships are either moderate or negligible. There is a moderate association between dimensions of washbasin and location of washbasin (rho=.699, p=.000) and design of washbasin and dimensions of washbasin has also moderate association (rho=.699, p=.000) at alpha value .001 level. Likewise, location of washbasin and toilet has moderate association (rho=.694, p=.000) at alpha value .001 level.

Table 8. Correlations among Bathroom variables in Single and Multi Storey Houses

Single Storey Houses				Multi Storey Houses			
Correlations between variables	Rho	p	N (60)	Correlations between variables	Rho	p	N (60)
Design of shower/bath*Dimensions of shower/bath	.883**	.000	43	Location of shower/bath*Location of toilet	.931**	.000	48
Dimensions of shower/bath*Location of shower/bath	.855**	.000	42	Dimensions of washbasin*Location of washbasin	.699**	.000	43
Design of washbasin*Dimension s of washbasin	.806**	.000	42	Design of washbasin*Dimensions of washbasin	.699**	.000	43
Design of toilet*Dimensions of toilet	.724**	.000	42	Location of washbasin*Location of toilet	.694**	.000	46
Dimensions of washbasin*Location of toilet	.698**	.000	39	Location of shower/bath*Location of washbasin	.567**	.000	45
Dimensions of washbasin*Design of toilet	.698**	.000	40	Design of toilet*Dimensions of toilet	.564**	.000	46
Dimensions of toilet*Location of toilet	.640**	.000	41	Design of toilet*Location of toilet	.543**	.000	46
Design of toilet*Location of toilet	.640**	.000	41	Dimensions of toilet*location of toilet	.483**	.001	46
Location of shower/bath*Location of toilet	.539**	.000	41	Design of washbasin*location of washbasin	.476**	.001	43

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

5.5.3 In Corridor

Corridor plays an important role in PA in indoor domestic environments, because it includes the most popular PA called walking. In single storey houses, proximity of rooms and location of corridor have a strong association (rho=.856, p=.000) at alpha value 0.01 level. Width of corridor and length of corridor (rho=.607, p=.000) have a moderate association at alpha value 0.01 level. Additionally, location of corridor and width of corridor's relationship has a low association at alpha value 0.05 level (rho= .331, p=.032). Lastly, there is a negative low relationship among number of corridors and PA level of participants (rho= -.278, p=.032) (see Table 9).

In multi storey houses, width of corridor and length of corridor (rho=.822, p=.000) third floor and second floor (rho=.802, p=.000) and third floor and first floor (rho=.738, p=.000) have strong associations at alpha value 0.01 level. Furthermore, there is a moderate association between proximity of rooms and location of corridor (rho= .640, p=.000), and between proximity of rooms of the corridor and width of the corridor (rho=.537, p=.000) at alpha value 0.01 level (see Table 9).

Table 9. Correlations among Corridor variables in Single and Multi Storey Houses

Single Storey Houses				Multi Storey Houses			
Correlations between variables	Rho	p	N (60)	Correlations between variables	Rho	p	N (60)
Proximity of rooms*Location	.856**	.000	45	Width *Length of corridor	.822**	.000	42
Width *Length of corridor	.607**	.000	48	Third floor*Second floor	.802**	.000	21
Location *Width of corridor	.331**	.032	42	Third floor*First floor	.738**	.000	21
Number of corridors *PA level of participants	-.278*	.032	60	Proximity of rooms*Location of corridor	.640**	.000	41
				Proximity of rooms*Width of corridor	.537**	.000	39

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

5.5.4 In Garden

In single storey houses, regular use of garden and garden activities (min/day) has a positive, very strong correlation at alpha 0.01 level (rho=.932, p = .000). There is a very strong relationship between having garden or not and garden activities (rho=.916, p=.000) and there is a negative low association among garden activities (min/day) and PA level of participants (rho=-.342, p=.008) at alpha value 0.01 level (see Table 10).

More participants who live in multi storey houses that have a garden than participants living in single storey houses. There is a strong relationship between area of garden and location of garden (rho=.882, p=.000) at alpha value 0.01 level. Moreover, there is a moderate association among design of garden and area of garden (rho=.481, p=.001) and between design of garden and location of garden (rho=.424, p=.006) at alpha value 0.01 level. Lastly, there is a low association among garden activities (min/day) and PA level of participants (rho= .329, p=.024) at alpha value 0.05 level.

Table 10. Correlations among Garden Variables in Single and Multi Storey

Single Storey Houses				**Multi Storey Houses**			
Correlations between variables	**Rho**	***p***	**N (60)**	**Correlations between variables**	**Rho**	***p***	**N (60)**
Using garden regularly * Garden activities (min/day)	.932**	.000	60	Area of garden*Location of garden	.882**	.000	41
Having garden or not*Garden activities	.916**	.000	60	Design of garden*Area of garden	.481**	.001	41
Using garden regularly * PA level	-.353**	.006	60	Design of garden* Location of garden	.424**	.006	41
Garden activities (min/day) *PA level	-.342**	.008	60	Garden activities (min/day) *and PA level	.329*	.024	47

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

5.5.5 On Terrace

In multi storey houses, there are moderate associations between all significant correlations: as among design of terrace and area of terrace (rho=.689, p=.001) design of terrace and location of terrace (rho=.669, p=.001) and, terrace activities (min/day) and PA level of women adults (rho=.516, p=.004) at alpha value 0.01 level. Moreover, there is a moderate association between area of terrace and location of terrace (rho= .461, p=.035) at alpha value 0.05 level (see Table 11).

Table 11. Correlations among Terrace Variables in Multi Storey Houses

Correlations between variables	Spearman's rho	p	N (60)
Design of terrace*Area of terrace	.689**	.001	21
Design of terrace*Location of terrace	.669**	.001	21
Terrace activities (min./day) * PA level	.516**	.004	29
Area of terrace * Location of terrace	.461*	.035	21

** Correlation is significant at the 0.01 level (2-tailed)
 * Correlation is significant at the 0.05 level (2-tailed)

5.5.6 At Staircase

In multi storey houses, there is a moderate association among types of staircase and dimension of tread and rise at alpha value 0.01 level (rho=.434, p=.0029). Besides, there is also a low association among handrails and dimension of the tread and rise (rho=.343, p=.028) at alpha value 0.05 level. Also, there is a low association among using staircase activity (min./day) and the dimension of the tread and rise (rho=.333, p=.017) and PA level and using staircase (min./day) (rho=.296, p=.024) at alpha value 0.05 level (see Table 12).

Table 12. Correlations among Staircase Variables in Multi Storey Houses

Correlations between variables	Spearman's rho	p	N (60)
Types of staircase*Dimension of tread and rise	.434**	.002	50
Handrails * Dimension of the tread and rise	.343*	.028	41
Using staircase (min./day) * Dimension of tread and rise	.333*	.017	51
PA level * Using staircase (min./day)	.296*	.024	58

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

5.6 Comparison of PA distribution in Houses

5.6.1 Explanation of PA Related to Partial Correlation Percentages in Houses

The association between domestic activities and PA level for both house types were investigated by using stepwise multiple regression models. Moreover, the partial correlation was considered to give precise measures of the respective influence of the independent variables (activities) on the dependent variable (PA level of participants). In this study, how much activities frequency is related with the PA level was analyzed (Argyrous, 2011).

5.6.1.1 In Single Storey Houses

In single storey houses; F-statistics for the model has a significance level of 0.043 at alpha value is 0.05 (p values $\leq .05$). The predictors (constant) are childcare activities (min/day) (β=-0.290, p= 0.043). It means that childcare activities (min. /day) are significantly related to PA level of participants (see Appendix C, Table 24). Moreover, according to partial correlation analysis; one of the LAs, the garden activities (in min.) (partial correlation= -.256, 6%, tolerance=.988) is most related with the PA level of the participants (see Table 13 and Appendix C, Table 24).

Table 13. Multiple Regression Analysis in Single Storey Houses

Activity Category	Model	Partial correlation	Tolerance	Percentage
	Housework (days/week)	.198	.999	3.9%
	Kitchen activities (min./day)	.118	.990	1.3%
IADL	Indoor Walking in corridors (min./day)	.124	.966	1.5%
BADL	Bathing (day/week)	.152	.994	2.3%
LAs	Garden Activities (min./day)	-.259	.988	6%

5.6.1.2 In Multi Storey Houses

According to the result of the multiple regression analysis, in multi storey houses; *F*-statistics for the model has a significance level of 0.008 at alpha value is 0.05 (*p* values ≤ .05). The predictors (constant) is terrace activities (min/day) (β=0.778, *p*= 0.008, α=0.05). Besides, the result of partial correlation analysis indicated that, the most related activity on PA level is cooking (days/week), it is effective as 24% (partial correlation= -0.497, tolerance= 0.947) and another related activity is housework (days/week) with 21% influence (see Table 14 and Appendix C, Table 25).

