

Study on Smart Health Management Strategy in Shenzhen from the Perspective of National Fitness

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Abstract. According to the National Fitness Plan (2021-2025) issued by the State Council, China's national fitness development has more clear guidance and strategies. Since the outbreak of the novel coronavirus, the level of health awareness in Shenzhen has entered a new height, and the diversified demand for sports is also rising, especially the change of community sports. Nowadays, as people's pace of life continues to accelerate and social competition intensifies, sub-health problems are gradually increasing, and presents the characteristics of young age, which poses a challenge to smart health management. This paper uses the questionnaire method to analyze the time management and fitness intention of the people who have time to exercise and the sub-healthy people who have no time to exercise. The research shows that building smart fitness platform, carrying out interesting community sports activities, and promoting multi-party coordination strategies play important role in promoting and improving the health status of the sports population, enhance the willingness of sub-health people to exercise, and drive the level of relevant smart health management, thus forming a virtuous circle in the development of national fitness.

Key words: National fitness; wisdom and health; management strategy

1 Introduction

In July 2021, The State Council issued the National Fitness Plan (2021-2025), which provides clear goals and guiding ideology for the development of national fitness in the new five-year plan, elevating the national fitness plan to a new national strategic goal, and the proportion of people who maintain fitness activities in the medium and long term has reached 37.2%. The national fitness movement is developing gradually, and sports have obvious anti-aging and anti-degeneration effects on body function in daily life. The emergence of fitness is one of the most valuable games in popular life with "exercise" and "competition" enhancing physical function and biological strength ^[1].

As the vanguard of the development of the national fitness industry, the Shenzhen Municipal People's Government issued the work measures of the Implementation Plan for Building a National Sports Consumption Pilot City in Shenzhen in September 2021, and clearly stated that it should lead national fitness activities, publicize the concept of national fitness, and innovate the form of national fitness activities. It has a promoting effect on medical and health for

participating in physical exercise can prevent a variety of diseases, improve physical fitness and immunity, reduce psychological stress and anxiety.

According to the "Healthy China 2030" pointed out that China's current "sub-health population" has more than 700 million, and the number is still expanding, sub-health is the latent stage of diseases. For people who have not joined in sports due to time fragmentation, inconvenient venues and other factors, the non-utilitarian, autonomous and proactive characteristics of physical fitness just meet these problems. Smart health management is the embodiment of modern lifestyle and healthy life concept which will help people achieve a healthy and happy life and promote social and economic development and progress.

2 Literature Review

The term "national fitness" is defined in Baidu Encyclopedia as: national fitness refers to the people of the whole country, regardless of men and women, old and young, all the people to enhance strength, flexibility, increase endurance, improve coordination, and control the ability of all parts of the body, so that the people are physically strong. The aim is to comprehensively improve the national physical fitness and health level, with the focus on teenagers and children, advocating that the whole people participate in physical fitness activities more than once a day, learn two or more fitness methods, such as insisting on fitness and running, and recommend that physical fitness tests be conducted once a year. In general, national fitness is to make fitness a part of people's lives, so that the people can truly enjoy the health and happiness brought by sports, and let sports play a more positive role in the all-round development of people and the construction of a harmonious society.

With the continuous advancement of society, the material life has been gradually improved which has affected the health of the public, and the state of "sub-health" has entered the life of the public. The term sub-health is defined in the 360 Encyclopedia network as: the human body is always in a state between health and disease. Usually, people in sub-health will not have a pathological self-perception, which is manifested by the individual's weakened exercise ability, low personality, memory loss, and even mild depression, leading to mental tension, psychological pressure, long-term bad mood, lack of exercise, insomnia, and other problems.

