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Master's Thesis of Public Administration

# A Study on Participation in Daily Sports Programs

– Focusing on
Individual and Environmental Factors

# 생활체육프로그램 참여 연구

–개인 및 환경 요인을 중심으로–

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# A Study on Participation in Daily Sports Programs

– Focusing on Individual and Environmental Factors–

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# Abstract

Daily sports positively improve health, quality of life, and the satisfaction of leisure life in an aging society. Accordingly, daily sports is sometimes interpreted as active sports welfare. The government has invested a lot of budgets and implemented various policies. Accordingly, the participation rate of people in daily sports has also continued to increase. However, the policies that have been implemented so far have been based on policy and political demand rather than on empirical analysis. In order to improve the effectiveness of the sports policy, which is expected to expand in the future, this paper studied various factors affecting sports participation.

The term 'daily sports' means voluntary and daily sports activities to improve health and physical fitness. 'Regularly participating in daily sports' means 'for the past year, regular participation in sports activities at least once a week and at least 30 minutes when exercising once a week.'

Research models and hypotheses were established based on the review of theory and previous research. Dependent variables are whether or not to participate in daily sports and the frequency of participation. Independent variables were divided into individual and environmental factors. It includes individual psychological factors (cognition about physical fitness effect of sports, awareness of physical fitness condition), individual experience factors (physical fitness program experience, sports club joining experience, sports program experience), and environmental factors (the number of public sports facilities, public sports clubs, certified sports leaders). It was hypothesized that the independent variables have a positive (+) effect on the dependent variables. After that, logistic regression analysis and regression analysis were conducted.

As a result, psychological awareness, and experience, which are individual factors, had a statistically significant positive (+) effect

on both participation and frequency. This was the same when the year and region were controlled and analyzed. On the other hand, in terms of environmental factors, only the number of private sports facilities and public sports clubs had a statistically significant positive (+) effect on both participation and frequency of daily sports. However, it was not found that the number of public sports facilities and certified sports leaders had a statistically significant positive (+) effect on participation and frequency.

Some factors were found to positively affect participation in daily sports, as expected, so it is necessary to expand policies that can further activate this. In particular, it was found that there were cases in which specific variables, regions, and years had an interaction effect, which had a positive impact on the expansion of participation. Therefore, it is necessary to further activate this policy in the region by looking at these cases.

In the case of public sports facilities and certified sports leaders, there was no positive (+) effect. However, since this is the result of a study on a specific region, year, and sample, it may be different from the overall estimation result. Another reason may be that since this paper counted the number of sports infrastructures at the regional government level, the proximity between the sample and sports infrastructure was insufficient. In addition, since the purpose of public interest worked when determining the installation spot of public facilities such as public sports facilities, there was a possibility that the demand for the participation of that region was not high from the beginning. Nevertheless, as it was confirmed that a simple quantitative increase in public sports facilities and certified sports leaders might not positively affect the expansion of participation, efforts to improve operations will be necessary.

In addition, the predictions in the policy field may differ from the results of research analysis in which various factors such as gender, income, age, individual characteristics, region, and year are considered. Therefore, it was found that the empirical analysis should also be supplemented in the policy field.

On the other hand, this study has the limitation of analyzing only the period before COVID-19 for data continuity. In addition, in the case of environmental factors, the region's scope was too broad to get consistent results between environmental factor variables.

Nevertheless, this study, which comprehensively analyzed individual and environmental factors and factors affecting participation in sports, is thought to help establish related policies in the future.

**Keyword:** Daily sports, Participation in daily sports, Frequency of participation in daily sports, Individual and Environmental factor, National Sports Survey, Sports for All

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# Chapter 1. Introduction

## 1.1. Purpose and Necessity of Research

Today, daily sports have become a part of people's lives. Quantitative and qualitative expansion of leisure time has been achieved against the background of the universalization of the five-day workweek, the social atmosphere emphasizing work-family balance, and the characteristics of the younger generation who prioritize personal happiness and quality of life. Along with expanding leisure time, the people's demand for culture, tourism, and sports to fill it has also grown. In particular, daily sports began to emerge as an essential tool that promotes health, leisure, and happiness.

The increase in interest in daily sports is also based on the efficacy of daily sports. It is known that regular participation in sports not only improves health and prevents chronic diseases but also has a positive effect on mental health. It can be confirmed through many preceding studies that participation in daily sports has a positive impact on leisure satisfaction, job satisfaction, and life satisfaction. In the case of a group participating in sports, research results indicate that indicators related to a happy life, such as achievement, self-development, religion, economic power, self-reliance, and altruism, appear high (Jang & Cho, 2021; Jung, 2001; Kim et al., 2008).

In particular, in the age of aging, the function of daily sports is becoming more prominent to support the successful aging of the elderly. Through daily sports, the elderly can have a positive attitude toward life and improve self-confidence and self-determination. Sports with many people can prevent social isolation

and maintain a sense of belonging and exchange. It is expected that daily sports in the super-aging period will contribute to achieving a healthy lifespan and promoting the happiness of the elderly population.

Accordingly, daily sports attract attention as a concept of preventive health care and sports welfare in the active sense. As the perception that daily sports have a positive role in reducing health expenditure and achieving a healthy lifespan has expanded, sports activities have been recognized as an active means of welfare. At this time, welfare means achieving health, happiness, and quality of life through sports beyond simply eating and living. In other words, sports welfare has a positive meaning to preventing disease through regular sports activities, beyond the passive right to benefit from health insurance and medical benefits when suffering from an illness. In other words, implementing a policy that provides citizens with opportunities to participate in daily sports means providing ‘welfare to be able to sport’.

In a similar context, advanced countries have already mentioned sports rights as social rights. Welfare-advanced countries, IOC, UN, etc., view the concept of sports for all as part of social welfare. From the perspective of equality, this concept means expanding sports participation to the underprivileged, such as women, the elderly, and the disabled. In particular, the active aging movement, which began in European society as a solution to the growing elderly population, emphasizes sports activities for a healthy and active old age life.

Based on such expanding demand from the people and global trends, the Korean government and local governments have promoted various policies to broaden the participation of citizens in daily sports. Korea's sports policy, centered on fostering professional sports, has gradually expanded the proportion of daily

sports. For example, as a result, the number of public sports facilities increased significantly from 17,157 in 2012 to 30,185 in 2019.

This policy aims to improve people's health, happiness, and quality of life by expanding participation in daily sports. Accordingly, the participation rate in sports( the rate of regular participation in sports for 30 minutes at least once a week for the past year) has continuously increased from 54.8% in 2014 to 66.6% in 2019.

For the various policies promoted to enhance people's participation in sports to achieve their goals efficiently, it is necessary to pursue consumer-tailored policies based on research on the reasons and aspects of policy consumers' participation. In other words, it is possible to improve the effectiveness of policies and the efficiency of budget execution by empirically analyzing which factors determine participation in daily sports and concentrating support on them.

However, Korea's policy to encourage participation in sports has been based on political and policy demands rather than empirical analysis. In this context, Lee et al. (2012) said that there was no concrete confirmation of how the improvement of the environment related to physical activity affects people's participation in physical activity. Policies to promote participation in daily sports, such as the construction of sports facilities, require large-scale national and local government budgets and have low flexibility in policy changes. Therefore, careful decision-making will be necessary for planning and execution.

This study will provide the basis for formulating a reasonable policy by analyzing the factors that affect participation in daily sports.

## 1.2. Research Subject and Scope

### 1) Definition of Daily Sports and Sports Participation

‘Sports’ refers to 'cultivating a healthy body and mind through physical activities such as athletics and outdoor sports and using leisure time wisely' (Article 2 of the National Sports Promotion Act). Sport traditionally focuses on the match and requires competitiveness, physicality, and rules. However, many researchers apply the concept of sport to a wide range presented by international organizations such as the United Nations and the Council of Europe. Sports, defined by the UN and the Council of Europe, have a common denominator of 'all kinds of physical activity.' According to the United Nations, sport refers to any form of physical activity contributes to physical health, mental health, and social interaction (Wellard, 2007). Similarly, the Sports Charter issued by the Council of Europe in 1992 defines sport as all forms of new activity at all levels that promote physical health, mental health, and social relationships (Kim & Ryu, 2016).

Health science uses a similar concept called 'Physical Activity.' Physical activity is a bodily movement that generates energy consumption through skeletal muscle contraction and includes all bodily movements that occur during daily life or work as well as exercise and sports in a wide range (Kang, 2015).

‘Daily sports ‘is sports activities conducted to improve people's health and physical fitness by using daily life and leisure time with voluntary participation (2018 Sports White Paper). Legally, it means ‘sports activities conducted voluntarily in daily life for the promotion of health and fitness’ (Article 2, of the National Sports Promotion Act). It contrasts with 'professional sports’ (Article 2 of the National Sports Promotion Act)', which

means 'activities of sports events conducted by players.' The Act on Promotion of Sports for All, which covers the entire field of daily sports, also stipulates the exact definition of the National Sports Promotion Act . This law uses the term 'sports for all,' but terms such as 'sports for all' and 'daily sports' are used interchangeably in various studies. Therefore, this study will use the term 'daily sports' rather than 'sports for all' for intuitive understanding.

Participation in daily sports can be interpreted in various ways. However, 'participation in regular daily sports, which the Ministry of Culture, Sports and Tourism uses as a standard in the National Sports Survey, means 'regularly participating in sports activities at least once a week for at least 30 minutes per exercise for the past year'. Regular activity is necessary to exert the effect of daily sports activity. In addition, even when analyzing factors influencing participation to enhance policy effects, it would be meaningful to analyze factors influencing regular participation. Therefore, in this study, it seems reasonable to define 'participation in daily sports' based on continuous and regular participation, not intermittent and temporary participation.

On the other hand, according to the National Sports Survey (2020), walking is the most common event among regular sports participants, followed by mountain climbing, bodybuilding, soccer, yoga, cycling, swimming, gymnastics, and golf. In other words, when it comes to participating in daily sports, there are various sports kinds to choose from, which will be determined by factors such as individual preference, nearby facilities, available time, and cost. However, in this study, participation patterns that vary depending on the participating kinds will not be included in the scope of analysis due to data acquisition and analysis limitations. Regardless of the sports kinds, the factors that can generally affect participation in sports are set as the scope of research and examined.

## 2) Policies for Expanding Participation in Daily Sports

Daily sports policy can be defined as the government's planning, adjusting, and developing the sport system to maintain and improve people's health and lead a happy life by improving their quality of life. Article 3 of Act on Promotion of Sports for All states that all citizens can enjoy sports for healthy physical activities and leisure use. It says that there is no discrimination regarding daily sports. Also, it mentions that the state and local governments have the duty to try for the people's sports participation. In other words, daily sport is not only an individual activity that individuals choose and engage in but also governments' support realizing the right to enjoy sports. Therefore, there is a need to examine participation in daily sports from a policy perspective, not just consider it as an individual choice.

Sports rights and the right to enjoy sports began to be declared internationally in the 'Sports Declaration' of the International Sports and Sports Conference held during the 1968 Mexico Olympics and the 'Sports Charter for All' enacted by the 1975 European Council Sports Ministerial Conference. In particular, after the meeting in 1975, it began to materialize into social movements and national policies. This charter declared for the first time that participation in sports is a right everyone should have and served as an opportunity to revitalize the global life sports movement called "sports for all." There is also an opinion that the right to sports is secured as a fundamental right under the constitution in modern society.

In other words, sports rights can be said to be a modern human right with a more robust social rights character than a free right among the people's fundamental rights, and it can also be said to be an active right that demands the state's duty. The government and local governments have continuously expanded daily sports policies to realize these sports rights.

Korea's sports policy before the 1980s recognized sports promotion as the driving force of national unity and the basis for national development under the slogan, "Physical strength is a national power," putting all efforts into fostering professional sports and leading sports policy led by the government. Since the 1980s, with the opening of professional baseball in 1982, international competitions have been successfully held in 1986 and 1988.

After successfully hosting the 1988 Seoul Olympics, the government established the so-called 'Hodori Plan' in 1989. This was the first comprehensive plan for promoting daily sports and became the basis for the policy for daily sports in Korea. In other words, the concentration on indirect sports watching sports began to change to direct sports participation in daily sports. And daily sports policies began to be activated accordingly.

In the 1990s, with the goal of balanced development with professional sports, sports policies were developed to promote daily sports, which were relatively behind compared to professional sports. Since the 2000s, with interest in international sports competitions, sports policies have been promoted as a decisive right to improve the quality of life for all citizens, such as expanding participation opportunities for the underprivileged as a welfare service based on daily sports (Son, 2016).

The continuous development of Korea's daily sports policy aligns with economic growth. The time of the shift in perception to the new sports policy was the point when GNI reached more than 2,000 dollars, which could focus on something other than survival as food, clothing, and shelter were resolved. When the GNI developed to about 10,000 to about 30,000 dollars, Korea began to promote daily sports' quantitative development and scientific policy.

In addition, it can be seen that Korea's daily sports environment developed in the 1980s in conjunction with means to solve political tasks, increased desire for leisure activities due to economic growth, and the government's attempt to focus attention on sports. In other

words, Korea's daily sports environment has developed based on a planned environment and induced goals rather than a gradual and cultural development like advanced sports countries.

Through these processes, the proportion of daily sports in Korea's policy has gradually expanded. The government's daily sports budget has increased continuously from 17.6 billion won (7.5%) to 127.5 billion won (99%) in 2018, and now the policy to expand participation in daily sports plays a critical axis in Korea's sports policy. Although Korea's daily sports policy has shown different aspects depending on the period, the general framework of improving people's physical strength, health, and quality of life has been implemented without change.

This study aims to comprehensively analyze participation in daily sports from both individual and environmental aspects and to focus on deriving policy implications for formulating policies that allow more people to participate in sports activities.

# Chapter 2. Theoretical Background and Previous Research Review

## 2.1. Theoretical Discussion

Many researchers have applied various theories and models to identify the factors that affect participation in sports and the expansion of physical activity in health, physical education, behavioral science, and public health.

### 1) Individual Psychological Cognition

A theory of individual psychological factors is the Value-Expectancy Theory. It starts from Victor Vroom's Expectancy Theory and is developed with a focus on the cognitive position. In this theory, behavior is achieved by subjective values and expectations which people have about the outcome. People act when they feel that the benefits of the activity outweigh the expected difficulties in acting. The Health Belief Model is the most used conceptual framework concerning physical activity participation and health behavior. It was developed in the United States in the 1950s to explain why people do not participate in cancer prevention programs. This model presents vulnerability awareness, seriousness awareness, benefit awareness, disability awareness, and action triggers as crucial elements (Kim, 2018a).

Also, Bandura (1977) presents the concept of Self-Efficacy. It means an individual' s confidence that they can successfully implement the actions necessary to elicit an outcome. In other words, when self-efficacy is satisfied through physical activity, this activity can continue.

## 2) Individual's Intrinsic Motivations: Satisfaction, Fun, etc.

Deci and Ryan's (1987) Self-Determination Theory explains intrinsic human motivation (Jang & Cho, 2021; Kim, 2011). It explains that an essential determinant of sports participation is an individual's internal choice (Jung, 2001). According to the Self-Determination Theory, certain behaviors are induced and have continuity when autonomy, competence, and relatedness are satisfied. In other words, if an individual has experienced satisfaction and fun in a sports activity, they will voluntarily maintain that behavior due to intrinsic motivation, even if there is no external reward (Jeong, 2000; Oh, 2015).

This state can also be seen as immersion. Scanlan, Carpenter, Schmidt, & Simons (1993) define positive commitment initiated by internal motivation as an apparent belief, hope, expectation, or promise to participate in sports or physical activity. Also, according to Flow Experience Theory, flow is a state of being completely immersed in a move due to an individual's internal motivation.

Scanian and co-researchers presents the Sports Commitment Model. It is a psychological concept representing the determination and motivation to participate in sports. Factors determining sports commitment include enjoyment, personal time investment and effort, opportunities, and social constraints. Among them, enjoyment was found to be the key variable that had the most significant influence on continued participation in sports (Oh, 2015).

Lee and Ji (2017) refer to the 'Theory of Planned Behavior (TPB)' developed by Ajzen (1991) and find the most appropriate way to understand the "why do people exercise?" model (Courneya, 1995). Previous studies applying this theory have analyzed that an individual's physical activity has a causal relationship with an individual's attitude, subjective norm, and perception of behavioral control. However, this theory is criticized for using only individual psychological variables as predictors and not considering physical and environmental variables.

### 3) Social Background and Social Relationships

Some studies emphasize social class background. Most people believe that sport is open, democratic, and free of inequality and that men and women of all ages can participate in sport. However, from a practical point of view, sports participation is related to various social class levels according to gender, age, education level, occupation, income level, and education level (Hobart, 1975). The hierarchical status of individuals or groups significantly impacts attitudes and behaviors in social life. Therefore, the type and degree of sports participation will differ depending on the various social classes formed in society (Park & Chae, 2011).

Bearden (1989) states that 'susceptibility to interpersonal influence' appears in product or service selection. This refers to the desire to improve one's image through others by consuming a product or service.

Won (2016) mentions that everyone belongs to one or more 'reference groups' and that reference groups affect individual thoughts and behaviors. People imitate group members to be recognized as group members.

According to Kemper's Reference Group Theory, humans take a group or other person as a reference standard. The attitudes and values of family, peers, coaches, and teachers affect individual participation in sports.

Kim et al. (2009) explains physical activity through the concept of social capital. Social capital facilitates the acquisition of information about physical activity needs and locations. It is seen that trust and solidarity constituting social capital activate social support that promotes physical activity and contributes to increasing the motivation to conform to a role model. In addition, it is said that members of society with a solid propensity to comply with norms, which is an element of social capital, can accept well the policies or guidelines for vitalizing daily sports.

## 4) Environmental Factors

Theories that explain the complex action of several factors have increased. Intention to continue participating is not only affected by the individual's intrinsic motivation but also influenced by the individual, society, and environment. The interaction of these variables continuously affects sports participation (Oh, 2015).

'Social Cognitive Theory (SCT)' is a triadic model in which personal factors, behaviors, and environments influence each other. The early social cognitive theory is based on the social learning theory that humans were created by learning in a social context. Social cognitive theory synthesizes cognitive, emotional, and behaviorist understandings of behavioral change (Kim, 2018a).

The socio-Ecological Model is based on the idea that interactions between an individual and the environment determine an individual's behavior. This model is a current theoretical framework proposed to unify multiple theories and hypotheses about individual behavior and health (Choi, 2020). The core of this model is to analyze individual adaptation to the environment and environmental influence simultaneously and to evaluate the individual and the ecosystem together.

Cho and Song (2003) states that Socio-Ecological model could be applied when explaining variables that affect physical activity. Kim et al. (2014) mentions that this model allows an integrated approach to physical activity in a social context that encompasses humans and environment. Kim et al. (2008) states that the possibility of success of this model is high when several factors affecting physical activity are mediated at the same time.

In other words, the Socio-Ecological Model explains that various determinants surrounding an individual, such as personal, interpersonal, environmental factors, and social policies, can have an integrated effect. As such, it presents several categories that can affect behavior and suggest the need for a broader evaluation of these determinants (Choi, 2020).

## 2.2. Previous Research Review

In the past, factors affecting physical activity were interpreted mainly from personal aspects such as motivation or belief. However, various social and physical environments and personal factors are recently considered to affect physical activity practice (Kang, 2015; Lee et al., 2012).

Kang (2015) states that since physical activity results from the interaction between the individual and the environment, it is essential to study personal, social, and environmental factors from a comprehensive perspective to promote physical activity.

Lee and Ji (2017) also mention that applying a socio-ecological perspective, it takes a multi-dimensional approach to the relationship between individual internal and external characteristics and social influences, environmental variables, and physical activities.

Kim et al. (2009) states that physical activity participation is affected by demographic factors (gender, age, income, education level, occupation), individual socio-psychological factors (self-efficacy, self-control ability, perceived benefits and obstacles to physical activity, enjoyment), sociocultural variables (social support from family, colleagues, teachers, existence of active role models), environment and policy factors (space for physical activity, transportation policy, urban planning) of the local community.

In 2005, the Transportation Research Board of the United States identified the determinants of physical activity as 'Individual characteristics,' such as attitude, taste, motivation, and technology. Also, it identified other determinants as 'Built environment,' such as land use patterns and transportation systems, and 'Social environment,' such as social values, public policies, and economic market principles (Kang et al., 2015).

## 1) Individual Psychological Factors

Psychological variables that affect sports participation include self-efficacy, perceived health status, drinking level, smoking status, sports broadcast viewing behavior, motivation, etc. According to a study by USDHHS (1996), high self-efficacy, belief that exercise has health benefits, and perceived sensitivity to health increased health-promoting behaviors. The higher the perceived severity of health, self-efficacy, and belief in the exercise effect, the more regular exercise was done.

Kim et al. (2014) states that self-efficacy showed reliable predictive power in explaining participation in physical activity. Kim (2012) reports that as a result of regression analysis on factors affecting sports activities of college students, the higher the subjective health status, the higher the number of sports activities.

## 2) Social Relationships and Previous Experiences

Social networks and culture affect an individual's physical activity. These include the support of family or friends, social norms, and the economic level of the community. When social capital is low, physical activity is also low. Social capital consists of social networks, social support, and social participation.

In a study of residents in Gyeonggi-do in Korea, it was analyzed that the higher the number of active group participation, the network, and the higher the sense of solidarity, the higher the practice rate of physical activity. It is known that physical activity increases when social support related to physical activity is provided by family, friends, and exercise experts (Kang, 2015).

'Social Modeling' refers to the degree to which people around them participate in a specific behavior. The higher the social modeling, the greater the number of people around them who participate in a specific behavior. In other words, the more people

around them who exercise, the higher the social modeling, and the longer they maintain physical activity. As the social modeling index increased by 1 unit, the probability of belonging to the sports participation group increased by 4.8%. In other words, it was found that social modeling had a more significant impact on sports participation than any other factor (Kim & Ryu, 2016).

There are also studies on the influence of groups to which individuals belong. According to Ahn (2000), group similarity influences sports participation behavior, and sports consumers go through the process of approving and internalizing values or norms directly delivered by reference groups.

Kim (2012) states that social factors such as membership in sports clubs and friendships significantly affect college students' physical activity. In other words, a network for exchanging information can be formed by forming close relationships with friends, seniors, and juniors in college life. Through this, an opportunity to participate in physical activities can be prepared.

Lee (2019) also mentions that if a companion or partner does physical activity together, the probability of participating in regular physical activity increases.