Table 14. Multiple Regression Analysis Values in Multi Storey Houses

Activity Category	Model	Partial correlation	Tolerance	Percentage
IADL	Cooking (days/week)	-.497	.947	24%
	Housework (days/week)	.459	.984	21%
	Cooking (min./day)	-.338	.931	11%
BADL	Bathing (days/week)	-.289	.844	8%
LAs	Garden activities (min./day)	-.376	.233	14%
	Garden and Terrace activities (min./day)	-.445	.192	19%
	Leisure Time Activities (min./day)	-.194	.966	3%

5.6.2 Comparison of PA Levels of Participants in Single and Multi Storey Houses

In this study, an inference is made depending on two variables that are PA level of participants (dependent variable), types of houses (independent variable). The physical activity level was valued as 1-low, 2-moderate, and 3-high. The two samples were being compared in terms of the level of PA. The two-sample t-test was

used to investigate whether there was a significant difference or not concerning the mean PA level of participants living at two different house types (see Table 15 and Appendix C, Table 26).

Table 15. Descriptive statistics for the samples

Descriptive statistics	Single Storey House PA level (n=60)	Multi Storey Houses PA level (n=60)
Mean	1.68	1.78
Standard deviation	.651	.715

The mean value for PA levels in multi storey houses is greater than single storey houses. Yet, according to result of the *t*-test, the null hypotheses is not rejected at 0.05 significance level because the *p* values $\leq$ .05 were considered statistically significant (*t*= -0.801, *p*=0.425, α=0.05). Therefore, the PA level of participants who live in single storey houses is not different than participants who live in multi storey houses at alpha level is 0.05 significant level.

CHAPTER VI

DISCUSSION AND CONLUSION

6.1. Discussion

It was assumed that designed space characteristics have a significant impact on the domestic PA level of women adults. This was analyzed by the qualitative content analysis method and was found that women adults are generally pleased with the design characteristics of specific spaces and think that the spaces are not negatively affecting their PA level. However, according to the responses, some design characteristics of specific spaces affect women's PA negatively. The frontal length of main working area in kitchen is the most negatively affecting design characteristics in both house types (see Figure 5). According to the participants' comments, the frontal length of main working area is important for cooking and other kitchen activities. Turkish females desire to have longer frontal length of main work for an ease of use (Demirkan & Kutlusoy, 1998). Related to bathroom, location of shower/bath and toilet were found as the two very negatively affecting design characteristics in the multi storey houses (see Figure 6). Related to corridors, length of corridor was to be found the most commonly negatively affecting design character in both house types (see Figure 7). Consequently, the few responses could explain the low frequency of utilitarian indoor walking among participants. There

while responding to this question that the corridors could be used for indoor recreational walking whenever they desire even when the weather condition is not suitable for outdoor walking. In multi storey houses, related to garden and terrace area, area and location of garden and the dimension of tread and rise were found to be the most negatively affecting design characteristics on PA levels of women adults.

According to the results of two-sample independent *t*-test, there was statistically significant difference in time spent in doing housework (min. /day) and bathing (day/week) in both type of houses. According to the findings of Brownson et al.'s (2000) study, there was a considerable variation in time spent at housework activity. In this study, it was also found that there was a difference in time spent in doing housework in two house types. The reason for this result could be explained by analyzing the responses of 'No housework activity', since, the number of responses as 'No housework activity' in multi storey houses are more than single storey houses. According to the rapid development of technology in domestic environments and increase in the number of employed women are the reasons for the decrease in the time spent for housework activity (Committee on Physical Activity, Health, Transportation and Land Use, 2005). It is emphasized that technology affects by diminishing our energy expenditure and the aim of the innovations is to make our life easier (Wells et al., 2007). Since, employed women spend much of their time in work rather than home (Grandjean, 1973) they generally need parental or professional guidance for doing housework. Although in this study, the number of unemployed women (83 out of 120) were greater than employed women (37 out of 120), the PA level of women adults were not high. So, there could be other reasons that affect their

housework activity as the income level, the unemployed women with high income level would use professional guidance for doing housework, as well. Moreover, having little child/children could be the reason for not having high level of PA. According to Mackay et al.'s (2011) systematic review, current evidence showed that women with young children are less active than women without children. They could be taking care of a child and have not enough time for doing housework because of the childcare activities. Moreover, there could be a reason in low activity levels of the participants of multi storey houses as the influence of the number of staircases; they could not wish to do housework for avoiding staircase use. Moreover, the difference in the total floor area of single and multi storey houses could be a reason in need of a helper for doing the housework.

The finding of the stepwise multiple regression model indicated that, in single storey houses, the percentages are less than multi storey houses. The higher value is from housework (as 3.9%). However, in multi storey houses, duration of cooking (day/week) (as 24%) and housework (min./day) (as 21%) activities are mostly related with the PA level of women adults. Moreover according to findings of correlation analysis, in single storey houses, there is a statistically positive low association between those activities (See Table 5). In multi storey houses, there is a statistically positive moderate association between cooking days per week and housework days per week (See Table 6). The reason could be the load of those activities on PA of women adults, since women spend much of their times in kitchen while cooking and also doing homework they allocate a great amount of time to these activities (Grandjean, 1973). When they do housework they could cook as well. In single storey houses, comparing daily time spent for housework activity (167.25 min. /day)

and cooking (95.35 min. /day), it is observed that women spend more time for housework activity. In multi storey houses, the time spent for housework (124.53 min. /day) is also higher than cooking activity (89.26 min. /day). However, the number of day in a week allocated to cooking is higher in both house types (See Table 4).

There is a strong association between location of cabinets and storage and height of reach for single storey house's kitchen (See Table 7). In multi storey houses, there is a strong association among location of appliances and location of cabinets and storage (See Table 7). It could be concluded that, in kitchen activities the location of appliances and cabinets have significant effect on PA level.

The strong correlations were found between shower/bath's design characteristics. Besides, in multi storey houses, location of shower/bath and location of toilet has a very strong relationship (See Table 8). The reason for this result could be described by the content analysis results where the design characteristics of shower/bath were found to be the most negatively affecting design characteristics on the PA level of women.

In single storey houses, proximity of rooms and location of corridor have a strong association (See Table 9). In multi storey houses, width of corridor and length of corridor has a strong association (See Table 9). This result indicates that among design characteristics, the corridors are effective on the PA levels of women. In multi storey houses, there is a moderate association among types of staircase and

dimension of tread and rise (See Table 12). The reason could be explained the staircase type determines the difference in dimension of the tread and rise.

Moreover, it was hypothesized that there is a difference in the level of physical activities of women adults who live in single and multi storey houses. It was found that there is no statistically significant difference between PA (the activities at work/house/yard/to get from place to place/leisure time/exercise or sport) level of women adults living at single and multi storey houses ($t= -0.801$, $p=0.425$, $\alpha=0.05$). However, according to the findings of this study using IPAQ Scoring Protocol (IPAQ Research Committee, 2005) and based on mean differences; PA levels of participants who live in multi storey houses is slightly greater than single storey houses' where low=1, moderated=2, high=3 ($M=1.78 > M=1.68$) (See Table 15). Furthermore, the result of each type of houses indicated that amount of low and moderate PA level are approximately same but moderate PA level is slightly greater than low PA level (single storey; low=25, moderate=30, high=5), (multi storey; low=23, moderate=27, high=10) (See Figure 11). The PA level analysis indicated that, 120 participants were not highly active because, only 15 (12.5%) stated that they have high level of PA and the low level value is 48 (40%), and commonly moderate level of PA were seen as 57 (47.5%). The relevant study by Dabrowska et al. (2015) also found that based on the result of IPAQ-L- PA (in four different domains; work/active transportation/domestic and garden/leisure time) level of most 400 midlife women was moderate PA level. The study (Dabrowska et al., 2015) also specified that in domestic and gardening domain; the PA level of women was found overly moderate (n=173, 51.48%), and the high level (n=78, 23.21%) was less than the other level (low=85, 25.3%).

6.2 Conclusion

In this thesis, the role of domestic environments that enable or prevent home-based

physical activities of women adults that live in single and multi storey houses were

studied. Additionally, the design characteristics of each space (kitchen, bathroom,

corridor, staircase, garden/terrace and multi spaces) that has an effect on the

domestic physical activities of women adults were determined in two type of houses.

Furthermore, the association between home-based physical activities and PA level of

participants were analyzed. The reason for the comparison of two house types is to

explore the relationship of the physical activities and the different design

characteristics of specific spaces that prevent or enable the PAs of women in

domestic environments.

The communal domestic activities that women encounter were grouped under

subtitles as BADLs, IADLs and LAs in order to explore the duration and frequency

of each activity group in the related activity space in both house types. According to

the result of statistical analysis, time spent in doing housework (min. /day) and

bathing (day/week) in both type of houses has a significant difference. Also, the

highly correlation between cooking and housework was found in both house types. In

addition, the correlation between activities, design characteristics and PA level in

each individual space were done.