In recent years, with the improvement of national living standards and the arrival of an aging population, the public has an increasing demand for health such as fitness, medical treatment, and old-age care. According to Liao (2023), the objects of national fitness usually include healthy people and sub-healthy people, and health can be achieved through exercise and fitness. The object of medical treatment to promote health usually includes sick people and elderly people, and health is guaranteed through medical intervention. Therefore, the national fitness belongs to the front-end health intervention work, mainly sports. Medical treatment to promote health belongs to the back-end medical intervention work, mainly health care ^[2]. Yu and Chen (2019) believe that in the setting and implementation of policies, it is necessary to focus on how to guide the public from home to sports and should not simply enhance the enthusiasm for sports while ignoring the base of sports population ^[3]. Meanwhile, multiple disease threats lead to a variety of health factors interwoven complex situation. Through many studies and practice proved that lack of exercise has become an important reason for the occurrence of a variety of chronic diseases. Chang (2021) proposes that adequate physical activity and regular exercise

can not only prevent a variety of chronic non-communicable diseases such as cardiovascular disease, diabetes, and obesity, but also help improve mental health, prevent Alzheimer's disease, promote bone health, and improve life quality and fulfillment ^[4].

Due to the increasing demand of the public for sports, Zhao (2020) points out that the basic policy of the national fitness strategy is mainly to improve the physical quality of the people from the four aspects of "want to exercise", "where to exercise", and "can exercise". The government and relevant departments call on the public to join the ranks of national fitness. While vigorously building sports equipment and facilities, the concept of scientific fitness is promoted, and rich and interesting sports activities are innovative carried out to promote the development of sports and related industries ^[5]. Ye (2021) stresses the need to accelerate the development of the sports industry, form a "combination of sports and tourism" and "combination of sports and medicine", and integrate with the operation of various sports venues into an industrial cluster^[6]. Wang et al. (2014) point out that the urgent problems include the national fitness driving mechanism construction, national fitness supervision mechanism, financing mechanism development, management system innovation, volunteer team construction, and the formulation of detailed tax preferential policies^[7].

Morvin and Baker (2009) refer that the U.S. government encourages young people, especially those who do not join in competitive sports to participate in non-competitive recreational sports ^[8]. Chae and Kim (2009) regard that South Korea launches the "7330" sports campaign under the slogan "exercise for more than 30 minutes a day, three times a week" to develop and promote all kinds of life sports by expanding policy support, including increased activity budgets ^[9]. Joanna et al. (2022) agree with that increasing physical activity in Poland is associated with increased self-confidence among adolescents and a lower risk of obesity and cardiovascular and metabolic diseases ^[10]. Zhai (2023) believes it necessary to promote the extensive development of national fitness, combine physical exercise, sports rehabilitation with clinical medical treatment and disease prevention and control, effectively improve people's physical fitness, provide "exercise prescriptions" for the prevention and treatment of sub-health, improve the overall health level of the people, and promote the phased breakthrough of "healthy China"^[11]. Xu and Liu (2012) carefully propose specific intervention programs for mental sub-health caused by various reasons in the experimental study of mental sub-health exercise prescription ^[12].

To sum up, Smart health management can use the Internet, cloud computing, artificial intelligence, and other high-tech means to carry out a full range of data collection, information analysis, personalized services, and health management for people's healthy life. Through smart health management, people can understand their health status and risks, detect, and prevent diseases in time, carry out scientific health management and form healthy habits. From the perspective of national fitness, this paper analyzes problems and puts forward strategies for smart health management.

3 Research Methods and Analyses

With the increasing enthusiasm for sports and fitness in Shenzhen, the demand for sports and fitness services and sports space is also growing in promoting healthy China action from focusing on the "treatment of disease" to focusing on the "prevention of disease", sub-health

issues need to be paid attention to. Leading the national fitness is not only to make the people who have time to exercise healthier, but also to let the "sub-health" people who have no time to exercise invest in community sports.

3.1 Data Collection

To obtain first-hand information, 472 questionnaires have been randomly distributed online and offline within one week from February 22, 2022, and 448 questionnaires have been collected with an effective rate of 95%. The factors affecting the motivation of national fitness such as time management and fitness willingness of the people who have time to exercise and the "sub-health" people who have no time to exercise being collected and analyzed with smart health management strategies for national fitness has been proposed.