Existing physical activity-related experiences have also been analyzed in previous studies. Kang (2015) states that moderate or higher physical activity participation is high among citizens who have participated in a local government exercise program within one year. Lee (2019) also mentions that the more experience related to physical education for daily sports, the higher the probability of participating in regular physical activity. Therefore, this shows the importance of daily sports leaders and programs.

Park and Lee (2019) used the propensity score matching method, a widely used method for evaluating the effectiveness of policy. In that research, participation in the physical fitness certification program of the National Fitness 100 showed significant positive effects on the frequency, duration, and intensity of

participation in daily sports.

### 3) Environmental, Regional Factors

Kim et al. (2014) states that environments affecting physical activity are weather, spatial accessibility of exercise facilities, the convenience of exercise facilities, home furnishing of exercise facilities, safety around exercise facilities, and socio-economic status of neighbors. Kang (2015) also mentions that even after adjusting for individual-level factors, access to exercise places and the experience of participating in exercise programs significantly positively affect physical activity practice. In other words, he cites facilities and programs as the physical and environmental factors that affect participation in daily sports.

Among them, there are many studies on the effect of sports facilities on sports participation. Many researchers have stated that ease of use, quality of facilities, and accessibility of exercise facilities are significantly related to physical activity participation. (Lee & Ji, 2017). In addition, some studies show that awareness of nearby sports facilities has a positive causal relationship with participation in regular sports activities (Lee, 2019)

Park and Kim (2019) expect that access to sports facilities (time required) would directly affect participation in sports rather than whether or not there are sports facilities near the house. As a result of the study, it is found that the longer it took to reach the gym, the lower the frequency of physical activity.

However, there are different results in a survey conducted by Lee (2012) on residents who visited public health centers in Seoul. The physical environment, such as the number of public sports spaces, sports facilities, and park areas, shows no relation with moderate and high-intensity physical activity and levels of walking participation. This differs from the results of many previous studies that the physical environment has a close relationship with physical activity.

In a study by Lee (2019), it is found that the time required to reach the facilities mainly used does not affect participation. In addition, the time required to reach the facility significantly negatively affect the participation frequency. In other words, the travel time to the sports facility does not significantly affect whether or not to participate. However, as the travel time increases and the accessibility to sports facilities decreases, the frequency of participation in sports activities tend to decrease.

A study also distinguishes public sports facilities from private facilities. Kim and Ryu (2016) analyze the factors influencing sports participation using a multi-layered model based on survey data of 465 Seoul citizens between the ages of 20 and 60. As a result, only private facilities have a significant positive effect, but the number of public sports facilities does not have a significant effect.

Research has also shown that a community's safety and comfort are essential in providing stimulation and opportunities for outdoor physical activity. It is said that appropriate stimulation and opportunity to participate in physical activity are provided when the exercise place and residence are safe and comfortable. However, according to Kang (2015), when people are satisfied with the safety level of the neighborhood, the rate of physical activity decreases. It can be estimated that these people do not relate their neighbor's safety with physical activity.

## 4) Individual Demographic Factors

Individual-level factors include demographic characteristics (gender, age, income) or socioeconomic status (income, education, occupation). Lee et al. (2012) state that community residents' degree of physical activity participation is more closely related to individual will or cognitive factors than the physical environment.

Regarding gender, studies have shown that males participate in high- and moderate-intensity exercise at a higher rate than females in adolescents, adults, and the elderly. Cho (2009) also analyzes that men have a higher participation rate in physical activity than women. Moreover, the research results of Kim (2018b) also shows that women's physical activity participation rate is lower than men's, especially in terms of participation time and cost. Except for some female-dominated events, such as aerobic exercise, women showed a lower participation rate than men in overall sports scenes. Kang (2015) analyzes the physical activity of Seoul citizens using the data from the Community Health Survey. As a result, it is found that males practiced physical activity 7-8% more than females.

Regarding age, Kang (2015) shows the most active participation in his 50s, and the participation rate was low in his 30s and 70s or older. Park and Kim (2019) analyze that teenagers' participation in sports was the most insufficient. They assume that it is because teenagers usually spend a lot of time at school and do not have enough time to participate in daily sports activities.

Regarding income, a study shows that people with low-income levels have a high prevalence and enjoy health-risk activities such as drinking and smoking. In contrast, high-income people regularly engage in health promotion activities and are interested in preventive activities (Kang, 2015). In a study based on the UK's 1997 survey data, there is also a research result that participation in physical activity shows the relationship with household income and educational attainment. However, Lee (2019) does not find the significance of the coefficient at the 5% significance level in the case of household income and analyzes that the level of education also does not have a statistically significant effect.

Regarding occupation, Lee (2019) reveals that the probability

of participating in physical activity decreases significantly for those who have a job. Workers are less likely to participate in regular sports activities than those who are not unemployed, students, or full-time homemakers who have relatively free leisure time. On the other hand, according to Kang (2015), there is no certain tendency between occupation and participation in physical activity.

Married people are less likely to participate in regular sports activities, which seems to be due to limitations in the use of leisure time (Lee, 2019).

## 2.3. Differences from Previous Studies

First, from a socio-ecological standpoint, this paper will comprehensively examine the various variables that affect participation in sports identified in previous studies. Recently, there has been an increasing trend of comprehensive studies examining the environment factors in addition to individual factors. However, many studies have focused more on verifying demographic factors such as gender and age. However, there is a limit to examining the factors that affect individuals' participation from only one aspect. Therefore, this paper will look at individual, social, and environmental factors equally.

Second, the causal relationship of variables derived differently in the range and direction of influence in previous studies will be analyzed more intensively. For example, the results of previous studies on the effect of sports facilities on participation are also different. These differences may be due to differences in research methods and scopes. As both the central and local governments are the fields in which the highest portion of sports finance is invested, it is considered necessary to analyze the impact relationship of public sports facilities and the effectiveness of policies.

Third, objective statistical data will be used together to verify the influence of sports facilities or programs, which are physical environmental factors. There are three main ways to analyze sports facilities' effect on sports participation. These are the method of confirming individual recognition and facility use, utilizing objective current status data of the region, and using both together. Most studies conducted research using questionnaire data for individuals, and only a few studies used individual and regional level variables together. According to Kim and Ryu (2016), the reason for including regional factor is that the location of residence influences individual behavior. Moreover, the effect between the unit and the regional unit variable could be compared by studying two variables.

# Chapter 3. Research Design and Method

## 3.1. Analytical Framework and Research Hypotheses

### 1) Analytical Framework

This study analyzes the factors influencing participation and frequency of daily sports. To this end, the dependent variables will be whether or not to participate in sports and the frequency.

As we enter an aging society, interest in healthy life expectancy increases. Moreover, interest in physical activity and medical care is also gradually increasing. Accordingly, the central and local governments are investing much budget to support people's participation in daily sports. In order to further increase policy effectiveness, it is essential to know what factors can promote participation in daily sports.

In this study, the key variables that affect the participation and frequency of sports are △the individual's psychological cognition related to daily sports, △the person's experience related to sports, and △the infrastructure related to sports in the residential area. In particular, according to the Socio-Ecological model, an individual's behavior is determined by the interaction between individuals and the environment.

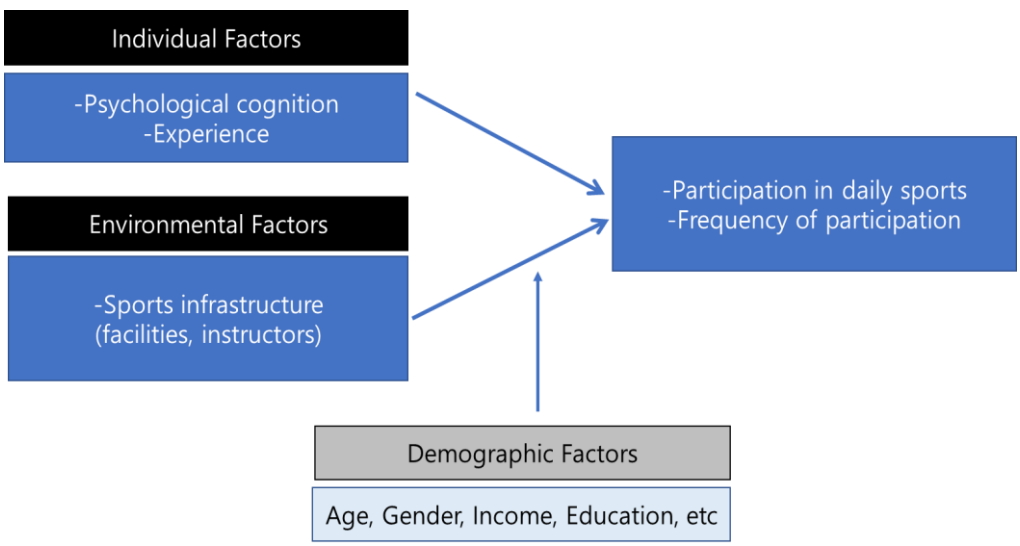
First, regarding the individual factor, the Health Belief Model has stated that vulnerability awareness, seriousness awareness, and benefit awareness are vital factors inducing health behavior. It can be seen that the psychological cognition about both the effects of daily sport and a person's physical condition will affect sports participation. In addition, according to the Self-Determination Theory, it has been said that experiencing fun and satisfaction in a specific action triggers intrinsic motivation. In other words, it can be assumed that the existing sports experience will affect future

participation in daily sports.

Next, regarding the environmental factor, previous studies have pointed out that the social environment can be a determinant of physical activity. In addition, daily sports policies of governments are also based on the premise that the expansion of such infrastructure will positively affect the expansion of participation in sports. Therefore, this study assumes that the infrastructure for daily sports, such as facilities and instructors in the residential area, is a variable that affects participation in daily sports.

In addition, previous studies have shown that individual demographic and socio-environmental characteristics also affect the participation and frequency of daily sports. Although the direction of the influence appears somewhat different, the explanatory power appears to be high. Therefore, the individual's gender, age, region of residence, education, income, and marriage status will be controlled.

<Table 3-1> Conceptual reference framework for research



## 2) Research Hypotheses

Based on the above research framework, the influence of each variable on the participation and frequency of daily sports will be analyzed with the broad frame of an individual's psychological cognition and experience related to sports and the presence of local infrastructure related to daily sports. To this end, this paper formulates the following hypotheses:

The first hypothesis is about the effect of an individual's cognition and experience related to daily sports on whether or not to participate in sports. This is a hypothesis to investigate the effects of individual factors on whether or not to participate in daily sports. It was assumed that it would have a positive (+) effect, as it is thought that the probability of participating in sports is high when there is psychological awareness and experience related to daily sports (hypothesis 1).

*Hypothesis 1. An individual's cognition and experience related to daily sports will have a positive (+) effect on participation in daily sports.*

The second hypothesis is about the effect of an individual's cognition and experience related to daily sports on the frequency of participation in sports. This is a hypothesis to investigate the effect of individual factors on the frequency of participation in daily sports. It was assumed that the frequency of participation in sports would be high when there was awareness and experience related to daily sports, so it would have a positive (+) effect (Hypothesis 2).

*Hypothesis 2. Individual experience and cognition related to daily sports will have a positive (+) effect on the frequency of participation in daily sports.*

The third hypothesis is about the effect of the infrastructure of the residential area related to daily sports on whether or not to participate in sports. This is a hypothesis to investigate the effect of environmental factors on participation in daily sports. It was assumed that it would have a positive (+) effect because it is thought that the probability of participating in daily sports is high when the local infrastructure related to sports is well-equipped (Hypothesis 3).

*Hypothesis 3. Infrastructure related to daily sports in the residential area will have a positive (+) effect on participation in daily sports.*

The fourth hypothesis is about the effect of the infrastructure of the residential area related to daily sports on the frequency of participation in sports. This is a hypothesis about the effect of environmental factors on the frequency of participation in daily sports. It was assumed that participation in daily sports would be frequent when the local infrastructure related to sports is well-equipped, so it would have a positive (+) effect (Hypothesis 4).

*Hypothesis 4. Infrastructure related to daily sports in the residential area will have a positive (+) effect on the frequency of participation in daily sports.*

## 3.2. Data

### 1) National Sports Survey

This study mainly utilizes data from the 'National Sports Survey.' The National Sports Survey is an approved statistics (approval number 113003) designated by the National Statistical Office that has been conducted by the Ministry of Culture, Sports, and Tourism since 1986. Until 2010, it was conducted every three years and two years, and since 2012, it has been conducted every year. The National Sports Survey is to identify the actual conditions and demand for Korean citizens' participation in daily sports and provides data by region, city size, gender, age, education level, occupation, and income. The survey target is 9,000 people aged ten or older residing in 17 cities and provinces, including Sejong Metropolitan City. The Stratified Multi-Stage Cluster Sampling method is used to extract samples. It is conducted through 1:1 household visit interviews by surveyors.

Survey items are largely divided into ① health and physical condition, ② physical activity and conditions, and ③ physical activity participation status. Physical activity and conditions are composed of items such as sports facilities, sports programs, physical fitness management, and clubs. The current status of participation in physical activity consists of items such as the current status of participation in physical activity, reasons, and events.

In other words, some items show participation in daily sports according to individual or regional characteristics, and some can explain the motivation for sports. Of course, it is meaningful to analyze the superficial differences in how the participation rate varies according to gender, age, and region. However, knowing the factors that cause these differences in participation in daily sports will have policy implications. Therefore, among the various

questionnaire items of the National Sports Survey, the items expected to affect sports participation will be set as variables.

Regarding the period of data, the six-year data from 2019 to 2014 are used, considering the possibility of obtaining the original data. In the case of 2020, due to the influence of COVID-19, participation in daily sports has changed significantly compared to previous years. Therefore, this paper uses the data up to 2019 instead of 2020 for continuous interpretation of the data.

## 2) Other Data

In addition to the survey data using the National Sports Survey, this paper intends to use statistical data announced by related organizations such as the Ministry of Culture, Sports and Tourism, and the National Sports Promotion Agency. In order to confirm the physical and environmental factors at the local level, objective statistical data such as the current status of sports facilities and sports programs at the local government level will be used. To this end, this paper uses various data, such as national public sports facility status, national report and registered sports facility business status, sports white paper, Korea sports index, etc. Those were disclosed through the Ministry of Culture, Sports and Tourism, the National Sports Promotion Agency, and the Korea Institute of Sports Policy and Science.

## 3.3. Measurement of Variables

The following variables were selected in consideration of previous research, theoretical review, and available data, focusing on significant items to participate in daily sports among the National Sports Survey. In particular, based on socio-ecological theory, we intend to analyze individual and environmental factors comprehensively.

### 1) Dependent Variables

As the dependent variables, this paper will use whether or not to participate in daily sports and the frequency of participation.

As for the first dependent variable, participation in daily sports, the concept of the participation rate for daily sports in the National Sports Survey is used. This index is a representative performance indicator of daily sports policies. And as the same as standard of survey, whether or not to participate in daily sports is interpreted as 'regularly participating in sports activities for at least 30 minutes at least once a week, once a day.'

In the survey, there is a question asking, "frequency of regular physical activity participation in the past year." And there are responding items, like "1 = never, 2 = less than 3 times a month, 3 = once a week, 4 = twice a week, 5 = 3 times a week, 6 = 4 times a week, 7 = 5 times a week, 8 = 6 times a week, 9 = every day". According to the standard for measuring participation in sports that the government has announced, "1=never, 2=less than 3 times a month" is classified as "non-participation". And "3=once a week" or more is classified as "participation." Then, it is converted into a dummy variable and treated as '1 = participation, 0 = non-participation' to proceed with the analysis.

The second dependent variable, frequency of participation in

daily sports, is an indicator that can measure the degree of specific participation. This is different from whether or not to participate in sports, which measures the lowest level of participation. The reason for using frequency as another dependent variable is that it could be significant in policy making. The primary goal of daily sports policies is to have more people participate in sports, but the ultimate goal would be to allow more people to participate in sports more often.

The answer to the question of "frequency of regular physical activity participation in the past year" in the survey is "1 = never, 2 = less than 3 times a month, 3 = once a week, 4 = twice a week, 5 = 3 times a week, 6 = 4 times a week, 7 = 5 times a week, 8 = 6 times a week, 9 = every day". Therefore, this paper uses this question to represent the frequency of participation.

## 2) Independent Variables

### (1) Individual factors: Psychological Cognition and Experience

Various variables can explain an individual's psychological cognition and experience. This study wants to set the sub-variables as follows.

#### A. Cognition about Physical Fitness Effect of Sports

According to Value-Expectancy Theory, people act when the benefits of the action outweigh the expected difficulties. In the Health Belief model, it is said that the perception of vulnerability, perception of seriousness, and perception of benefit are key factors inducing health behavior. In other words, if the efficacy of participating in sports is extensively recognized, the possibility of participating and continuously increasing the frequency increases. Therefore, in this study, 'recognition about physical fitness effect of daily sports' is used as an independent variable.

To measure this, the question asking "the most necessary activity to maintain physical fitness" of the National Sports Survey is used. The answer to this question is "1=regular physical activity, 2=sufficient rest and sleep, 3=regular meals and nutritional supplement, 4=abstaining alcohol and non-smoking". When people answer "1=regular physical activity," we can interpret that people are aware of daily sports' effects on physical fitness. For regression analysis, it is converted into a dummy variable and treated as “1=recognized as sports as the most necessary factor for maintaining physical fitness”, “0=not recognized as sports”.

### B. Awareness of Physical Fitness Condition

According to Bandura's Self-Efficacy, it is said that there is a high possibility of acting when people can effectively take action to bring about a result. In other words, in the case of recognizing that their physical fitness condition is good, they will recognize that they can get good results by participating in sports, and the possibility of continuously participating in sports will increase. Therefore, this study uses 'awareness of one's physical fitness condition' as an independent variable.

In order to measure this, this paper uses the question of " What level perceives own physical fitness condition level?" in the National Sports Survey. As an answer to this, there are examples of "1 = not good at all, 2 = not very good, 3 = so-so, 4 = good, 5 = very good". In other words, people know that their physical fitness is good as it goes from number 1 to number 5. This paper uses these five scales for analysis.

### C. Physical Fitness Program Experience, Daily Sports Program Experience

According to the Self-Determination Theory, when a person experiences satisfaction and fun in a specific action, the action is maintained by intrinsic motivation. It is to become immersed in an

activity described in the Flow Experience Theory. In the Sports Commitment Model, the most critical variable that determines sports commitment is a pleasure. In other words, the existing daily sports experiences can be a factor in determining whether or not to participate and how often. Therefore, in this study, the experience of participating in the 'physical fitness program' and 'daily sports program' is used as an independent variable.

In order to measure this, this paper uses the question of "whether there is an experience in classes related to daily sports" and "whether there is an experience of prescriptions and counseling services for physical fitness management" of the National Sports Survey. Lessons related to daily sports can be seen as the experience of active and continuous experience of sports regardless of the event. Moreover, prescription and counseling services for physical fitness management can also be considered an active practicing experience. Both questions are converted into dummy variables and treated as '1 = experienced, 0 = no experience' to proceed with the analysis.

### D. Sports Club Joining Experience

According to the Reference Group Theory, it is said that to be recognized by the group members to which they belong, they imitate them and perform similar actions. Based on the concept of Social Capital, it was said that information acquisition becomes more manageable if we belong to a group that exchanges social capital, and activities together through trust and solidarity are further promoted. In other words, the experience of a group or club participating in daily sports activities can be an essential factor in continuing sports activities. Therefore, in this study, 'club membership experience' will be used as an independent variable.

To measure this, the question “whether or not to join a sports club” in the survey is used. This paper converts it into a dummy variable and processed as ‘1= experienced, 0=no experience’.

## (2) Environmental Factors: Daily Sports Infrastructure in Residential Areas

Independent variables in the aspects of the environment are also examined. According to previous studies and theories, local social environment and policy factors can affect participation in sports activities. It turns out that there are some differences in the research scope and result direction among multiple previous studies.

In addition, the reason for analyzing daily sports infrastructure at the local level is that residents who live in areas with suitable sports environments will be exposed to a sports-friendly atmosphere, which can positively affect participation in sports.

The government's policies influence the infrastructure enabling participation in sports. Daily sports policies can be largely divided into three elements: facilities, instructors, and programs. However, this paper will analyze the program as another variable related to individual experience. Therefore, regarding environmental factors, only two aspects of facilities and instructors will be examined. In addition, facilities provided by the private sector can also affect participation, so this factor is also considered.

### A. The number of Public Sports Facilities and Private Facilities

Sports facilities are essential infrastructure that serves as the most standard in checking the environment for daily sports in the region. Although physical activities can be performed in special facilities, such as walking, jogging, and mountain climbing, these are not considered variables that can be measured and used in research. Therefore, the presence or absence of sports facilities can be seen as the most basic indicator to measure the infrastructure of the sports environment in the region.

As defined in Article 2 of the 'Installation and Utilization of Sports Facilities Act,' sports facilities are continuously used for

sports activities and their ancillary facilities. Sports facilities are divided into public and private sports facilities according to the subject of construction and operation. Public sports facilities are divided into specialized sports facilities, daily sports facilities, and workplace sports facilities according to the purpose of use. Private sports facilities are constructed according to detailed standards for 21 events. Private sports facilities are managed as registered and reported sports facilities. Industries such as golf courses, ski resorts, and car racetracks fall under this category.

There are 26,927 public sports facilities in 17 provinces and cities nationwide (as of 2018), with the Gyeonggi having the most public sports facilities. A total of 58,884 sports facility businesses registered in 17 cities and provinces were identified. These sports facility supply policies account for the most significant portion of the sports finance input by the central and local governments. Therefore, in this study, the number of public and private sports facilities by region will be used as an independent variable.

In order to measure this, the status data of national public sports facilities and national registered and reported facilities announced annually by the Ministry of Culture, Sports and Tourism were used. All of them were measured in units of 17 cities. In addition, the number of public and private sports facilities has many digits compared to other variables. Also, the data are concentrated in relatively small values, so they do not follow a normal distribution. Therefore, this paper conducts statistical analysis by converting the number of public and private sports facilities into natural log values.

### B. The number of Public Sports Club

A public sports club is a project in which the government and local governments jointly invest money to support sports facilities, programs, and leaders comprehensively. It is a policy introduced by many advanced sports countries, and it is known that sports clubs played a central role in establishing Germany as an advanced

country in daily sports. The primary goal of sports clubs is to allow residents to visit sports facilities and enjoy well-equipped programs with residents easily. Korea also benchmarked this and started a policy to support the opening and operation of public sports clubs in 2019, and as of 2019, 98 clubs are in operation. Public sports clubs can be seen as an environmental infrastructure for sports that combines sports facilities for all and instructors. Therefore, this indicator is intended to be used as an independent variable in this study.