The spaces were identified according to the PAs of domestic environment. Then the

design characteristics of each space and their elements were analyzed with respect to

the PA spaces (kitchen, bathroom, corridor, staircase, garden/terrace and multi spaces) and equipment (shower/bath, washbasin, sink, toilet, etc.,). Using qualitative content analysis method, the negatively affecting design characteristics of each space and their elements were determined. Furthermore, the comparison PA level distribution in single and multi storey houses was done and it was found that cooking activity frequency is mostly related with the PA level of multi storey houses' participants.

PA level was measured and tested by IPAQ-S and it was found that there is no statistically significant difference in PA levels of women adults that live in single and multi storey houses. The PA levels of women adults were found to be commonly moderate. In two house types, it was explored that participants are not so active in their life.

The lack of physical activity culture was found among women adults. They mainly realized how they could be active in domestic environment while answering the survey questions.

6.3 Implications of the Study on Interior Architecture/Design

This study claimed the designed characteristics of spaces have a significant impact either in enabling or preventing on the domestic PA level of women adults. In addition, it explored the design characteristics of domestic environment that could

mostly affect the PA level of women adults. Although each country has its own building regulations and standards, interior architects/designer should promote women to be physically active in their domestic environment their designs since well-designed houses increase domestic PA level of the users. Designers should consider active design with universal design principles and accessibility issues. Afacan & Demirkan (2010: 335) emphasized that "Designers must consider a set of criteria for maximizing the overall performance of a universal design solution for diverse user needs, capabilities and expectations".

In addition, interior architects and designers should design their client's house while taking into consideration of their domestic activity frequency, by deeply interviewing them before starting to design. Determining the duration and frequency of the domestic activities could provide easiness and efficiency for the clients in use of space.

Besides, the number of stories in a house could be an effective factor in increasing/decreasing the domestic PA level of women adults since all house types have different design characteristics. In this study, through the comparison of single and multi storey houses, effectiveness of number of stories on PA level of women adults were determined.

According to result of this study, in order to enhance PA level of women adults in domestic environment, designing domestic environment while considering the design characteristics that affect women's PA positively is recommended. Also, the

correlation of the design characteristics with others is identified with their duration/frequency in each domestic space.

6.4 Limitations of the Study and Future Research Areas

Since there are limited studies in literature exploring the effects of domestic indoor environment and garden/terrace spaces on PAs of women adults. Consequently, the comparisons of results of this study are limited.

In further study, the influence of income level on women's PA in domestic environment could be studied in analysis of housework in different house types. Also, the houses located in different settlement (urban/rural areas) type could be chosen and compared. Size of houses could be changed and house types could be diminished. Lastly, the size of participants could be increased and age range could also be changed according to life span, so older women adults could be added.

The findings of this study may be a guide for interior designers, architects, designer who interested in activity-friendly house design to increase the domestic PA level for enhancement the life quality of adults

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APPENDICES

APPENDIX A

(TURKISH VERSON OF THE SURVEY SETS)

Bilkent Üniversitesi İç Mimarlık ve Çevre Tasarımı

EV ORTAMININ YETİŞKİN KADINLARIN FİZİKSEL AKTİVİTELERİ
ÜZERİNDEKİ ROLÜ: TEK VE ÇOK KATLI EVLERİN
KARŞILAŞTIRMASI
Anketi

Sayın katılımcı,

Bu anket Bilkent Üniversitesi, İç Mimarlık ve Çevre Tasarımı bölümü yüksek

lisans programı içerisinde yapılan bir araştırmanın parçasıdır. Vermiş

olduğunuz bilgiler hiç bir yabancı kurum veya kuruluş ile paylaşılmayacak olup

sadece 'Ev OrtamınınYetişkin Kadınların Fiziksel Aktiviteleri Üzerindeki

Rolü: Tek ve Çok Katlı Evlerin Karşılaştırması" adlı yüksek lisans tezinde

bilimsel veri olarak kullanılacaktır.

TEK KATLI EV TİPİ ANKET SETİ

BÖLÜM.1 GÖZLEM KAĞIDI

BÖLÜM. 1.1 KİŞİSEL BİLGİLER

Yaş: _____   **Tarih:** _____

Çalışma durumu: Evet ☐   Hayır ☐

Eğitim Seviyesi: _____

Medeni Durum: Bekar ☐   Evli ☐

Küçük (1-5 yaş arası) çocuk/çocuklara sahip misiniz? Evet ☐   Hayır ☐

BÖLÜM. 1.2 TEK KATLI EV TİPİ ÖZELLİKLERİ

Bu bölüm, evinizin fiziksel özellikleri ile ilgilidir. Lütfen doğru kutucuğa işaret koyunuz ve boşlukları doldurunuz.

1. **Toplam alan** _____ m²
2. **Oda sayısı** 2+1 ☐   3+1 ☐   4+1 ☐   5+1 ☐
3. **Koridor Sayısı;** Koridor yok ☐   1 ☐   2 ☐   3 ☐
4. **Mutfak alanı** _____ m² **ve banyo (genellikle kullanılan) alanı** _____ m²
5. **Mutfak Planı ;** Tek Taraflı ☐ İki Taraflı ☐ L Şekli ☐ U Şekli ☐ Ada ☐
6. **Bahçeye** sahip misiniz ?   Evet ☐   Hayır ☐

BÖLÜM. 2 YARI YAPILANDIRILMIŞ GÖRÜŞME

Bu bölüm evinizin belirli aktivite bölümleri ve bu bölümlerin sizin fiziksel aktivitenize etkisi ile ilgilidir. Lütfen soruları, <u>kendi evinizi</u> düşünerek cevaplayınız.

A. MUTFAK

Mutfağınızdaki **çalışma alanınız** sizin fiziksel aktivitenizi olumsuz etkiliyor mu? (ana çalışma alanı uzunluğu, dolaplara erişim yüksekliği, dolapların alanı, dolapların ve saklama alanının yeri, lavabonun yeri, mutfak aletlerinin yeri vb.)

_____

_____

Mutfağınızın **şekli** (tek yönlü/ çift yönlü, L şekli/ U şekli/ Ada) sizin fiziksel aktivitenizi olumsuz etkiliyor mu? Eğer etkiliyor ise nasıl?

_____

_____

B. BANYO

Klozetin, lavabonun, küvetin/duş kabinin yeri, ölçüleri ya da tasarımı sizin fiziksel aktivitenizi olumsuz etkiliyor mu? Eğer etkiliyor ise nasıl?

_____

_____

Banyonuzda fiziksel aktivitenizi **olumsuz** etkileyen herhangi bir **engel/engeller** var mıdır?

_____

C. KORİDOR

Koridorlarınızın **uzunluğu** ve/veya **genişliği** iç mekan yürüyüşü yapmanızı olumsuz etkiliyor mu? Eğer etkiliyorsa nasıl?

_____

Koridorlarınızın **konumu,** diğer mekânlara olan uzaklığı ve sayısı **iç mekan yürüyüşü** yapmanızı olumsuz etkiliyor mu? Eğer etkiliyorsa nasıl?

_____

_____

Koridorlarınızda **iç mekân yürüyüşü** yapmanızı **olumsuz** etkileyecek herhangi bir **engel/engeller** var mıdır?

_____

D. BAHÇE

Eğer bahçenizin **yerleşimi, alanı** ve/veya **tasarımı** fiziksel aktivitenizi olumsuz etkiliyor ise lütfen yorum yapınız?

_____

_____

Bahçenizi sıklıkla kullanır mısınız?

_____

Bölüm 2 sorularımız sona erdi, lütfen şimdi Bölüm 3'e geçiniz.

BÖLÜM. 3 ANKET

Bu bölüm geçen son 7 gün içerisinde, genel ve evinizin mekânlarında yapmış olduğunuz aktivitelerin zamanları ile ilgilidir.

1. GENEL AKTİVİTELER

Bu kısım geçen 7 gün içerisinde evinizin içinde yapmış olduğunuz fiziksel aktivitelerin zamanları ile ilgilidir.

1.a Geçen 7 gün içerisinde, ev işi (yerleri silmek, toz almak, ütü yapmak vb.) yaparak geçirdiğiniz gün sayısı kaçtır?

Haftada _____ gün

☐ Ev işi yapmadım ⟶ *(Soru 1.c' ye gidin.)*

1.b Bu günlerden birinde ev işi yaparak genellikle ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

1.c Geçen 7 gün içerisinde, bu günlerden birinde çocuk bakımı aktiviteleri (eğer 1-5 yaş arası çocuk sahibi iseniz) yaparak ne kadar zaman geçirdiniz?

Günde_____ saat _____ dakika

☐ Çocuk bakımı aktivitesi yapmadım.

1.d Bu günlerden birinde evinizde boş zaman aktiviteleri (televizyon izlemek, kitap okumak, bilgisayar kullanmak vb.) yaparak genellikle ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

2. MEKÂNLARDAKİ AKTİVİTELER

Bu kısım, geçen 7 gün içerisinde evinizin bölümlerinden; mutfak, banyo, koridor ve bahçede yaptığınız fiziksel aktivitelerin zamanları ile ilgilidir.