In the questionnaire, 55.36% are male and 44.64% are female. Through the analysis of the proportion of age groups in the data collected by the questionnaire, the post-00s are 10.94%, post-90s 28.35%, post-80s 43.08% and post-70s 17.63%. The main work force in various industries in the current society is the people in the 80s and 90s, and the post-00s account for a relatively small proportion, or due to factors such as incomplete study. The whole age group has not yet entered the society, so the data collected is less. The post-70s population is in the second echelon of the main body of urban work. The urban population in Shenzhen tends to be younger.

Through the analysis of income share data, The number of people with monthly income below 8000 is 10.49%, 8000 and 15000 is 47.10%, 15000 and 20000 is 31.03%, 20000 and 30000 is 10.49%, and above 30000 is only 0.89%. In the urban consumption of Shenzhen, the overall income level is high, the consumption ability is strong, and there is a certain amount of capital reserve after consumption. Combined with the analysis of the young segment of the main working group in the society, the main body of urban consumption is also the young group in the 80s and 90s.

From the educational data, 3.13% of the population are below high school, 20.09% are junior college, 46.87% are undergraduate, 29.91% are graduate or above, reflecting the overall high cultural literacy of Shenzhen, and people have good learning ability and adaptability to various emerging things, which helps to improve the city's competition level.

The data of day off are also part of the analysis, among which 8.48% of the people who have less than one day of rest per week, 51.34% have one day of rest per week, 35.27% have two days of rest per week, and 4.91% of the people who have more than two days of rest. Most people can basically maintain one day of vacation per week and have free time to relax after work.

To sum up, it can be seen from the data of the population characteristics of the questionnaire that the social population tends to be younger as a whole and has a certain level of cultural literacy. While maintaining a certain income, it also supports the main group of consumers, and the arrangement of weekly rest days has become what people aspire to.

3.2 Data Analysis

3.2.1 Fitness Methods Favored by People Who "Have Time to Exercise"

3.2.1.1 Fitness Frequency

Nowadays, the scale of China's sports and fitness industry continues to grow. Through the questionnaire of "How often do you exercise?", it is found that 57.14% participate in fitness only once a week, 35.72% exercise two to three times a week, and 7.14% do more than three times a week as Figure 1 shown. Since ignoring various sports factors, for office workers, as long as they take out a little time to exercise and fitness on the weekend, they can complete their own sports indicators, and there are certain benefits for themselves.

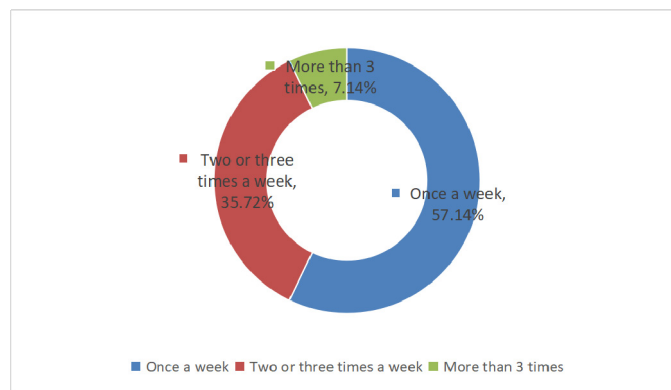


Figure 1. Fitness frequency of the survey population (Owner-drawing)

Among the 448 questionnaires, 168 have time to participate in fitness in a week, among which, most of the people who have time to exercise choose to participate in fitness for body management, relieve pressure and enhance physical fitness, and a small part of them choose to improve sports competitiveness as Figure 2 shown.