Data on the current status of public sports clubs announced by the Ministry of Culture, Sports and Tourism are used to measure this. All of them were measured in units of 17 cities.

### C. The number of Certified Sports Leader

Instructors, one of the three elements of sports infrastructure, can also be an essential variable in determining whether or not residents participate in sports. It is possible to participate in sports activities alone without learning. However, the role of an instructor is vital in improving confidence and competence in sports activities and achieving continuous participation.

A more direct and accurate analysis would be possible if the number of coaches that could be met in public and private sports facilities could be used. However, considering the data acquisition problem, the analysis is conducted with the daily sports instructor as an independent variable, supported nationwide by the government and local governments jointly investing financial resources. Certified sports leader is a project to support the deployment of trained leaders nationwide and support activities at schools, community centers, senior citizen centers, and sports facilities. As of 2019, about 2,270 people are active across the country. Also, the number of instructors has many digits compared to other variables. Also, the data are concentrated in relatively small values, so they do not follow a normal distribution. Therefore,

this paper conducts statistical analysis by converting the number of instructors into natural log values.

### 3) Control Variables

Gender, age, region of residence, year, marital state, income level, educational background, and occupational state are intended to be the control variables derived from the review of previous studies. These variables are expected to impact significantly whether or not to participate in sports and their frequency. Therefore, this paper considers them as control variables in the model. In previous studies, the effects of these factors on participation in daily sports appeared in different directions.

First, 'gender' is treated as a dummy variable and included in the analysis as '1=male, 0=female'.

As 'age' is surveyed from the age of ten or older in the National Sports Survey, this study also treats it as a control variable, including each age of the sample aged ten or older.

'Residence area' refers to the region of the metropolitan government unit where the samples reside. All regions are represented as follows : '1=Seoul, 2=Busan, 3=Daegu, 4=Incheon, 5=Gwangju, 6=Daejeon, 7=Ulsan, 8 = Sejong, 9 =Gyeonggi, 10 = Gangwon, 11 = Chungbuk, 12 = Chungnam, 13 = Jeonbuk, 14 = Jeonnam, 15 = Gyeongbuk, 16 = Gyeongnam, 17 = Jeju'

The 'year' is the corresponding year of the National Sports Survey included in the analysis and corresponds to five years from 2016 to 2019.

The 'income' includes the average monthly household income surveyed in the National Sports Survey. Since the average monthly household income does not follow the normal distribution due to a large number of digits and relatively small values compared to other variables, statistical analysis will be conducted by converting them into natural log values.

‘Education’ means the highest educational background. And it includes "1=elementary school or lower, 2=elementary school graduate, 3= middle school graduate, 4=high school graduate, 5= college graduate (bachelor's degree), 6= graduate school graduate (master's degree)."

'Marriage' is investigated as "1=married, 2=unmarried, 3=divorce, 4=bereavement, 5=other" in the survey. Since it was analyzed in previous studies that it affects participation in daily sports, it is treated as a dummy variable and included as '1=married, 0=not married'.

Like the National Sports Survey, ‘job’ is treated as '1=have a job, 0=no job'.

<table 3-2> Definition of variables

| Item | | Variables | Explanation |
|---|---|---|---|
| Dependent Variables | | Participation in Daily Sports (partici) | Whether or not to participate in sports regularly in the past year (1=participation, 0=non-participation) |
| | | Frequency of Participation in Sports (freq) | Frequency of participation in past year (1=never, 2=less than 3 times a month, 3=once a week, 4=twice a week, 5=3 times a week, 6=4 times a week, 7=5 times a week, 8=6 times a week, 9=every day) |
| In-dependent Variables | Individual factors | Cognition about Physical Fitness Effect of Sports (physcialimpo_new) | What perceive as the most important thing for maintaining physical fitness (1=sports, 0=others) |
| | | Awareness of Physical Fitness Condition (physcialkn) | What level perceives own physical fitness condition level (1= not good at all, 2=not very good, 3=so so, 4=good, 5=very good) |
| | | Physical Fitness Program Experience (phypro_new) | Experience in physical fitness measurement and exercise prescription service (1=experienced, 0=no experience) |
| | | Sports Club Joining Experience | whether or not to join a sports club (1= experienced, 0=no experience) |

| | | | |
|---|---|---|---|
| | | (clubjoin_new) | |
| | | Sports Program Expereience (program_new) | whether there is an experience in classes related to daily sports (1= experienced, 0=no experience) |
| | **Environment Factors** | The number of Public Sports Facilities (ln_number_pu) | Number of public sports facilities in the residential area |
| | | The number of Private Sports Facilities (ln_number_pr) | Number of private sports facilities in the residential area |
| | | The number of Public Sports Club (number_club) | Number of public sports club in the residential area |
| | | The number of Certified Sports Leades (ln_number_ins) | Number of Certified Sports Leaders in the residential area |
| **Control Variables** | | Gender (sex_dum) | Gender (1=male, 0=female) |
| | | Age (age) | Age |
| | | Region (reg) | Residential area ('1=Seoul, 2=Busan, 3=Daegu, 4=Incheon, 5=Gwangju, 6=Daejeon, 7=Ulsan, 8 = Sejong, 9 = Gyeonggi, 10 = Gangwon, 11 = Chungbuk, 12 = Chungnam, 13 = Jeonbuk, 14 = Jeonnam, 15 = Gyeongbuk, 16 = Gyeongnam, 17 = Jeju' ) |
| | | Year (year) | Year |
| | | Income (ln_inc) | Average monthly household income |
| | | Education (edu) | the final educational background (1=elementary school or lower, 2=elementary school graduate, 3= middle school graduate, 4=high school graduate, 5=college graduate, 6=graduate school graduate |
| | | Marriage (mar_new) | Married or not (1= married, 0= not married) |
| | | Job (job_new) | Whether to have a job or not (1= have a job, 0=no job) |

## 3.4. Research Method

### 1) Descriptive Statistical Analysis

Descriptive statistics means recording and describing the contents and characteristics of data. Therefore, this study aims to identify the characteristics and relationships of variables by performing frequency and descriptive statistical analysis prior to correlation and regression analysis.

First, this paper identifies the characteristics of the data, focusing on the variance, such as the mean, standard deviation, minimum value, and maximum value of the dependent variable, independent variable, and control variable. In addition, frequency analysis will be conducted according to the characteristics of the variables, and the relationships among variables will be briefly reviewed.

### 2) Correlation Analysis

Correlation analysis is a numerical analysis of what kind of correlation the items that are correlated with each other for a variance are and to what extent the correlation is. The two variables may have an independent or correlated relationship with each other. In this case, the strength of the relationship between the two variables is called a correlation coefficient. Although it is possible for variables to have some degree of linear relationship, a very high linear relationship may reduce the significance of the estimate.

The Pearson correlation coefficient is commonly used in bivariate analysis to obtain correlations between variables. This study analyzes the correlation between variables through Pearson's correlation analysis and decides the regression analysis method accordingly.

### 3) Regression Analysis

After controlling the effects of the third variable, regression analysis can analyze whether there is an association between the dependent variable and the independent variable and even the direction and size of the association. Regression analysis checks how the dependent variable changes when only one independent variable is changed while other independent variables are fixed. It is called simple regression analysis when analyzing the relationship between one dependent variable and one independent variable. It is called multiple regression analysis when trying to investigate the relationship between one dependent variable and several independent variables.

This study intends to utilize two regression analysis methods based on the characteristics of the dependent variable. One of the dependent variables, participation in daily sports, is treated as '0=non-participation, 1=participation'. Since this dependent variable is a binary variable rather than a continuous variable, logistic regression is used. Logistic regression analysis is one of the regression analysis techniques that can be performed, especially when the dependent variable is dichotomous among regression analyses. On the other hand, since the other dependent variable, frequency of participation in daily sports, is a continuous variable, a general regression analysis will be performed.

# Chapter 4. Research Results

## 4.1. Descriptive Statistics Analysis Results

This study examines the factors affecting individuals' participation in daily sports and frequency. To this end, samples were collected from the metropolitan areas (special cities, metropolitan cities, special self-governing cities, provinces, and special self-governing provinces) in the administrative districts of the Republic of Korea. Missing values and outliers were removed during sample collection and pre-processing, and finally, 47,866 samples were used as analysis data.

### 1) Descriptive Statistics of the Dependent Variable

#### (1) Participation in Daily Sports

<Table 4-1> shows the results of descriptive statistical analysis of the first dependent variable, participation in daily sports. Participation in sports is a dummy variable, 0 = non-participation, 1 = participation, and the average is 0.667 (SD = 0.471).

<Table 4-1> Descriptive statistics of participation in sports

| Item | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Participation In Sports | 47,866 | 0.667 | 0.471 | 0 | 1 |

On the other hand, <Figure 4-1> shows the trend of the mean of participation in sports. The mean of participation is the highest in 2015 and the lowest in 2016. Compared to 2014 and 2015, the mean of participation from 2016 to 2019 is lower. A significant drop from 2015 to 2016 shows a gentle rise from 2016 to 2019.

<Figure 4-1> Mean of participation in sports by year

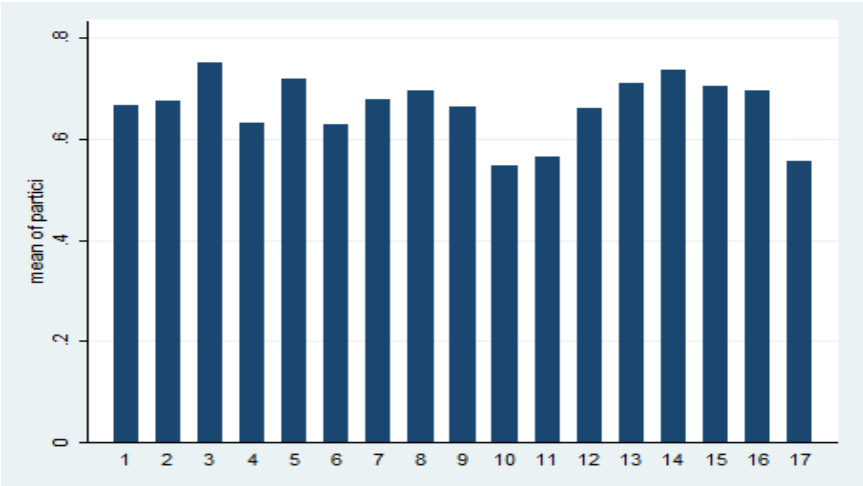
The current status of each year is shown in <Table 4-2>. The participation rate in daily sports is 83.18% in 2014, 85.41% in 2015, 57.53% in 2017, 61.76% in 2018, and 65.62% in 2019. It can be seen that participation in sports is gradually increasing from 2016 to 2019. However, this figure is somewhat different from the figure of the National Sports Participation Rate announced by the Ministry of Culture, Sports, and Tourism every year. The reason is that the number of target samples changed while removing missing values for statistical analysis. In 2014 and 2015, there is a somewhat excessive aspect compared to the participation rate announced by the government. However, the difference is not significant after 2016, and 66.72% of the total 47,866 samples to be analyzed is similar to the sports participation rate announced as of 2019.

<Table 4-2> Participation in sports by year

| year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|
| participation (%) | 4,947 (83.18) | 5,045 (85.41) | 5,185 (57.53) | 5,295 (58.83) | 5,558 (61.76) | 5,906 (65.62) | 31,936 (66.72) |
| Non participation (%) | 1,000 (16.82) | 862 (14.59) | 3,827 (42.47) | 3,705 (41.17) | 3,442 (38.24) | 3,094 (34.38) | 15,930 (33.28) |
| Total | 5,947 | 5,907 | 9,012 | 9,000 | 9,000 | 9,000 | 47,866 |

On the other hand, the mean of participation in daily sports by region is shown in <Figure 4-2>. Gangwon has the lowest, and Daegu has the highest. In addition, Gwangju, Jeonbuk, Jeonnam, Gyeongbuk, and Gyeongnam regions show high values, while Chungbuk and Jeju show low values. The mean of participation varies by region and does not show a tendency according to metropolitan cities or provinces.

<Figure 4-2> Mean of participation in daily sports by region




(1=Seoul, 2=Busan, 3=Daegu, 4=Incheon, 5=Gwangju, 6=Daejeon, 7=Ulsan, 8 = Sejong, 9 = Gyeonggi, 10 = Gangwon, 11 = Chungbuk, 12 = Chungnam, 13 = Jeonbuk, 14 = Jeonnam, 15 = Gyeongbuk, 16 = Gyeongnam, 17 = Jeju)

## (2) Frequency of Participation in Daily Sports

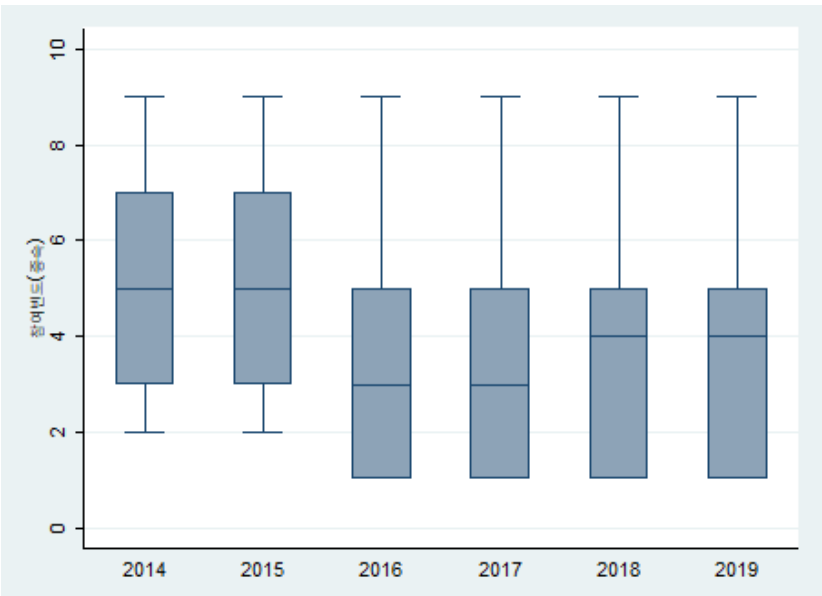
<Table 4-3> shows the results of the descriptive statistics analysis of the second dependent variable, the frequency of participation in sports. The mean of frequency of participation in daily sports is 3.957 (SD=0.233). A minimum value of 1 is "not at all," and a maximum value of 9 is "participating every day."

<Table 4-3> Descriptive statistics of frequency of participation

| Item | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Frequency | 47,866 | 3.957 | 2.377 | 1 | 9 |

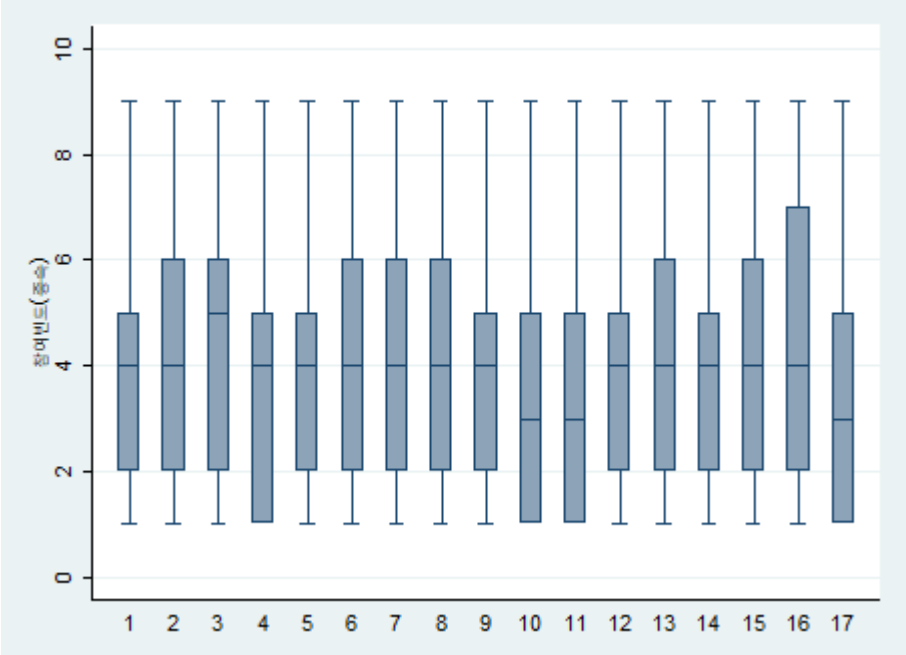
<Figure 4-3> shows the box plot of the frequency of participation in daily sports by year. The median values in 2014 and 2015 are the same and higher than after 2016. The maximum values for all years are the same (9=participation every day). The minimum values in 2014 and 2015 (2=participate less than three times a month) appear to be greater than the minimum after 2016 (1=not participating at all). The median from 2014 to 2015 is the highest, and the median from 2016 to 2017 is the lowest. Moreover, the median from 2018 to 2019 increases slightly, but the median from 2018 to 2019 is lower than from 2014 to 2015.

<Figure 4-3> Frequency of participation in daily sports by year




<Figure 4-4> shows the box plot of the frequency of participation by region. Daegu has the highest median, and Gangwon, Chungbuk, and Jeju have the lowest values. In the case of Incheon, Gangwon, Chungbuk, and Jeju, the minimum value is lower (1=not participating at all) than in other regions. The maximum value is the same for all regions (9=every day). In the case of Daegu, Incheon, Gwangju, Gyeonggi, Chungnam, and Jeonnam, the median is slightly above the box, indicating that many participate more than average.

<Figure 4-4> Frequency of participation in daily sports by region




## 2) Descriptive Statistics of Independent Variables

### (1) Individual Factors (Psychological Cognition)

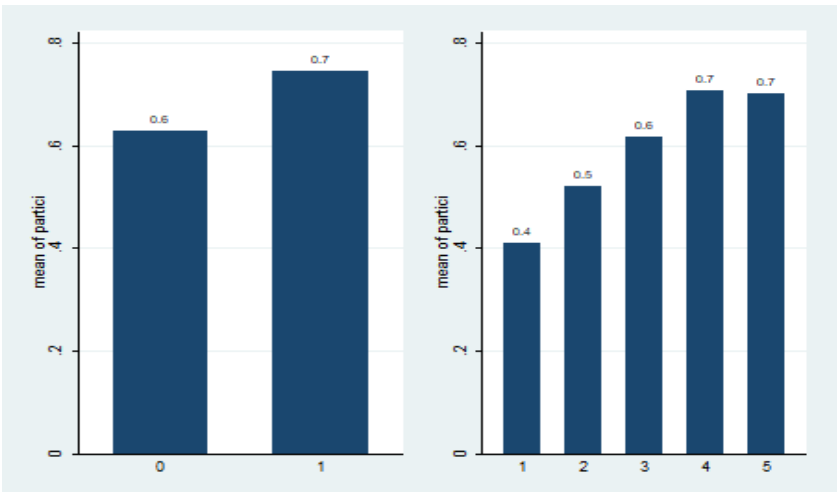
<Table 4-4> shows the results of descriptive statistical analysis of variables related to the psychological cognition among individual independent variables. The mean of 'cognition about the physical fitness effect of sport' is 0.330 (SD=0.470), and the mean of 'awareness of physical fitness condition' is 3.679 (SD=0.794).

<Table 4-4> Descriptive statistics of individual factors(psychological cognition)

| 구분 | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Cognition about physical fitness effect of sports | 47,866 | 0.330 | 0.470 | 0 | 1 |
| Awareness of physical fitness condition | 47,866 | 3.679 | 0.794 | 1 | 5 |

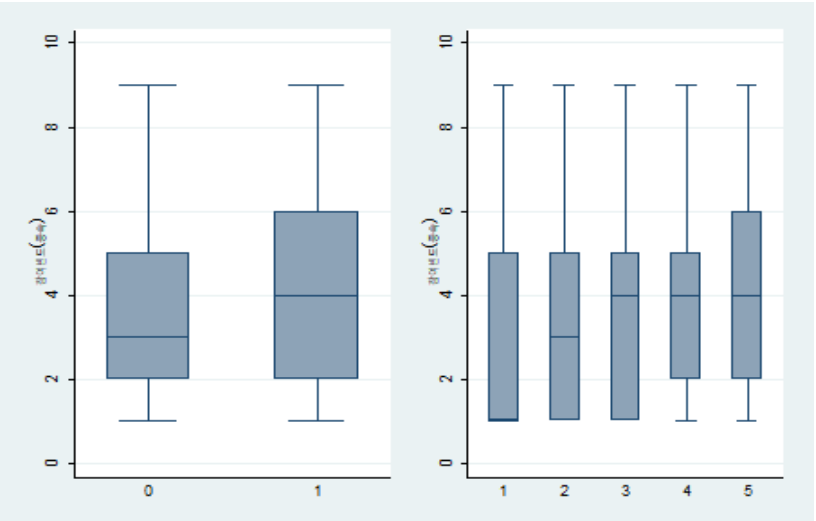
<Figure 4-5> shows the mean of participation in daily sports according to psychological cognition. Regarding cognition about the physical fitness effect of sports, the mean of participation in cases where sports is recognized as the most important activity for improving physical fitness (=1) is 0.7. It can be seen that this is higher than the case where the most important activity for improving physical fitness is recognized as an activity other than sports (=0). Regarding awareness of physical fitness condition, it can be seen that the higher people perceive their physical fitness (from 1 to 5), the higher the mean of participation in daily sports.

<Figure 4-5> Mean of participation of cognition variables




<Figure 4-6> shows the box plot of the frequency of participation in daily sports by psychological cognition. It can be seen that the median and the third quintile of the frequency are higher than the case where there is a perception of the effect of sports on improving physical fitness. In addition, when non-sports activities are considered effective in improving physical fitness (=0), the median is located at the bottom, indicating that people in this group participate below the frequency average. Regarding the awareness of one's physical fitness, the median is high when one perceives one's physical fitness as better than the normal level.

<Figure 4-6> Participation frequency of cognition variables




## (2) Individual Factors (Experience)

<Table 4-5> shows the results of descriptive statistical analysis of variables related to experience among independent variables of individual factors. The mean of physical fitness program experience is 0.091 (SD=0.029), the mean of club membership is 0.138 (SD=0.345), and the mean of sports program experience is 0.239 (SD=0.427).