2.a MUTFAK

2.a.1 Geçen 7 gün içerisinde, mutfağınızda yemek yaparak geçirdiğiniz gün sayısı kaçtır?

Haftada _____ gün

☐ Yemek yapmadım ⟶ *(Soru 2.a.3'e gidin.)*

2.a.2 Geçen 7 gün içerisinde, bu günlerden birinde yemek yaparak ne kadar zaman geçirdiniz?

Günde ＿＿ saat ＿＿ dakika

2.a.3 Geçen 7 gün içerisinde, bu günlerden birinde mutfaktaki ev işlerini (bulaşık makinası kullanma, yemek hazırlama toplama vb.) yaparken genellikle ne kadar zaman geçirdiniz?

Günde ＿＿ saat ＿＿ dakika

2.b BANYO

2.b.1 Geçen 7 gün içerisinde, banyonuzda (genellikle kullanılan) temel günlük aktivitelerden 'banyo yapma' aktivitesini yaptığınız gün sayısı kaçtır?

Haftada ＿＿ gün

2.b.2 Geçen 7 gün içerisinde, bu günlerin birinde ebeveyn banyonuzda temel günlük yaşam aktiviteleri (el yıkama, diş fırçalama vb.) yaparak genellikle ne kadar zaman geçirdiniz?

Günde ＿＿ saat ＿＿ dakika

2.c KORİDOR

2.c.1 a. Koridorlarınızda faydalı yürüyüşler yaparak genellikle ne kadar zaman geçirdiniz?

Günde ＿＿ saat ＿＿ dakika

☐ Koridorlarda faydalı yürüyüşler yapmadım.

2.d BAHÇE

2.d.1 Geçen 7 gün içerisinde, bu günlerin birinde, bahçenizde orta derecede fiziksel aktivite (sulama yapma, bahçeyi tırmıklamak vb.) yaparak genellikle ne kadar zaman geçirdiniz?

Günde ＿＿ saat ＿＿ dakika

☐ Bahçede orta dereceli fiziksel aktivite yapmadım.

Anketimiz sona ermiştir, lütfen şimdi Uluslararası Fiziksel Aktivite Anketi Kısa Formundaki sorulara geçiniz.

BÖLÜM 4

ULUSLAR ARASI FİZİKSEL AKTİVİTE ANKETİ (KISA FORM)

İnsanların günlük hayatlarının bir parçası olarak yaptıkları fiziksel aktivite tiplerini bulmayla ilgileniyoruz.Sorular son 7 gün içerisinde fiziksel olarak harcanan zamanla ilgili olarak sorulacaktır.Lütfen yaptığınız aktiviteleri düşünün;işte,evde,bir yerden bir yere giderken,boş zamanlarınızda yaptığınız spor,egzersiz veya eğlence aktiviteleri.

Son 7 günde yaptığınız şiddetli aktiviteleri düşünün.Şiddetli fiziksel aktiviteler zor fiziksel efor yapıldığını ve nefes almanın normalden çok daha fazla olduğu aktiviteleri ifade eder.Sadece herhangi bir zamanda en az 10 dakika yaptığınız bu aktiviteleri düşünün.

1.Geçen 7 gün içerisinde kaç gün ağır kaldırma,kazma,aerobik,basketbol,futbol veya hızlı bisiklet çevirme gibi şiddetli fiziksel aktivitelerden yaptınız?

Haftada___gün
☐ Şiddetli fiziksel aktivite yapmadım. → (3.soruya gidin.)

2.Bu günlerin birinde şiddetli fiziksel aktivite yaparak genellikle ne kadar zaman harcadınız?

Günde ___ saat
Günde ___ dakika
☐ Bilmiyorum/Emin değilim

Geçen 7 günde yaptığınız orta dereceli fiziksel aktiviteleri düşünün.Orta dereceli aktivite orta derece fiziksel güç gerektiren ve normalden biraz sık nefes almaya neden olan aktivitelerdir.Yalnız bir seferde en az 10 dakika boyunca yaptığınız fiziksel aktiviteleri düşünün.

3.Geçen 7 gün içerisinde kaç gün hafif yük taşıma, normal hızda bisiklet çevirme, halk oyunları, dans, bowling veya çiftler tenis oyunu gibi orta dereceli fiziksel aktivitelerden yaptınız?Yürüme hariç.

Haftada___gün
☐Orta dereceli fiziksel aktivite yapmadım. → (5.soruya gidin.)

4.Bu günlerin birinde orta dereceli fiziksel aktivite yaparak genellikle ne kadar zaman harcadınız?

Günde ___ saat
Günde ___ dakika
☐ Bilmiyorum/Emin değilim

Geçen 7 günde yürüyerek geçirdiğiniz zamanı düşünün.Bu işyerinde,evde,bir yerden bir yere ulaşım amacıyla veya sadece dinlenme,spor,egzersiz veya hobi amacıyla yaptığınız yürüyüş olabilir.

5.Geçen 7 gün,bir seferde en az 10 dakika yürüdüğünüz gün sayısı kaçtır?

Haftada___gün
☐ Yürümedim. → (7.soruya gidin.)

6.Bu günlerden birinde yürüyerek genellikle ne kadar zaman geçirdiniz?

Günde ___ saat
Günde ___ dakika
☐ Bilmiyorum/Emin değilim

Son soru,geçen 7 günde hafta içinde oturarak geçirdiğiniz zamanlarla ilgilidir. İşte, evde, çalışırken ya da dinlenirken geçirdiğiniz zamanlar dahildir.Bu masanızda, arkadaşınızı ziyaret ederken,okurken,otururken veya yatarak televizyon seyrettiğinizde oturarak geçirdiğiniz zamanları kapsamaktadır.

7.Geçen 7 gün içerisinde,günde oturarak ne kadar zaman harcadınız?

Günde ___ saat
Günde ___ dakika
☐ Bilmiyorum/Emin değilim

SORULARIMIZ SONA ERMİŞTİR.KATILIMINIZ İÇİN TEŞEKKÜRLER.

ÇOK KATLI EV TİPİ ANKET SETİ

BÖLÜM.1 GÖZLEM KÂĞIDI

BÖLÜM 1.1 KİŞİSEL BİLGİLER

Yaş: _____   Tarih: _____

Çalışma Durumu? Evet ☐   Hayır ☐

Eğitim Seviyesi _____

Medeni Durum: Bekar ☐   Evli ☐

Küçük (1-5 yaş arası) çocuk/çocuklara sahip misiniz?   Evet ☐   Hayır ☐

BÖLÜM 1.2 ÇOK KATLI EV TİPİ ÖZELLİKLERİ

Bu bölüm, evinizin fiziksel özellikleri ile ilgilidir. Lütfen doğru kutucuğa işaret koyunuz ve boşlukları doldurunuz.

1. Çok katlı evin tipi; 2 katlı ☐   3 katlı ☐   4 katlı ☐

2. Toplam alan _____ m²

3. Oda sayısı 3+1 ☐   4+1 ☐   5+1 ☐   5+2 ☐   6+1 ya da daha fazla ☐

4. Koridor Sayısı; 1. kat: Koridor yok ☐ 1 ☐ 2 ☐   3 ☐

   2. kat: Koridor yok ☐ 1 ☐ 2 ☐   3 ☐

   3. kat: Koridor yok ☐ 1 ☐ 2 ☐   3 ☐

   4. kat: Koridor yok ☐ 1 ☐ 2 ☐   3 ☐

5. Mutfak alanı _____ m² ve banyo (genellikle kullanılan) alanı _____ m²

6. Mutfak Planı ; Tek Taraflı ☐   İki Taraflı ☐   L Şekli ☐   U Şekli ☐   Ada ☐

7. Merdiveninizin şekli; Düz ☐   L şekli ☐   U şekli ☐   Kavisli ☐   Sprial ☐

8. Bahçeye ☐ veya terasa ☐ sahip misiniz ?

   ☐ Hem bahçeye hem de terasa sahibim

   ☐ Bahçeye ya da terasa sahip değilim.

BÖLÜM. 2 YARI YAPILANDIRILMIŞ GÖRÜŞME

Bu bölüm evinizin belirli aktivite bölümleri ve bu bölümlerin sizin fiziksel aktivitenize etkisi ile ilgilidir. Lütfen soruları, <u>kendi evinizi</u> düşünerek cevaplayınız.

A. MUTFAK

Mutfağınızdaki **çalışma alanınız** sizin fiziksel aktivitenizi olumsuz etkiliyor mu? (ana çalışma alanı uzunluğu, dolaplara erişim yüksekliği, dolapların alanı, dolapların ve saklama alanının yeri, lavabonun yeri, mutfak aletlerinin yeri vb.)

_____

_____

Mutfağınızın **şekli** (tek yönlü/ çift yönlü, L şekli/ U şekli/ Ada) sizin fiziksel aktivitenizi olumsuz etkiliyor mu? Eğer etkiliyor ise nasıl?