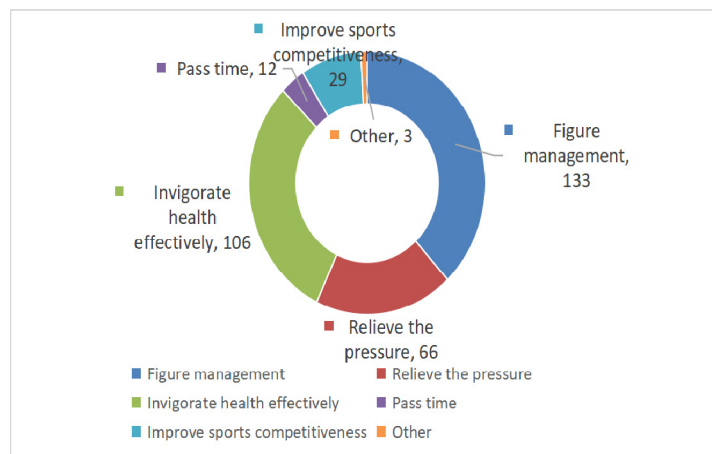


Figure 2. Fitness purpose of the survey population (Owner-drawing)

According to the questionnaire, 66.67% of people who have time to exercise join the ranks of fitness through spontaneous health awareness and body management, 63.69% are driven by relatives and friends, and 23.21% are from the publicity of the club as Figure 3 shown. Firm belief is the internal driving force for action, and when there is a peer incentive, the persistence time will increase.

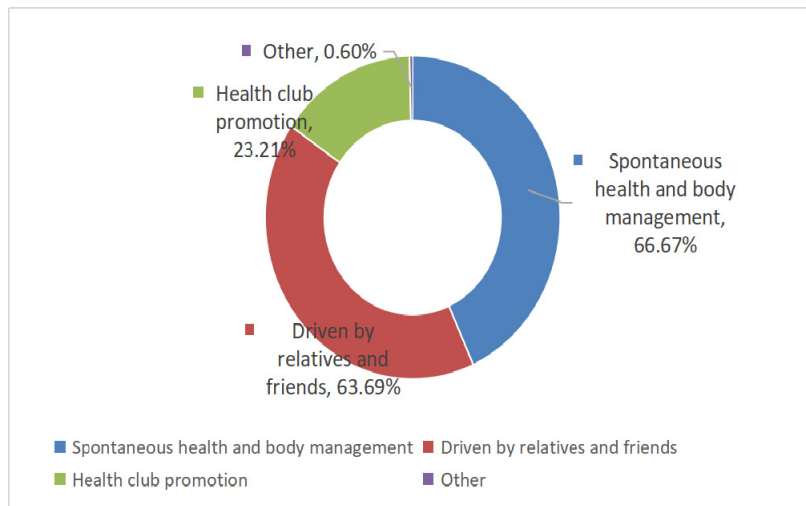


Figure 3. Fitness ranks of the survey population (Owner-drawing)

3.2.1.2 Fitness Activities

Treadmill exercise accounting for 67.5% ranks the first place, followed by the lively and enthusiastic group gymnastics class accounting for 63.13%, 39.38% choose to practice in the equipment area, and the swimming project accounting for 31.25% as Figure 4 shown. The people in the gym not only have a certain understanding of fitness, but also have direction for targeted exercises.

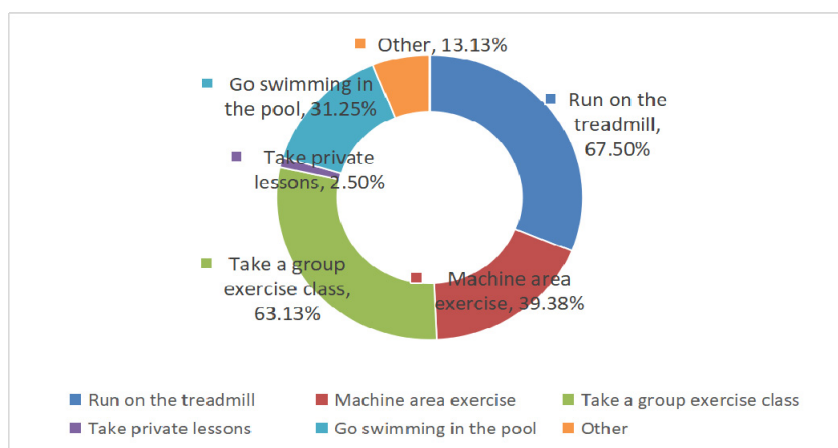


Figure 4. Survey of the gym activities of the population (Owner-drawing)

3.2.1.3 Fitness Methods

In addition to enthusiastic group exercise classes and self-training methods with a certain direction, only 10% of the people who "have time to exercise" choose more targeted one-to-one private training courses as Figure 5 shown. Most of the people who choose gyms are sensitive to price and do not have a strong willingness to choose private training. And they are more inclined to pay the basic fee to enjoy the complete equipment and positive team exercise atmosphere of the gym.