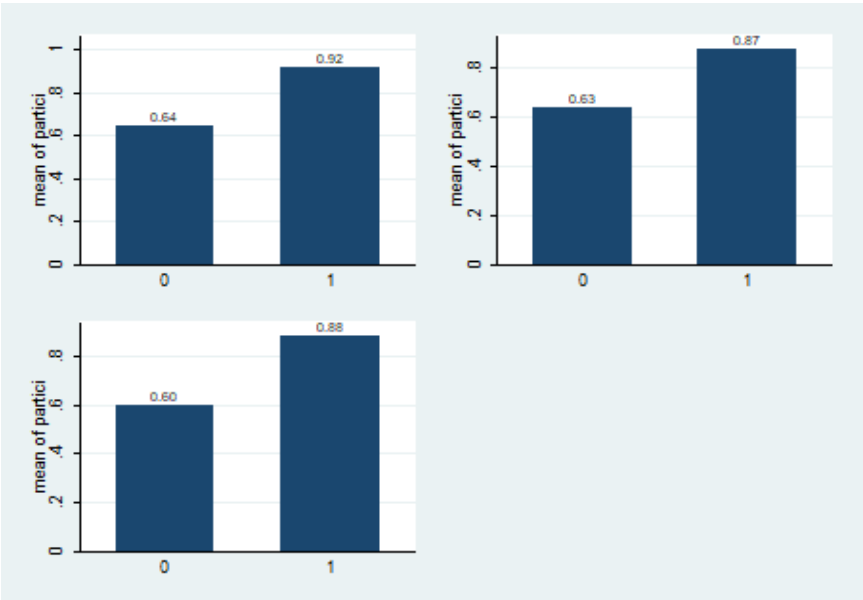
<Table 4-5> Descriptive statistics of individual factors(Experience)

| Item | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Physical fitness program experience | 47,866 | 0.091 | 0.029 | 0 | 1 |
| Sports club joining experience | 47,866 | 0.138 | 0.345 | 0 | 1 |
| Sports program experience | 47,866 | 0.239 | 0.427 | 0 | 1 |

The mean of participation in daily sports according to individual experience is shown in <Figure 4-7>. The mean of participation in the case of experiencing a physical fitness program (=1) is 0.92,

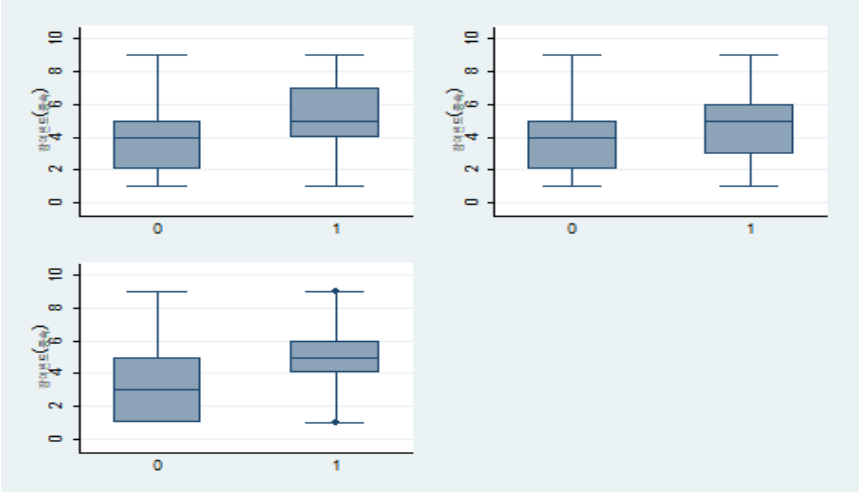
higher than the mean of 0.64 for participation in the case of no experience (=0). The mean of both those with experience in joining a sports club and those with experience in sports programs was higher than those without experience. In all three variables, the difference between the mean of experienced cases and the mean of experienced cases is not significant.

<Figure 4-7> Mean of participation of experience variables




<Figure 4-8> shows the box plot of the sports participation frequency according to individual experience variables. The median of frequency in the case of having experience in physical fitness programs, club membership, and sports programs (=1) is higher than in the case of having no experience (=0). The difference between the median of frequency in cases with and without experience is the largest in the 'sports program experience' variable. On the other hand, in the case of physical fitness program experience, the four quartiles of the frequency are the highest. In the case of sports program experience, the distribution of participation frequency in the case of no experience (=0) is broad, and the minimum value and the first quartile are the same.

<Figure 4-8> Participation frequency of experience variables



## (3) Environment Factors

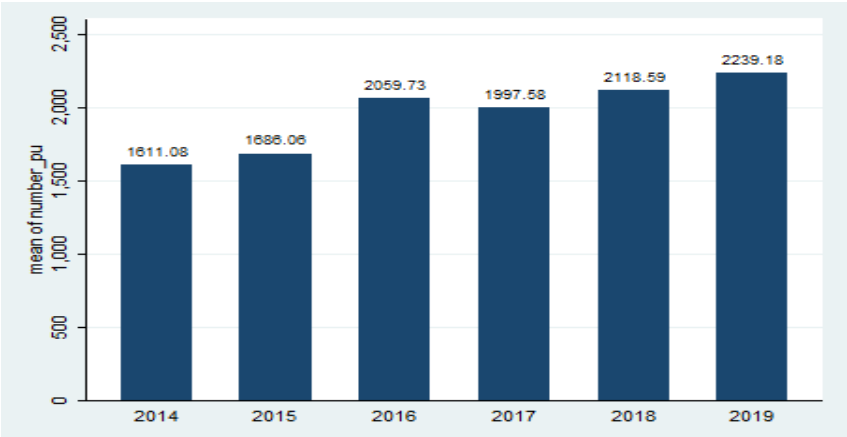
<Table 4-6> shows the results of the descriptive statistics analysis of independent variables related to environmental factors in the residential area. The mean of the number of public sports facilities is 1990.998 (SD=1269), the minimum is 46, and the maximum is 5,105. In the case of the number of private sports facilities, the mean is 5,042,516 (SD=1,269.299), the minimum is 137, and the maximum is 14,823. This number is larger than the number of public sports facilities. In the case of the number of public sports clubs, the mean is 3.269 (SD = 2.387), the minimum value is 0, and the maximum is 10. In the case of the number of certified sports leaders, the mean is 199.990 (SD=96.791), the minimum is 8, and the maximum is 342.

<Table 4-6> Descriptive statistics of environment factors

| Items | Observation | Mean | SD | Mean | Max |
|---|---|---|---|---|---|
| Public sports facilities | 47,866 | 1,990.998 | 1,269.299 | 46 | 5,105 |
| Private sports facilities | 47,866 | 5,042.516 | 4,649.49 | 137 | 14,823 |
| Public sports club | 47,866 | 3.269 | 2.387 | 0 | 10 |
| certified sports leaders | 47,866 | 188.990 | 96.791 | 8 | 342 |

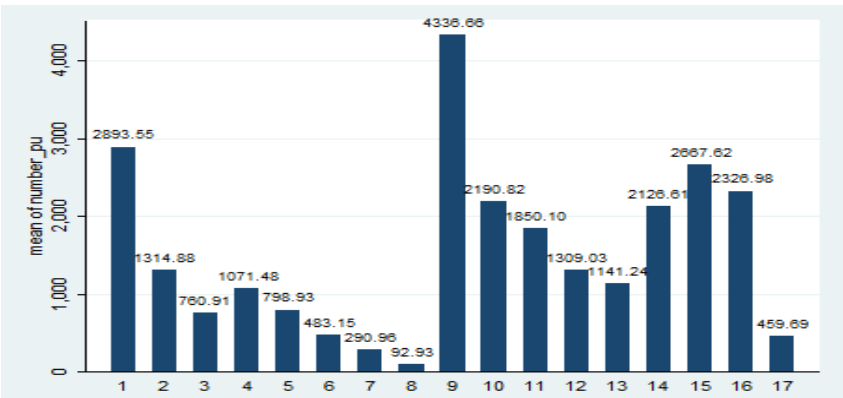
<Figure 4-9> shows the mean of the number of public sports facilities by year. It shows a gradual increase from 1,611 in 2014 to 2,239 in 2019. Due to the nature of public sports facilities operated by local governments, closures are not frequent. Therefore, it can be assumed that this decrease occurs while removing missing values for statistical analysis.

<Figure 4-9> Mean of number of public sports facilities by year




<Figure 4-10> shows the mean of the number of public sports facilities by region. Areas with the largest number of public sports facilities are Gyeonggi (4,336), Seoul (2,893), Gyeongbuk (2,667), and Gyeongnam (2,326). Areas with a small number are Sejong (92), Jeju (459), Ulsan (290), and Daejeon (483).

<Figure 4-10> Mean of number of public sports facilities by region

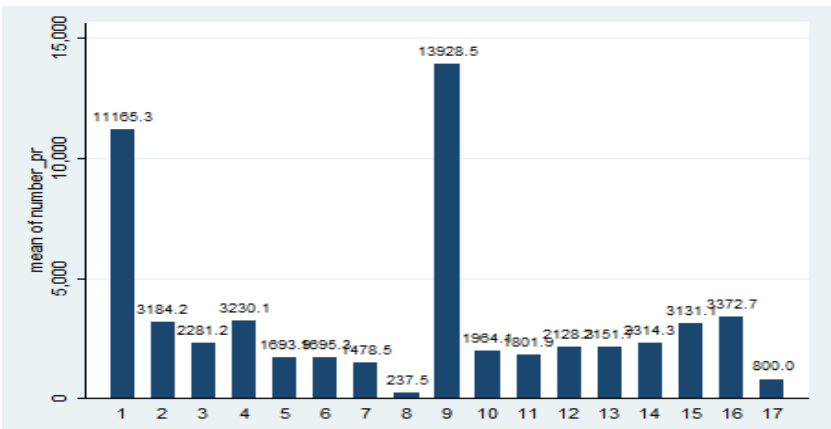


<Figure 4-11> shows the mean of the number of private sports facilities by year. 6,007.251 in 2016 is the largest, and 4,526.518 in 2019 is the smallest. Unlike public sports facilities, an accumulated increase does not appear. It's due to the nature of private sports facilities with the characteristics of general self-employment, such as gyms near residential areas, which are free to close.

<Figure 4-11> Mean of number of private sports facilities by year

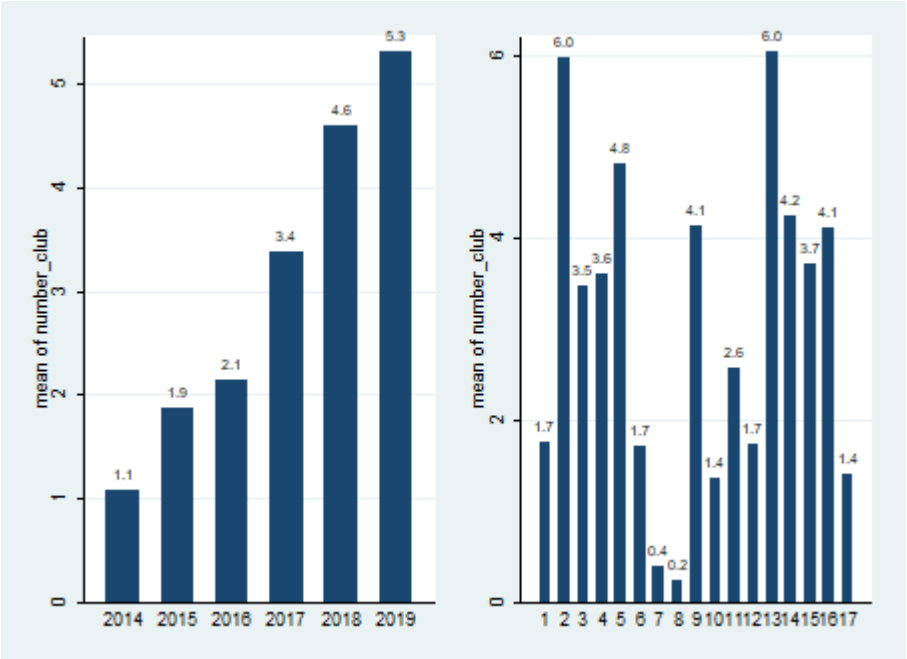
<Figure 4-12> shows the mean of the number of private sports facilities by region. Areas with a large number are Gyeonggi (13,928.47), Seoul (11,165.26), Gyeongnam (3,372.667), and Incheon (3,230.133). Areas with a small number are Sejong (237.504), Jeju (800.049), and Ulsan (1,478.489). It is similar to the area with many and few public sports facilities.

<Figure 4-12> Mean of number of private sports facilities by region



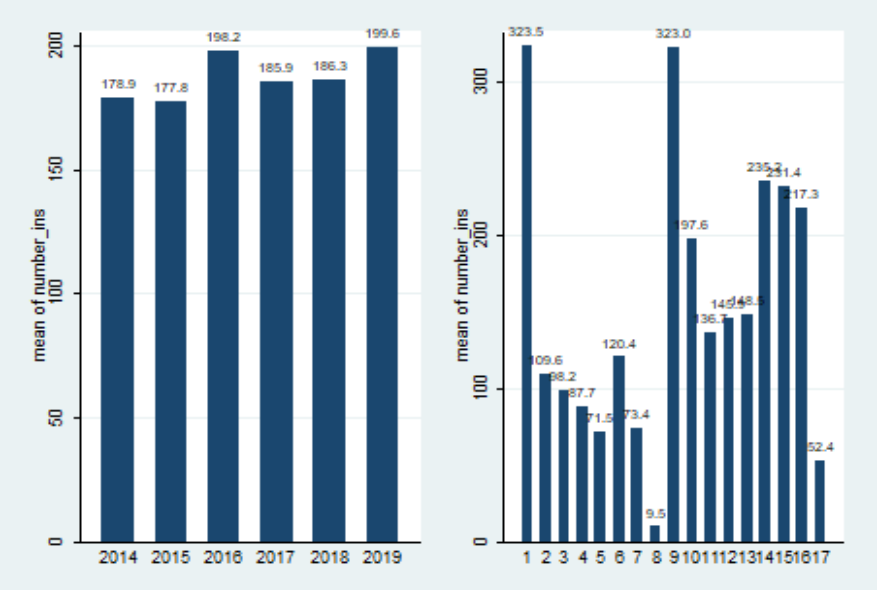
<Figure 4-13> shows the mean of the number of public sports club by year and region. It shows a gradual increase from 1.1 in 2014 to 5.3 in 2019. Areas with a large number are Jeonbuk (6.0), Busan (6.0), Gwangju (4.8), and Jeonnam (4.2). Areas with a small number are Sejong (0.226), Ulsan (0.4), Gangwon (1.4), and Jeju (1.4). It shows a somewhat different appearance from the regional distribution of public and private sports facilities. This seems to be because different standards are applied when selecting depending on the project's purpose.

<Figure 4-13> Mean of number of public sports club by year and region




<Figure 4-14> shows the mean of the number of certified sports leaders by year and region. It shows a gradual increase from 178.9 in 2014 to 199.6 in 2019. Since the government secures a certain level of budget every year and conducts recruitment, there does not seem to be a significant increase or decrease from year to year. Areas with a large number are Seoul (323.5), Gyeonggi (323.0), and Jeonnam (235.2). Areas with a small number are Sejong (9.5), Jeju (52.4), Gwangju (71.5), and Ulsan (73.4).

<Figure 4-14> Mean of number of certified sports leaders by year and region




## 3) Descriptive Statistics of Control Variables

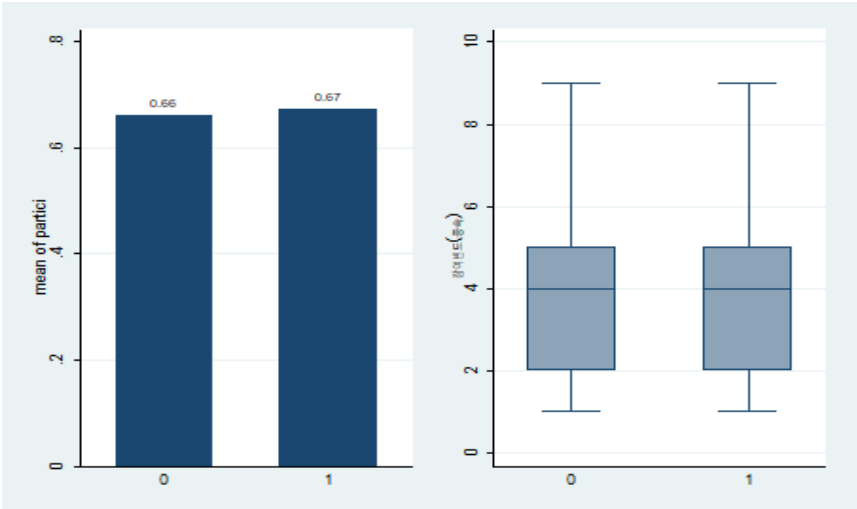
The results of the descriptive statistics analysis of 'gender' are shown in <Table 4-7>. It is converted into a dummy variable (1=male, 0=female) and has a mean of 0.507 (SD=0.500). Looking at the number of samples, it can be seen that 24,261 males (50.69%) and 23,605 females (49.31%) are evenly distributed.

<Table 4-7> Descriptive statistics of gender

| | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Gender | 47,866 | 0.507 | 0.500 | 0 | 1 |
| | Male | | Female | | Total |
| Number | 24,261(50.69%) | | 23,605(49.31%) | | 47,866 |

<Figure 4-15> shows the mean of participation and the box plot of participation frequency by gender. The mean of participation did not show a significant difference between male(0.67) and female(0.66), and the frequency of participation also does not show a significant difference.

<Figure 4-15> Mean of participation and frequency by gender




The results of descriptive statistics related to 'age' are shown in <Table 4-8>. The mean of age is 43.609 (SD=17.760). Looking at the number of samples, it can be seen that the proportion is large in the order of those in their 40s (1781%), 50s (17.23%), 30s (15.45%), 20s (14.33%), 60s (14.32%), 10s (12.59%), 70s (7.74%), and 80s or older (0.54%).

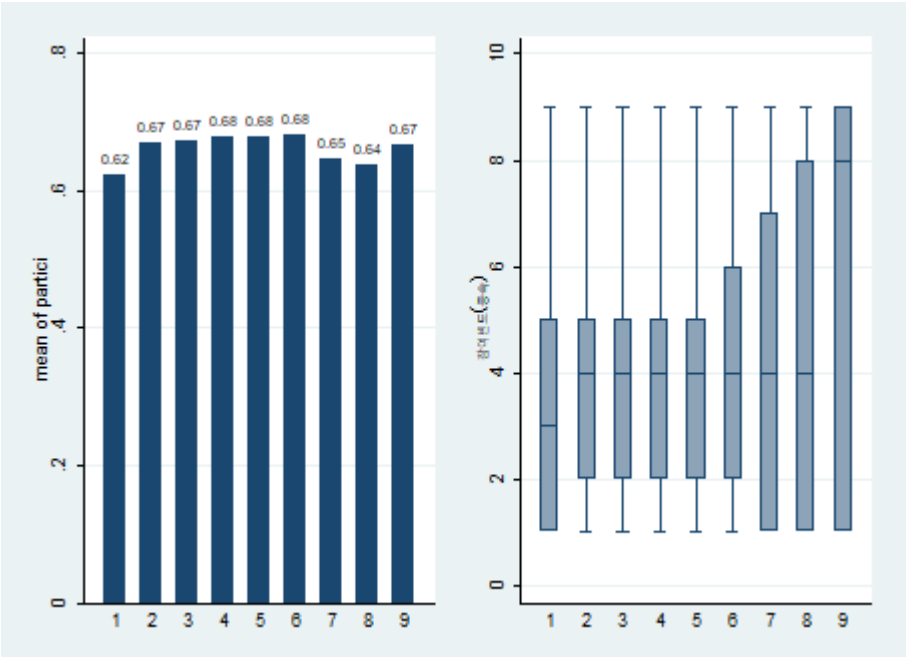
<Table 4-8> Descriptive statistics of age

| | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Age | 47,866 | 43.609 | 17.760 | 10 | 90 |
| | 10s | 20s | 30s | 40s | |
| Number | 6,025(12.59%) | 6,858(14.33%) | 7,395(15.45%) | 8,523(17.81%) | |
| | 50s | 60s | 70s | 80s or older | |
| Number | 8,246(17.23%) | 6,854(14.32%) | 3,707(7.74%) | 258(0.54%) | |

<Figure 4-16> shows the mean of participation and the box plot of participation frequency by age. The mean of participation in the 40s, 50s, and 60s is relatively higher than that of other age groups. And there is a difference in participation according to age. Regarding participation frequency, the median is the same except for teenagers and the 90s. Although there are similar patterns of

participation frequency in the 20s and 50s, the distribution of participation frequency by age group shows differences.

<Figure 4-16> Mean of participation and frequency by age




(1=10s, 2=20s, 3=30s, 4=40s, 5=50s, 6=60s, 7=70s, 8=80s, 9=90s)

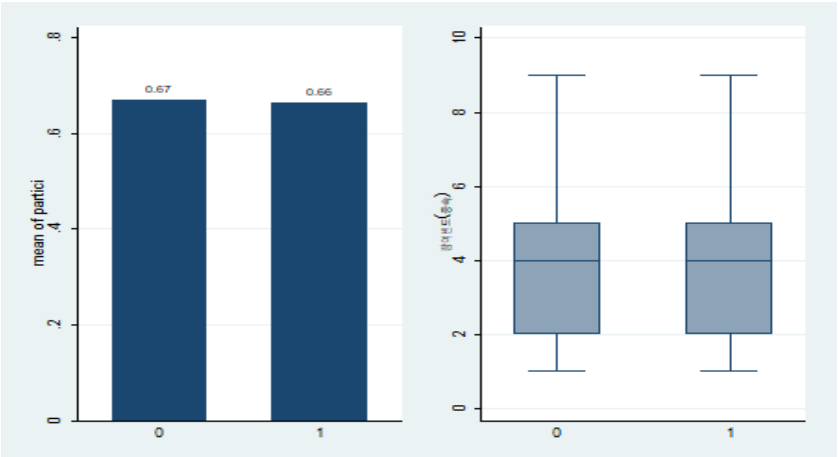
The results of the descriptive statistics analysis of 'marriage' are shown in <Table 4-9>. It is converted into a dummy variable (1=married, not 0=married), and the mean is 0.550 (SD=0.498). Looking at the number of samples, 26,314 (54.97%) are married, and 21,552 (45.03%) are non-married, including unmarried, divorced, and bereavement.