_____

_____

B. BANYO

Klozetin, lavabonun, küvetin/duş kabinin yeri, ölçüleri ya da tasarımı sizin fiziksel aktivitenizi olumsuz etkiliyor mu? Eğer etkiliyor ise nasıl?

_____

_____

Banyonuzda fiziksel aktivitenizi **olumsuz** etkileyen herhangi bir **engel/engeller** var mıdır?

_____

C. KORİDOR

Koridorlarınızın **uzunluğu** ve/veya **genişliği** iç mekan yürüyüşü yapmanızı olumsuz etkiliyor mu? Eğer etkiliyorsa nasıl?

_____

Koridorlarınızın **konumu**, diğer mekânlara olan uzaklığı ve sayısı **iç mekan yürüyüşü** yapmanızı olumsuz etkiliyor mu? Eğer etkiliyorsa nasıl?

_____

_____

Koridorlarınızda **iç mekân yürüyüşü** yapmanızı **olumsuz** etkileyecek herhangi bi **engel/engeller** var mıdır?

_____

_____

D. MERDİVEN

Eğer merdiveninizin **fiziksel tasarım özellikleri** (basamak sayısı/rıht yüksekliği/korkuluklar vb.) sizin fiziksel aktivitenizi olumsuz etkiliyor ise lütfen yorum yapınız

_____

_____

Merdiveninizin **yerleşimi**; girişe yakınlığı sizin fiziksel aktivitenizi olumsuz etkiliyor mu? Eğer etkiliyor ise nasıl?

_____

_____

Merdiveninizin **malzemesi** sizin fiziksel aktivitenizi **olumsuz** etkiliyor mu?

_____

_____

Merdiveninizin **şekli** (düz, L-şekli, U-şekli, spiral vb.) sizin fiziksel aktivitenizi **olumsuz** etkiliyor mu?

_____

_____

E. BAHÇE/TERAS

Eğer bahçenizin/terasınızın **yerleşimi, alanı** ve/veya **tasarımı** sizin fiziksel aktivitenizi olumsuz etkiliyor ise lütfen yorum yapınız?

_____

_____

Bahçenizi sıklıkla kullanır mısınız?

_____

Terasınızı sıklıkla kullanır mısınız?

_____

Bahçenizi ve terasınızı sıklıkla kullanır mısınız?

_____

Bölüm 2 sorularımız sona erdi, lütfen şimdi bölüm 3'e geçiniz.

BÖLÜM. 3 ANKET

Bu bölüm geçen son 7 gün içerisinde, genel ve evinizin mekânlarında yapmış olduğunuz aktivitelerin zamanları ile ilgilidir.

1. GENEL AKTİVİTELER

Bu kısım geçen 7 gün içerisinde evinizin içinde yapmış olduğunuz fiziksel aktivitelerin zamanları ile ilgilidir.

1.a Geçen 7 gün içerisinde, ev işi (yerleri silmek, toz almak, ütü yapmak vb.) yaparak geçirdiğiniz gün sayısı kaçtır?

Haftada ＿＿＿ gün

☐ Ev işi yapmadım ⟶ *(Soru 1.c' ye gidin.)*

1.b Bu günlerden birinde ev işi yaparak genellikle ne kadar zaman geçirdiniz?

Günde ＿＿＿ saat ＿＿＿ dakika

1.c Geçen 7 gün içerisinde, bu günlerden birinde çocuk bakımı aktiviteleri (eğer 1-5 yaş arası çocuk sahibi iseniz) yaparak ne kadar zaman geçirdiniz?

Günde ＿＿＿ saat ＿＿＿ dakika

☐ Çocuk bakımı aktivitesi yapmadım

1.d Bu günlerden birinde evinizde boş zaman aktiviteleri (televizyon izlemek, kitap okumak, bilgisayar kullanmak vb.) yaparak genellikle ne kadar zaman geçirdiniz?

Günde ＿＿＿ saat ＿＿＿ dakika

2. BELİRLİ MEKÂNLARDAKİ AKTİVİTELER

Bu kısım, geçen 7 gün içerisinde evinizin bölümlerinden; mutfak, banyo, koridor, merdiven ve bahçede yaptığınız fiziksel aktivitelerin zamanları ile ilgilidir.

2.a MUTFAK

2.a.1 Geçen 7 gün içerisinde, mutfağınızda yemek yaparak geçirdiğiniz gün sayısı kaçtır?

Haftada ＿＿＿ gün

☐ Yemek yapmadım ⟶ *(Soru 2.a.3'e gidin.)*

2.a.2 Geçen 7 gün içeresinde, bu günlerden birinde yemek yaparak ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

2.a.3 Geçen 7 gün içerisinde, bu günlerden birinde mutfaktaki ev işlerini (bulaşık makinası kullanma, yemek hazırlama toplama vb.) yaparken genellikle ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

2.b BANYO

2.b.1 Geçen 7 gün içerisinde, banyonuzda (genellikle kullandığınız) temel günlük aktivitelerden banyo aktivitesini yaptığınız gün sayısı kaçtır?

Haftada _____ gün

2.b.2 Geçen 7 gün içerisinde, bu günlerin birinde ebeveyn banyonuzda temel günlük yaşam aktiviteleri (el yıkama, diş fırçalama vb.) yaparak genellikle ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

2.c KORİDOR

2.c.1 Koridorlarınızda faydalı yürüyüşler yaparak genellikle ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

☐ Koridorlarda faydalı yürüyüşler yapmadım

2.d. MERDİVEN

2.d.1 Geçen 7 gün içerisinde, merdiveninizi kullanarak ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

2.e BAHÇE/TERAS

2.e.1 Bu günlerin birinde, bahçenizde/terasınızda orta derecede fiziksel aktivite (sulama yapma, bahçeyi tırmıklamak vb.) yaparak genellikle ne kadar zaman geçirdiniz?

Günde _____ saat _____ dakika

☐ Bahçede/terasta orta dereceli fiziksel aktivite yapmadım.

Anketimiz sona ermiştir, lütfen şimdi Uluslararası Fiziksel Aktivite Anketi Kısa Formundaki sorulara geçiniz.

BÖLÜM 4

ULUSLAR ARASI FİZİKSEL AKTİVİTE ANKETİ (KISA FORM)

İnsanların günlük hayatlarının bir parçası olarak yaptıkları fiziksel aktivite tiplerini bulmayla ilgileniyoruz.Sorular son 7 gün içerisinde fiziksel olarak harcanan zamanla ilgili olarak sorulacaktır.Lütfen yaptığınız aktiviteleri düşünün;işte,evde,bir yerden bir yere giderken,boş zamanlarınızda yaptığınız spor,egzersiz veya eğlence aktiviteleri.

Son 7 günde yaptığınız şiddetli aktiviteleri düşünün.Şiddetli fiziksel aktiviteler zor fiziksel efor yapıldığını ve nefes almanın normalden çok daha fazla olduğu aktiviteleri ifade eder.Sadece herhangi bir zamanda en az 10 dakika yaptığınız bu aktiviteleri düşünün.

1.Geçen 7 gün içerisinde kaç gün ağır kaldırma,kazma,aerobik,basketbol,futbol veya hızlı bisiklet çevirme gibi şiddetli fiziksel aktivitelerden yaptınız?

Haftada____gün
☐ Şiddetli fiziksel aktivite yapmadım. → (3.soruya gidin.)

2.Bu günlerin birinde şiddetli fiziksel aktivite yaparak genellikle ne kadar zaman harcadınız?

Günde ____ saat
Günde ____ dakika
☐ Bilmiyorum/Emin değilim

Geçen 7 günde yaptığınız orta dereceli fiziksel aktiviteleri düşünün.Orta dereceli aktivite orta derece fiziksel güç gerektiren ve normalden biraz sık nefes almaya neden olan aktivitelerdir.Yalnız bir seferde en az 10 dakika boyunca yaptığınız fiziksel aktiviteleri düşünün.

3.Geçen 7 gün içerisinde kaç gün hafif yük taşıma, normal hızda bisiklet çevirme, halk oyunları, dans, bowling veya çiftler tenis oyunu gibi orta dereceli fiziksel aktivitelerden yaptınız?Yürüme hariç.

Haftada____gün
☐Orta dereceli fiziksel aktivite yapmadım. → (5.soruya gidin.)

4.Bu günlerin birinde orta dereceli fiziksel aktivite yaparak genellikle ne kadar zaman harcadınız?

Günde ____ saat
Günde ____ dakika
☐ Bilmiyorum/Emin değilim

Geçen 7 günde yürüyerek geçirdiğiniz zamanı düşünün.Bu işyerinde,evde,bir yerden bir yere ulaşım amacıyla veya sadece dinlenme,spor,egzersiz veya hobi amacıyla yaptığınız yürüyüş olabilir.

5.Geçen 7 gün,bir seferde en az 10 dakika yürüdüğünüz gün sayısı kaçtır?

Haftada___gün
☐ Yürümedim. → (7.soruya gidin.)

6.Bu günlerden birinde yürüyerek genellikle ne kadar zaman geçirdiniz?