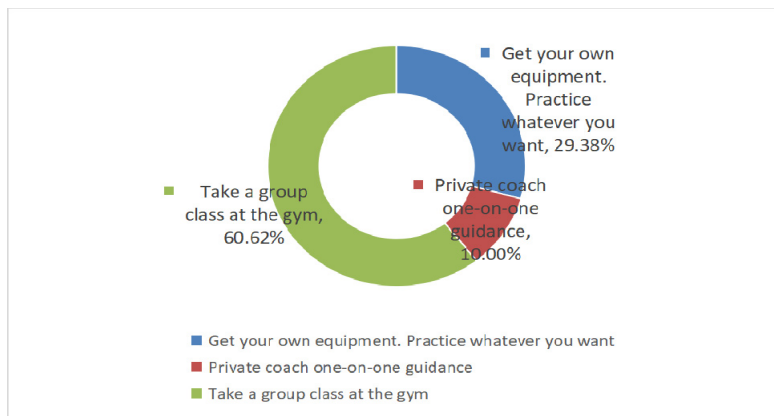


Figure 5. Survey of people's fitness styles (Owner-drawing)

3.2.1.4 Fitness Requirements

In view of the increasing requirements of people for sports, 37.50% of the people in the sample have high requirements for the fitness environment and comfort, and 33.75% of the people choose the professional guidance of excellent coaches. Among them, 12.5% of people choose a private customized plan for a more professional and scientific gym. About 10% of people who have a certain in-depth understanding of fitness focus on professional equipment, and the remaining 6.25% of people fall on the exciting price as Figure 6 shown.

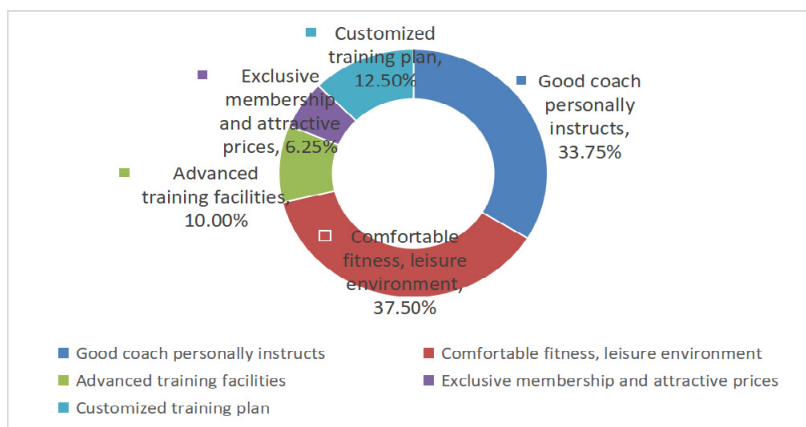


Figure 6. The fitness needs of the population (Owner-drawing)

According to the questionnaire data, 71.88% of the population needs fitness guidance in the process of fitness as Figure 7 shown, and it is inevitable that there will be movement bottlenecks in the process of fitness. Meanwhile, scientific, and professional movement guidance is particularly important for sports enthusiasts who want to keep more efficient.