<Table 4-9> Descriptive statistics of marriage

| | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Marriage | 47,866 | 0.550 | 0.498 | 0 | 1 |
| | Married | | Not married | | 계 |
| Number | 26,314(54.97%) | | 21,552(45.03%) | | 47,886 |

<Figure 4-17> shows the mean of participation and the box plot of participation frequency by marriage. It can be seen that there is no significant difference in whether or not married (=1) and unmarried (=0) participate in daily sports. The mean of participation in non-married cases (0.67) is slightly higher than that of married cases (0.66).

<Figure 4-17> Mean of participation and frequency by marriage




The results of the descriptive statistics analysis of 'income' are shown in <Table 4-10>. The mean of income is 65,153 million won (SD=2,544,072).

<Table 4-10> Descriptive statistics of income

| Item | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Income | 47,866 | 65,153.1 | 2,544,072 | 16 | 1.00e+08 |

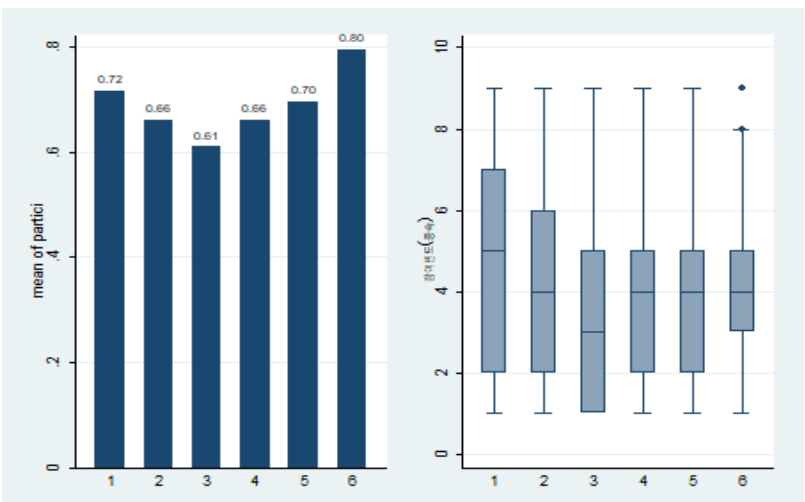
The results of the descriptive statistics analysis of 'education' are shown in <Table 4-11>. With '1=elementary school or lower, 2=elementary school, 3= middle school, 4=high school, 5=university, and 6= graduate school', the mean is 3.974 (SD=1.017). The number of samples is significant in the order of high school graduates (40.58%), college graduates (33.93%), and middle school graduates (14.61%).

<Table 4-11> Descriptive statistics of education

| | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Education | 47,866 | 3.974 | 1.017 | 1 | 6 |
| | Elementary school or lower | | Elementary school | | Middle school |
| Number | 1,093(2.28%) | | 3,855(8.05%) | | 6,993(14.61%) |
| | High school | | University | | Graduate school |
| Number | 19,426(40.58%) | | 16,240(33.93%) | | 259(0.54%) |

<Figure 4-18> shows the mean of participation and the box plot of participation frequency by education. The mean of participation (0.80) is the largest in the case of finishing graduate school (=6). Moreover, the mean (0.61) is the smallest when graduating from middle school (=3). Although the mean of participation differs depending on the final education level, there is no increase or decrease in the mean proportion to the high and low educational levels. In the case of the participation frequency, there is a difference in the frequency based on final educational levels.

<Figure 4-18> Mean of participation and frequency by education




The results of the descriptive statistics analysis of 'job' are shown in <Table 4-12>. It is converted into a dummy variable

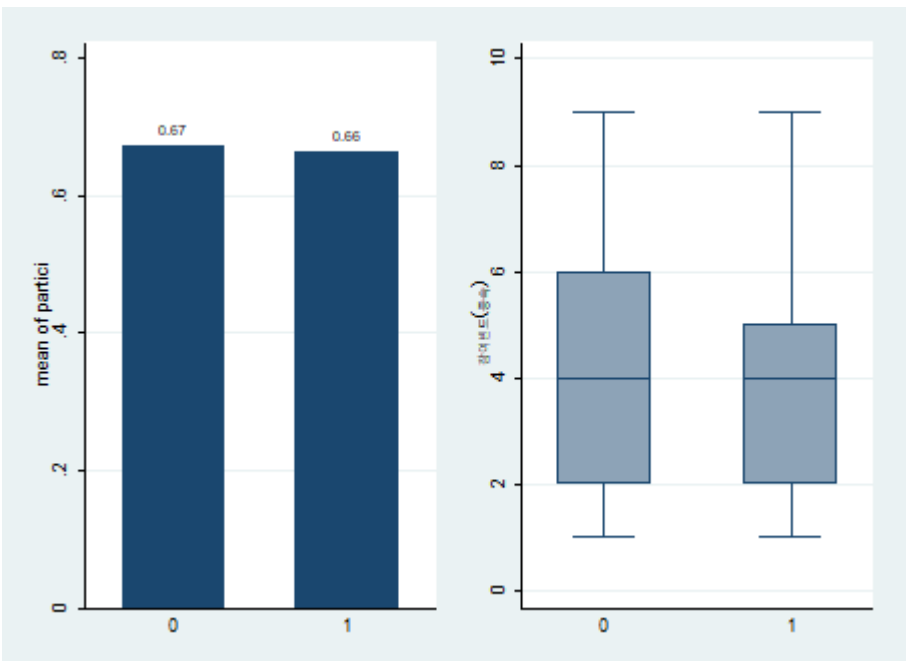
(1=have a job, 0=no job), and the mean is 0.604 (SD=0.489). Looking at the number of samples, 60.37% of those with jobs and 39.63% without jobs are found.

<Table 4-12> Descriptive statistics of job

| | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Job status | 47,866 | 0.604 | 0.489 | 0 | 1 |
| | Have a job | | No job | | Total |
| Number | 28,898(60.37%) | | 18,968(39.63%) | | 47,866 |

<Figure 4-19> shows the mean of participation and the box plot of participation frequency by job status. The mean of participation (0.67) in the case of no job (=0) is slightly higher than the mean (0.66) in the case of having a job (=1). Regarding the frequency of participation, the median is the same regardless of job status. However, the distribution and the fourth quartile differ based on job status.

<Figure 4-19> Mean of participation and frequency by job



## 4.2. Correlation Analysis Results

Pearson correlation analysis is performed to estimate the linear relationship between variables, and the results are shown in <Table 4-13>.

It is confirmed that the first dependent variable, participation in sports, has a significant positive correlation (r=0.774) at the level of 1% or less with the frequency of participation. There is a significant positive correlation with individual independent variables, including cognition about the physical fitness effect of sports (r=0.116), awareness of physical fitness condition (r=0.115), physical fitness program experience (r=0.168), sports club joining experience (r=0.171), and sports program experience (r=0.257).

Among the independent variables of environmental factors, no statistically significant correlation is observed between the number of private sports facilities and the number of certified sports leaders. The number of public sports facilities (r=-0.024) and public sports clubs (r=-0.013) are statistically significant but negatively correlated with sports participation.

Regarding control variables, participation in sports has a positive correlation with gender (r=0.011), age (r=0.011), income (r=0.034), and education (r=0.036). Moreover, job status negatively correlates (r=-0.010) with participation in sports.

It is found that the second dependent variable, frequency of participation, has positive correlations with individual independent variables. It includes cognition about the physical fitness effect of sports (r=0.130), awareness of physical fitness condition (r=0.093), physical fitness program experience (r=0.184), sports club joining experience (r=0.124), and sports program experience (r=0.238).

Also, the frequency of participation has a positive and negative

correlation with independent variables of environmental factors, such as the number of public sports facilities (r=−0.049), the number of private sports facilities (r=−0.029), the number of public sports clubs (r=−0.040), and the number of certified sports leaders (r=−0.016).

In the case of the control variable, there is a significant positive correlation with age (r=0.083) and region (r=0.26). In addition, the frequency of participation has a significant negative correlation with gender (r=−0.016), income (r=−0.020), education (r=−0.010), job status (r=−0.029), and year (r=−0.162).

In addition, several significant correlations are confirmed between independent and control variables. However, there are some high correlations of more than 0.8, including between private sports facilities and public sports facilities (r=0.820), between certified sports leaders and public sports facilities (r=0.917), and between certified sports leaders and private sports facilities (r=0.832).

As a result of analyzing correlations, it is confirmed that there is a statistically significant correlation between most independent and dependent variables. There is a high correlation above 0.8 between some regional independent variables. In addition, among the independent variables, there is a partial negative correlation between the local factor independent variable and the dependent variable, showing a different direction from the hypotheses. However, since this analysis is a simple correlation without adding conditions, it will be meaningful to analyze the relationship between variables through a model with added control. Regression analysis is performed based on the results of this correlation analysis.

<Table 4-13> Correlation analysis

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | | | | | | | | | | | | | | | | | |
| 2 | 0.774*** | 1 | | | | | | | | | | | | | | | | |
| 3 | 0.116*** | 0.130*** | 1 | | | | | | | | | | | | | | | |
| 4 | 0.115*** | 0.093*** | -0.001 | 1 | | | | | | | | | | | | | | |
| 5 | 0.168*** | 0.184*** | 0.093*** | 0.064*** | 1 | | | | | | | | | | | | | |
| 6 | 0.171*** | 0.124*** | 0.086*** | 0.096*** | 0.211*** | 1 | | | | | | | | | | | | |
| 7 | 0.257*** | 0.238*** | 0.110*** | 0.092*** | 0.377*** | 0.297*** | 1 | | | | | | | | | | | |
| 8 | -0.024*** | -0.049*** | 0.002 | -0.023*** | 0.020*** | 0.048*** | 0.090*** | 1 | | | | | | | | | | |
| 9 | 0.006 | -0.029*** | 0.013*** | 0.011** | 0.060*** | 0.073*** | 0.161*** | 0.820*** | 1 | | | | | | | | | |
| 10 | -0.013*** | -0.040*** | -0.072*** | -0.020*** | -0.038*** | -0.044*** | -0.022*** | 0.282*** | 0.109*** | 1 | | | | | | | | |
| 11 | -0.001 | -0.024*** | -0.004 | -0.011** | 0.026*** | 0.049*** | 0.091*** | 0.917*** | 0.832*** | 0.133*** | 1 | | | | | | | |
| 12 | 0.011** | -0.016*** | 0.040*** | 0.151*** | 0 | 0.122*** | -0.057*** | -0.005 | -0.002 | -0.016*** | -0.003 | 1 | | | | | | |
| 13 | 0.011** | 0.083*** | 0.001 | -0.391*** | -0.034*** | -0.028*** | -0.105*** | 0.013*** | -0.015*** | 0.033*** | 0.007 | -0.055*** | 1 | | | | | |
| 14 | 0.034*** | -0.020*** | 0.011** | 0.236*** | 0.083*** | 0.102*** | 0.152*** | 0.056*** | 0.147*** | 0.026*** | 0.057*** | 0.047*** | -0.365*** | 1 | | | | |
| 15 | 0.036*** | -0.010** | 0.036*** | 0.165*** | 0.105*** | 0.128*** | 0.156*** | 0.041*** | 0.103*** | 0.038*** | 0.039*** | 0.108*** | -0.134*** | 0.353*** | 1 | | | |
| 16 | -0.010** | -0.029*** | 0.017*** | 0.043*** | 0.027*** | 0.085*** | 0.010** | 0.009* | 0.001 | 0.020*** | 0.006 | 0.264*** | 0.156*** | 0.126*** | 0.468*** | 1 | | |
| 17 | -0.134*** | -0.162*** | -0.047*** | -0.049*** | -0.043*** | -0.023*** | 0.015*** | 0.120*** | -0.023*** | 0.612*** | 0.039*** | -0.028*** | 0.028*** | 0.074*** | 0.073*** | 0.015*** | 1 | |
| 18 | -0.005 | 0.026*** | -0.007 | -0.036*** | -0.056*** | -0.028*** | -0.119*** | 0.086*** | -0.314*** | 0.074*** | 0.055*** | 0.003*** | 0.025*** | -0.160*** | -0.119*** | 0.010** | 0.001 | 1 |

* p<0.10, ** p<0.05, *** p<0.01

(1)participation, (2)frequency, (3) cognition about physical fitness effect of sports, (4) awareness of physical fitness condition, (5) physical fitness program experience, (6) sports club joining experience, (7) sports program experience, (8) public sports facilities, (9) private sports facilities, (10) public sports club, (11) certified sports leader (12) gender, (13)age, (14)income, (15)education, (16) job, (17)year, (18)region

## 4.3. Regression Analysis Results

## 1) Participation in Daily Sports

This study analyzes whether independent variables affect participation in sports and verify the research hypotheses presented above. Since participation in sports is a binary variable, logistic regression analysis is conducted. In particular, the review is conducted by dividing it into (1) individual factor independent variable: a pooled method that does not consider year and region, (2) adding control variables, including year and region, and (3) adding environmental factor independent variable. The results are shown in <Table 4-14>.

<Table 4-14> Logistic regression analysis on participation

| Items | | (1) | (2) | (3) |
|---|---|---|---|---|
| **Independent Variables (Individual)** | Cognition about physical fitness effect of sports | 0.427<br>(18.70)** | 0.429<br>(17.90)** | 0.437<br>(18.17)** |
| | Awareness of physical fitness condition | 0.357<br>(24.99)** | 0.315<br>(20.97)** | 0.320<br>(21.30)** |
| | Physical fitness program experience | 1.002<br>(16.89)** | 0.923<br>(15.14)** | 0.914<br>(14.96)** |
| | Sports club joining experience | 0.835<br>(20.57)** | 0.934<br>(22.35)** | 0.925<br>(22.06)** |
| | Sports program experience | 1.291<br>(38.85)** | 1.424<br>(41.17)** | 1.437<br>(41.40)** |
| **Control Variables** | gender | 0.022<br>(1.01) | 0.007<br>(0.33) | 0.007<br>(0.33) |
| | age | 0.013<br>(17.98)** | 0.010<br>(12.56)** | 0.010<br>(12.68)** |
| | marriage | -0.072<br>(3.26)** | 0.255<br>(9.98)** | 0.255<br>(9.95)** |
| | income | 0.007<br>(0.35) | 0.092<br>(3.92)** | 0.088<br>(3.75)** |
| | Education | -0.008<br>(0.62) | 0.025<br>(1.88) | 0.024<br>(1.81) |
| | Job status | -0.216<br>(8.45)** | -0.295<br>(10.98)** | -0.298<br>(11.05)** |
| | 2015bn.year | | 0.205<br>(3.88)** | 0.090<br>(1.67) |
| | 2016.year | | -1.318<br>(29.87)** | -1.480<br>(29.21)** |
| | 2017.year | | -1.394<br>(31.47)** | -1.703<br>(28.29)** |

| | | | | |
|---|---|---|---|---|
| | 2018.year | | -1.228 | -1.656 |
| | | | (27.78)** | (23.73)** |
| | 2019.year | | -1.025 | -1.434 |
| | | | (23.13)** | (18.24)** |
| | 2bn.reg | | 0.336 | 0.016 |
| | | | (6.51)** | (0.05) |
| | 3.reg | | 0.762 | 0.974 |
| | | | (13.34)** | (2.41)* |
| | 4.reg | | -0.095 | -0.256 |
| | | | (1.78) | (0.68) |
| | 5.reg | | 0.676 | 0.755 |
| | | | (11.25)** | (1.57) |
| | 6.reg | | -0.003 | 0.760 |
| | | | (0.05) | (1.74) |
| | 7.reg | | 0.414 | 1.037 |
| | | | (6.60)** | (1.94) |
| | 8.reg | | 0.232 | 1.033 |
| | | | (2.61)** | (0.98) |
| | 9.reg | | 0.002 | -0.467 |
| | | | (0.06) | (5.24)** |
| | 10.reg | | -0.278 | 1.223 |
| | | | (4.80)** | (3.63)** |
| | 11.reg | | -0.196 | 0.908 |
| | | | (3.48)** | (2.39)* |
| | 12.reg | | 0.205 | 1.187 |
| | | | (3.77)** | (3.42)** |
| | 13.reg | | 0.651 | 0.907 |
| | | | (11.53)** | (2.58)** |
| | 14.reg | | 0.747 | 1.691 |
| | | | (13.02)** | (5.64)** |
| | 15.reg | | 0.604 | 1.400 |
| | | | (11.14)** | (5.63)** |
| | 16.reg | | 0.570 | 1.157 |
| | | | (10.94)** | (4.87)** |
| | 17.reg | | -0.245 | 0.799 |
| | | | (3.51)** | (1.27) |
| **Independent Variables (Environment Factors** | Number of public sports facilities | | | -0.329 (2.02)* |
| | Number of private sports facilities | | | 1.072 (5.64)** |
| | Number of certified sports leaders | | | -0.691 (2.63)** |
| | Number of Public sports club | | | 0.150 (13.02)** |
| | _cons | -1.527 (11.60)** | -1.293 (7.88)** | -4.665 (2.16)* |
| | *N* | 47,866 | 47,866 | 47,866 |

* $p<0.05$; ** $p<0.01$

## (1) Individual Factors Independent Variables

### (Not consider year and region)

Logistic regression analysis is conducted to determine the effect of five independent variables of individual factors on participation in daily sports, and this study model is found to be statistically significant( $\chi^2$=5783.37, p<0.01).

As a result of the analysis, it is found that all five variables have a statistically significant positive (+) effect on participation in daily sports at the 1% level. Regarding psychological factors, when people recognize that daily sports is effective in improving physical fitness(Coef.=.427, p<.01), and people consider their physical fitness condition as better(Coef.=.357, p<.01), the probability of participating in daily sports increases. Regarding experience factors, when people have experienced physical fitness program (Coef.=1.002, p<.01), sports club joining(Coef.=.835, p<.01), and sports program(Coef.=1.291, p<.01), the probability of participating in daily sports increases.

Meanwhile, odds ratio analysis results are shown in <Table 4-15>. Those who recognize the physical fitness effect of sports participation are1.53 times more likely to participate in daily sports than not. Moreover, those who consider their physical fitness good are 1.43 times more likely to participate in sports than not. Those who have participated in the physical fitness program are 2.72 times more likely to participate in sports than those who do not. If people have sports club experience, they are 2.30 times more likely to participate in sports than if they do not, and if people have experience in sports programs, they are 3.64 times more likely to participate in sports than if they do not.

<Table 4-15> Odds ratio analysis (individual factors variables)

| | b | z | P>\|z\| | e^b | e^bStdX | SDofX |
|---|---|---|---|---|---|---|
| Cognition about physical fitness effect of sports | 0.42696 | 18.702 | 0 | 1.5326 | 1.2224 | 0.4703 |
| Awareness of physical fitness condition | 0.35672 | 24.985 | 0 | 1.4286 | 1.3274 | 0.794 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Physical fitness program experience | 1.00161 | 16.893 | 0 | 2.7227 | 1.3344 | 0.288 |
| Sports club joining experience | 0.83501 | 20.567 | 0 | 2.3048 | 1.3333 | 0.3445 |
| Sports program experience | 1.2908 | 38.846 | 0 | 3.6357 | 1.7345 | 0.4267 |
| Gender | 0.02198 | 1.014 | 0.31 | 1.0222 | 1.011 | 0.5 |
| age | 0.01302 | 17.979 | 0 | 1.0131 | 1.2602 | 17.7601 |
| Marriage | -0.07204 | -3.26 | 0.001 | 0.9305 | 0.9648 | 0.4975 |
| Income | 0.00672 | 0.35 | 0.726 | 1.0067 | 1.0041 | 0.6153 |
| Education | -0.00766 | -0.617 | 0.537 | 0.9924 | 0.9922 | 1.0169 |
| Job status | -0.21624 | -8.454 | 0 | 0.8055 | 0.8996 | 0.4891 |

e^b = exp(b) = factor change in odds for unit increase in X

## (2) Adding Control Variables (Year and Region)

Unlike the case of (1), which does not consider the year and region, logistic regression analysis is performed by controlling the year and region. This study model is also found to be statistically significant ($\chi^2$=9211.10, p<0.01).

Even considering year and region, all five independent variables of individual factors are found to have a positive (+) effect on participation in sports at the 1% level. However, it can be seen that the magnitude of the effect of the independent variable on the dependent variable has changed somewhat. However, even though year and region are controlled, it can be seen that the overall effect of the independent variable on the dependent variable is robust.

Among the control variables, marriage shows a slight change after regional and year control. It had a statistically significant negative influence when the region and year were not considered. However, it has a positive impact after controlling the region and year. In other words, married people are likely to participate in sports considering the region and year.

On the other hand, looking at the change in participation in daily sports by year, it is found that participation in 2015 increased compared to 2014. However, participation in daily sports continues to decrease (2016: Coef.=−1.318, 2017: Coef.=−1.394, 2018: Coef.=−1.228, 2019: Coef.=−1.025). It can be seen that this is a somewhat different result from the trend that the government has

revealed. Also, it differs from the year trend of previous descriptive analysis. A continuous upward trend appeared when the annual participation trend was investigated without considering independent or control variables. On the other hand, in this analysis, it is analyzed that participation in sports decreases.

Looking at the participation in daily sports by region, among the regions with statistically significant results, Busan, Daegu, Gwangju, Ulsan, Sejong, Chungnam, Jeonbuk, Jeonnam, Gyeongbuk, and Gyeongnam are higher participation than Seoul. Amtong the regions with statistically significant results, Gangwon(Coef.=-.278), Chungbuk(Coef.=-.196), and Jeju(Coef.=-.245) are found to have lower participation in sports than Seoul. In other words, it can be seen that participation in daily sports in Seoul and urban areas is not necessarily high.

Meanwhile, odds ratio analysis results are shown in <Table 4-16>. Those who recognize the physical fitness effect of sports participation are 1.54 times more likely to participate in daily sports than not. Moreover, those who consider their physical fitness good are 1.37 times more likely to participate in sports than not. Those who have participated in the physical fitness program are 2.52 times more likely to participate in sports than those who do not. If people have sports club experience, they are 2.55 times more likely to participate in sports than if they do not, and if people have experience in sports programs, they are 4.15 times more likely to participate in sports than if they do not. Compared to (1), which does not control the year and region, the odds ratio changed slightly, but there is no significant difference.