Günde ___ saat
Günde ___ dakika
☐ Bilmiyorum/Emin değilim

Son soru,geçen 7 günde hafta içinde oturarak geçirdiğiniz zamanlarla ilgilidir. İşte, evde, çalışırken ya da dinlenirken geçirdiğiniz zamanlar dahildir.Bu masanızda, arkadaşınızı ziyaret ederken,okurken,otururken veya yatarak televizyon seyrettiğinizde oturarak geçirdiğiniz zamanları kapsamaktadır.

7.Geçen 7 gün içerisinde,günde oturarak ne kadar zaman harcadınız?

Günde ___ saat
Günde ___ dakika
☐ Bilmiyorum/Emin değilim

SORULARIMIZ SONA ERMİŞTİR.KATILIMINIZ İÇİN TEŞEKKÜRLER.

APPENDIX B

(ENGLISH VERSON OF THE SURVEY SETS)

Bilkent University

Department of Interior Architecture and Environmental Design

THE ROLE OF DOMESTIC ENVIRONMENT ON PHYSICAL
ACTIVITIES OF WOMEN ADULTS: COMPARISON OF SINGLE AND
MULTI STOREY HOUSES

Dear participant,

This questionnaire is part of graduate studies research conducted in Bilkent

University, Interior Architecture and Environmental Design Department. All

information that you have given will not be shared any third party person or

company, it is only use as scientific data in master thesis called 'The Role of

Domestic Environment on Physical Activities of Women Adults: Comparison

of Single and Multi Storey Houses'.

SINGLE STOREY HOUSE TYPE

SECTION.1 OBSERVATION SHEET

SECTION 1.1 PERSONAL INFORMATION

Age: _____   Date: _____

Employment status: Yes ☐ No ☐

Education level _____

Marital Satatus: Single ☐ Married ☐

Having young child/children at age 1 to 5: Yes ☐   No ☐

SECTION 1.2 PHYSICAL FEATURES OF SINGLE STOREY HOUSE TYPE

This section is about features of your physical home environment. Please tick the appropriate box and fill in the blanks.

1. Total area of house _____ m²

2. Type of House; Three bedroom ☐ Four bedroom ☐   Five bedroom ☐

2. Number of corridors; No corridor ☐   1 ☐   2 ☐   3 ☐

3. Total floor area of kitchen _____ m² and bathroom (usually used) _____ m²

4. Layout of kitchen; One-sided ☐ Two-sided ☐ L shaped ☐ U shaped ☐ Aisle ☐

5. Do you have garden? Yes ☐ No ☐

SECTION. 2 SEMI-STRUCTURED INTERVIEW

This section is about the specific domestic activity spaces and its effects on your physical activity. Please, think your own house and answer the questions.

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A. KITCHEN

Does your **kitchen working area** affect your physical activity negatively? (frontal length of main working area, height of reach, cupboard space, location of cabinets and storage, location of sink, location of domestic appliances etc.,)

_____

_____

Does the **layout** (one-sided/two-sided/ L shaped/ U shaped/aisle) of your **kitchen** affect your physical activity negatively?

_____

_____

B. BATHROOM

Does the **location**, **dimension** and/or **design** of toilets, wash-basin, baths/showers affect your physical activity negatively in your bathroom (usually use)? If yes, how?

_____

_____

Are there any **obstacles** affect your physical activity in your bathroom negatively?

_____

_____

C. CORRIDOR

Does the **length and width** of your **corridors** affect your indoor walking negatively? If yes, how?

_____

_____

Does the **location** and **proximity** of rooms of the **corridors** affect your indoor walking negatively? If yes, how?

_____

Are there any **obstacles** affect your indoor walking in corridors negatively?

_____

_____

D. GARDEN
Please, comment on if the garden/terrace's **location**, **area** or **design** affect your physical activity negatively?

_____

_____

Do you use your garden regularly?

_____

_____

This is the end of the semi-structured interview. Now, please answer the questions in questionnaire part.

SECTION. 3 QUESTIONNAIRE

This section is about the time of general physical activities and the activities in particular spaces you have done in the last 7 days in your house.

1. GENERAL ACTIVITIES
This section is about the physical activities you have done in the last 7 days inside your house.

> **1.a** During the last 7 days, how many days did you do housework (cleaning, dusting, laundry etc.,) inside your house?
>
> _____ **days per week**

☐ No housework inside house ⟶ *Skip to question 1.c*

1.b How much time did you usually spend on one of those days doing housework inside your home?

___ hour/s ___ minutes per day

1.c During the last 7 days, how much time did you usually spend on one of those days doing childcare activities (if you have a young- child/children at age 1 to 5) inside your home?

___ hour/s ___ minutes per day

☐ No childcare activities inside house

1.d During the last 7 days, how much time did you usually spend on one of those days sitting while doing leisure time activities (watching TV, using computer etc.) inside your home?

___ hour/s ___ minutes per day

2. ACTIVITIES IN SPECIFIC SPACES

This section is about the physical activities you have done in kitchen, bathroom, corridors, staircases and garden/terrace in the last 7 days.

2.a KITCHEN

2.a.1 During the last 7 days, how many days did you do moderate physical activities like cooking in your kitchen?

___ days per week

☐ No cooking ⟶ *Skip to question 2.a.3*

2.a.2 During the last 7 days, how much time did you usually spend on one of those day on cooking?

___ hour/s ___ minutes per day

2.a.3 During the last 7 days, how much time did you usually spend on one of those day in kitchen activities; ordering after and before the eating, using dishwasher etc.?

___ hour/s ___ minutes per day

2.b BATHROOM

    2.b.1 During the last 7 days, on how many days did you do one of the basic activities of daily living- bathing in your bathroom (usually use)?

        ____ days per week

    2.b.2 During the last 7 days, how much time did you do basic activities of daily living as personal hygiene (washing your hands, brushing your teeth etc.) in your bathroom (usually use)?

        ____ hour/s ____ minutes per day

2.c CORRIDOR

    2.c.1 How much time did you usually spend one of those days for utilitarian walking in corridors?

        ____ hour/s ____ minutes per day

        ☐ No utilitarian walking in corridors

2.d GARDEN

    2.d.1 How much time did you usually spend on one of those days doing moderate physical activities (irrigating, raking etc.) in the garden?

        ____ hour/s ____ minutes per day

        ☐ No garden activity

This is the end of the questionnaire. Now, please answer the questions in 'International Physical Activity Questionnaire Short Form'.

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

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

Think about all the **vigorous** activities that you did in the **last 7 days**. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

    _____ days per week

    ☐ No vigorous physical activities ➝ *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

    _____ hours per day
    _____ minutes per day

    ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

    _____ days per week

    ☐ No moderate physical activities ➝ *Skip to question 5*

SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ days per week

☐ No walking ⟶ *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a week day?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.

Source: IPAQ_English_self-admin_short.pdf (v.4) 12 Jan 2010. Emma Patterson. Retrieved from www.ipaq.ki.se

https://sites.google.com/site/theipaq/questionnaire_links

MULTI STOREY HOUSE TYPE SURVEY SET

SECTION.1 OBSERVATION SHEET

SECTION 1.1 PERSONAL INFORMATION

Age: _____   **Date:** _____

Employment status: Yes ☐   No ☐

Education level _____

Marital Satatus: Single ☐ Married ☐

Having young child/children at age 1 to 5: Yes ☐   No ☐

SECTION 1.2 PHYSICAL DESIGN FEATURES OF MULTI STOREY HOUSE TYPE

This section is about features of your physical house environment. Please tick the appropriate box and fill in the blanks.

1. **Type of multi-storey house;**   2-storey ☐   3- storey ☐   4-Storey ☐

2. **Total floor area of house** _____ m²

3. **Type of house;** Three bedroom ☐   Four bedroom ☐   Five bedroom ☐
    Six or more bedroom ☐

4. **Number of corridors; 1st floor:** No Corridor ☐   1 ☐   2 ☐   3 ☐
    2nd floor: No Corridor ☐   1 ☐   2 ☐   3 ☐
    3rd floor: No Corridor ☐   1 ☐   2 ☐   3 ☐
    4th floor: No Corridor ☐   1 ☐   2 ☐   3 ☐

5. **Type of staircase;** Straight ☐   L-shaped ☐   U-shaped ☐   Curved ☐   Sprial ☐

6. **Total floor area of** kitchen _____ m² and bathroom (usuallly used) _____ m²

7. **Layout of kitchen;** One-sided ☐   Two-sided ☐   L shaped ☐   U shaped ☐   Aisle ☐

8. **Do you have** garden ☐ or terrace ☐ ? No ☐   Both garden and terrace ☐

A. KITCHEN

Does your **kitchen working area** affect your physical activity negatively? (frontal length of main working area, height of reach, cupboard space, location of cabinets and storage, location of sink, location of domestic appliances etc.,)

_____

_____

Does the **layout** (one-sided/two-sided/ L shaped/ U shaped/aisle) of your **kitchen** affect your physical activity negatively?