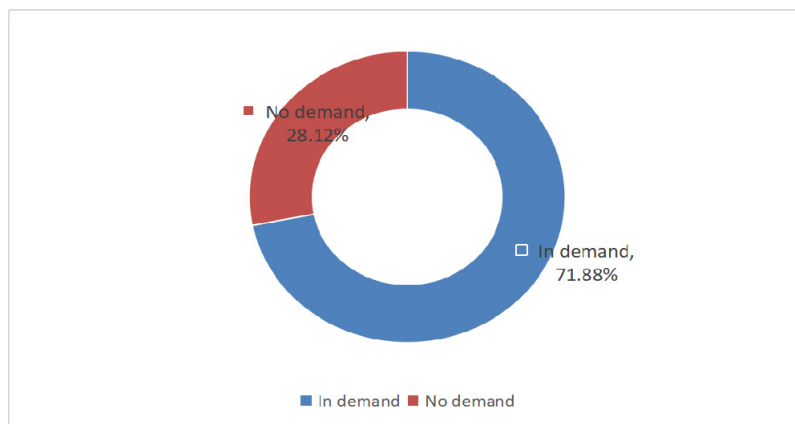


Figure 7. The fitness guidance needs of the population (Owner-drawing)

In terms of course classification, 77.50% of people want to follow small classes, 22.50% prefer private teaching as Figure 8 shown, and different groups have different course contents. The sense of participation in group classes and the major of private teaching have their own advantages, and the sense of participation in group classes is more popular among people who have time to exercise.

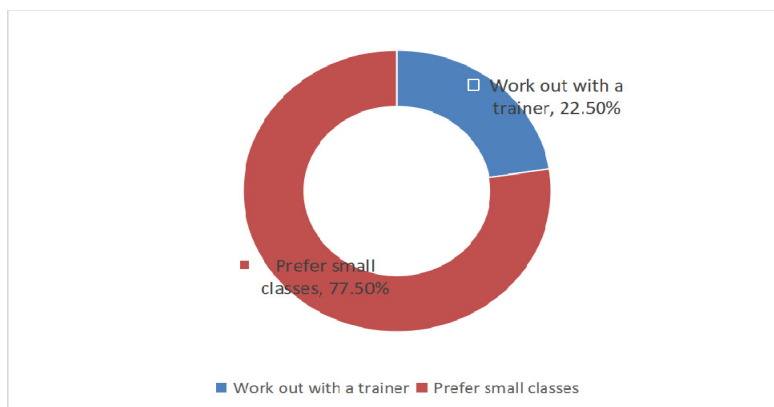


Figure 8. The fitness tendency of regular exercisers (Owner-drawing)

Another set of data can prove this problem, in the people who are just in contact with sports, under the choice of multiple sports, taking group class is as high as 63.13%, the popularity of choosing to follow the fitness video is 54.37%, 26.25% and 11.88% choose to practice equipment and find private education as Figure 9 shown. The enthusiasm and sense of participation of group classes are more popular. Meanwhile, the training effect is no less than that of private training courses.

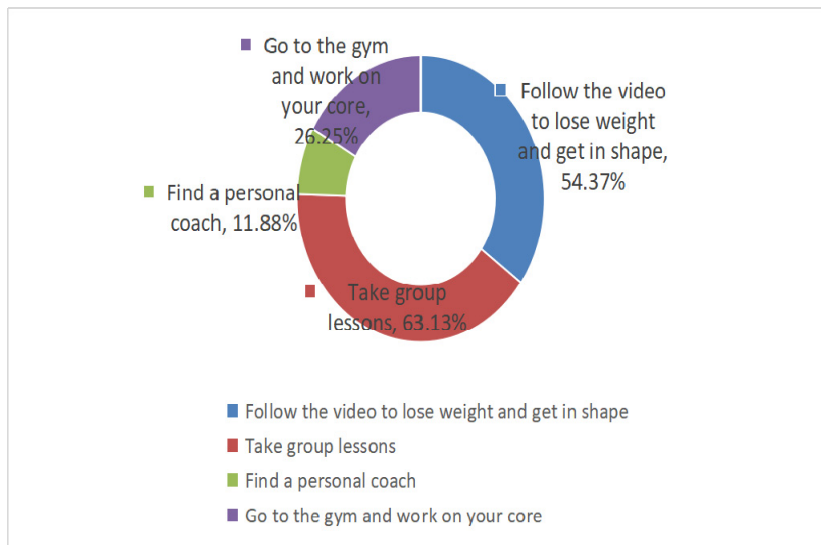


Figure 9. The fitness tendency of the new fitness group (Owner-drawing)

In the data of people who have time to exercise, one-to-one courses are often boring, although the pertinence is better, but the dynamic and warm group atmosphere is often more popular with contemporary sports people. From the level of sports consumption and inner pressure release, group classes have become the first choice. Shenzhen health clubs have played positive role in promoting the national fitness, but most are only limited to those who have time to exercise, how to implement the other part of the "people who have no time to exercise" is ignored.