<Table 4-16> Odds ratio analysis (individual) (controlling year and region)

| | b | z | P>\|z\| | e^b | e^bStdX | SDofX |
|---|---|---|---|---|---|---|
| Cognition about physical fitness effect of sports | 0.42908 | 17.901 | 0 | 1.5358 | 1.2236 | 0.4703 |
| Awareness of physical fitness | 0.31458 | 20.974 | 0 | 1.3697 | 1.2838 | 0.794 |

| | | | | | | |
|---|---|---|---|---|---|---|
| condition | | | | | | |
| Physical fitness program experience | 0.92254 | 15.139 | 0 | 2.5157 | 1.3043 | 0.288 |
| Sports club joining experience | 0.93437 | 22.347 | 0 | 2.5456 | 1.3798 | 0.3445 |
| Sports program experience | 1.42418 | 41.166 | 0 | 4.1544 | 1.8361 | 0.4267 |
| Gender | 0.00735 | 0.326 | 0.745 | 1.0074 | 1.0037 | 0.5 |
| age | 0.01012 | 12.562 | 0 | 1.0102 | 1.197 | 17.7601 |
| Marriage | 0.2547 | 9.979 | 0 | 1.2901 | 1.1351 | 0.4975 |
| Income | 0.09218 | 3.923 | 0 | 1.0966 | 1.0584 | 0.6153 |
| Education | 0.02499 | 1.88 | 0.06 | 1.0253 | 1.0257 | 1.0169 |
| Job status | -0.29526 | -10.975 | 0 | 0.7443 | 0.8655 | 0.4891 |
| 2015.year | 0.20452 | 3.884 | 0 | 1.2269 | 1.0696 | 0.3289 |
| 2016.year | -1.31761 | -29.872 | 0 | 0.2678 | 0.5974 | 0.3909 |
| 2017.year | -1.39418 | -31.469 | 0 | 0.248 | 0.58 | 0.3907 |
| 2018.year | -1.22834 | -27.778 | 0 | 0.2928 | 0.6188 | 0.3907 |
| 2019.year | -1.02542 | -23.133 | 0 | 0.3586 | 0.6699 | 0.3907 |
| 2.reg | 0.33566 | 6.509 | 0 | 1.3989 | 1.0874 | 0.2497 |
| 3.reg | 0.76156 | 13.341 | 0 | 2.1416 | 1.1907 | 0.2292 |
| 4.reg | -0.09517 | -1.778 | 0.075 | 0.9092 | 0.9779 | 0.2351 |
| 5.reg | 0.67551 | 11.25 | 0 | 1.965 | 1.1492 | 0.2059 |
| 6.reg | -0.00275 | -0.047 | 0.962 | 0.9973 | 0.9994 | 0.2082 |
| 7.reg | 0.41427 | 6.601 | 0 | 1.5133 | 1.0819 | 0.19 |
| 8.reg | 0.23187 | 2.606 | 0.009 | 1.261 | 1.0305 | 0.1296 |
| 9.reg | 0.00233 | 0.055 | 0.956 | 1.0023 | 1.0008 | 0.3444 |
| 10.reg | -0.27757 | -4.803 | 0 | 0.7576 | 0.9437 | 0.2089 |
| 11.reg | -0.19612 | -3.481 | 0.001 | 0.8219 | 0.959 | 0.2136 |
| 12.reg | 0.20519 | 3.769 | 0 | 1.2278 | 1.0484 | 0.2305 |
| 13.reg | 0.65105 | 11.53 | 0 | 1.9175 | 1.1568 | 0.2237 |
| 14.reg | 0.74734 | 13.022 | 0 | 2.1114 | 1.1831 | 0.225 |
| 15.reg | 0.60441 | 11.136 | 0 | 1.8302 | 1.1546 | 0.2378 |
| 16.reg | 0.57049 | 10.945 | 0 | 1.7691 | 1.1525 | 0.2489 |
| 17.reg | -0.24508 | -3.509 | 0 | 0.7826 | 0.961 | 0.1624 |

e^b = exp(b) = factor change in odds for unit increase in X

## (3) Adding Environmental Factor Independent Variable

This time, while controlling the year and region, logistic regression analysis is conducted by adding independent variables of environmental factors. This study model is also found to be statistically significant ($\chi^2$=9403.98, p<0.01).

Even in this case, it is analyzed that all five independent

variables of individual factors have a positive (+) effect on participation in daily sports at the 1% level. In addition, similar to the case of (2), there is no significant difference in influence magnitude between the independent and dependent variables. In other words, even when the independent variable is added, a stable relationship appears between the existing independent variable and the dependent variable.

In the case of four independent variables of environmental factors, all four variables are found to have a statistically significant effect on participation in daily sports. The number of private sports facilities (Coef.=1.072) and the number of public sports clubs (Coef.=.150) are found to have a positive (+) effect on participation. In other words, it is found that the more private sports facilities and public sports clubs in the area where the sample resides, the higher the probability of participating in daily sports. However, it is found that the number of public sports facilities (Coef.=−.329) and the number of certified sports leaders (Coef.=−.691) have a negative (−) effect on participation.

On the other hand, looking at the participation by year, as in (2), participation tends to decrease after 2014 and 2015. Some areas changed from the analysis results of (2). In the case of Gwangju, Ulsan, and Sejong, it is analyzed that participation in daily sports is greater than that of Seoul in (2), which does not consider the independent variables of environmental factors. However, it is not statistically significant in (3). In the case of Gyeonggi, it shows greater participation than Seoul in (2), but it shows less participation than Seoul in (3). In other words, it is confirmed that the comparison results by region of participation in sports changed as the independent variables considered changed.

Meanwhile, odds ratio analysis results are shown in <Table 4−17>. Regarding individual factors, those who recognize the physical fitness effect of sports participation are 1.55 times more likely to participate in daily sports than not. Moreover, those who consider

their physical fitness good are 1.38 times more likely to participate in sports than not. Those who have participated in the physical fitness program are 2.50 times more likely to participate in sports than those who do not. If people have sports club experience, they are 2.52 times more likely to participate in sports than if they do not, and if people have experience in sports programs, they are 4.21 times more likely to participate in sports than if they do not. Compared to the cases of (1) and (2), there is a slight difference, but there is no noticeable difference.

Next, regarding environmental factors, those who reside in an area with many private sports facilities are 2.92 times more likely to participate in daily sports than not. Moreover, those who live in an area with many public sports clubs are 1.16 times more likely to participate in sports than not. However, those who reside in an area with many public sports facilities are 0.72 times less likely to participate in daily sports than not. Similarly, those who live in an area with many certified sports leaders are 0.50 times less likely to participate in sports than not.

<Table 4-17> Odds ratio analysis (adding environmental factors)

| | b | z | P>\|z\| | e^b | e^bStdX | SDofX |
|---|---|---|---|---|---|---|
| Cognition about physical fitness effect of sports | 0.4372 | 18.165 | 0 | 1.5484 | 1.2283 | 0.4703 |
| Awareness of physical fitness condition | 0.32023 | 21.296 | 0 | 1.3774 | 1.2895 | 0.794 |
| Physical fitness program experience | 0.91449 | 14.96 | 0 | 2.4955 | 1.3013 | 0.288 |
| Sports club joining experience | 0.9252 | 22.06 | 0 | 2.5224 | 1.3754 | 0.3445 |
| Sports program experience | 1.43709 | 41.405 | 0 | 4.2084 | 1.8462 | 0.4267 |
| Gender | 0.0074 | 0.327 | 0.744 | 1.0074 | 1.0037 | 0.5 |
| Age | 0.01024 | 12.682 | 0 | 1.0103 | 1.1994 | 17.7601 |
| Marriage | 0.2545 | 9.952 | 0 | 1.2898 | 1.135 | 0.4975 |
| Income | 0.08811 | 3.749 | 0 | 1.0921 | 1.0557 | 0.6153 |
| Education | 0.02415 | 1.813 | 0.07 | 1.0244 | 1.0249 | 1.0169 |
| Job status | -0.2979 | -11.047 | 0 | 0.7424 | 0.8644 | 0.4891 |
| 2015.year | 0.08992 | 1.665 | 0.096 | 1.0941 | 1.03 | 0.3289 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2016.year | -1.48013 | -29.206 | 0 | 0.2276 | 0.5607 | 0.3909 |
| 2017.year | -1.70276 | -28.286 | 0 | 0.1822 | 0.5141 | 0.3907 |
| 2018.year | -1.65612 | -23.729 | 0 | 0.1909 | 0.5236 | 0.3907 |
| 2019.year | -1.43442 | -18.238 | 0 | 0.2383 | 0.5709 | 0.3907 |
| 2.reg | 0.0164 | 0.048 | 0.961 | 1.0165 | 1.0041 | 0.2497 |
| 3.reg | 0.97351 | 2.411 | 0.016 | 2.6472 | 1.25 | 0.2292 |
| 4.reg | -0.2558 | -0.684 | 0.494 | 0.7743 | 0.9416 | 0.2351 |
| 5.reg | 0.75492 | 1.566 | 0.117 | 2.1274 | 1.1682 | 0.2059 |
| 6.reg | 0.75975 | 1.736 | 0.083 | 2.1377 | 1.1714 | 0.2082 |
| 7.reg | 1.03715 | 1.944 | 0.052 | 2.8212 | 1.2178 | 0.19 |
| 8.reg | 1.03304 | 0.978 | 0.328 | 2.8096 | 1.1433 | 0.1296 |
| 9.reg | -0.46651 | -5.245 | 0 | 0.6272 | 0.8516 | 0.3444 |
| 10.reg | 1.22272 | 3.629 | 0 | 3.3964 | 1.2909 | 0.2089 |
| 11.reg | 0.90761 | 2.395 | 0.017 | 2.4784 | 1.2139 | 0.2136 |
| 12.reg | 1.18718 | 3.423 | 0.001 | 3.2778 | 1.3147 | 0.2305 |
| 13.reg | 0.90687 | 2.577 | 0.01 | 2.4766 | 1.2249 | 0.2237 |
| 14.reg | 1.6912 | 5.644 | 0 | 5.426 | 1.4631 | 0.225 |
| 15.reg | 1.39966 | 5.626 | 0 | 4.0538 | 1.395 | 0.2378 |
| 16.reg | 1.15693 | 4.865 | 0 | 3.1801 | 1.3336 | 0.2489 |
| 17.reg | 0.79897 | 1.274 | 0.202 | 2.2232 | 1.1386 | 0.1624 |
| Public sports facilities | -0.32933 | -2.02 | 0.043 | 0.7194 | 0.7643 | 0.8163 |
| Private sports facilities | 1.07152 | 5.644 | 0 | 2.9198 | 2.58 | 0.8845 |
| certified sports leaders | -0.691 | -2.631 | 0.009 | 0.5011 | 0.635 | 0.6573 |
| Public sports clubs | 0.14978 | 13.017 | 0 | 1.1616 | 1.4298 | 2.3871 |

e^b = exp(b) = factor change in odds for unit increase in X

## (4) Interim Conclusion

As a result of the analysis, it is found that the five independent variables of individual factors have a positive (+) effect on participation in sports regardless of year and region control. Even when four independent variables of environmental factors are added, the positive (+) effect does not change. In other words, the relationship between the independent and dependent variables shows a stable appearance despite the change in the model.

Among the four environmental factors, it is analyzed that only the number of private sports facilities and the number of public sports clubs have a positive (+) effect on sports participation. And

the two variables (the number of public sports facilities and certified sports leaders) have a negative (−) effect on participation.

On the other hand, regarding the year and region comparison, it is found that the results are somewhat different from common policy guesses that were investigated without considering variables.

## (Additional) Interaction Effect Analysis

This paper further analyzes whether the independent variable has an interaction effect with the year and region. The items from which statistically significant results are derived will be briefly described (see Appendix A for full detailed results).

### A. Individual Factor Independent Variable – Region

This paper examines the regions where the interaction effect between the variable and the region is significant among the five individual factor−independent variables (see table A1). Some areas showed lower participation than Seoul (including areas with no significance) when not considering the interaction effect. However, considering the interaction effect, some areas show higher participation than Seoul. This area includes Ulsan (cognition of physical fitness effect of sports*region), Gyeonggi (physical fitness program experience*region), and Gwangju (sports program experience*region). In other words, it can be said that there is a higher effect of participating in sports when those regional residents recognize or experience those variables. Also, the impact of those programs looks greater in those regions.

On the other hand, there are some opposite results. When not considering the interaction effect, some areas' participation was not lower than Seoul's (including areas with no significance). However, when considering the interaction effect, some regions show lower participation than Seoul. This area includes Jeonbuk (awareness of physical fitness condition* region), Jeonnam (awareness of physical

fitness condition* region, physical fitness program experience* region), and Daegu (sports club experience* region). In other words, in the case of this region, those experiences and programs do not look to have a significant effect on sports participation.

### B. Environmental Factor Independent Variable – Region

This paper examines the regions where the interaction effect between the variable and the region is significant among the four environmental factor-independent variables (see table A2). Some areas showed lower participation than Seoul (including areas with no significance) when not considering the interaction effect. However, considering the interaction effect, some areas show higher participation than Seoul. These areas include Busan (public sports facilities* region, public sports club* region), Gwangju (public sports facilities* region, Ulsan (public sports club* region, certified sports leaders* region), Sejong (public sports facilities* region), Gyeonggi (public sports facilities* region), Jeju (public sports facilities* region, private sports club* region). In other words, when the sports infrastructure is installed in those areas, it can be seen that the effect of participating in sports is relatively significant. Notably, public sports facilities show an interaction effect of increasing participation compared to Seoul in many regions, and private sports facilities show an interaction effect of increasing participation compared to Seoul in Jeju alone.

On the other hand, there are some opposite results. When not considering the interaction effect, some areas' participation was not lower than Seoul's (including areas with no significance). However, when considering the interaction effect, some regions show lower participation than Seoul. These areas include Busan (private sports facilities* region), Daejeon (private sports facilities* region, certified sports leaders* region), Ulsan (private sports facilities* area), Sejong (private sports facilities* region), and Gangwon (private sports facilities* region, certified sports leaders* region).

In other words, in the case of this region, it can be seen that the effect of participating in sports due to the supply of the sports infrastructure is not relatively significant.

### C. Individual Factor Independent Variable – Year

This paper examines the years where the interaction effect between the variable and the year is significant among the five individual factor–independent variables (see table A3). When not considering the interaction effect, participation in sports in 2015, 2016, 2017, 2018, and 2019 was lower than in 2014. However, if considering the interaction effect between variables and years, in some years, participation increased compared to 2014. The awareness of physical fitness conditions make participation improve in 2017, 2018, and 2019 when considering the interaction effect with the year. The experience of the physical fitness programs make participation improve in 2015, 2017, and 2018 when considering the interaction effect with the year. The interaction effect of the sports club experience in 2016 and 2017 is positively significant, and the interaction effect of the sports program experience in 2016 and 2017 is also positively substantial. In other words, it is found that particular cognition and experience relatively positively affect the expansion of sports participation in a specific year.

### D. Environmental Factor Independent Variable – Year

This paper examines the years where the interaction effect between the variable and the year is significant among the four environmental factor–independent variables (see table A4). When not considering the interaction effect, participation in sports in 2015, 2016, 2017, 2018, and 2019 was lower than in 2014. However, if considering the interaction effect between variables and years, in some years, participation increased compared to 2014. In the case

of previous individual factor variables, in many variables, participation in sports increased compared to 2014 due to the interaction effect with the year. However, in the case of environmental factors, only the interaction effect of public sports facilities, private sports facilities, and sports leaders in 2016 looks positively meaningful. In other words, in this case alone, there is a difference in the improvement in participation compared to 2014.

## 2) Frequency of Participation in Daily Sports

This study analyzes whether independent variables affect sports participation frequency and verifies the above research hypotheses. Since the frequency of participation in sports is a continuous variable, regression analysis is conducted. Like the previous logistic regression, the review is conducted by dividing it into (1) individual factor independent variable: a pooled method that does not consider region and year, (2) adding control variables, including region and year, and (3) adding environmental factor independent variable. The results are shown in <Table 4-18>.

<Table 4-18> Regression analysis on frequency of participation

| Items | | (1) | (2) | (3) |
|---|---|---|---|---|
| **Independent Variables (Individual)** | Cognition about physical fitness effect of sports | 0.498<br>(22.61)** | 0.456<br>(21.32)** | 0.462<br>(21.59)** |
| | Awareness of physical fitness condition | 0.421<br>(29.34)** | 0.353<br>(25.33)** | 0.354<br>(25.44)** |
| | Physical fitness program experience | 0.788<br>(20.31)** | 0.676<br>(17.98)** | 0.668<br>(17.78)** |
| | Sports club joining experience | 0.284<br>(8.90)** | 0.364<br>(11.79)** | 0.354<br>(11.49)** |
| | Sports program experience | 1.058<br>(38.80)** | 1.145<br>(42.96)** | 1.150<br>(43.17)** |
| **Control Variables** | gender | -0.048<br>(2.19)* | -0.066<br>(3.14)** | -0.065<br>(3.11)** |
| | age | 0.023<br>(31.80)** | 0.021<br>(29.91)** | 0.021<br>(29.92)** |
| | marriage | -0.159<br>(7.23)** | 0.137<br>(6.17)** | 0.136<br>(6.16)** |
| | income | -0.063<br>(3.28)** | 0.044<br>(2.32)* | 0.040<br>(2.10)* |

| | | | | |
|---|---|---|---|---|
| | Education | -0.055 | -0.003 | -0.005 |
| | | (4.46)** | (0.29) | (0.39) |
| | Job status | -0.250 | -0.334 | -0.335 |
| | | (9.82)** | (13.57)** | (13.60)** |
| | 2015bn.year | | 0.127 | 0.074 |
| | | | (3.21)** | (1.80) |
| | 2016.year | | -1.151 | -1.205 |
| | | | (30.98)** | (28.03)** |
| | 2017.year | | -1.180 | -1.322 |
| | | | (31.77)** | (25.80)** |
| | 2018.year | | -1.054 | -1.241 |
| | | | (28.51)** | (20.66)** |
| | 2019.year | | -1.107 | -1.278 |
| | | | (29.97)** | (18.60)** |
| | 2bn.reg | | 0.609 | 0.843 |
| | | | (12.82)** | (2.77)** |
| | 3.reg | | 0.930 | 1.376 |
| | | | (18.36)** | (3.89)** |
| | 4.reg | | -0.050 | 0.263 |
| | | | (1.01) | (0.77) |
| | 5.reg | | 0.674 | 1.280 |
| | | | (12.23)** | (2.98)** |
| | 6.reg | | 0.394 | 1.000 |
| | | | (7.26)** | (2.67)** |
| | 7.reg | | 0.626 | 1.143 |
| | | | (10.72)** | (2.49)* |
| | 8.reg | | 0.524 | 1.978 |
| | | | (6.49)** | (2.07)* |
| | 9.reg | | 0.106 | -0.080 |
| | | | (2.75)** | (1.05) |
| | 10.reg | | -0.036 | 1.487 |
| | | | (0.67) | (4.93)** |
| | 11.reg | | 0.119 | 1.476 |
| | | | (2.23)* | (4.33)** |
| | 12.reg | | 0.415 | 1.460 |
| | | | (8.21)** | (4.76)** |
| | 13.reg | | 0.799 | 1.320 |
| | | | (15.32)** | (4.31)** |
| | 14.reg | | 0.706 | 1.746 |
| | | | (13.63)** | (6.59)** |
| | 15.reg | | 0.992 | 1.959 |
| | | | (19.87)** | (8.76)** |
| | 16.reg | | 0.892 | 1.659 |
| | | | (18.63)** | (7.82)** |
| | 17.reg | | 0.104 | 1.386 |
| | | | (1.56) | (2.50)* |
| **Independent Variables (Environment Factors** | Number of public sports facilities | | | -0.666 |
| | | | | (4.68)** |
| | Number of private sports facilities | | | 0.971 |
| | | | | (5.68)** |
| | Number of certified sports leaders | | | -0.039 |
| | | | | (0.16) |
| | Number of Public sports club | | | 0.099 |
| | | | | (9.54)** |
| | _cons | 1.737 | 1.551 | -2.002 |
| | | (13.21)** | (11.32)** | (1.07) |
| | $R^2$ | 0.11 | 0.18 | 0.18 |
| | *N* | 47,866 | 47,866 | 47,866 |

* $p<0.05$; ** $p<0.01$

### (1) Individual Factors Independent Variables (Not consider year and region)

Regression analysis is conducted to determine the effect of five independent variables of individual factors on the frequency of participation in daily sports. The explanatory power of the dependent variable of the independent variables is 11.01% ($R^2$=0.1101), and the research model is confirmed to be statistically significant(F=539.26, p<.01).

As a result of the analysis, it is found that all five variables have a statistically significant positive (+) effect on the frequency of participation in daily sports at the 1% level. Regarding psychological factors, when people recognize that daily sports is effective in improving physical fitness(Coef.=.498, p<.01), and people consider their physical fitness condition as good(Coef.=.421, p<.01), the frequency of participating in daily sports increases. Regarding experience factors, when people have experienced physical fitness program (Coef.=.788, p<.01), sports club joining(Coef.=.284, p<.01), and sports program(Coef.=1.508, p<.01), the frequency of participating in daily sports increases.

### (2) Adding control variables (Year and Region)

Unlike the case of (1), which does not consider the year and region, regression analysis is performed by controlling the year and region. The explanatory power of the dependent variable of the independent variables is 17.48% (R2=0.1101), and the research model is confirmed to be statistically significant(F=317.79, p<.01).

Even considering year and region, all five independent variables of individual factors are found to have a positive (+) effect on the frequency of participation in sports at the 1% level. However, it can be seen that the magnitude of the effect of the independent variable

on the dependent variable has changed somewhat. However, even though year and region are controlled, it can be seen that the overall effect of the independent variable on the dependent variable is robust.

Among the control variables, there are variables whose direction changes after regional and year control. In the case of the Marriage and Income variables, they had a statistically significant negative influence when the region and year were not considered. However, after controlling the region and year, it has a positive effect on the frequency of participation in sports. In other words, considering the region and year, the more married and the higher the income, the more frequently they participate in sports.

On the other hand, looking at the change in the frequency of participation in daily sports by year, the frequency of participation in 2015 increased (Coef.=.127) compared to 2014, and the frequency continued to decrease (2016: Coef.=−1.151, 2017: Coef.=−1.054, 2019: Coef.=−1.10−17). This is similar to the annual trend of participation in sports. And it can be assumed that the overall frequency of participation in daily sports differs from the annual trend without considering independent or control variables, such as descriptive analysis.