_____

_____

B. BATHROOM

Does the **location**, **dimension** and/or **design** of toilets, wash-basin, baths/showers affect your physical activity negatively in your bathroom (usually use)? If yes, how?

_____

_____

Are there any **obstacles** affect your physical activity in your bathroom negatively?

_____

_____

C. CORRIDOR

Does the **length and width** of your **corridors** affect your indoor walking negatively? If yes, how?

_____

_____

Does the **location** and **proximity** of rooms of the **corridors** affect your indoor walking negatively? If yes, how?

_____

Are there any **obstacles** affect your indoor walking in corridors negatively?

_____

D. STAIRCASE
Does your **staircase** design features' (dimension of tread and rise /number of steps / handrails etc.,) affect your physical activity negatively?

_____

_____

Does the **proximity** of the building entrance of your **staircase** affect your physical activity negatively?

_____

_____

Does the **material** of your staircase affect your physical activity negatively? If yes, how?

_____

_____

Does the **type** of your staircase (straight/ L-shaped/U-shaped etc.,) affect your physical activity negatively? If yes, how?

_____

_____

E. GARDEN/TERRACE
Does your garden/terrace's **location**, **area** or **design** affect your physical activity negatively?

_____

_____

Do you use your **garden/terrace** regularly?

_____

Do you use your **garden** and **terrace** regularly?

_____

SECTION 3. QUESTIONNAIRE

This section is about the time of general physical activities and the activities in particular spaces you have done in the last 7 days in your home.

1. GENERAL ACTIVITIES

This section is about the physical activities you have done in the last 7 days inside your house.

1.a During the last 7 days, how many days did you do housework (cleaning, laundry, etc.,) inside your home?

    ____ **days per week**

    ☐ **No housework inside house** ⟶ *Skip to question 1.c*

1.b How much time did you usually spend on one of those days doing housework inside your home?

    ____ **hour/s** ____ **minutes per day**

1.c During the last 7 days, how much time did you usually spend on one of those days doing childcare activities (if you have a young- child/children at age 1 to 5) inside your home?

    ____ **hour/s** ____ **minutes per day**

    ☐ **No childcare activities inside house**

1.d During the last 7 days, how much time did you usually spend on one of those days sitting while doing leisure activities (watching TV, using computer, etc.) inside your home?

    ____ **hour/s** ____ **minutes per day**

2. ACTIVITIES IN SPECIFIC SPACES

This section is about the physical activities you have done in kitchen, bathroom, corridors, staircases and garden/terrace in the last 7 days.

2.a KITCHEN

2.a.1 During the last 7 days, how many days did you do moderate physical activities like cooking in your kitchen?

    ____ **days per week**

    ☐ **No cooking** ⟶ *Skip to question 2.a.3*

2.a.2 During the last 7 days, how much time did you usually spend on one of those day on cooking?

_____ hour/s _____ minutes per day

2.a.3 During the last 7 days, how much time did you usually spend on one of those day in kitchen activities; ordering after and before the eating, using dishwasher etc.?

_____ hour/s _____ minutes per day

2.b BATHROOM

2.b.1 During the last 7 days, on how many days did you do one of the basic activities of daily living- bathing in your bathroom (usually use)?

_____ days per week

2.b.2 During the last 7 days, how much time did you do basic activities of daily living personal hygiene (washing your hands, brushing your teeth etc.) in your bathroom (usually use)?

_____ hour/s _____ minutes per day

2.c CORRIDOR

2.c.1 How much time did you usually spend one of those days for utilitarian walking in corridors?

_____ hour/s _____ minutes per day

☐ No utilitarian walking in corridors

2.d STAIRCASE

2.d.1 During the last 7 days, how much time did you usually spend one of those days while using staircase?

_____ hour/s _____ minutes per day

2.e GARDEN/TERRACE

2.e.1 How much time did you usually spend on one of those days doing moderate physical activities (irrigating, raking etc.) in the garden?

_____ hour/s _____ minutes per day

☐ No garden activity

2.e.2 How much time did you usually spend on one of those days doing moderate physical activities (irrigating, raking etc.) in the terrace?

_____ hour/s _____ minutes per day

☐ No terrace activity

2.e.2 How much time did you usually spend on one of those days doing moderate physical activities (irrigating, raking etc.) in **garden and terrace**?

____ hour/s ____ minutes per day

☐ No garden and terrace activity

This is the end of the questionnaire part. Now, please answer the questions at 'International Physical Activity Questionnaire Short Form'.

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

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

Think about all the **vigorous** activities that you did in the **last 7 days**. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

    _____ days per week

    ☐ No vigorous physical activities ➡ *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

    _____ hours per day
    _____ minutes per day

    ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

    _____ days per week

    ☐ No moderate physical activities ➡ *Skip to question 5*

SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ days per week

☐ No walking   ➝   *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ hours per day

_____ minutes per day

☐ Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.

Source: IPAQ_English_self-admin_short.pdf (v.4) 12 Jan 2010. Emma Patterson. Retrieved from www.ipaq.ki.se

https://sites.google.com/site/theipaq/questionnaire_links

APPENDIX C

STATISTICAL RESULTS

Table 16. T-Test Analysis for Home-Based Activity-Duration: HouseworkActivity

(min./day)

Group Statistics

	type of houses	N	Mean	Std. Deviation	Std. Error Mean
housework (min./day)	single storey	51	167.25	109.715	15.363
	multi storey	43	124.53	73.069	11.143

Independent Samples Test

		Levene's Test for Equality of Variances	
		F	Sig.
housework (min./day)	Equal variances assumed	4.129	.045
	Equal variances not assumed		

Independent Samples Test

		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
housework (min./day)	Equal variances assumed	2.178	92	.032
	Equal variances not assumed	2.251	87.587	.027

Independent Samples Test

		t-test for Equality of Means	
		Mean Difference	Std. Error Difference
housework (min./day)	Equal variances assumed	42.720	19.619
	Equal variances not assumed	42.720	18.979

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
housework (min./day)	Equal variances assumed	3.756	81.684
	Equal variances not assumed	5.001	80.439

Table 17. T-Test Analysis for Home-Based Activity- Duration: Bathing

Activity(days per week)

Group Statistics

	type of houses	N	Mean	Std. Deviation	Std. Error Mean
bathing in a week/days	single storey	60	4.47	1.882	.243
	multi storey	60	5.68	1.600	.207

Independent Samples Test

		Levene's Test for Equality of Variances	
		F	Sig.
bathing in a week/days	Equal variances assumed	1.132	.289
	Equal variances not assumed		

Independent Samples Test

		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
bathing in a week/days	Equal variances assumed	-3.816	118	.000
	Equal variances not assumed	-3.816	115.018	.000

Independent Samples Test

		t-test for Equality of Means	
		Mean Difference	Std. Error Difference
bathing in a week/days	Equal variances assumed	-1.217	.319
	Equal variances not assumed	-1.217	.319

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
bathing in a week/days	Equal variances assumed	-1.848	-.585
	Equal variances not assumed	-1.848	-.585

Table 18. Negatively Affecting Design Characteristics of Kitchen

Negatively Affecting Design Characteristics Single and Multi Storey Houses (each n=60)																								
Space	Kitchen																							
Design Characteristics of Spaces	Frontal Length of main working area				Height of reach				Location of cabinets & storage				Location of sink				Location of appliances				Layout of kitchen			
Type of houses	Single Storey		Multi storey		Single Storey		Multi Storey		Single Storey		Multi storey		Single Storey		Multi Storey		Single Storey		Multi Storey		Single Storey		Multi-storey	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Affected PA	18	30	18	30	13	21.7	11	18.3	13	21.7	14	23.3	2	3.3	-	-	6	10	3	5	9	15	15	25
Not Affected PA	31	51.7	33	55	34	56.7	35	58.3	32	53.3	36	60	37	61.7	39	65	35	58.3	37	61.7	45	75	42	70
Total	49	81.7	51	85	47	78.3	46	76.7	45	75	50	83.3	39	65	-	-	41	68.3	40	66.7	54	90	57	95
Missing	11	18.13	9	15	13	21.7	14	23.3	15	25	10	16.7	21	35	21	35	19	31.7	20	33.3	6	10	3	5

Table 19. Negatively Affecting Design Characteristics of Bathroom

Negatively Affecting Design Characteristics Single and Multi Storey Houses (each n=60)																								
Space	Bathroom																							
Design Chracteristics of Spaces	Location of toilet				Height and width of toilet				Design of toilet				Location of washbasin				Height of washbasin				Design of washbasin			
Type of houses	Single Storey		Multi storey		Single Storey		Multi Storey		Single Storey		Multi storey		Single Storey		Multi Storey		Single Storey		Multi Storey		Single Storey		Multi-storey	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Affected PA	5	8.3	10	16.7	4	6.7	2	3.3	4	6.7	5	8.3	-	-	5	8.3	5	8.3	2	3.3	2	3.3	2	3.3
Not Affected PA	38	63.3	42	70	38	63.3	45	75	39	65	43	71.7	40	66.7	41	68.3	39	65	42	70	40	66.7	41	68.3
Total	43	71.7	52	86.7	42	70	47	78.3	43	71.7	46	76.7	-	-	46	76.7	46	73.3	44	73.3	42	70	43	71.7
Missing	17	28.3	8	13.3	18	30	13	21.7	17	28.3	14	23.3	20	33.3	14	23.3	14	26.7	16	26.7	18	30	17	28.3