3.2.2 Leisure Styles of People Who "Have No Time to Exercise"

3.2.2.1 Leisure Activity Tendency

In the intention survey of people who "have no time to exercise", the emphasis of the public on sports is different. 67.01% prefer to take part in sports activities with a leisure attitude, 17.01% hope to take part in sports activities anytime and anywhere. Without venue restrictions, 9.03% want to be able to exercise independently, and 6.95% want to exercise without utilitarian as Figure 10 shown. Most people are more willing to choose a leisure state of mind or a sport without restricted venues, the leisure sport being more suitable for people who do not have a fixed time to exercise.

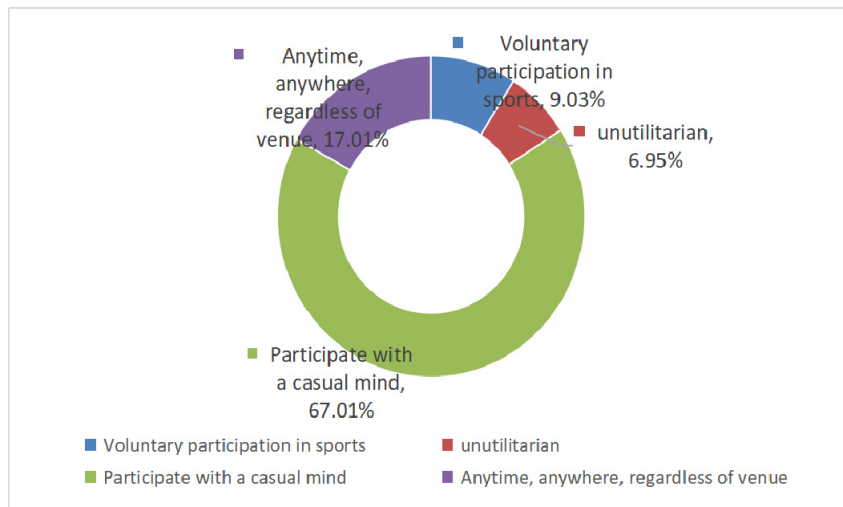


Figure 10. Leisure direction that people focus on (Owner-drawing)

3.2.2.2 Group Activity Tendency

According to the data, people who love sports meet accounts for as high as 70.14%. 23.26% want to participate in group exercise classes, square dancing only accounts for 0.35% due to traditional concepts and lack of fun, and the remaining 6.25 percent look forward to other sports as Figure 11 shown for emerging group gymnastics class has gradually entered people's attention.

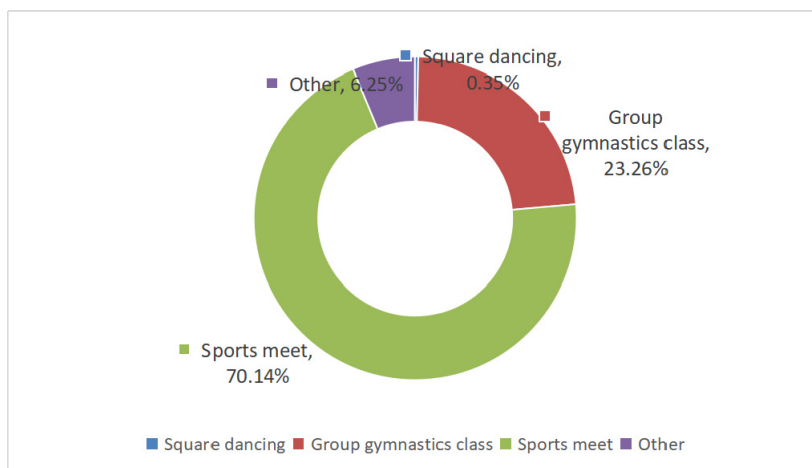


Figure 11. Leisure group sports tendency of the population (Owner-drawing)