Looking at the frequency of participation in daily sports by region, among the regions with statistically significant results, all regions except Incheon, Gangwon, and Jeju are found to have a higher frequency of participation in daily sports than Seoul. It includes Busan (Coef.=.609, p<.01), Daegu (Coef.=.930, p<.01), Gwangju (Coef.=.674, p<.01), Daejeon (Coef.=.394, p<.01), Ulsan (Coef. =.626, p<.05), Sejong (Coef.=.524, p<.05), Gyeonggi (Coef. =.106, p<.01), Chungbuk (Coef. =.119, p<.01), Chungnam (Coef.=.415, p<.01), Jeonbuk (Coef.=.799, p<.01), Jeonnam (Coef.=.706, p<.01), Gyeongbuk (Coef.=.992, p<.01), Gyeongnam (Coef. =.892, p<.01), Jeju (Coef. = 1.386, p<.05). Compared to the previous participation in sports, more regions show a higher frequency of participation than in Seoul.

### (3) Adding Environmental Factor Independent Variable

This time, while controlling the year and region, regression analysis is conducted by adding independent variables of environmental factors. The explanatory power of the dependent variable of the independent variables is 17.67% ($R^2$=0.1767), the highest among the three regression models. And the research model is confirmed to be statistically significant(F=286.43, p<.01).

Even in this case, it is analyzed that all five independent variables of individual factors have a positive (+) effect on the frequency of participation in daily sports at the 1% level. In addition, similar to the case of (2), there is no significant difference in influence magnitude between the independent and dependent variables. In other words, even when the independent variable is added, a stable relationship appears between the existing independent variable and the dependent variable.

Among the four independent variables of environmental factors, the number of certified sports leaders is not statistically significant. Among the three variables that are statistically significant at the 1% level, the number of private sports facilities (Coef.=.971, p<).01) and the number of public sports clubs (Coef.=.099, p<.01) have a positive (+) effect on the frequency of participation in sports. In other words, the more private sports facilities, and public sports clubs in the area where the sample resides, the higher the frequency of participation in daily sports. This is consistent with the variable that has a positive (+) effect on participation in daily sports. However, the number of public sports facilities (Coef.=−.666, p<.01) is found to have an effect on the frequency of participation in daily sports in the negative (−) direction.

Like the case of (2), the frequency of participation in the subsequent years tends to decrease compared to 2014 and 2015. In addition, in comparison by region, there are some changes compared to the result of (2). Gyeonggi shows higher frequency

than Seoul in the case of (2), which does not consider the environmental factor independent variable. However, it is not statistically significant in the case of (3), which considers the environmental factor independent variable. In the case of Gangwon and Jeju, on the contrary, it is not statistically significant in the case of (2). However, in the case of (3), the frequency of participation in sports is higher than in Seoul. In other words, it can be seen that when the environmental factor independent variable is added, the frequency of participation in daily sports in a specific region changes. In the case of Busan, Daegu, Gwangju, Daejeon, Ulsan, Sejong, Chungbuk, Chungnam, Jeonbuk, Jeonnam, Gyeongbuk, and Gyeongnam, they have no difference in the direction of influence. In those cases, the frequency of participation is higher than in Seoul to a greater extent than when independent variables for environmental factors were not added.

### (4) Interim Conclusion

As a result of the analysis, it is found that the five independent variables of individual factors have a positive (+) effect on the frequency of participation in sports regardless of year and region control. Even when four independent variables of environmental factors are added, the positive (+) effect does not change. In other words, the relationship between the independent and dependent variables shows a stable appearance despite the change in the model. This is the same result as when analyzing whether or not to participate in daily sports as a dependent variable.

Among the four environmental factors, it is analyzed that only the number of private sports facilities and the number of public sports clubs have a positive (+) effect on the frequency of sports participation. This is the same result as when analyzing whether or not to participate in daily sports as a dependent variable.

In terms of year and region comparison, similar to the analysis of participation in daily sports, the results are somewhat different

from the previous descriptive analysis that does not consider various variables. In other words, it is found that the frequency of participation has decreased since 2016 and that many regions have a higher frequency of participation than Seoul.

## (Additional) Interaction Effect Analysis

This paper further analyzes whether the independent variable has an interaction effect with the year and region. The items from which statistically significant results are derived will be briefly described (see Appendix B for full detailed results).

### A. Individual Factor Independent Variable – Region

This paper examines the regions where the interaction effect between the variable and the region is significant among the five individual factor–independent variables (see table B1). It can be said that no region improves the frequency of participation compared to Seoul due to this interaction effect. On the other hand, many regions lower the frequency of participation compared to Seoul after applying this interaction effect. In particular, the cognition of the physical fitness effect of sports makes the participation frequency lower than that of Seoul due to the interaction effect in nine regions (Daegu, Gwangju, Daejeon, Sejong, Gyeonggi, Chungnam, Jeonbuk, Jeonnam, and Gyeongnam). The physical fitness program's experience makes participation frequency lower than Seoul due to the interaction effect in three regions (Daegu, Jeonnam, and Gyeongbuk). Also, sports club experience makes the frequency of participation lower than that of Seoul due to the interaction effect in 11 regions (Daegu, Gwangju, Daejeon, Gyeonggi, Chungnam, Jeonbuk, Jeonnam, Gyeongbuk, Busan, Ulsan, and Chungbuk).

### B. Environmental Factor Independent Variable – Region

This paper examines the regions where the interaction effect between the variable and the region is significant among the four environmental factor-independent variables (see table B2). Gyeonggi shows a higher frequency than Seoul when considering the interaction effect(Public sports facilities*region). On the other hand, many regions show lower frequency than Seoul when considering the interaction effect. Private sports facilities make the frequency of participation lower than in Seoul due to the interaction effect of three regions (Daejeon, Gangwon, and Chungbuk). Public sports clubs make the frequency of participation lower than that of Seoul due to the interaction effect of two regions (Daejeon and Incheon). Certified sports leader variable makes the frequency of participation lower than that of Seoul due to the interaction effect of three regions (Daejeon, Gangwon, and Gyeongnam). Still, in any regions, public sports facilities don't make frequency of participation lower than that of Seoul due to the interaction effect.

### C. Individual Factor Independent Variable – Year

This paper examines the years where the interaction effect between the variable and the year is significant among the five individual factor-independent variables (see table B3). When not considering the interaction effect, the frequency of participation in sports in 2015, 2016, 2017, 2018, and 2019 was lower than in 2014. However, when considering the interaction effect of variables and years, there are many years in which the participation frequency increased compared to 2014. Considering the interaction effect with 2016, cognition of physical fitness effects of sports makes the frequency higher compared to 2014. With the interaction effect in 2016, 2017, 2018, and 2019, the awareness of the physical fitness condition makes the frequency of participation higher compared to 2014. With the interaction effect in 2016, 2017, and 2018, the physical fitness program experience makes the frequency of participation higher compared to 2014. Sports club experience has a

significant interaction effect with 2016 and 2017, and club participation experience has a significant interaction effect with 2016 and 2017. With the interaction effect in 2016, 2017, and 2018, sports program experience makes the frequency of participation higher compared to 2014. In other words, specific cognitions and experiences in a particular year positively affect the expansion of sports participation.

### D. Environmental Factor Independent Variable – Year

This paper examines the years where the interaction effect between the variable and the year is significant among the four environmental factor–independent variables (see table B4). When not considering the interaction effect, the frequency of participation in sports in 2015, 2016, 2017, 2018, and 2019 was lower than in 2014. However, when considering the interaction effect of variables and years, 2016 is the year in which the frequency of participation increases compared to 2014. With the interaction effect of 2016 with the public sports facilities, private sports facilities, and certified sports instructor variables, the frequency of sports participation increased compared to 2014.

## 4.4. Hypotheses Testing

This study conducted a regression analysis after establishing hypotheses that the psychological cognition and experience related to daily sports and the residential area's infrastructure will positively affect sports participation and frequency. The results are shown in <Table 4-19>.

<Table 4-19> Hypotheses testing

| | Hypotheses | Testing results |
|---|---|---|
| Hypothesis1 | An individual's cognition and experience related to daily sports will have a positive (+) effect on participation in daily sports. | Reject Ho |
| Hypothesis2 | Individual experience and cognition related to daily sports will have a positive (+) effect on the frequency of participation in daily sports. | Reject Ho |
| Hypothesis3 | Infrastructure related to daily sports in the residential area will have a positive (+) effect on participation in daily sports. | Fails to Reject Ho |
| Hypothesis4 | Infrastructure related to daily sports in the residential area will have a positive (+) effect on the frequency of participation in daily sports. | Fails to Reject Ho |

Regarding hypothesis 1, individuals' cognition and experience related to sports were sub-verified with five independent variables for individual factors. All five variables, such as cognition about the physical fitness effect of sports, awareness of physical fitness condition, physical fitness program experience, sports club joining experience, and sports program experience, show a statistically significant and positive (+) relationship with participation in daily sports. Therefore, this paper can reject the null hypothesis.

Hypothesis 2's individual cognition and experience related to daily sports were also sub-verified with the above five independent variables. As a result, all five variables show a statistically

significant and positive (+) relationship with the frequency of participation in sports, which is a dependent variable. Therefore, this paper can reject the null hypothesis.

Regarding the hypothesis 3, the infrastructure related to daily sports in the residential area was sub-verified with four independent variables of environmental factors. Among the four variables, the number of private sports facilities and public sports clubs is found to have a statistically significant positive (+) effect on whether or not to participate in daily sports, which is a dependent variable. However, it is found that public sports facilities and certified sports leaders are statistically significant but show negative (-) effects with participation in sports. In other words, the direction of influence among variables is different and lacks consistency. Therefore, this paper fails to reject the null hypothesis.

Hypothesis 4's residential sports-related infrastructure was also sub-verified with the four independent variables of the environmental factors. As a result, similar to Hypothesis 3, it is analyzed that the number of private sports facilities and public sports clubs have a statistically significant positive (+) relationship with the frequency of participation in daily sports. However, although it is statistically significant in the case of public sports facilities, it shows a negative (-) relationship with the frequency of participation. In addition, it is found that the variables of certified sports leaders are not statistically significant. Therefore, as in Hypothesis 3, the consistency of the relationship between variables is insufficient. Therefore, this paper fails to reject the null hypothesis.

# Chapter 5. Conclusion

## 5.1. Summary of Research Results

Korea has already entered an aging society, and interest in participating in sports for a healthy life is also growing. Accordingly, policy projects and budget inputs from the government and local governments are also increasing. As a result, the participation rate of people in daily sports continues to increase yearly. Supporting the people's participation in daily sports is part of the welfare policy that the government and local governments should implement. Therefore, analyzing the factors affecting participation in daily sports will significantly help determine future policy directions.

To this end, this study selected 'whether to participate in daily sports' and 'frequency of participation in daily sports' as dependent variables. This is to determine what factors are in place to increase the probability of participating in sports and participating more often. As independent variables, 'individual' and 'environmental' factors were divided. In addition to analyzing the inherent factors of each participant, it was to analyze the sports environment and infrastructure of the region where the individual resides. As an independent variable of the 'individual' factor, psychological cognition and experiences related to daily sports were determined. In specific, cognition about the physical fitness effect of sports, awareness of physical fitness condition, physical fitness program experience, sports club joining experience, and sports program experience were used as sub-independent variables. As an independent variable of the 'environmental' factor, facilities and instructors related to daily sports in the residential area were used. Specifically, the number of public sports facilities, private sports facilities, public sports clubs, and certified sports leaders were used as sub-independent variables. On the other hand, gender, age,

region, education level, job status, marital state, and income level analyzed as factors affecting participation in several previous studies were used as control variables.

This study used data from the National Sports Survey from 2014 to 2019, before COVID-19. Descriptive statistical analysis, correlation analysis, logistic regression analysis, and regression analysis were conducted. In particular, the regression analysis was conducted in stages, such as (1) analyzing individual factor-independent variables without considering the year and region, (2) adding year and region control, and (3) adding environmental factor-independent variables. As a result, this paper confirmed how the influence of the independent variable on the dependent variable in each case was different. In addition, the interaction effect was additionally analyzed to confirm how the influence of the independent variable on the dependent variable varies depending on the year and region.

As a result of hypotheses testing, it was found that cognition and experience related to daily sports, which are 'individual' factors, had a statistically significant positive (+) effect on both participation and frequency of participation in daily sports (Hypothesis 1, Hypothesis 2). In other words, it was analyzed that when one recognizes sports participation as the most critical factor to improve physical fitness and considers one's physical condition good, people are likely to participate in daily sports and more frequently. Also, when people have experience in a physical fitness program, sports clubs, and certified sports leaders, they are likely to participate in daily sports and more frequently. This was the same result when the year and region were controlled and not controlled. Accordingly, Hypothesis 1 and Hypothesis 2 could fail to reject.

On the other hand, regarding the daily sports infrastructure of residential areas, which is an 'environmental' factor, only the number of private sports facilities and the number of public sports

clubs were found to have a statistically significant positive effect on both participation and frequency. In other words, the higher the number of private sports facilities and public sports clubs in the residential area, the higher the probability of participating in daily sports and the more frequently. However, contrary to the hypothesis, the number of public sports facilities and the number of certified sports leaders did not have a positive (+) effect on participation or frequency. Hypothesis 3 and 4 rejected because the relationship between sub-variables was inconsistent.

There could be some reasons that cause different results from expectations. First, there are statistical reasons. Participation in 2014 and 2015 may look high, and participation after 2016 is low due to the removal of missing values for statistical analysis. In the case of public sports facilities and certified sports leaders, it has increased and supplied quantitatively every year since 2014 due to policy reasons. Therefore, the continuous increase in public sports facilities and certified sports leaders may not look related to the rise in participation since 2016. Secondly, there is a reason for the scope of the study. This study counted the number of facilities for various environmental factors at the metropolitan government level. However, even residents of the same metro government have very different facilities to access. In other words, the failure to consider the accessibility of the infrastructure may have led to the result that the infrastructure does not positively affect participation. This is because the distance between the sample and the variable became too far.

On the other hand, it is meaningful to analyze the different research results between public and private sports facilities. While public sports facilities do not positively affect sports participation and frequency, private sports facilities are found to have a positive effect. This is considered a difference due to the purpose of establishing the two facilities and the establishment method. In other words, public sports facilities are also installed in underprivileged areas where private facilities cannot operate

because public facilities are aimed at "public interest" in addition to "profitability." In the case of public sports facilities, unlike private sports facilities, they can be installed in areas where population, demand, and participation are not likely. In addition, the once-built facility is operated by local governments, so there are few closures even though their usage is not high. However, private sports facilities are installed in areas that are likely to participate in the first place, and they are closed if they do not get enough participation and profitability. In other words, it can be seen that the degree of born closeness with the demand for participation influenced the difference in the research results of public and private sports facilities.

Furthermore, significant results could be derived in addition to hypotheses testing through this study. First, it was found that the influence of the independent variable on the dependent variable was stable. The direction and size of the influence of the independent variable on the dependent variable remained constant regardless of whether the independent and control variables were added. Second, it was confirmed that sports participation by year and region might vary when other variables intervene. In other words, the trend of year and region used in the policy field results from an overall analysis, not considering specific variables. This result may be different if various variables are involved. For example, there is room for different interpretations, such as "the participation rate in daily sports continues to rise over the years" and "the participation rate in daily sports in urban areas such as Seoul and Gyeonggi is high." Third, when considering the interaction effect of the year and region, it was confirmed that there might be an effect contrary to the hypotheses testing in the case of a specific year and region. For example, it was found that the number of public sports facilities had a negative (−) effect on participation. However, in certain regions, it was found that it had a positive (+) effect.

## 5.2. Policy Implications

This study was conducted to obtain implications for the policy direction of the government and local governments that support the participation of the people in daily sports. As a result of the analysis, it was found that factors such as sports facilities, programs, sports experiences, and cognition positively affected participation and frequency of sports. That is, policies the government has been promoting so far exert the intended effect. However, on the other hand, some variables were found to not affect participation in sports. Based on this, this paper will review policy suggestions to expand people's participation in daily sports further.

First, since 'recognition of the effect of daily sports' was found to have a positive (+) effect on both participation and frequency, policies are needed to promote this further. It was found that the higher the cognition that sports participation is the most effective activity for maintaining physical fitness, the more actively participating in daily sports. Therefore, a policy to actively promote the effectiveness and function of daily sports will be effective. It can be expanded not only to direct effects, such as improving physical strength and health but also to social welfare, such as improving the quality of life and happiness. Many developed countries encourage daily sports as part of national health and social welfare, and sometimes they are regarded as a measure of the welfare state. A campaign that allows the public to recognize daily sports' various effects and meanings quickly and accurately will also be effective.

Second, it was found that 'awareness of one's physical fitness condition' had a positive (+) effect on both participation and frequency. In other words, the more one recognizes that one's physical strength is good, the more one participates in daily sports. People can participate in sports to improve their poor physical

fitness. However, knowing that they can get good results with their excellent physical fitness is also a factor in participation. In other words, people who periodically check their physical condition and trust their abilities tend to participate more actively in physical activities. In other words, it will be possible to increase the frequency of participation by using programs that let people know the degree of regular physical fitness checks, sports participation, and physical fitness improvement.

Third, it was found that the 'experience of physical fitness programs and sports programs' also had a positive (+) effect on participation in and frequency. Until now, the government has provided various sports programs. Also, they serviced physical fitness measurement and exercise prescription services at the National Physical Fitness Certification Center. In other words, it can be seen that these policies worked effectively. Of course, when sports-related experiences give pleasure and satisfaction, they can positively affect participation in sports. Therefore, it is natural that quality improvement should be considered together rather than simply expanding the business quantitatively. For example, diversification of sports programs considering individual characteristics such as age, household, gender, and occupation, and induction of continuous participation in the program through follow-up satisfaction surveys and reflux will be effective.

Fourth, it was found that the 'experience of joining sports clubs' also had a positive (+) effect on participation and frequency. Therefore, support for this also needs to be continuously expanded. In other words, a policy that supports clubs where people with similar interests and understanding gather together to engage in sports activities will be effective. Currently, at the government and local governments level, projects are being implemented to provide a certain amount of money to clubs that meet the requirements. When considering the limitations of financial resources, the degree

of activation of the club support policy is a matter to be considered. Nevertheless, it is also necessary to consider the expected effect that activating club activities can contribute on sports participation and happiness promotion.

Fifth, it was found that the ‘number of public sports facilities’ did not have a positive (+) effect on the participation and frequency of daily sports. This is somewhat far from the expected effect that the government and local governments have continuously implemented policies to expand the number of public sports facilities. However, this is the result of research on a specific year, region, and sample, so there may be limitations. In fact, as a result of analyzing the interaction effects based on the year and region, results different from the overall analysis were derived. In addition, not only 'demand' but also 'public interest' is considered when determining the location of public sports facilities. In other words, public sports facilities may be opened for public interest reasons in areas where participation in sports is not high due to the size or composition of the population. As a result, a positive (+) effect may not have appeared. Nevertheless, it was confirmed that the quantitative increase in public sports facilities does not necessarily guarantee participation. In other words, only supply expansion is not valid, and there is a need for an operation improvement policy that allows more people to pay attention and continue to use it.

Sixth, the ‘number of private sports facilities’ was found to have a positive (+) effect on the participation and frequency of daily sports, so policies are needed to revitalize them further. Private sports facilities are self-employed, so they open and operated based on demand. It may be closed if demand is not met and there is no profit. This is the difference from public sports facilities; therefore, it may be one of the reasons for the difference in the analysis results. Private sports facilities are indirectly regulated and supported through related laws and regulations. If there are

unnecessary regulations, it is necessary to rationalize them and expand the support that facility users want.

Seventh, it was found that the ‘number of public sports clubs’ also had a positive (+) effect on the participation and frequency of daily sports. Sports clubs are a concept that combines facilities, instructors, and programs, which are the basics of participation in sports. In advanced sports countries such as Germany, sports clubs have played a vital role as the base of daily sports. In addition, club people with similar interests give social support to each other. Until now, the government has supported fostering sports clubs, and this study also confirmed the positive effects of sports clubs. In addition to the quantitative increase in public sports clubs, efforts such as operating programs at various levels, securing high-quality leaders, and revitalizing volunteer culture will be effective.

Eighth, it was found that the ‘number of certified sports leaders’ did not significantly have a positive (+) effect on participation and frequency. The impact of instructors on participation in sports is not tiny. However, due to limitations such as obtaining data, this study only dealt with certified sports leaders the government supports. Therefore, there might be a limitation in the scope of the research. Alternatively, it can be seen that the current number of certified sports leaders has not reached the scale that can significantly affect residents' participation in sports. Of course, it is necessary to focus more on the public interest purpose of ensuring that residents in areas with few private instructors can be taught by high-quality instructors rather than the unconditional quantitative expansion of certified sports leaders.

Overall, policy efforts necessary to expand participation in daily sports, which is a policy purpose, are examined. First, for variables that positively affect sports participation and frequency as a result of the study, a policy to further increase supply in the future will be

significant. However, specific effects may vary by region and group. In particular, as seen in this study, the magnitude of the relative impact on participation and frequency varies depending on the interaction effect between specific variables and regions. Therefore, it would be meaningful to adjust the supply of the corresponding variables in the region considering this. For example, in areas where the positive effect has become more robust due to the interaction effect, the supply of the corresponding variables needs to be further increased. In addition, if the negative impact has become stronger due to the interaction effect, it will be necessary to review the appropriateness of the supply of the variables and reorganize the policy to produce a positive impact.

Also, in the case of variables that did not appear to have a positive effect on participation and frequency as a result of the study, policy efforts to have a positive impact will be needed. Of course, it is necessary to consider this paper's limitations, which is a limited study on a specific sample. Nevertheless, it is found that the increase in the quantitative supply of public sports facilities and certified sports leaders may not necessarily positively affect the expansion of participation and participation frequency.

As a solution, first, a policy is needed to improve the utilization rate of public facilities. In the case of public facilities, there is a possibility that they may be installed in areas where participants cannot be high from the beginning due to public interest purposes. However, even in this case, a policy that can enhance participation through expanding use is needed. As the low utilization rate of public sports facilities has been pointed out, it is necessary to induce continuous participation by taking advantage of the advantages of public facilities. Second, due to the interaction effect between public sports facilities and regions, many regions show higher participation than the time when not considering the interaction effect. This is in contrast to the fact that no significant results are found in the interaction effect between private sports facilities and regions. In other words, public sports facilities can still

be relatively effective in expanding participation in sports in certain areas, and efforts will be needed to further revitalize public facilities in these areas.