Table 19. (cont'd), Negatively Affecting Design Characteristics of Bathroom

Negatively Affecting Design Characteristics Single and Multi Storey Houses (each n=60)												
Space	**Bathroom** *(continue)*											
Design Chracteristics of Spaces	Location of shower/bath				Height and width of shower/bath				Design of shower/bath			
Type of houses	Single Storey		Multi storey		Single Storey		Multi Storey		Single Storey		Multi storey	
	n	%	n	%	n	%	n	%	n	%	n	%
Affected PA	6	10	10	16.7	7	11.7	5	8.3	7	11.7	5	8.3
Not Affected PA	40	66.7	39	65	39	65	40	66.7	39	65	39	65
Total	46	76.7	49	81.7	46	76.7	45	75	46	76.7	44	73.3
Missing	14	23.3	11	18.3	14	23.3	15	25	14	23.3	16	26.7

Table 20. Negatively Affecting Design Characteristics of Corridor

Negatively Affecting Design Characteristics Single and Multi Storey Houses (each n=60)																
Space	**Corridor**															
Design Cahracteristics of Spaces	Length of corridor				Width of corridor				Location of corridor				Proximity of entrance			
Type of houses	Single Storey		Multi storey		Single Storey		Multi Storey		Single Storey		Multi storey		Single Storey		Multi Storey	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Affected PA	9	15	11	18.3	9	15	6	10	4	6.7	3	5	3	5	3	5
Not Affected PA	41	68.3	36	60.0	40	66.7	37	61.7	41	68.3	39	65	42	70	38	63.3
Total	50	83.3	47	78.3	49	81.7	43	71.7	45	75	42	70	45	75	41	68.3
Missing	10	16.7	13	21.7	11	18.3	17	28.3	15	25	18	30	15	25	19	31.7

Table 21. .Negatively Affecting Design Characteristics of Garden

Negatively Affecting Design Characteristics Single and Multi Storey Houses (each n=60)												
Space	**Garden**											
Design Cahracteristics of Spaces	**Location of garden**				**Area of garden**				**Design of garden**			
Type of houses	**Single Storey**		**Multi storey**		**Single Storey**		**Multi Storey**		**Single Storey**		**Multi storey**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Affected PA	1	1.7	5	8.3	2	3.3	4	6.7	2	3.3	2	3.3
Not Affected PA	6	10	38	63.3	5	8.3	37	61.7	5	8.3	40	66.7
Total	7	11.7	43	71.7	7	11.7	41	68.3	7	11.7	42	70
Missing	53	88.3	17	28.3	53	88.3	19	31.7	53	88.3	18	30

Table 22. Sitting Time Analysis in Multi Storey Houses

Statistics

Sitting time (in min.)

N	Valid	40
	Missing	20
Median		270.00
Percentiles	25	180.00
	50	270.00
	75	360.00

Table 23. Sitting Time Analysis in Single Storey Houses

Statistics

Sitting time (in min.)

N	Valid	50
	Missing	10
Median		240.00
Percentiles	25	180.00
	50	240.00
	75	420.00

Table 24. Comparison PA distribution in Single Storey Houses- Regression Analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	childcare activities (min./day)	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: PA level

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.290[d]	.084	.065	.605

a. Predictors: (Constant), childcare activities (min./day)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.578	1	1.578	4.314	.043[d]
	Residual	17.197	47	.366		
	Total	18.776	48			

a. Predictors: (Constant), childcare activities (min./day)
b. Dependent Variable: PA level

Coefficients[a]

Model		Unstandardized Coefficients	
		B	Std. Error
1	(Constant)	1.739	.092
	childcare activities (min./day)	-.292	.141

Coefficients[a]

Model		Standardized Coefficients		
		Beta	t	Sig.
1	(Constant)		18.904	.000
	childcare activities (min./day)	-.290	-2.077	.043

a. Dependent Variable: PA level

Table 24. (cont'd), Comparison PA distribution in Single Storey Houses- Regression

Analysis

Excluded Variables[b]

Model		Beta In	t	Sig.
1	housework (days per week)	.189[a]	1.369	.178
	housework (min./day)	.003[a]	.024	.981
	Leisure time activities (min./day)	.048[a]	.335	.739
	cooking (days per week)	.089[a]	.625	.535
	cooking (min./day)	-.038[a]	-.267	.791
	kitchen activities (min. /day)	.114[a]	.809	.423
	bathing (day per week)	.146[a]	1.043	.302
	personal hygiene (min. /day)	.085[a]	.601	.551
	indoor walking in corridors (min./day)	.121[a]	.850	.400
	garden activities (min. /day)	-.249[a]	-1.816	.076

Excluded Variables[b]

Model		Partial Correlation	Collinearity Statistics Tolerance
1	housework (days per week)	.198	.999
	housework (min./day)	.004	.980
	Leisure time activities (min./day)	.049	.950
	cooking (days per week)	.092	.970
	cooking (min./day)	-.039	.992
	kitchen activities (min. /day)	.118	.990
	bathing (day per week)	.152	.994
	personal hygiene (min. /day)	.088	.996
	indoor walking in corridors (min./day)	.124	.966
	garden activities (min. /day)	-.259	.988

a. Predictors in the Model: (Constant), childcare activities (min./day)
b. Dependent Variable: PA level

Table 25. Comparison PA distribution in Multi Storey Houses- Regression Analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	terrace activities (min. /day)	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: PA level

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.778[a]	.606	.557	.544

a. Predictors: (Constant), terrace activities (min./day)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.636	1	3.636	12.308	.008[a]
	Residual	2.364	8	.295		
	Total	6.000	9			

a. Predictors: (Constant), terrace activities (min./day)
b. Dependent Variable: PA level

Coefficients[a]

Model		Unstandardized Coefficients	
		B	Std. Error
1	(Constant)	1.455	.232
	terrace activities (min. /day)	.909	.259

Coefficients[a]

Model		Standardized Coefficients		
		Beta	t	Sig.
1	(Constant)		6.276	.000
	terrace activities (min. /day)	.778	3.508	.008

a. Dependent Variable: PA level

Table 25. (cont'd), Comparison PA distribution in Multi Storey Houses -Regression

Analysis

Excluded Variables[b]

Model		Beta In	t	Sig.
1	housework (days per week)	.290[a]	1.365	.214
	housework (min./day)	-.088[a]	-.373	.720
	Leisure time activities (min./day)	-.124[a]	-.524	.617
	cooking (days per week)	-.321[a]	-1.515	.173
	cooking (min./day)	-.220[a]	-.951	.373
	kitchen activities (min. /day)	.059[a]	.249	.810
	bathing (days per week)	-.197[a]	-.798	.451
	personal hygiene (min. /day)	.026[a]	.104	.920
	using staircase (min./day)	.083[a]	.338	.745
	garden activities (min. /day)	-.489[a]	-1.072	.319
	garden and terrace activities (min./day)	-.638[a]	-1.316	.230

Excluded Variables[b]

Model		Partial Correlation	Collinearity Statistics Tolerance
1	housework (days per week)	.459	.984
	housework (min./day)	-.140	.987
	Leisure time activities (min./day)	-.194	.966
	cooking (days per week)	-.497	.947
	cooking (min./day)	-.338	.931
	kitchen activities (min. /day)	.094	.994
	bathing (days per week)	-.289	.844
	personal hygiene (min. /day)	.039	.909
	using staircase (min./day)	.127	.931
	garden activities (min. /day)	-.376	.233
	garden and terrace activities (min./day)	-.445	.192

a. Predictors in the Model: (Constant), terrace activities (min./day)
b. Dependent Variable: PA level

Table 26.Comparison of PA Levels of Participants in Single and Multi Storey

Houses: T-Test analysis

Group Statistics

	type of houses	N	Mean	Std. Deviation	Std. Error Mean
PA levels of participants	single storey	60	1.68	.651	.084
	multi storey	60	1.78	.715	.092

Independent Samples Test

		Levene's Test for Equality of Variances	
		F	Sig.
PA levels of participants	Equal variances assumed	.244	.623
	Equal variances not assumed		

Independent Samples Test

		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
PA levels of participants	Equal variances assumed	-.801	118	.425
	Equal variances not assumed	-.801	116.961	.425

Independent Samples Test

		t-test for Equality of Means	
		Mean Difference	Std. Error Difference
PA levels of participants	Equal variances assumed	-.100	.125
	Equal variances not assumed	-.100	.125

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
PA levels of participants	Equal variances assumed	-.347	.147
	Equal variances not assumed	-.347	.147