In the development of national fitness, how to mobilize the enthusiasm of the public, how to grasp the fragmented time of the public, and how to let the public out of the "fun" exercise, have become the key point to promote the development of national fitness. The high-frequency words in the suggestions and prospects of national fitness have been sorted out,

and most of them are "publicity", "activity", "participation", "age group", "competition", etc., which shows that the publicity of the promotion and development of national fitness is lack of participation in the planning of activities. It is recommended to set up competition activities for different age groups, increase interest and other ways to maintain the public's enthusiasm for national fitness, to usher in more vigorous development.

4 Smart Health Management Strategies

4.1 Build Smart Fitness Platform

With the development of new technologies such as 5G, Internet of Things, artificial intelligence, majority data, and cloud computing, the wisdom of urban public sports service supply is accelerating in an all-round way. The smart fitness platform integrates stadium sports, daily fitness, event registration, sports delivery services, etc. It can generate "health code" according to real-name information, provides the whole process of stadium sports services such as stadium information inquiry, venue online booking, and venue service evaluation. It also provides services such as viewing and registration of national fitness events, querying results after games, downloading photos, issuing certificates, and receiving fitness concessions and subsidies.

The intelligent physical fitness detector in the sports stadium offers scientific program before exercise, and the test includes various movement indicators of the body as height, weight, grip strength, heart rate and balance. The construction of an online "smart fitness platform" can avoid personal injury or equipment damage caused by wrong fitness methods, provide professional sports guidance services, meet the public's demand, and actively promote scientific national fitness.

4.2 Carry Out Fun Community Activities

National fitness development is entering a transition stage from the traditional and single sports content into a new direction of diversification of sports. Young people, the elderly and even children are more inclined to sports around the community with free time, convenient venues, moderate amount of exercise and more interesting. It not only need vivid graphic, video, and interview fitness guidance for the masses in different categories, but also call for professional and fun activities.

The development of community with the support of interesting sports starts from different groups, ages, hobbies, exercise intensity to expand a wealth of sports to maintain the public's enthusiasm for national fitness. Based on leisure sports theory, the construction of fun community sports can gradually enhance the exercise desire of "sub-health" people, increase the vitality, creativity and interest for the cultural publicity and development of national fitness, and increase the base of sports population.

4.3 Promote Multi-Party Coordination

Facts have proved that it is necessary for government and social organizations to promote multi-party interaction and cooperation, develop the leisure sports among sub-health people and seek for national fitness through the sustainable development strategy. The local

government focuses on providing support in policy and funds, and the sports-related associations, communities and social sports enterprises actively participate in the development, maintenance, and innovation.

Based on the theory of leisure sports, the multi-party interaction and cooperation will be promoted to attract the "sub-health" people to the community, improve their sense of sports participation and experience, enhance the coordinated organization and development of sports venues, and make the development of national fitness more well-organized.

5 Conclusion and Prospect

With the rapid development of social economy and the intensification of the aging trend, health issues have become an important topic of global concern. Public health is the fundamental problem, in order to improve the health status of the sports population and the exercise willingness of sub-healthy people, the construction of corresponding smart fitness platform can make reasonable use of fragmented time to carry out more efficient fitness activities, carry out interesting community sports activities and constantly attract people to participate in sports, promote multi-party coordination, and the government takes the lead in focusing on national fitness. In this development, a virtuous cycle is formed.

There are still some shortcomings in terms of research methods as the scientific data collection. The questionnaires are only limited to Shenzhen with certain regional restrictions. Future research should further collect nationwide data and adopt other research methods to obtain more scientific and effective conclusions. As national fitness has been included in the 2030 Healthy China Plan Outline, the study of smart health management strategy will be more compatible with medical services, promote the theoretical, technical, and practical innovation of sports health integration for human health protection and sustainable development.

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