Finally, it is necessary to recognize that governments' policy predictions might differ from analysis through research. Therefore, it needs a supplement to become a more empirical policy. Specifically, the overall sports participation trend may not be sufficient without considering the year and region. For example, the participation rate in daily sports has continued to rise yearly. However, suppose various factors such as gender, income, age, educational background, and experiences and perceptions related to sports are considered. In that case, the trend of participation rate may vary. In addition, a specific policy infrastructure may have a different impact than expected depending on the region and year, which may also affect the overall effect of the policy. Of course, this detail might not be fully reflected because universality and specificity must be considered together when formulating policies. Nevertheless, it is necessary to recognize that the relationship between input and output that the policy manager expected to be natural does not always take place and to design a policy in preparation for this.

## 5.3. Limitation of Research

This study attempted to analyze the effects of individuals' experiences and cognition related to sports and the daily sports infrastructure of the residential area on the participation and frequency of daily sports. However, there are several limitations in the scope of research and interpretation of research results, which is needed to be supplemented through future research.

First, the data used in this study is data from before COVID-19. This is because it was intended to analyze the factors influencing participation without being affected by COVID-19. As a result, the time point of the reference data has become somewhat far from the present. And there is a limitation: the changed situation after COVID-19 has not been reflected.

Actually, after COVID-19, there was also a change in the participation rate in sports for all. According to the National Sports for All survey, the participation rate in 2020 was 60.1%, down 6.5%p from the previous year. However, after the COVID-19 situation improves, it will likely recover to the same pattern of daily sports participation. In addition, even if the COVID-19 situation is not reflected, there is no difference in that the data used in this study reflect the patterns of people's participation in sports. Therefore, this study can be meaningful itself and may be supplemented by analyzing the changing participation patterns after COVID-19.

Second, this study set participation in sports and the frequency of participation in sports as two dependent variables. This was because it was expected that there would be a remarkable difference between the two variables. However, in the actual research results, no noticeable difference was found in the relationship between those dependent variables. For that reason,

first of all, the problem of the measurement method can be considered. According to the National Sports Survey, the standard of 'participation in sports is set somewhat differently from the usual definition of participation – non–participation. That is, the term 'participation' encompasses "participation less than three times a month" besides "not participating at all." Accordingly, the nature and direction of the two dependent variables are similar, and therefore, it can be assumed that no significant difference was found. Alternatively, there is a possibility that the independent variable was not strong enough to influence participation and frequency differently.

For any reason, the analysis of the two dependent variables in this study did not show a significant difference, unlike initial expectations. Therefore, in future studies, it would be adequate to conduct an analysis focusing more on the frequency of participation or to conduct an analysis by setting other independent variables that can bring a meaningful difference.

Third, the daily sports participation analyzed in this study did not classify participating events, and only regular participation was targeted. However, in sports, the pattern and frequency of participation can vary greatly depending on the event participating. For example, when deciding to participate in sports, it can also be crucial whether the facilities of the preferred sport exist within a short distance. In addition, in the case of irregular participation in sports activities less than once a week, it is also necessary to analyze the factors that affect it. Therefore, a design that considers the scope of participation excluded from this study will be significant in future studies.

Fourth, in the case of the independent variable of the 'environmental' factor, two out of four obtained results in a different direction from the hypotheses. There could be several reasons. First, statistics on the status of cities and provinces were used to

process the environmental factor variables statistically. In other words, since the regional scope is vast, even samples living in the same metropolitan local government do not share the same sports facilities nearby. Therefore, it could be possible that the relationship between the participation pattern of each sample in sports and the local infrastructure was inconsistent. Second, there could be some initial factors that may affect participation in sports regardless of environmental things from this study. However, this study could not consider that regional specialty. Third, the existence of a specific infrastructure affects participation in daily sports over a time difference after opening. However, this study was conducted without considering the time difference.

Nevertheless, this study is meaningful because it was confirmed that the local sports infrastructure affected residents' participation in sports. After that, a more real influence relationship can be analyzed by reducing the scope of the area, reflecting the time difference of policy effects, and panel analysis.

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# Appendix A

## Interaction Effect Analysis
## (Dependent Variable : Participation)

This paper further analyzes whether independent variables interacted with region and year. Only statistically significant results are described below.

### 1. Individual Factor Independent Variable – Region

The statistically significant effects of the five individual independent variables and regional interaction effects on participation in sports are shown in <table A1> below.

<Table A1> Interaction effect of individual factors and region

| | Cognition about physical fitness effect of sports | Awareness of physical fitness condition | Physical fitness program experience | Sports club joining experience | Sports program experience |
|---|---|---|---|---|---|
| Coef. (Factor *region) | Ulsan | Gwangju | Gyeonggi | Daegu | Gwangju |
| | 0.476 | −0.230 | 0.895 | −0.851 | 1.278 |
| | (2.61)** | (2.98)** | (2.79)** | (3.00)** | (2.79)** |
| | | Jeonbuk | Jeonnam | Gangwon | Chungbuk |
| | | −0.228 | −0.904 | 0.894 | 0.645 |
| | | (3.17)** | (2.48)* | (3.51)** | (2.54)* |
| | | Jeonnam | | | |
| | | −0.175 | | | |
| | | (2.47)* | | | |
| | | Gyeongnam | | | |
| | | 0.146 | | | |
| | | (2.19)* | | | |

* $p<0.05$; ** $p<0.01$

### 2. Environmental Factor Independent Variable – Region

The statistically significant effects of the four environmental independent variables and regional interaction effects on participation in sports are shown in <table A2> below.

<Table A2> Interaction effect of environmental factors and region

| | Public sports facilities | Private sports facilities | Public sports club | certified sports leaders |
|---|---|---|---|---|
| Coef. (Factor *region) | Busan 7.864 (4.59)** | Busan −5.148 (3.53)** | Busan 0.141 (4.41)** | Daejeon −8.982 (2.15)* |
| | Daegu 9.525 (5.04)** | Daegu 2.009 (2.27)* | Daegu 0.218 (4.09)** | Ulsan 18.815 (4.92)** |
| | Gwangju 8.880 (4.76)** | Daejeon −8.201 (4.35)** | Gwangju 0.233 (6.50)** | Gangwon −16.129 (2.98)** |
| | Ulsan 11.809 (5.99)** | Ulsan −3.270 (3.33)** | Ulsan 0.345 (4.60)** | Jeonbuk 5.076 (2.34)* |
| | Sejong 6.962 (3.34)** | Sejong −2.734 (3.07)** | Chungbuk 0.227 (2.11)* | |
| | Gyeonggi 6.485 (3.62)** | Jeonnam 3.251 (2.09)* | Chungnam 0.231 (2.64)** | |
| | Gangwon 5.640 (3.06)** | Gyeongnam 4.602 (2.96)** | Jeonbuk 0.145 (4.51)** | |
| | Chungbuk 7.590 (3.97)** | Jeju 10.856 (4.26)** | Jeonnam 0.229 (6.32)** | |
| | Chungnam 7.628 (3.95)** | | Gyeongbuk 0.277 (6.74)** | |
| | Jeonbuk 7.139 (3.93)** | | Gyeongnam 0.152 (4.39)** | |
| | Jeonnam 9.068 (4.76)** | | Jeju 0.518 (3.44)** | |
| | Gyeongbuk 9.184 (4.87)** | | | |
| | Gyeongnam 8.461 (4.65)** | | | |

| | |
|---|---|
| | Jeju |
| | 8.435 |
| | (4.24)** |

* $p<0.05$; ** $p<0.01$

### 3. Individual Factor Independent Variable – Year

The statistically significant effects of the five individual independent variables and year interaction effects on participation in sports are shown in <table A3> below.

<Table A3> Interaction effect of Individual factors and year

| | Cognition about physical fitness effect of sports | Awareness of physical fitness condition | Physical fitness program experience | Sports club joining experience | Sports program experience |
|---|---|---|---|---|---|
| Coef. (Factor *year) | | 2015 | 2015 | 2015 | 2016 |
| | | −0.174 | 0.575 | −1.190 | 0.534 |
| | | (2.56)* | (2.06)* | (7.66)** | (4.85)** |
| | | 2016 | 2017 | 2016 | 2017 |
| | | −0.429 | 0.568 | 0.644 | 0.381 |
| | | (7.75)** | (2.93)** | (4.64)** | (3.88)** |
| | | 2017 | 2018 | 2017 | |
| | | 0.388 | 0.637 | 0.315 | |
| | | (7.02)** | (3.37)** | (2.29)* | |
| | | 2018 | | | |
| | | 0.334 | | | |
| | | (6.58)** | | | |
| | | 2019 | | | |
| | | 0.368 | | | |
| | | (6.58)** | | | |

* $p<0.05$; ** $p<0.01$

### 4. Environmental Factor Independent Variable – Year

The statistically significant effects of the four environmental independent variables and year interaction effects on participation in sports are shown in <table A4> below.

<Table A4> Interaction effect of environmental factors and year

| | Public sports facilities | Private sports facilities | Public sports club | certified sports leaders |
|---|---|---|---|---|
| Coef. (Factor *year) | 2016 | 2016 | 2015 | 2016 |
| | 0.125 | 0.121 | −0.201 | 0.175 |
| | (2.21)* | (2.39)* | (3.81)** | (2.47)* |
| | | 2018 | 2016 | |
| | | −0.216 | −0.173 | |
| | | (3.94)** | (4.11)** | |
| | | 2019 | | |
| | | −0.135 | | |
| | | (2.35)* | | |

* $p<0.05$; ** $p<0.01$

# Appendix B

## Interaction Effect Analysis
## (Dependent Variable : Frequency of Participation)

This paper further analyzes whether independent variables interacted with region and year. Only statistically significant results are described below.

### 1. Individual Factor Independent Variable – Region

The statistically significant effects of the five individual independent variables and regional interaction effects on frequency of participation in sports are shown in <table B1> below.

<Table B1> Interaction effect of individual factors and region

| | Cognition about physical fitness effect of sports | Awareness of physical fitness condition | Physical fitness program experience | Sports club joining experience | Sports program experience |
|---|---|---|---|---|---|
| Coef. (Factor *region) | Daegu | Gangwon | Daegu | Seoul | Chungbuk |
| | −0.447 | 0.137 | −0.906 | −0.449 | 0.440 |
| | (2.96)** | (1.99)* | (3.39)** | (2.61)** | (2.32)* |
| | Incheon | Gyeonnam | Jeonnam | Busan | |
| | −0.423 | 0.294 | −0.736 | −0.453 | |
| | (2.86)** | (4.79)** | (2.70)* | (2.29)* | |
| | Gwangju | Jeju | Gyeongbuk | Daegu | |
| | −0.562 | 0.248 | −0.714 | −1.076 | |
| | (3.34)** | (3.08)* | (2.53)* | (5.00)** | |
| | Daejeon | | | Gwangju | |
| | −0.529 | | | −0.793 | |
| | (3.34)** | | | (3.34)** | |
| | Sejong | | | Daejeon | |
| | −0.729 | | | −0.628 | |
| | (3.66)** | | | (3.14)** | |
| | Gyeonggi | | | Ulsan | |
| | −0.484 | | | −0.515 | |
| | (3.57)** | | | (2.21)* | |
| | Chungnam | | | Gyeonggi | |
| | −0.473 | | | −0.478 | |

| | | | |
|---|---|---|---|
| | (3.11)** | | (2.81)** |
| | Jeonbuk | | Chungbuk |
| | −0.669 | | −0.427 |
| | (4.10)** | | (2.08)* |
| | Jeonnam | | Chungnam |
| | −0.600 | | −0.438 |
| | (3.90)** | | (2.26)* |
| | Gyeonnam | | Jeonbuk |
| | −0.500 | | −0.258 |
| | (3.32)** | | (1.98)* |
| | | | Jeonnam |
| | | | −0.972 |
| | | | (4.54)** |
| | | | Gyeonbuk |
| | | | −0.405 |
| | | | (1.97)* |

* $p<0.05$; ** $p<0.01$

## 2. Environmental Factor Independent Variable – Region

The statistically significant effects of the four environmental independent variables and regional interaction effects on frequency of participation in sports are shown in <table B2> below.

<Table B2> Interaction effect of environmental factors and region

| | Public sports facilities | Private sports facilities | Public sports club | certified sports leaders |
|---|---|---|---|---|
| Coef. (Factor *region) | Busan | Daejeon | Busan | Daegu |
| | 5.000 | −6.269 | 0.104 | 10.558 |
| | (3.40)** | (3.89)** | (3.64)** | (2.57)* |
| | Daegu | Gangwon | Daegu | Gwangju |
| | 6.600 | −5.235 | 0.163 | 3.943 |
| | (4.13)** | (4.68)** | (3.95)** | (2.18)* |
| | Gwangju | Chungbuk | Incheon | Daejeon |
| | 7.221 | −2.080 | −0.136 | −7.957 |
| | (4.55)** | (2.21)* | (2.33)** | (2.00)* |
| | Ulsan | Gyeongnam | Gwangju | Ulsan |
| | 6.984 | 7.259 | 0.216 | 11.514 |
| | (4.06)** | (4.92)** | (6.80)** | (3.29)** |
| | Sejong | Jeju | Daejeon | Gangwon |
| | 5.757 | 4.378 | −0.248 | −32.239 |

| | | | |
|---|---|---|---|
| (3.25)** | (2.17)* | (2.26)* | (6.33)** |
| Gyeonggi | | Chungbuk | Jeonbuk |
| 4.873 | | 0.205 | 4.977 |
| (3.18)** | | (2.06)* | (2.58)** |
| Gangwon | | Chungnam | Gyeongnam |
| 3.177 | | 0.211 | −3.752 |
| (2.02)** | | (3.06)** | (2.10)* |
| Chungbuk | | Jeonbuk | |
| 5.635 | | 0.110 | |
| (3.45)** | | (3.86)** | |
| Chungnam | | Jeonnam | |
| 5.651 | | 0.156 | |
| (3.45)** | | (4.90)** | |
| Jeonbuk | | Gyeongbuk | |
| 4.172 | | 0.235 | |
| (2.67)** | | 6.49)** | |
| Jeonnam | | Gyeongnam | |
| 6.408 | | 0.072 | |
| (3.93)** | | (2.35)** | |
| Gyeongbuk | | Jeju | |
| 7.069 | | 0.339 | |
| (4.39)** | | (2.42)* | |
| Gyeongnam | | | |
| 5.507 | | | |
| (3.55)** | | | |
| Jeju | | | |
| 6.194 | | | |
| (3.65)** | | | |

* $p$<0.05; ** $p$<0.01

### 3. Individual Factor Independent Variable – Year

The statistically significant effects of the five individual independent variables and year interaction effects on frequency of participation in sports are shown in <table B3> below.

<Table B3> Interaction effect of Individual factors and year

| | Cognition about physical fitness effect of sports | Awareness of physical fitness condition | Physical fitness program experience | Sports club joining experience | Sports program experience |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Coef. (Factor *year) | 2015 | 2016 | 2016 | 2015 | 2015 |
| | −0.221 | 0.570 | 0.509 | −0.687 | −0.427 |
| | (2.89)** | (12.31)* | (4.17)** | (6.35)** | (5.17)** |
| | 2016 | 2017 | 2017 | 2016 | 2016 |
| | 0.192 | 0.527 | 0.567 | 0.583 | 0.601 |
| | (2.72)** | (12.31)** | (4.74)** | (6.13)** | (7.63)** |
| | | 2018 | 2018 | 2017 | 2017 |
| | | 0.439 | 0.357 | 0.399 | 0.721 |
| | | (9.13)** | (3.20)** | (4.16)** | (9.72)** |
| | | 2019 | | | 2018 |
| | | 0.494 | | | 0.259 |
| | | (10.66)** | | | (3.51)** |

* $p<0.05$; ** $p<0.01$

## 4. Environmental Factor Independent Variable – Year

The statistically significant effects of the four environmental independent variables and regional interaction effects on frequency of participation in sports are shown in <table B4> below.

<Table B4> Interaction effect of environmental factors and year

| | Public sports facilities | Private sports facilities | Public sports club | certified sports leaders |
|---|---|---|---|---|
| Coef. (Factor *year) | 2016 | 2016 | 2015 | 2016 |
| | 0.124 | 0.193 | −0.176 | 0.155 |
| | (2.69)** | (4.68)** | (4.36)** | (2.69)** |
| | | | 2016 | |
| | | | −0.146 | |
| | | | (4.11)** | |
| | | | 2019 | |
| | | | −0.089 | |
| | | | (2.81)** | |

* $p<0.05$; ** $p<0.01$

# Abstract in Korean

생활체육은 고령화 사회 건강수명 증진, 삶의 질 증진, 여가 생활의 만족도 제고 등에 긍정적인 역할을 한다. 이에 따라 생활체육은 적극적이고 능동적인 스포츠 복지의 개념으로 해석되기도 한다. 정부와 지자체에서는 많은 예산을 투입하고 다양한 정책을 시행해 왔다. 이에 따라 국민들의 생활체육 참여율 역시 지속적으로 증가해왔다. 그러나 그간 실행해 온 정책들은 실증적인 분석에 기반한 것이기 보다는 당위적 수요에 기반했던 것이 사실이다. 향후에도 확대될 것으로 예상되는 생활체육 정책의 효과성 제고를 위해 체육 참여에 영향을 미치는 다양한 요인들을 연구해보고자 하였다.

‘생활체육’이란 건강과 체력 증진을 위하여 행하는 자발적이고 일상적인 체육 활동을 의미한다. ‘규칙적으로 생활체육에 참여’한다는 것은 문화체육관광부의 기준에 따르면 ‘최근 1년간 주1회 이상, 1회 운동시 30분 이상 규칙적으로 체육활동에 참여’하는 것을 의미한다.

이론 및 선행연구에 대한 분석을 토대로 연구 모형과 가설을 설정하였다. 종속변수로는 생활체육 참여 여부 및 참여 빈도를 정하였다. 독립변수는 개인 요인과 환경 요인으로 크게 나누었다. 구체적으로는 개인의 심리적 요인(체육의 체력증진 효과 인지, 본인의 체력상태 인지), 개인의 경험 요인(체력관리프로그램 경험, 동호회 경험, 체육프로그램 경험), 환경 요인(공공체육시설, 민간체육시설, 공공스포츠클럽, 생활체육지도자의 수)을 포함한다. 상기 독립변수들이 종속변수에 정(+)의 영향을 미칠 것이라고 가설을 세웠으며, 이후 로지스틱 회귀분석 및 회귀분석을 실시하였다.

그 결과 개인 요인인 심리적 인지와 경험은 생활체육 참여 여부와 빈도에 모두 통계적으로 유의한 정(+)의 영향을 미치는 것으로 나타났다. 즉, 체력 증진의 가장 중요한 요소로 생활체육 참여를 인지하고, 본인의 체력상태가 좋다고 인지하며, 체력관리프로그램/동호회/체육프로그램 경험이 있을수록 생활체육 참여 확률이 높고 참여 빈도가 높을 확률이 크다고 분석되었다. 이는 연도와 지역을 통제하여 분석하였을 때도 동일한 결과로 나타났다. 반면, 환경 요인에서는 민간체육시설 및 공공스포츠클럽 수 만이 생활체육 참여 및 빈도에 모두 통계적으로 유의한 정(+)의 영향을 미치는 것으로 나타났다. 즉, 거주 지역에 민간체육시설 및 공공스포츠클럽이 많을수록 생활체육에 참여할 확률과 자주 참여할 확률이 높다고 나타났다. 하지만, 공공체육시설 및 생활체육지도자의 수는 참여 여부 및 빈도에 통계적으로

유의한 정(+)의 영향을 미치는 것으로 나타나지 않았다.

일부 요인은 예상대로 생활체육 참여에 긍정적인 영향을 미치는 것으로 나타났는 바, 이를 좀 더 활성화할 수 있는 정책의 확대가 필요할 것이다. 특히, 특정 변수와 지역 및 연도가 상호작용효과를 발생하여 참여 확대에 긍정적인 영향을 끼치는 경우들이 있는 것으로 나타났다. 따라서, 이러한 경우를 살펴 해당 지역에서의 동 정책을 더욱 활성화할 필요가 있다.

다만, 공공체육시설 및 생활체육지도자 정책의 경우 정(+)의 효과가 나타나지 않았는데, 이는 특정 지역, 연도 및 표본을 대상으로 한 연구 결과이므로 정책 현장에서의 예측 결과와는 차이가 있을 수 있다. 생활체육 인프라 개소 수를 정할 때 광역 자치단체 단위로 설정하여 표본과의 근접성이 떨어졌던 점 또한 하나의 원인이 될 수 있다. 또한, 공공체육시설 등 공공시설 설치 지역을 정할 때 공익적 목적이 작용하였으므로, 애초부터 체육참여의 수요가 크지 않을 가능성이 존재하기도 했다. 그럼에도 불구하고 공공체육시설 및 생활체육지도자의 단순 양적 증대가 참여 확대에 긍정적인 영향을 미치지 않을 수 있음을 확인하였으므로, 운영 개선을 위한 노력도 필요할 것이다. 또한, 정책 현장에서의 예측은 성별, 소득, 연령 등 개인적 요인, 지역, 연도 등 다양한 요인이 고려되는 연구 분석 결과와 달라질 수 있다. 따라서 정책 현장에서도 실증적인 분석을 보완해야 할 것임을 알 수 있었다.

한편, 본 연구는 데이터의 연속성 등을 위해 코로나19 이전의 시기에 한정하였는 바 코로나19로 인한 참여 변화 양상을 반영하지 못한 한계를 가진다. 또한, 비규칙적 생활체육 참여 및 종목에 따른 참여 양상의 차이 또한 이후 연구의 분석 대상이 될 수 있다. 또한, 환경 요인에 대한 분석에 있어 지역 범위가 지나치게 넓었다는 점, 해당 지역의 기존 인프라를 고려하지 못했다는 점, 시간 차를 반영하지 못했다는 점 등이 한계로 여겨진다.

그럼에도 불구하고, 동 연구는 개인 및 환경 요인을 아울러 생활체육 참여에 영향을 미치는 요인들을 포괄적으로 분석하였다는 데 의의가 있으며, 향후 관련 정책 수립에 도움이 될 것이라 사료된다.

**키워드:** 생활체육, 생활체육 참여 영향 요인, 생활체육 참여 빈도 영향 요인, 개인 및 환경적 요인, 국민생활체육조사, 공공체육시설, 생활체육프로그램

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